

1926
TRANSACTIONS
OF THE
**National Safety
Council**

FIFTEENTH ANNUAL
SAFETY CONGRESS

**VOLUME I
GENERAL SESSIONS
AND
INDUSTRIAL SECTIONS
(A to F, Inclusive.)**

*Volume II of these Transactions
contains Industrial Sections M to W,
inclusive.*

*Volume III of these Transactions con-
tains the Public Safety and Education
Sessions.*

October 25 to 29, 1926
Hotels Book-Cadillac, Statler, Tuller and Wolverine
DETROIT, MICHIGAN

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NOTE

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

National Safety Council

108 East Ohio Street, Chicago

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National Safety Council

Annual Meeting of Members

Detroit, Michigan

Monday, October 25, 1926

CHARLES B. SCOTT, Chairman
President, The National Safety Council

THE opening session of the Fifteenth Annual Meeting of the National Safety Council convened at 10:15 o'clock at the Book-Cadillac Hotel, Detroit, Michigan, Charles B. Scott, President of the Council, presiding.

PRESIDENT SCOTT: Our deliberations will be opened with prayer by the Rev. Edgar DeWitt Jones, of Detroit.

DR. EDGAR DEWITT JONES: Eternal Father, strong to save, we draw near unto thee that thou mayest draw near unto us. Thine is the love that wilt not let us go. Thy mercy endureth forever. Thy loving kindness, O, how great. Thou art the fount of every blessing, giver of every good and perfect gift.

Almighty God, our Father, we invoke thy blessing upon this important gathering. We pray thee to bless those who are to preside over the various sessions. Inspire those who are to speak and we pray thee to direct those who bear the burden of routine responsibilities. Consecrate the mirth, sanctify the pleasure seeking of our guests, and use mightily, we pray thee, this gathering for the furtherance of the teaching that we are our brother's keeper and that love is the greatest thing in the world.

Our Father, we pray that the sacredness of personality and the value of a single human being may become more apparent as time goes on, that in every-day life we may indicate our interest in all peoples, but especially the aged, the afflicted and the youth, and that our thoughts and our plans may be in consideration of others.

Our Father, we pray thee that the spirit of Him of whom it was said, "a bruised reed He would not break and smoking flax He would not quench," may animate those who lead us in the great industries and in commerce and, whatever our vocations, we may somehow feel the obli-

gations of working together for the conservation of life. Forbid it, our Father, that praise and power and affluence should ever blind our eyes to common justice or dull our ears to the cry of suffering humanity.

Our Father, we bless thee for this high privilege of prayer. Over this shining pathway great hosts of men and women have come unto thee. They came, weak and enfeebled, and thou didst make them strong; they came confessing ignorance and thou didst impart unto them wisdom; they came confessing that their lives were broken by sin and suffering, and thou didst make them whole.

Our Father, we meet with these our brother pilgrims and sojourners and we come unto thee in prayer today, thanking thee for the power of this highway and the wonder of it all. Shine out upon this gathering, O Spirit, and brood over this gathering and lift it and inspire it and direct it mightily. we pray, for human good in thine own glory.

We ask it in the name of Him in whom it pleased thee to reveal in us thy father heart and show us the pathway of power and peace—in His blessed name we ask all. Amen.

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

ANNUAL ADDRESS OF THE PRESIDENT

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

We extend to all of you a most cordial welcome to the Fifteenth Annual Safety Congress. We are delighted to see such a representative assembly of those who have an interest and a part in our cause and our work. The people of Detroit have done everything possible for our convenience and comfort. We thank these people and assure them that all of our members are deeply grateful for their kindness and hospitality. We know what it means to entertain and care for such a convention as the one here assembled. To the mayor of the city and to all the other public officials; to the president and other officers of the Detroit Safety Council and the several local committee chairmen and their associates; to the speakers on our program, to the press and to everyone else who has worked to make this Congress a success, we extend the thanks of the National Safety Congress. Let us arise for a moment, as an expression of our appreciation, so these friends may know we are grateful to them for having spent so much effort, time and money in our behalf. (The audience arose.)

It is with a reasonable measure of pride in the accomplishments of the National Safety Council and with an appreciation of the responsibilities and possibilities for this gathering which must largely determine the future work of our organization, that we begin these sessions.

The administrative year, of which this Congress marks the close, has not been characterized by spectacular achievements, but has been marked by steady progress of the national safety movement, of which this organization is the recognized leader. The purposes which prompted the

creation of this Council, the advance it has made and is to make hereafter in the accomplishment of these purposes, can never be justly judged by any momentary success with some specific phase of accident prevention, but can be measured by the active interest shown by both the public and industry in their determination to prevent that needless waste of life and man power which has so long characterized us as a nation.

Progress in industrial development is indeed essential to our advancement, but this progress must not be made at the cost of the waste of lives and limbs it was designed to benefit. This country can not afford even such commendable progress as it is now making without due regard for human life. The responsibility for awakening and maintaining an industrial and public interest in the conservation of life so needlessly sacrificed in our advancement is the chief responsibility and greatest task of this Council. Organizations like the National Safety Council, designed to mould public opinion and lead public effort, can succeed only when the public has entire confidence in the seriousness and diligence of the leaders and in the practicability of their plans. Such conviction of the importance of the cause and such confidence in the organization and its plans have been justified by the past history of this Council.

An Organization with the Broadest Purposes

This organized body is in no way limited as a service bureau for industry or as a propagandist for public safety. Its reasons for existence, its place in our industrial and social life, and its ultimate aims are greater than those of service to industry or the moulding of public opinion, because the Council has not only aroused the interest, but also the participation of industry and the public in sound measures for the solution of the problems. The responsibilities of the Council are far greater than if its activities were confined to less essential requisites of advancing civilization, dealing as it does with the lives of men, women and children, both as to preservation and development. The interest of the people to be served must be far more vital and of deeper concern than is necessary or possible in matters of economy or convenience. So long as this body of men thus conceives its responsibilities and opportunities, just so long will this organization be properly esteemed as a vital factor in our industrial and civic life.

As in all meritorious national movements, the founders of this accident prevention institution dimly conceived the part it was to have in our national life, or the growing importance of the work for which it was originally established. Responsibilities and opportunities were obscured by impossibility to foresee the increasing hazards to human life that would be the natural results of scientific developments in manufacture and transportation and the increasing complexities of our advanced civilization. There was need for the Council long before it was organized by its founders; their aims and ideals were fully justified

by the conditions at the time it was created, but there are now far more reasons for the Council's existence than ever before.

Today it should not be necessary to prove what was once a theory—that accidents can be prevented. It should not be necessary to present the economic and other advantages to the industries of our country; nor should it be necessary to assume the burden of proof as to how and why the public may be benefited. The accomplishments of the National Safety Council and its affiliated branches during the last decade furnish a sufficient answer to these questions which at one time held our attention. The industries which have made a real test of the value of organized accident prevention work have reaped a harvest of benefits in efficiency, economy, production, employee relations, company spirit, and above and greater than any of these, in the humanizing of their industries in a way and to a degree that was never before imagined. The public, too, has become convinced of the necessity and practicability of conserving lives and limbs, and there is at this time a growing sentiment for a safer and saner citizenship that bespeaks a more enlightened people because of a greater concern for human welfare.

A Body of Loyal and Steadily Cooperating Members

The financial problem of the Council from the beginning has been wisely considered and intelligently dealt with. At no time have there been available more funds than were required for the most important expenditures, and a business-like surplus to keep it solvent. It is, and always should be, a non-profit making cooperative institution, the administrator of a trust fund, with a full appreciation of its responsibility. During the present year, it became necessary to increase the scale of dues from our industrial memberships to meet the growing demands for greater service and to increase the scope of our work. The increase was met with a most gratifying response. As a further aid to the solution of the Council's financial problem, and particularly that angle presented by the needs for public safety work, a sustaining membership plan has been evolved for those individuals and institutions who desire to share the privilege of assisting the Council in meeting its ever increasing problems.

This organization is different from many others by reason of the constant, loyal, consecrated service which it receives from an army of volunteers who receive no financial remuneration. It is the contribution which these volunteer workers have made that stands out as the main cause of its growth, vitality and continuing usefulness. It is, therefore, my privilege and my most important duty to pay deserved tribute to these men and women in summing up the work of the year. No greater influence for the continued life of the Council and the accomplishment of its purpose is necessary or can be desired than the maintenance of this loyalty, interest and service from these volunteer workers. As long as this unselfish service is given so freely and wil-

lingly, this Council will continue to grow in achievement, and always to these people will be due the homage of a grateful public.

One of the outstanding and significant indications of the increasing importance of the problems of industrial and public safety has been reflected during the past year in the serious attention given these subjects by our Federal and other governmental bodies. The activities of these agencies have been very perceptible and helpful to the Council. Due expressions of appreciation are tendered on behalf of the Council, to the President of the United States, Secretary of Commerce, Secretary of Labor, Governors, State Industrial Commissions, Municipalities and other governmental organizations for their efforts. Wise law enactment is unquestionably helpful to our cause. The greatest possible degree of cooperation should constantly be maintained between the Council and these agencies. We should continue our policy of giving every possible assistance to such efforts as have been made by these governmental bodies whose aims and purposes are the same as ours, but whose avenues of influence and approach are different. We pledge to these law enactment and enforcement bodies the continued support of the National Safety Council and its membership.

Developments in Meeting the Public Safety Problem

To those of us who have carefully sensed the future of accident prevention, the task of meeting the public safety problem looms as a most stupendous one. Without magnifying or perhaps even appreciating the lack of finances to carry on the work of public safety, the Council and its locals have continued their efforts with unabated zeal. The national body has fully realized its inability to make desired headway in such a difficult duty with almost negligible funds. Notwithstanding this handicap, it has tried to make the best of its opportunities. It has been instrumental in arousing the sympathetic interest of the public to its opportunities for safety. The field of public safety is almost limitless and the requirements are clearly apparent. The proper financing of this most important work is now under consideration. Through Mr. John D. Rockefeller, Jr., we are the recipients of a provisional contribution of \$177,500. The acknowledgment of the Council and the interested public for this contribution is most gratefully made. This fund, supplemented by the amount necessary for its payment to us, will assist very materially in meeting the demands of the present situation.

Intimate contact with and service to the Community Councils has been developed. Several new councils have been organized during the year, making a present total of 66 associated councils. The quarterly conferences of community safety council secretary-managers have been well attended and productive of good results.

There has been an increasing interest in safety in many other nations, as is evidenced by the attendance at this Congress of representatives from Canada and other countries. A sincere welcome is extended to these

visitors, with the assurance from the National Safety Council of its desire to render every possible cooperation.

The Education Division has made unusual progress through the services of its Executive Secretary and three Field Secretaries, made possible by the generous assistance of the National Bureau of Casualty and Surety Underwriters. This division has been represented at all the important meetings of educational leaders; it has continued its contact with hundreds of public school systems throughout the country and has continued its monthly publication for schools, entitled, "*Safety Education*." It has continued its distribution of school posters and has established new demonstration centers. Cooperation has been continued with other national bodies such as the Playground and Recreation Association of America, The National Congress of Parents and Teachers and others. This division was represented at the meeting of the National Education Association and supervised the preparation of the year-book on safety education in the schools which was presented at the annual meeting of the department of superintendence.

Constructive Work of the Industrial Sections

We are justly proud of the constructive work accomplished during the past year by our 20 industrial sections and the American Society of Safety Engineers. The success of the Council depends to a very large extent upon the activities of the individual industrial sections and the responsibilities that are assumed by the sectional officers. Both of these factors have been evident during the year and have been appreciated. The increasing number of members reporting summaries of their accident statistics makes valuable comparison possible. Research activities employed are helping to throw light on some of the most important hazards existing in industry. Sectional meetings and regional safety conferences are educating executives and workers concerning the need for approved methods used in practical accident prevention work. Service in the formulation of safety codes and standards is of unquestioned value in promoting uniformity, and in raising the minimum requirements for the conservation of life.

There is a marked development in the number and usefulness of national trade associations giving service to particular groups and industries. The activities of these organizations in many instances, are of especial effectiveness because of the close contact with men who have intimate knowledge of industrial hazards of the particular business represented by the several trade associations. There should be a much closer cooperation between the National Safety Council and these organizations. The question of a plan which will provide more effective cooperation is being carefully studied.

Most of us know and appreciate the successful accident prevention activities by such organizations as the Safety Section of the American Railway Association, the American Electric Railway Association, the Portland Cement Association, American Gas Association, National Electric

Light Association, United States Bureau of Mines, Bureau of Standards and numerous other national organizations. These are doing much for the cause of safety. We should not let this opportunity pass without also expressing appreciation for the support and cooperation we are receiving from the various national organizations of women, the Red Cross, Boy Scouts, engineering societies and other like bodies, too numerous now to recite.

It is regretted that industries and the public generally are not better informed of the purposes and work of the Council, its sections and its locals. If these purposes and activities were sufficiently known there would be a greater appreciation. During the past year the National Council has recognized the necessity of giving this information and has diligently sought to do so through every available channel to such an extent as our resources would permit, but with results which have been only fairly satisfactory. Efforts by the Council sections and locals are being continued to develop plans by which more effective publicity may be obtained. Such efforts are designed to reach not only trade association conventions, but all industries and the public as well: While some of the national magazines may not be giving the safety movement the recognition to which it is entitled, we express our appreciation to the editors of the thousands of daily newspapers, trade, technical and class publications who have generously devoted valuable space to us during the past year.

Grateful Acknowledgment to Many Individuals

This resume briefly reflects the higher spots in the year's accomplishments. These and the many other achievements have only been possible by the devotion to the cause of safety and the contributions made by the general and special committees provided by the Council's organizational structure, the local councils, sectional officers and committees and the office staff of the Council. To each one of these most grateful acknowledgement is made. It is only by such continued devotion, loyalty and service that the National Safety Council may ultimately hope to approach the achievement of purposes which are of such vital concern to our national welfare.

It has been the history of organizations such as this, that they are beset by dangerous temptations born of an enthusiasm unquestionably sincere, but generally unwise. Those who have the responsibility for the direction of such institutions are often confronted with the question whether to continue on the definite conservative basis upon which the organization was founded or to broaden out and enter newly conceived fields of usefulness. With respect to these dangers, the men who have directed the affairs of the Council and the sentiment of those who have been influential in its affairs are to be highly commended. The history of the Council reflects wise conservatism and close adherence to the purposes of its creation. There are other phases of our modern industrial and public life which demand organized effort for the control of harmful

influence. There are obvious needs for constructive service in the development of many other essentials to the well being and happiness of our people, but these should not be confused with the cause of industrial and public safety. They should not be allowed to deflect us from our main objective, the one that underlies and is the foundation for the existence of the National Safety Council.

We have a very definite work before us. The name of our organization very clearly defines our aim. The needfulness of our work is a growing one. Our problem is a specific problem big enough, important enough—yes, essential enough to require our every endeavor. Therefore, our objective must always be the solution of our particular problem. It would seem entirely proper in relinquishing the leadership which has been intrusted to me to give this word of admonition to those who are to follow me and to express the earnest hope that this body of men will never succumb to the temptation to weaken their cause and their devotion to it by diverting the activities of the Council into unwise channels.

Let us constantly and diligently strive to direct wisely this movement, designed to make a more thoughtful and a safer citizenship.

PRESIDENT SCOTT: The Executive Committee appointed three inspectors of election. The Chair will appoint these three as tellers also. These gentlemen are Elmer L. Hewitt, chairman; Clifford Penland and William J. Guilbert.

(A motion was regularly made, seconded and carried dispensing with the reading of the minutes of the last annual meeting.)

PRESIDENT SCOTT: The next item of business is the report of the Nominating Committee. Will Mr. Spring, as chairman, report for this committee?

DR. RISTEEN: In the absence of Mr. Spring I have been requested to present this report, as follows:

REPORT OF THE NOMINATING COMMITTEE

Complying with your instructions, we, the Nominating Committee appointed by you, with the approval of the Executive Committee, and as provided for in Section 4, Article VI, of the By-Laws of the Council, and as further provided in Section 5 of Article VI of the By-Laws, present herewith the report of nominations for successors to the Directors whose terms of office expire at the annual meeting October 25, 1926.

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

George Hodge, Assistant Manager, Industrial Relations, International Harvester Company, Chicago, Ill.

W. H. Winans, Industrial Relations Department, Union Carbide and Carbon Corporation, New York City.

Judson G. Rosebush, Treasurer and General Manager, Northern Paper Mills, Green Bay, Wis.

Miller McClintock, Harvard University, Cambridge, Mass.

Col. James Sinke, Director of Public Safety, Grand Rapids, Mich.

The names of the following Directors whose terms expire October 25, 1926, are submitted for re-election:

L. A. DeBlois, John A. Oartel, C. E. Pettibone, H. A. Reninger, A. D. Risteen, Charles B. Scott, A. L. Watson, H. M. Webber, A. W. Whitney and J. H. Harvey.

Very Respectfully yours,

E. C. SWING, Chairman

HARRY J. BELL

W. E. WORTH

A. D. RISTEEN

M. G. LLOYD

PRESIDENT SCOTT: No member's ticket having been presented, a motion that the nominations close will be in order.

(The motion was made, seconded and carried.)

PRESIDENT SCOTT: As there have been legally nominated just men enough to fill the positions, the Chair suggests, in order to facilitate the transaction of business, that the secretary be directed to cast a ballot for the candidates named for the terms for which they have been nominated. Do I hear such a motion?

(The motion was made, seconded and carried.)

SECRETARY CAMERON: The ballot is cast.

PRESIDENT SCOTT: The Secretary has cast the ballot. The inspectors who are serving as tellers will please report the result of the vote.

MR. HEWITT: Your tellers have examined the proxies and find that there are 2,054 votes for the candidates as nominated.

PRESIDENT SCOTT: The report of the tellers shows that 2,054 votes have been cast for the nominees and none against. It therefore gives me a great deal of pleasure to announce to you that the gentlemen whose names have been presented are to serve as your directors for the terms specified.

I would like Mr. David Van Schaack, chairman of the Resolutions Committee, to present any resolutions which, in the judgment of the committee, should be entertained by this convention.

REPORT OF THE RESOLUTIONS COMMITTEE

Public Safety Resolution

MR. VAN SCHAACK: You all have printed copies of a resolution expressing our continued interest in public safety and our thoughts as to how public safety could best be advanced. I move, Mr. Chairman, the adoption of this resolution.

(The motion was seconded and carried for this resolution as follows:)

WHEREAS, Government, municipal and civic agencies have tabulated statistics showing that last year approximately 90,000 persons were killed in accidents that occurred in industry, on the streets and highways, in

other public places and at home, causing great sorrow and resulting in an economic loss to the United States which is estimated at billions of dollars, and

WHEREAS, After fifteen years of research studies devoted to the problem of preventing accidents and the expenditure of several million dollars generously contributed by industries, associations and public spirited citizens interested in conserving lives and limbs and property, it has been conclusively demonstrated that the majority of these 90,000 deaths could have been prevented and that thousands of accidents were actually avoided through organized safety efforts, and

WHEREAS, Such accidents can be prevented only through the united cooperation of all of the people of this country who must devote more thought to this subject if this nation is to be relieved of this terrible annual toll of fatalities and injuries which affect every community, and

WHEREAS, Organized accident prevention work by the members of the National Safety Council, other associations, organizations, agencies, etc., to check this toll has been favorably received by Federal, State and Municipal authorities who have called meetings of interested citizens to plan methods of improving the situation and the President of the United States, all of the Governors and hundreds of civic officials have placed themselves on record to the effect that the time has come for united action to remedy the traffic situation, therefore be it:

RESOLVED: That the members of the National Safety Council assembled here in Detroit at their Fifteenth Annual Safety Congress go on record as being unanimously in favor of a more comprehensive campaign designed to better traffic conditions, pledge their individual efforts to the further conservation of lives and limbs and property, the human and economic resources of the United States, agree to continue their past policy of cooperating in every possible manner with all other associations, authorities and citizens concerned with this problem, and recommend for the consideration of everyone interested:

1. That additional community safety councils be organized wherever practicable so that more cities will conduct activities along the lines now being successfully followed by the present affiliated branches of the National Safety Council; that more national, state and local associations, societies, clubs, etc., support organized safety work and thus show their realization of the seriousness of the problem and their appreciation of the efforts being made to prevent deaths and injuries on the streets and highways, in public places and in residences; that the general public be invited to participate more fully in such endeavors and that the attention of the editors of the nation be called to the importance of not merely recording in their columns news about accidents but presenting the remedies that have been definitely ascertained by traffic students.

2. That we believe the solution of the traffic problem rests upon national, state and local authorities adopting three main principles which are essential for the prevention of automobile accidents, namely, (A) Engineering revision of streets. (B) Regulation of traffic and respect

for and enforcement of traffic laws. (C) Education of both motorists and pedestrians.

3. That all persons interested in the traffic problem should cooperate in their endeavors to convince both motorists and pedestrians that it is essential for them to accept the principle that each has rights while on the streets and highways but failure to respect each other's rights may result in death, personal injury or economic loss. We feel that a large number of traffic accidents may be traced to the failure of motorists and pedestrians to accept this principle.

4. That all public, private and parochial schools of elementary and high school grades should include in their courses of study the principles of personal and public safety so that the youth of the nation may be trained to avoid the hazards of life so as to enjoy more fully the real adventures of life.

5. That the traffic problem be given the serious consideration it deserves by officials of states, cities and towns, who should obtain, compile and distribute uniform, standard statistics, charts and accident spot maps which are essential for the study of the causes and remedies of such accidents. It is important that the authorities obtain accurate data showing where, when, why and how accidents occur and exchange their findings with fellow officials.

6. That the various States of the Union pass and enforce uniform traffic laws to eliminate the present confusion that exists throughout the country.

7. That every state in the Union should have a license law for motor vehicle operators who would be required to pass an examination conducted by competent and honest officials to determine the moral, mental and physical qualifications of the applicants. That licenses should be suspended or revoked for cause.

8. That Federal, state and local authorities and the steam and electric railways should continue to cooperate in the country-wide campaign to reduce accidents at highway crossings.

9. That all laws, rules and regulations designed to lessen the hazards of modern life and to prevent accidents be enforced. Both motorists and pedestrians should be inspired with a greater respect for traffic regulations. We feel that until the majority of the people of the nation cooperate more enthusiastically in observing these rules there will be no marked reduction in the number of accidents. Law observance is the need of the hour. Fearless judges should be in charge of traffic cases and political influence should not be a factor in the disciplining of habitual reckless, careless and thoughtless motor vehicle operators. Drunken drivers should be given jail sentences!

10. That the Fifteenth Annual Safety Congress delegates and officers express their deep appreciation of the cooperation that has been received from all other national associations, societies, Federal, State and Municipal officials, the editors of the country, etc., participating in the national safety movement whose successful progress is prolonging the lives of

thousands of men, women and children and preventing the loss of countless limbs, to say nothing of the sorrow and suffering which cannot be measured in terms of dollars and cents.

MR. VAN SCHAAK: You have also before you in printed form a copy of a similar resolution on industrial safety. I move the adoption of that resolution.

(The motion was seconded and carried for this resolution as follows:)

Industrial-Safety Resolution

WHEREAS, statistics show that during the past year more than 23,000 workers have been accidentally killed, and hundreds of thousands injured in factories, workshops, and other industrial establishments, resulting in the needless shortening of thousands of lives, in the crippling and blinding of many of those injured, in the causing of sorrow and suffering to their families, in the delaying of production, in the interrupting of orderly processes, and in the cost to both employers and employees of billions of dollars; and

WHEREAS, more than 4,000 employers, who are members of the National Safety Council, have learned that the majority of all accidents can be prevented through organized cooperative safety methods and devices, and have actually succeeded in materially reducing the severity and frequency of accidents; and

WHEREAS, the members of the National Safety Council have demonstrated that what has been accomplished in some industries can be achieved in all fields of industrial endeavor if all employers, both large and small, will realize that the prevention of such accidents is both a public and personal responsibility which should be shouldered by every employer, therefore be it

RESOLVED, that the delegates to the Fifteenth Annual Safety Congress, held by the National Safety Council at Detroit, Michigan, go on record as recommending:

1. That all employers in the United States immediately inaugurate a survey of their respective establishments to ascertain the chief causes of accidents and take steps to install effective safety methods and devices as rapidly as possible.

2. That employers, realizing that safety is as important a part of their major operations as production, have all dangerous machinery safeguarded. Hazardous machinery now installed should be protected by necessary devices. New machinery should be equipped with the essential appliances, and all dangerous processes should be given prompt attention.

3. That all employers have their superintendents, foremen and workmen generally instructed in safe methods and habits of work which shall protect them while employed, on the streets and highways, in public places and at home.

4. That employers support the efforts now being made by community safety councils, the National Safety Council and other national associa-

tions, organizations, societies, Federal, State and municipal officials, etc., to protect men, women and children from hazards on the streets, highways, in public places and in residences, so as to conserve the nation's greatest resources.

5. That comparatively small employers especially become actively engaged in accident prevention work. We suspect that untold thousands of owners of factories, shops and other industrial establishments feel that their plants are too small to warrant organized safety activities, and we wish to call their attention to the fact that it is not necessary for every workshop to have a trained accident prevention specialist or install new machinery, as the plant superintendent or foreman can conduct a modified safety campaign which will be productive of fruitful results and the installation of safeguards on old machinery does not involve prohibitive expense.

6. That employers encourage the inclusion of safety education in the courses of public, private and parochial schools of elementary and higher grades so that pupils may be instructed in the principles of safeguarding themselves and others.

7. That more colleges and universities should incorporate accident prevention material in existing engineering courses, so that graduate engineers will realize that safety work is an integral part of production, and be it

RESOLVED, that the delegates to this congress express their thanks to the thousands of employers, both within and outside the membership of the National Safety Council, who have been conducting accident prevention campaigns in their shops and supporting the public safety campaigns designed to protect people in public places and at home, and acknowledge their indebtedness to the radio stations, editors of daily newspapers, trade, technical and class periodicals who have given generously of their facilities to the national safety movement, the successful progress of which has made the United States and foreign countries better places in which to live and work because of the conservation of lives and limbs and property.

Safety Recognition in National Organizations

MR. VAN SCHAAK: Mr. Chairman, I desire to offer a resolution.

WHEREAS, the National Safety Council has enjoyed throughout its entire existence the opportunity of cooperating in a helpful way in the interest of safety with many national organizations, the list of which is too long to be here recited; and

WHEREAS, there has recently been an increasingly marked and definite trend on the part of the most influential engineering societies and commercial and industrial associations toward the inclusion of specific safety planks in their platforms as part and parcel of their avowed purposes; and

WHEREAS, the mutual helpfulness of these societies and associations

and of the National Safety Council has distinctly accelerated the solution of the safety problem;

THEREFORE, Mr. Chairman, I move that it be expressed as the sense of this meeting that we view with keen interest and hearty commendation the growing adoption of safety activities as an essential part of the programs of national organizations and pledge to all such our continued and increasing cooperation and support.

(The motion was seconded and carried.)

Resolutions of Appreciation

MR. VAN SCHAAK: Mr. Chairman, I desire to offer this resolution:

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

RESOLVED, that the Fifteenth Annual Safety Congress, assembled at Detroit, Michigan, expresses to Mr. Scott, by a rising vote, its deep appreciation of his services as President and of his notable contribution to the safety movement.

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

MR. VAN SCHACK: Then I have the following resolution:

WHEREAS, the holding of this Fifteenth Annual Congress of the National Safety Council in the City of Detroit, Michigan, and the notably successful arrangements made for it are distinctly due to the sincere interest and support of the public officials, civic organizations, and leading citizens of Detroit; and

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

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

RESOLVED, that the National Safety Council extend to the City of Detroit, through its mayor, Wm. Robt. Wilson, the various sub-committees of the General Congress Committee, and the Detroit Industrial Safety Council, its thanks for and appreciation of the opportunity now afforded those attending this conference of observing the practical

methods employed in furthering accident prevention and their results. and the hospitality of a city and people deservedly far-famed as hosts.

I move the adoption of this resolution. (The motion was seconded and carried.)

ANNUAL REPORT OF MANAGING DIRECTOR

W. H. Cameron, Chicago, Ill.

During the past fiscal year 749 new members have joined the National Safety Council. A comparison of the total membership for the past two years shows:

Membership July 31, 1926.....	4,224
Membership July 31, 1925.....	4,023

Net gain	201
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The net gain in membership revenue was \$43,909.99. The total amount of dues now being paid by the 4,224 members is \$237,881.79, or an average of \$56.32 per member. The increase of 25 per cent in dues billed to members, commencing February 1, has been generously accepted by the members. Only two resignations can be traced to the increase. The remaining resignations were due to the fluctuations in business and to other causes.

The NATIONAL SAFETY NEWS has gained in circulation and in importance. The quality has improved and the number of special features and articles has increased. The minimum number of pages per issue has increased from 56 to 64. There has also been an increase in the number of extra copies ordered by members. The success of this magazine is made possible only through the continued generosity of members in contributing special articles, photographs, data on special hazards and safeguards, and statistical information of a very valuable character.

The *Safety Bulletins and Posters* have been published regularly and have been steadily improved in quality. More time and money have been spent upon their preparation, and well known artists have furnished illustrations. The addition of four large size posters and the change in the method of presenting samples to the membership have been generally accepted as improvements of the service. Economies in printing resulting from this change have made it possible to increase the number issued monthly from 36 to 40. More than nine million posters were used by our members during the year. The Council's street posters, distributed through community councils, have filled a need for continued education of the public in the safe use of the streets. An up-to-date safety poster catalogue containing 252 miniature illustrations of selected posters was reprinted at the beginning of the calendar year. These posters are kept in stock for use by new and old members in conducting safety campaigns.

The *Safe Practices Pamphlets* have appeared bi-monthly under the supervision of Mr. R. J. Young and the Conference Committee of 75 safety engineers. Six of these pamphlets have been revised and reprinted. Six new pamphlets have been produced. This "Safety Encyclopedia" now in-

cludes 33 separate treatises on the fundamentals of safety engineering practice in a majority of the industries. New members are ordering complete sets of these pamphlets for reference purposes. Four hundred and sixty-eight sets have been ordered by members during the fiscal year.

The Consultation Service has answered 6,069 requests for information. For the fiscal year ending July 31, 1922, there were 2,677 such inquiries. There is a marked increase year-by-year in the use of the facilities of the Library and Information Bureau. During the past fiscal year 40,439 pieces of information were distributed in answer to the 6,069 inquiries, including books, pamphlets, clippings, photographs, blueprints, bulletins and similar material. Thirty thousand eight hundred and thirty-three new pieces of material have been added to the library files during the past year. Twenty-nine exhibits were prepared and sent to various association meetings and expositions—the largest number in any one year.

Films and Slides are Increasingly Useful

Films and Slides have been in demand by members in increasing quantities. The two albums of photographic reproductions of the entire slide collection (now numbering more than 1725) are in constant circulation among members. There is a continued demand for the Council's first film, "Ask Daddy," and the Council's second film, "Hindsight vs. Foresight," shown first at the Louisville Congress, is also being used by many of the members. Twenty-eight copies of these two films have been sold and 16 copies are in constant circulation. The new film, produced under Council auspices, "The Fall of Man," has received popular approval and has been in constant circulation. As soon as the film fund increases through sales and rentals another new film will be produced. Several members in foreign countries have ordered copies of the Council's films. The list of motion picture films was revised and reprinted during the year.

The Safety Calendar increases yearly in popularity as a medium for reaching the worker and his family, school children, and the general public. Five hundred and sixty-five thousand copies of the 1926 calendar were distributed. The 1927 calendar, now ready for mailing, is a further improvement over the 1926 edition. The information on the reverse sides of the 1927 calendar sheets relates to health conservation.

The 1925 Congress and Exhibit eclipsed every previous Safety Convention in attendance, number of speakers, exhibits and interest. The proceedings of that Congress contained 1154 pages devoted to industrial and general sessions and 164 pages devoted to public safety, with complete alphabetical index. A cumulative index to the proceedings of the Council, 1919-1925, inclusive, was prepared and sent to the membership. The 1926 Congress program, now ready for mailing, contains 76 pages.

National Safety Codes have continued to receive the careful attention of your committees and staff. Representatives of members of the Council are assisting in the formulation of 44 of the national standard codes. The Council continues to contribute towards the expenses of the American Engineering Standards Committee.

Editors of Employees' Magazines have continued to receive a special service including original safety illustrations and accompanying stories. Other special material and assistance have been accorded members publishing plant magazines or contemplating the establishment of this type of publication, including copies of the addresses presented at a June meeting of the editors in Chicago. An attractive program has been prepared for the annual meeting of these editors at the Detroit Congress and a new feature has been added to the NATIONAL SAFETY NEWS through editorial advice to the publishers of employee magazines.

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

The Engineering Section held 18 successful regional safety conferences during the year, an increase of six over 1925, including the Third Pacific Coast Safety Congress. Eight additional regional conferences have been planned for the remainder of the calendar year. Seventeen research committees have been at work. An all-day safety conference was held in New York, November 18, with the four Founder Engineering Societies. The amalgamation of the American Society of Safety Engineers and the Engineering Section, which took place at the Louisville Congress, has proved the wisdom of cooperation and has continued the unity of effort and strength necessary to win respect for the safety cause. During the year a special pamphlet entitled "Accident Prevention and the Engineer" was printed.

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

Activities in a National Public Safety Conference

Public Safety: The National Conference on Street and Highway Safety, called by Mr. Herbert Hoover, Secretary of Commerce, was held at Washington March 23, 24 and 25. Your Council's representatives served on the committees presenting reports at this second Congress and the Director of the Public Safety Division gave special assistance as consultant. The Council continued to contribute financially to this national activity. Representatives of the Council have been asked to serve on the continuing committees. Much of the Council's activity for safety on the streets and in the homes has been directed towards the formation and upbuilding of community safety organizations. A new booklet was prepared during the year entitled, "Essentials of a Community Safety Program," presenting an analysis of the experience of the affiliated local community coun-

cils. A series of six leaflets on safe driving, "You and Your Car," were distributed. The report of the Committee on Public Accident Statistics has been widely distributed. Seven community safety surveys were completed. The new standard accident reporting plan has made great strides. Ninety-eight cities and four states are now reporting to your national headquarters their monthly record of public and home accidents. There has been a marked increase in the public safety publicity of the Council. The following special pamphlets were published during the year following intensive study: "Safety in Winter Sports"; "Safety on the Farm"; "Safe Use of Gas in the Home." State and municipal authorities have been furnished with copies of the Council's public safety material. Mr. John D. Rockefeller, Jr., has generously offered to contribute substantially toward the much-needed extra money for the expansion of the Council's public safety activities; it is expected that the entire amount required will be contributed within the next few months and plans have already been completed for the expenditure of these funds on an enlarged nationwide campaign to cut down the public accident toll. A Public Safety Advisory Committee, composed of fifteen national leaders in the official, business and civic groups most concerned with public safety, has been organized and has held its first meeting.

The Education Division Accomplished Important Work

The Education Division has made unusual progress through the services of its executive secretary and three field secretaries, made possible through the continued generous assistance of the National Bureau of Casualty & Surety Underwriters. (See record of contribution in the treasurer's report.) The Education Division has been represented at all of the important meetings of educational leaders, has continued its contact with hundreds of public school systems throughout the country, has continued its monthly publication for school teachers entitled, *SAFETY EDUCATION*, has continued its distribution of school safety posters and has established new demonstration centers. Cooperation has been continued with other national bodies, such as the Playground and Recreation Association of America, The National Congress of Parents and Teachers, and numerous others. A hand book for schools entitled, "Junior Safety Council Manual," was prepared and the Safety Bibliography for teachers and pupils was revised. This division was represented at the meeting of the National Education Association and had the honor of supervising the preparation of the Yearbook on safety education in the schools which was presented at the annual meeting of the Department of Superintendent.

Our Educational Publicity Service in the industrial and public safety fields has been considerably increased. Scores of news stories, special articles, seasonal safety lessons, photographs, charts and other propaganda have been used by hundreds of daily and weekly newspapers, magazines, trade, technical and class publications. Dispatches and feature stories have been cleared through the national news distributing

agencies. Daily radio talks have been broadcast through a special service sent to more than 70 radio stations in different cities at their request. Special material has been given to community councils and members for local publicity campaigns. Numerous periodicals have published editorials commending the Council's work. Our news release clip sheet service is now printed and sent to more than 1,000 newspapers and 500 trade, technical and class periodicals. A trial mat service is being sent to more than 100 newspapers on request.

Local Councils: Our intimate contacts with and services to the community councils have been greatly developed. Six new councils have been affiliated with the National Safety Council during the year, making a total of 67 affiliated councils. The quarterly conferences of community safety council secretary-managers have been well attended. The ten volume loose leaf encyclopedia, "Standard Practices for Community Safety Councils," has been kept up-to-date and copies of revision sheets sent to all users. The monthly News-Letter of specific information to community councils' officials with valuable enclosures has been continued. Two field representatives have given all of their time to the organization of and service to community safety councils.

External Relations and General Activities

External Relations: Friendly relations have been maintained with other institutions interested in safety, such as the American Red Cross, American Museum of Safety, Chamber of Commerce of the United States, Canadian Safety League, American Association of Industrial Physicians and Surgeons, American Railway Association and its Safety Section, American Gas Association, the safety bureaus of the insurance companies, National Fire Protection Association, National Education Association, Joseph A. Holmes Safety Association, International Association of Chiefs of Police, Playground and Recreation Association of America, National Child Welfare Association, American Automobile Association, Associated General Contractors of America, International Labor Conference of the League of Nations, and state and federal government departments, as well as the American Engineering Standards Committee and the National Bureau of Casualty & Surety Underwriters. The Council has maintained its policy of cooperation with these institutions and has looked for opportunities for closer contacts with those leading the safety movement in their respective spheres of influence. Twenty-nine Safety exhibits have been furnished on request for trade association meetings and other affairs.

General Activities: The new research committee to study the health problem of spray painting has been completed and an appropriation of \$10,000 set aside for the expenses of the field staff, laboratory work and publication of reports. The final report of the Benzol Committee has been printed and distributed. The report of the special committee for the abandonment of the constitution was accepted and the revised By-Laws, approved at the annual meeting of the directors, has been published. Three hundred and thirteen bulletin boards have been distributed among mem-

bers. A new pamphlet, "Make It Safe," has been prepared for distribution by the members among workers. Distribution of the booklet entitled, "Safetyize," relating to the elimination of accidents in the home, has been continued. A condensation of the experience of members has been prepared in a four-page leaflet and entitled, "Industrial Safety Program to Fit Your Needs," and is being sent to each new member. A series of 14 sample letters from the manager to the foremen were distributed to all of the members under the caption, "Personalized Safety." A series of six four-page lesson outlines on "Fire Prevention" have been printed. These comprise a course in safety instruction in industrial fire prevention. They have been used particularly by the community councils in their school activities. A six months' campaign was conducted in the art departments of 150 high schools and more than 1800 original posters contributed. Five hundred dollars in prize money was sent to the winners and a loving cup given to the high school submitting the best collection of posters.

The Unique "Staff" of the Council

Another printing press has been added to the Council's equipment. On January 1 the Council moved its offices and now has twice the floor space. The foreign membership has increased and the Council has augmented its foreign service. The staff now numbers 65 persons.

Staff: The real "staff" of the National Safety Council is the membership, a large percentage of which has contributed to the NATIONAL SAFETY NEWS, the Safety Poster Service, the Safe Practices pamphlets, the up-building and service of the sections, the Annual Congress, the film and slide collections and all of the committees, both sectional and local. More than one thousand persons now serve on these committees. During the Year John M. Sandel, Safety Engineer; Carl L. Smith, Field Representative; R. T. Solensten, Director, Poster Division; A. Mark Smith, Director, Business Division, and Mary Noel Arrowsmith, Executive Secretary. Education Division, resigned. The leaders in the headquarters staff now are:

William H. Cameron, Managing Director.
 Sidney J. Williams, Director, Public Safety Division.
 W. Dean Keefer, Director, Industrial Safety Division.
 Willard L. Wheeler, Director, Business Division.
 Lee H. Gardiner, Director, Poster Division.
 Arnold A. Mowbray, Director, Public Information Division.
 Paul F. Stricker, Field Representative.
 E. Williams Corn, Field Representative.
 Carman T. Fish, Editor, NATIONAL SAFETY NEWS.
 Guy M. Briggs, Associate Editor, NATIONAL SAFETY NEWS.
 Stanley H. Kershaw, Safety Engineer.
 George E. Burns, Safety Engineer.
 Earl J. Reeder, Engineer, Public Safety Division.
 Carroll E. Robb, Statistician, Public Safety Division.
 Herbert H. Greenwald, Accountant.

George O. Lindquist, Supervisor of Purchasing and Shipping.
 Idabelle Stevenson, Executive Secretary, Education Division.
 Marian L. Telford, Field Secretary, Education Division.
 Florence Nelson, Editor, SAFETY EDUCATION, Education Division.
 Mary B. Day, Librarian.
 Mary M. Wells, Assistant Librarian.
 Myrtle H. Mollan, Chief Clerk.

ANNUAL REPORT OF THE TREASURER OF THE NATIONAL SAFETY COUNCIL

H. M. Webber, Treasurer, Chicago, Ill.

COMPARATIVE BALANCE SHEET—JULY 31, 1926 AND 1925

ASSETS				
Current Assets:	As at July 31, 1926	As at July 31, 1925	Increase	Decrease
Cash	\$13,954.26	\$ 8,266.35	\$ 5,687.91	
Investment Securities	19,913.75	19,913.75		
Accounts and Notes Receivable	23,216.30	14,646.96	8,569.34	
Advances for Traveling Expenses	4,575.00	2,225.00	2,350.00	
Inventory of Supplies	3,640.45	2,662.68	977.77	
Deposit with Postmaster	364.29	284.23	80.06	
			<u>\$17,665.08</u>	
Total Current Assets	\$65,664.05	\$47,998.97	\$17,665.08	
National Safety Council Reserve Fund Investments	59,990.94	42,288.81	17,702.13	
Office Furniture and Equipment	15,726.11	11,802.31	3,923.80	
Deferred Charges	11,412.28	28,177.49		\$15,765.21
			<u>\$39,291.01</u>	<u>\$15,765.21</u>
	<u>\$152,793.38</u>	<u>\$129,267.58</u>	<u>\$23,525.80</u>	
LIABILITIES				
Current Liabilities:	As at July 31, 1926	As at July 31, 1925	Increase	Decrease
Accounts Payable	\$	\$ 2,245.75	\$	\$ 2,245.75
Current Accounts (Local Councils)	246.25	511.68		265.43
				<u>\$ 2,511.18</u>

Fifteenth Safety Congress

Total Current Liabilities.....\$.	246.25	\$ 2,757.43		\$ 2,511.18
Accrued Expenses	220.00	470.00		250.00
Sustaining Membership Fund	9,350.00		9,350.00	
Special Film Fund		18,898.31		18,898.31
Unexpended Balance—Education Section	3,740.66	2,938.82	801.84	
Sundry Special Funds.....		70.03		70.03
Reserve for Future Service to Members	59,990.94	42,288.81	17,702.13	
Surplus	79,245.53	61,844.18	17,401.35	
			\$45,255.32	\$21,729.52
	\$152,793.38	\$129,267.58	\$23,525.80	

STATEMENT OF GROSS REVENUES AND EXPENDITURES

Fiscal Year Ending July 31, 1926

GROSS REVENUE

Membership Dues:	
Active	\$222,454.36
Sales of 1926 Calendars, Pamphlets, Bulletins, Chauffeurs' Lessons and Miscellaneous Receipts.....	223,032.64
Contribution of National Bureau of Casualty and Surety Underwriters Toward Expense of Education Section.....	31,000,000
Contribution of National Bureau of Casualty and Surety Underwriters Toward Expense of Field Work.....	1,666.66
Gross Revenue, National Safety News (Dues From Council Members Not Included).....	20,777.40
Interest Earned	1,443.09
	\$500,374.15

GROSS EXPENDITURES AND DISPOSITION OF NET REVENUE

Annual Congress Expense.....	\$ 3,000.84
Annual Congress Exhibit.....	2,054.61
1925 Annual Congress Proceedings.....	8,107.28
Automobile Dash Cards.....	353.56
1926 Calendars	78,569.47
Chauffeurs' Lessons	990.01
Depreciation, Office Furniture and Equipment.....	2,798.04
Exchange	328.23
Field Work, Including Salaries.....	16,844.87
General Local Council Expense.....	845.93
General Bulletins	19,877.61
General Office Expense.....	4,302.95
Library Expense	550.84
Membership Solicitation Expense.....	13,243.79
Miscellaneous Publication Expense.....	1,672.80
National Safety News.....	33,068.17
Office Printing and Supplies.....	4,736.88
Postage	5,157.36
Publicity	2,205.03
Rent, Light and Power.....	19,678.21
Safe Practice Pamphlets.....	2,042.88
Salaries of Officers and Staff.....	127,827.92
Sundry Activities	56,632.79

Annual Meeting of Members

29

Taxes and Insurance	129.69
Telephone and Telegraph	1,899.87
Traveling Expense—Administrative, including National Committee Expense	2,708.87
Loss on Exchange of Equipment	3.60
Moving Expense	815.54
Equipment Written Off	384.08
Sectional Activity Expense, including Printing Bulletins	19,775.71
Education Section Expense from Contributions of National Bureau of Casualty and Surety Underwriters	31,000.00
Education Section—Sundry Disbursements	6,477.66
	\$468,085.09
Transfer to Reserve for Future Service to Members	14,887.71
Transfer to Surplus	17,401.35
	\$500,374.15

H. M. WEBBER, Treasurer.

We have examined the above Comparative Balance Sheet of the National Safety Council as at July 31, 1926, and July 31, 1925, and the attached Statement of Revenues and Expenditures for the year ending July 31, 1926, and have compared them with the books and vouchers and have found them correct.

ARTHUR YOUNG & COMPANY,
Certified Public Accountants.

Chicago, Illinois, August 16, 1926.

The Temperamental Interest of the Public in Safety

PRESIDENT SCOTT: You will remember that a few months ago the city of New York went wild over the death of a certain moving picture idol. It happened that on the same day one of the greatest educators of this age passed away. Our public press gave thousands of columns devoted to the incidents following the death of the movie idol but very little space was given to the demise of the educator. We Americans are peculiar.

When the recent disaster in Florida was flashed over the country we responded with interest and with funds for relief. We are quick to respond to the call for any disaster affecting human lives. But during the same month in which this Florida disaster occurred there were more deaths caused by automobiles in this country than the total loss of life in this Florida catastrophe; yet that fact received little notice in our press and it was not emphasized to us.

I think the work of the man who is engaged in industrial and public safety is sometimes a discouraging work. He starts out with enthusiasm and appreciation of the loss of life and the importance of the work that he is doing. Then he gets into a certain routine that causes him to lose the larger vision of the thing that he is really doing. He seems to forget, as he becomes more accustomed to his duties, that he is doing work like the minister, like the scientist—work for humanity.

This morning we are to have an outsider give us his views as to the meaning of this national loss of life that is constantly going on. We

are going to hear from a man of many parts. He admits he is a college graduate, is proud of the fact that he worked as a clerk for an insurance company, recalls with pleasure his studies with a law firm and does not deny that at one time he was an editor. We have learned that he launched a civic revival in Trenton, New Jersey, and that he founded an anti-bribery society in that state. Our investigations have also brought forth the fact that he was secretary of the Michigan State Peace Commission and we know that he is the author of several books.

With such a background, our speaker should bring us a real message. I know he is going to do more than meet our expectations and it is with great pleasure that I present to you the Rev. Alfred Wesley Wishart, of Grand Rapids, Michigan.

THE DRAMATIC ASPECTS OF OUR NATIONAL ACCIDENT TOLL

Alfred W. Wishart, D. D., Pastor of the Fountain Street Baptist Church,
Grand Rapids, Mich.

Your program is crowded with technical topics that have to do with safety appliances, safety education, factory and mine management and traffic regulation. I am not qualified to speak upon these technical themes but it is fitting that at the outset of this Congress we should direct our thoughts for a few minutes at least to some of the moral and spiritual phases of this crusade against the perils of our modern civilization.

Notwithstanding all of the progress that has been made in the application of science to industry and the increasing efficiency of economic organizations, we still have with us the old problem of human nature. It is not within the power of machinery and organization to improve the quality of man, to give him knowledge, to teach him discipline; and so we have before us, as always in the past, this old, old problem of improving the quality of our human nature.

There is nothing in mechanical progress of itself to make man wise or good. There is nothing in mechanical progress to fit a man to live. The real cause for progress, for civilization, for all the achievement of all time, is not in things, not in that which lies external to ourselves, but in the creative moral and spiritual purpose of man. It is the will of man that is the real secret of all substantial achievement, and so the problem of our life is not the problem of things but the problem of personalities, the problem of moral and spiritual and social development.

Human progress is not inevitable. That which science and skill and thought build up—achievements of civilization, of organized society and individual effort—may be torn down almost over night by the inhumanity of man, by his ignorance, by his selfishness, by his blindness to spiritual values, by his sordid ambitions.

We have seen many of the achievements of our modern civilization

shattered during the late war within a very few years. So we have no guarantee that what we have won will be kept, but we are making progress in the realization of the nature of our goal and of the conditions of achievement.

For centuries man labored under the delusion that most of the ills of his life were acts of God. God was to blame for the misfortunes heaped upon him by natural causes; God was to blame for disease; God was to blame for war. So by incantation and prayer he bombarded heaven asking God to do things for him, lift burdens from him, open up paths for him, with the implication behind the prayer, that God was responsible. It is only within recent years that we have begun to realize that the key to the prison house lies in our own mind and in our own will. If disease is to be eliminated from life or its ravages avoided we must discover the causes and apply the remedies.

I used to say at the grave, as most ministers do, "Whereas it has pleased Almighty God to take out of this world the soul of our deceased brother—or sister." I say it no longer because I realize that many times it was quite clear that it was not the pleasure of God to do this thing at all, but somebody had blundered and someone had sinned and someone had broken a law, and the man was in the grave because of his own fault or his own ignorance or that of someone else. I never prayed once during the war that God would stop the war, because I did not believe God started it. If a man sits on a powder keg and applies a match, all the prayer in the world will not keep his feet on the earth.

What Shall We Do with Our Machinery of Life?

Wars will stop when man wants them to stop and no sooner. We have the remedy in our own hands if we would apply it. We are wise, we are progressive, we are rich, we are powerful, that is true; and yet think of all the effort put forth by this wonderful organization and its thousands of coworkers all over this country, of your magazine and newspaper articles, the posters, the educational efforts in schools and colleges, the conferences, the heart-to-heart talks, the appeals, the factory discussions—all to save relatively few lives; and then think how, with a more wonderful organization, a more skillful management, a wider application of science, we banded together (I mean the men of the world) to slaughter, on the field of battle, ten million men, with other losses of life and property beyond our imagination to conceive.

So the question arises as to what we are to do with our knowledge, what we are to do with our organizations, what we are to do with invention, what we are to do with the machinery of life? It is the old, old problem of man versus the machine. It is not a problem of the conflict of physical forces, material energies—it is man against the machine, against his own machine, his own physical organization, to control all for the highest good.

So we have come to realize that true progress is the result of a ra-

tional, conscious effort toward a worthy end. It is the result of endeavor wisely directed and sustained by high and noble motives. So we come to see this whole work of our modern life as a great crusade for improved manhood and womanhood, for better living.

We have accepted the challenge of nature. We have come to realize how much we can do when we have freedom from fear, and the knowledge that brings control over nature's forces, the power that comes from an understanding of nature's sequence. Again we find the prime cause of power and wealth within the soul of man.

Men Are Captains of their Own Souls

So today we are no longer ready to take the view of certain of the old Greek dramatists who loved to portray the great drama of life as the struggle between man and fate, with man always dominated by fate, under the heel of the gods. We believe we are captains of our own souls, masters of our own destiny, or at least such achievement and victory is possible for the human soul. So we venture forth in the conquest of the world; so we go out to overcome ignorance and superstition. We have abandoned magic for research and the old miracle for the modern miracle of man's power, God-given, in the conquest of nature and the discipline of life. That is a very great game.

I remember in one of Kingsley's novels he describes the people having gathered in a little church in England to ask God to stop the plague of England, to forgive their sins, for they thought that their sins were the cause of the plague; and a modern-minded doctor comes to the door of the church and says to the people, "If you will come out with me and clean up this town, I will stop the plague."

That is the spirit of the modern man—no less reverent than the old type of thought in life because in our venture we recognize that it is God who works in and through us for his own good will and purpose; because we realize that we can win only by moral and intellectual spirit; because in this kind of work and from this high motive we do honor God by using our own mind and respecting, as our brother prayed today, human personality and the work of the individual.

So we have come through the long struggle of the ages to achieve organized society with law and order. We have come to an unprecedented knowledge of nature's processes. We have come to a higher, purer, more practical, more human, a truer form of religion. We have come to a new sense of the worth and value and importance of man as man.

Your work, then, my friends, is a crusade to prevent disaster. As your Chairman intimated, it is sometimes a discouraging undertaking—it lacks what men commonly think is dramatic, spectacular, appealing to the imagination, exciting newspaper comment, for as of old men could only see the working of God in the flashing meteor, in the hurricane and the earthquake, so today men can only see the nobility of man in the reformatory work. They see it in the greatness and dignity and self-

sacrifice of man in the coast guards, pushing their boat through the surf to rescue lives on the sea. They do not see the heroism and self-sacrifice and dignity and dramatic feature of the worker in the laboratory who will one day discover how to send messages across the sea. The wireless in one year has saved more lives than all the coast guards of all the seas—the work of prevention.

There was an old saying that a fence at the top of a precipice is better than an ambulance at the bottom. But the fence is not very dramatic. The ambulance with clanging bell and white clad nurse and doctor—that is spectacular, that is dramatic; everybody hears the clamor. Nobody pays any attention to the fence (*laughter*)—and you are building fences and nobody is excited about them. You are trying to prevent disaster.

When will we learn that the world's benefactors are neither those old saints who ran away from the world to find God in peace and save their own souls, nor are they alone those who are engaged in picking up the wrecks of humanity, patching up the lives that have gone to ruin, and who go about dealing out alms to the poor.

That is all beneficent work, beautiful work, and I would not detract from their glory or withhold an atom of praise, but there are other people to be honored also and their activities are to be included in the field of religion and they, like you, are to be seen as workers in the kingdom of God, standing on as high a platform as the preacher of the Gospel. (*Applause.*)

The Highest and the Lowest are the World's Benefactors

They are the school teachers throughout the country, molding, influencing, directing lives—guiding the personality in its unfolding. The world benefactors are all of the executives of industry who, through their wise, honest, efficient management, help men to guard against poverty by keeping them employed, by not being a failure, by leading them to prosperity. All of the toilers in factories and mines and railroads who minister to a human need, for we have our human need, the need of our daily bread—those who minister in this humble way, honestly giving an honest day's work for their pay, are also the world's benefactors, without whom we could not advance or live.

Men, where is the field of moral endeavor for the layman who is not a professional religious man if not in his daily life? If it is my duty to pray to God when I go into the pulpit, that He will help me speak the truth, help me to be humble, help me to be honest with myself and my people, is it not the business of the editor, whose words reach thousands more than mine or any other minister's thus molding their citizenship and directing their mental and moral life—is it not his duty also to regard himself as the mouthpiece of Jehovah whose blessing he should seek that he too may be honest and free from base motives? (*Applause.*)

And if it is the duty of the minister and the doctor and the charity

worker and the social reformer not to seek profit, but human welfare, is it not also the duty of the business man to join to his desire for a profitable business—that is an on-going business, a successful business—the desire to make his life count for something in the lives of other men, to be his brother's keeper?

Why should the high and holy motive of self-sacrifice, of service, be denied the worker in the secular field? I can not help but think, with all due reverence to the scholars of the Church in the past, that this is a fatal, misleading, harmful distinction which has always been made between the sacred and the secular, as if there was a field where God was and another where he was not, as if the minister and the Sunday school teacher and the charity worker were in the Kingdom of God and laboring for the Kingdom of God and all of the people in their respective vocations in the secular life of the world were engaged in holy callings.

Religions are Tested by the Lives of Common People

That has been the view of many men who have tried to keep the preacher out of the practical life of the world—to deny the application of the spiritual truth to the daily concerns of life. I think it is a false distinction. A man can tell the truth and bless humanity while running a factory as well as when preaching the Gospel; and sometimes I think that Christianity and Judaism and all of our religions are really tested, not so much by the lives and teachings of ministers, as by the lives and teachings of the representatives of those religions in their daily contact with men in business and in the home. (*Applause.*)

Indeed, the great religions of the earth—Christianity, Buddhism, Zoroastrianism, Mohammedanism—were founded by laymen who stepped out of the secular life before the world as the founders of great faith and the proclaimers of great ideals.

So that is your work—the crusade for the prevention of misfortune. If that is true, you should conceive your work in that light. That is the way we spiritualize our activities, by seeing them in their broad implications. I sometimes tell the furniture workers of our city that when they make a table, for example, they must remember that that table is going into a home and around that home will be father and mother and the kiddies. It will be the center of holy influences, of delightful intercourse—the table of the home. Why not make it a good table? Why have a lie staring these people in the face—something that is not what it pretends to be? Put conscience and honor and religion into this work.

A man's work bench can, in that sense, be the altar where he worships. Just as in the play, "The Servant in the House," the drayman fixing the sewer down below performs his function so that the worshipper above may be healthful and not go to his home long before his time; he too is an agent of God.

So I say, let your motive be more than economic. I believe if a careful analysis were made of much of the industrial betterment movement

of our time, we would discover, contrary to the teaching of a good many people, that the economic motive is not dominant, that there are thousands of men in this country who are trying to prevent accidents and improve working conditions and hours and wages and benefit their brothers, not from an economic motive, but because they feel they ought to render a service and because they love their fellow men. All the love of man is not confined to the people who work for wages. There are many men in this world in high station who are trying to discharge their function in society, to employ their high talent for the good of mankind; and that is why some of them are noble, for what makes real nobility of character is a high motive and a broad purpose; you are just as big as your cause and if your cause is dollars you are going to have a mean, shriveled up soul.

The Boy Who Had the Usual Dream of Riches

I never will forget the story of the boy who said to an old rich miser, "How can I get rich?"

"Well," said the old man, "save every possible cent you can save to get a hundred dollars and put it in the bank. It will draw interest. Do not touch the interest. Wear your clothes as long as you can. Don't spend your money for the theater and concerts and cigars. Save and save and save, and when you get as old as I am you will be as rich as I am and as mean as the devil."

There are many men like that whose eye is fixed on the profit, and perhaps some have crept in here unawares, who are interested in the safety movement because it may reduce their overhead or their expenses, their insurance or something like that. There is money in it for them; it is going to pay them to look after their fellow men.

Why degrade a noble calling, an occupation of supreme value? Why supreme value? Because your success, men and women, is to be measured not only by the statistics of the number of reductions in accidents, the amount of dollars saved; but whenever you prevent, by your labor, an accident, you do more than save a life, you save a home. The boy and the girl now have an opportunity because the breadwinner is alive; they would not have had money for an education; they would have been crowded into the factory before their time; now they can go to school. You save tears. You prevent heart aches. You minister to life, make it happier, give it a chance to be pure and true. That is what we do when we save life.

Let us conceive of ourselves as a part of that great host of men and women who today are beginning to realize the glory and beauty of service in the daily life of man, the beauty of fidelity in the factory and mine and railway and bank and newspaper office.

The Master of old, speaking of religion, said to his disciples, the field is the world. And so it is. The field of moral endeavor is not limited to Sunday and the church, to kneeling in prayer or to performing rites

and ceremonies or reciting creeds. It includes your daily thought, your daily plan, your daily motive.

PRESIDENT SCOTT: Dr. Wishart, if there was any discouragement in our hearts when we came here this morning, it has been removed and I am sure everyone here will feel deeply grateful for the inspiration, the new view, the splendid view of our work which you have so well presented, and we thank you for addressing us.

In the absence of the Mayor, he has delegated one of his staff to give the official welcome to this delegation, I have great pleasure in presenting to you, as the Mayor's representative, Mr. John Atkinson, Assistant Corporation Counsel.

AN OFFICIAL WELCOME FROM THE CITY OF DETROIT

John Atkinson, Assistant Corporation Counsel, Detroit, Mich.

Mr. President, fellow guests and members of the National Safety Council: There was a time when we didn't need safety in Detroit at all—when, if we had a few accidents a year, it was wonderful and they got the front page of the paper. Detroit was so sleepy and so safe that it needed nobody to stand at the corners and warn us to stop, look and listen. About 12 or 13 years ago we woke up and we began to step out beyond any man's judgment or prophecy. We gradually came into our own in what is known as the automobile industry. Previous to that time we had had our great industrial plants and we thought we were quite some city. Our streets were beautiful; we had made up our minds that certain families were going to be the wealthy families of all generations to come, and each man had fitted into his slot and was apparently content to run his race in the line in which he was heading.

But when the new era came in and we began to manufacture motor cars, not only the individuals went crazy but collectively the city went crazy. So we have expanded and expanded and expanded again, until today Detroit is a great, huge, throbbing metropolis where before it was a sleepy, well-cared-for old town, and the beauty of the thing—or perhaps the devastation, if you want to call it that—is that as we go to bed at night we don't at all know where the limits of the city are going to be the next day.

There was a time here when our friend Henry Ford got up to a capacity of 1,000 cars, and we thought it wonderful. I tried a condemnation suit the other day in which we sought to put a street across his Highland Park plant and discovered that the output of the plant is as high as 9,500 cars a day. When his witness told me that he thought Henry was a great philanthropist, I told him I wasn't so sure but what he would have a lot to answer for when he got to heaven. (*Laughter.*)

So we have gone on in this city, gentlemen and ladies, and we have just

built our city by sheer strength. Our city is no longer pretty. We are getting higher buildings and some of them are structures of beauty like this building; we think we are going to be a great, beautiful city. We are spending millions of dollars for parks; we are spending millions of dollars for wider streets; we are just lavishing money in every direction with the idea that some day we will amount to something, but right now we are a great, huge, lumber camp that is just busy doing things.

I don't know so much about safety. When I came over here I had an idea, (being a man who drives a car), that it applied entirely to the ability to get through a street without having seven or eight Fords go over the top of you. (*Laughter.*) I appreciate that it means more than that and I appreciate that men like yourselves—unless you have a love of the thing, unless you are fired by real zeal—probably never would get together in an assemblage of this kind to work for the benefit of your fellow men. I have had one or two fellows run into me recently that I could recommend to you strongly. (*Laughter.*)

Speaking seriously, it is worth while to have a crowd of men like yourselves who come in and say, "This world war that killed so many people, when life grew so cheap, is all over and we have to get back to first principles where a life is of inestimable value and must be saved." For that reason I feel that this Council is entitled to particular consideration and I am particularly sorry that the Mayor couldn't be here to welcome you in person, but I want to tell you from the bottom of my heart, in behalf of the city of Detroit, that we are glad to have you here and we hope you will like us well enough to come again.

Thanks and Appreciation to the City of Detroit

PRESIDENT SCOTT: We know what it means to a city to entertain such a vast number of people, and the fact that we are all comfortable and happy demonstrates that Detroit was equal to the occasion.

I want the representative of the Mayor to convey to him our appreciation for all that the city of Detroit has done for us and to assure these people that we deeply appreciate the time and the expense they have gone to for our entertainment.

I will take this occasion also to express appreciation to others to whom we are indebted for the success of this meeting and its program. I want to give an expression of appreciation to the president of the Detroit Industrial Safety Council and to his local committees and their chairmen who have been of such great assistance in this work; to the speakers who are on the program, to the press, and in fact to everyone who has worked to make this Congress a success, we extend the thanks and appreciation of this entire convention.

We have been up on the precipice and have been building the fence and we have had a view of our work and what it means by that beautiful illustration that was given by Dr. Wishart. Now we are going down to

the foot of the precipice and we are going to hear something about what goes on down there, where the ambulances are and the hospitals and the cots and bandages and the first aid equipment, and we have selected a minister for this presentation also.

Mr. Cameron is accustomed to handing the president a biography of all of these gentlemen and if any of you want to see these biographies after the meeting is over, I shall be glad to submit them to you in detail. But for the purpose of introduction I will only say that the next gentleman who is to address us has the distinction of being president of the Catholic Hospital Association of Milwaukee and a representative of the American Conference on Hospital Service. In addition, he is the acting dean of the College of Hospital Administration of Marquette University, at Milwaukee.

It is with great pleasure that I take this opportunity to ask Dr. Moulinier to address you.

THE HOSPITAL'S PART IN PREVENTION AND CURE OF DISABILITIES

**Rev. C. B. Moulinier, S. J., President, Catholic Hospital Association,
Milwaukee, Wis., and Representative of the American
Conference of Hospital Service.**

I am beginning to think that you are a very pious group of people. You have had three ministers here to talk to you today. I think the other two ministers have told you about enough, as coming from the ministerial side of things. I am a priest and pretty old and really haven't practiced in the ministry, except in a personal way, for a number of years.

The association of which I am president is continent-wide. I saw 12 years ago that hospitals weren't all that they should be and I said to myself (being at the time regent of a medical school and knowing something about medicine and also being a priest), that if I could induce the 750 hospitals conducted by Catholic sisters to become better places for the sick, I would accomplish something.

Two years after that, having organized this group of people, I was invited to join the American College of Surgeons in its effort at standardizing all of the hospitals of this continent. During these years of travel all over the continent, I have been studying not only hospitals, not only preventive medicine and curative or restorative medicine, but I have been studying in as thorough a way as I could, in the midst of many occupations, the general health problem.

When I was asked to come here and make this talk to you today I started in to learn what I could of the progress you have been making since the meeting you held in Milwaukee 14 years ago, when I talked to you for five or ten minutes. I got your program; I got your literature;

Dr. Mock, that great salvage surgeon, has written to me; I have met the local men of Milwaukee and have gotten all of their literature; I have written a paper which I don't think I will use because I have gotten a great deal of knowledge and inspiration here this morning. I had the inspiration that the reverend gentleman has been giving you all along except that it was revived and strengthened and I have been analyzing for the last couple of weeks or more, your whole proposition as far as I am able to grasp it.

Big Organizations All Working Together

Of course, I am a layman. I am not an M.D.; I am not a nurse; I am not a health officer; I am not a safety first expert. But, if you will pardon my presumption, I am going to try to tell you something that has been growing up in my mind by way of mere lay suggestion. I consider it a great honor to be here, a great joy to be here with you, and if I can just suggest a few little things, I shall be fully repaid.

My topic is "The Hospital's Part in Prevention and Cure of Disabilities." The emphasis of the thought this morning has been on the prevention side. That is very important, but don't forget the curative and restorative and rehabilitation side. I have been dealing with big national organizations and it is a joy to come in contact with another one. We are all working together. I would like to see a joint meeting of the American Medical Association, the American College of Surgeons, the American College of Physicians, the Protestant Hospital Association and the Catholic Hospital Association.

Our work is really one and the same in its purpose, as was so beautifully brought out here today—the saving, the prolonging of human life, the most sacred God-given thing we have next to our soul and its immortal value.

You are educating the public by publicity. You are getting into many of the city schools. You are educating the men in the shops and in transportation. You have a wonderful system of publicity through your posters and your literature, but I am wondering, as your president did in his address, whether there isn't room for more work in these lines. Why can't you get into the parochial and private schools, in the grade and high schools? I offer my services to get you there if you want them. (*Applause.*)

I know that in Milwaukee the director of parochial schools is in close touch with the Safety Council there, but the same thing could be done all over this continent by a little bit of concerted action. In order to develop an instinct for safety, an attitude to be safe and to keep safe, you must get at the young. You get into the home through the workers in the shops. You must get there thoroughly and completely over this whole continent through the schools. The young must be trained to appreciate that priceless gift of life. They must be made thoughtful and careful—a difficult thing, of course, but possible, provided you begin

when they are young enough, and train the teachers and train the visiting nurses and give them enough of thought and fact.

I am told that there were about nine millions of people injured in accidents last year—nearly one-thirteenth of our population. Very likely if you hadn't been so active for these last 15 years, there would have been twenty millions injured. Your aim, therefore, must be to reduce, year by year, the accidents in spite of the fact of our growing complex civilization and the dangers that are becoming more numerous all about us from day to day, and from month to month. How can this be done? You must get better laws from the legislature governing traffic; you must get laws requiring licensed chauffeurs and demanding careful examination before a machine may be driven by anyone; you must train the police forces all over the country—they are being trained but I think not enough. The traffic laws within the city, I believe, can be improved. You can, with the machinery you already have, make that training and that preparation against accident more thorough.

The Hospitals Should Be Enlisted in Safety Effort

The hospital organizations have not yet, as far as I know, entered into your movement for the prevention of accidents. I don't see any of your posters, I don't hear of any of your literature being distributed in the nearly 8,000 hospitals of our own country. How are they going to help you in accident prevention unless they know more about your movement, unless your local councils and the National Council get into these hospitals and instruct the people there—the managers, the nurses, the orderlies, the internes, the doctors? When they are thoroughly educated every patient that comes to the hospital will go out educated, and there are between ten and twelve millions of people who pass through these hospitals every year. See the field that hasn't been touched, as far as I know, except through the natural reflection of prevention in medicine, prevention of disease. Now, gentlemen, there is a field there and I hope before your meeting closes that some committee newly appointed, or some committee already in existence, will take up that problem of reaching this great body of hospitals.

I was introduced as being regent of a college of hospital administration, the first of its kind in the world. It is now in its third year. Why such a college? In order to give a real, scientific hospital training to those who are to manage the hospitals of this continent, regardless of creed or sect. There are \$4,000,000,000 invested in hospitals, \$600,000,000 annually paid for the maintenance of them, and some \$500,000,000 being invested every year in additions or new hospitals. Just think of the tremendous investment and of the people managing, handling and directing those hospitals who have had no specific scientific training. They have just grown up as hospital executives. The nurses get a training, yes, but the executives, the ones who decide on the policies, the trustees, are mere laymen and hardly know what a hospital is except that it is a place where the sick go and where doctors treat them. They are not trained.

May I ask a question? Are your safety officers being trained? You are getting experience; you have grown up in the shops, on the railroads; you have read a great deal; and I have no doubt this body is made up of a wonderful group of experts; but what about the scientific analysis of the whole problem? What about your knowledge of first aid, of medicine? What about your knowledge of mechanical safety devices and your practical technical knowledge? What about your whole view of the health situation of our people?

Gentlemen, in this College of Hospital Administration we have a department planned for the training of health officers, safety officers and all connected with human health. Think of it; deliberate upon it; get some one of your committees at work on it. You have done wonders and are doing a great work in the world, the like of which can hardly be duplicated anywhere. The number of lives you have saved and the injuries you have prevented can't be estimated, but isn't it time to get right down to solid analysis, to see whether every worker in every shop and on every line of transportation has had a training that fits him for his work, not only the practical but the theoretical?

The Medical Profession Has Been Lagging

There is a science of preventive medicine and prevention of accident, just as there is a science of restoration. The medical profession itself is lagging way behind. I am sure that Dr. Mock will tell you some things that perhaps you know—perhaps you don't know—about the tremendous development in surgery, restorative, rehabilitative surgery and the application of physiotherapy as an aid to surgery. I have heard him speak a number of times. He is, perhaps, the leader in that phase of medical and surgical work in this country. You are to be congratulated in having this year for the first time brought in the hospitals and the medical profession in the matter of human salvage. The medical profession is an infant in its knowledge of orthopedic surgery and the application of physiotherapy as an aid to surgery. I say infant because only a few years back—and the war has aided the progress—it began. You yourselves must know that in your shops the disabled are returned to work rather inefficiently. The National Industrial Surgeons Association, only a few years ago, began to realize the importance of their work, began to analyze and study themselves, and began to see that the industries too often took medical men into their shops and turned over the workers to them rather in view of the small salaries for which such service could be gotten than the expert knowledge and skill they possessed. That is changing. We are coming into a new era. Everybody, every organization of considerable size, is realizing that the terrific industrial expansion of our country calls for the very highest and best service.

Next in importance to preventing an accident is the restoring of the injured person to economic and social value. I like to differ a little from my reverend friend, Dr. Wishart. You represent industry. You represent the railroads. All this work, no matter how beautiful and how

wonderful and how sweet and how glorious it is, must pay—must pay your employers, must pay the industries—and I say that it will pay better than it has in the past the more scientific it becomes, the more thorough and sure, and the better trained are all the men who have in their charge the safety work and the restorative first aid and medical and surgical care.

I am not preaching. I am just telling you what seems to me to be the basic principle. Your president said you must be wise; you must conserve your financial resources. Absolutely you must, and you must conserve the resources of the big industries and the railroads which you represent. You must convince them by your scientific care in the prevention of disease and the restoration of the injured. You must combine all these tremendous agencies of the medical profession and the hospital people to give you the kind of service which a thorough study of the situation will enable you to judge is wise, and you must convince your higher-ups that a cheap doctor, a cheap surgeon, is a waste of money. You must have the best.

So it is with all your safety officers. If they are not trained, if they don't know, if they are not thoroughly conversant with every phase of prevention of accident and restoration, if they don't know what the hospitals are and can do and should do and aren't doing, you are not giving them the service, you are not getting for them the return on their investment and you are not saving for them the money that you might.

A Personal Message to Henry Ford

If Mr. Ford were in this audience, I would say to him, "Mr. Ford, invest some of your millions in the best way possible, and that is to help this movement for the prevention of accident and the restoration of the injured and look to it that the hospital world of this country and the medical profession become more and more keenly alive to what they can do with the growing knowledge of surgery and of physiotherapy." *(Applause.)*

I don't know what your expenditures have been year by year. Let me say they are a million dollars. I say to you, Mr. President, and all of you officers and members, if it has been a million dollars per year, put in five million and you will save more money to industry and to the world; and of course you will save more lives and you will restore more lives, because in order to do all this more effectively, getting everywhere, not only in the shop, not only on the transportation line, not only in the home through the shop, but also in the schools, and bringing along with you as cooperators all of the hospitals of this continent, you will save millions of dollars and thousands of lives and you will restore them to economic productiveness and human happiness far beyond any estimation we can make now.

I recommend that you have a committee to study this situation and I would like to make one final suggestion. This whole problem (I speak of it as one great problem) needs more survey work to get the facts,

not only the facts of accidents but the facts of every kind that have any bearing on human health in industry, on the streets, in the home, in the schools, on the playgrounds—everywhere. Next to that you need a group of research people. You are doing some research. Are you doing it systematically? Have you people whose work it is to make research in every direction affecting human health in industry and in every other occupation of life?

Then your publicity. It is splendid. I have been amazed at it and yet I can see where much more can be done. Perhaps you haven't the money. Get the money. Tell the people who have the money that they are wasting their time and energy in not putting in more money so you can make this publicity greater among the laboring men, among the general public, so that they will realize that industry, that money makers, that the wealthy people who are guiding the destinies of the finance of this country have hearts, have souls, have consciences. How can they prove it? By putting their money into it. They have done some of it. They should do more.

Then this same group of surveyors, of research people, should have with them, or be themselves, publicity agents. And, finally, there should be a teaching corps, made up of the same group of men or others.

I suggest that you go to Henry Ford before you leave town (*laughter*) with a committee—if I could stay here, I would go with you—and tell him that you need about five million dollars to establish a group of fellowships for the survey, the research, the publicity and the teaching of the value of human life and the various means of preventing accident and restoring those who are the unfortunate victims of accident. You can do this, gentlemen. You see how bold I am. I am a clergyman only. Perhaps if I had a position in a shop, I wouldn't talk this way. I might feel that I were jeopardizing my position. I don't owe anything to any industry or to any group of people. I am giving my services without salary to this whole country in the betterment of hospitals, and it is a rare delight to me to be able to come here and say these few plain, outspoken words.

ADJOURNMENT.

Executives' Session

October 25, 1926

WM. ROBERT WILSON, Chairman
President, Detroit Industrial Safety Council, and President, Guardian Trust Company, Detroit, Mich.

THE Executives' Session convened at 2:30 o'clock, President Scott presiding.

PRESIDENT SCOTT: At the opening of this second session of our Congress it gives me great pleasure to introduce to you the chairman who is to preside at the session this afternoon. Mr. William Robert Wilson is the recently elected president of the reorganized Detroit Industrial Safety Council. Mr. Wilson is also the president of the Guardian Trust Company of Detroit and chairman of the board of the Murray Body Company. He is also chairman of the board of the Copeland Products Company as well as other organizations engaged in the automobile manufacturing business.

The chief and outstanding fact in connection with Mr. Wilson follows: Mr. Wilson started his business career in Chicago and at one time was vice-president of the Irving National Bank in New York. He then became the president of the Maxwell Corporation and is now devoting his energy to the Guardian Trust Company and other corporations mentioned. Mr. Wilson is a graduate of the Armour Institute of Technology of Chicago.

It gives me a great deal of pleasure to introduce to you the chairman of the afternoon session, Mr. William Robert Wilson.

CHAIRMAN WILSON: It might be embarrassing to have all of your ancient history as well as modern so thoroughly developed on an occasion of this kind. I appreciate the fact that Mr. Scott forbore going any farther than he did.

If you have traveled by day from Buffalo to Toronto you will recall how, after some journey on the high level plateau which makes the gorge of Niagara possible, suddenly there bursts on your view the great expanse of Lake Ontario, and later the city of Hamilton is laid out underneath your eyes. It is a view like that of Duluth from the heights

behind the city, and excelled, I presume, by that of Rio Janiero from its nearby mountain.

Like a hundred million Americans, I have believed in safety for years but have taken a matter-of-fact view—a view arising from ordinary and often small reminders. Riding along a smooth asphalt street in pre-occupied fashion one is occasionally given to profane expression by an abrupt jolt from one of those warts in the pavement made to mark a safety zone. Or again in boarding a railroad train one is given to sardonic humor by the safety signs which confront you, when you may feel that they should more properly face the railroad operator. It has not escaped my attention, as one of the small reminders in any home with children, that this safety idea starts early and only takes on a new significance at the grave.

But the program of this National Safety Congress, like the sudden view of a great city from the heights, brings an impressive realization of the comprehensiveness of this great movement for safety.

It reaches into more and more industries, into mining, quarrying, transportation and the various other works of men. It not only enters his occupations but like an all-pervading protecting influence surrounds him everywhere. In fact, if safety continues to have the attention it has already enjoyed, it will be a kindly influence almost as pervasive as Providence.

Modern Civilization Has Multiplied the Hazards

But the comprehensiveness of this expanding work for the protection of human life and happiness should not be construed as paternalizing us with a coddled comfort. It can not be said that the instincts of the savage were sharpened to any more alertness against danger nor his fibre better developed. The amazing development of material civilization, while it has freed us from some of the cruder dangers, has brought an infinite train of new and often more terrible tests. The savage was in no danger, by a misstep, of electrocution by 100,000 volts; the savage had none of the menaces typified by our towering blast furnaces where, if the mix gets out of control, an explosion may bring a flood of white iron to engulf hundreds of workers in a twinkling. It seems to me our progress develops more alertness of faculties and a sterner fibre. One look at the thoroughfare just outside at 5 p. m. brings a trail of reminders of the narrow thread of life.

So I am sure you will agree that the enlarging refinement of this great endeavor for safety is not weakening the fibre of our people, but is, on the contrary, the only fitting accompaniment to the high pressure of life, the imminence of disaster, and the swarm of new dangers presented by our rapid material progress. It seems to me that if we regard our present civilization as one of those great armies stretching across hundreds of miles of a "Western Front," then the amazing organization for safety is only comparable to the sum total of those many ministering agencies of welfare best typified by the great Red Cross. It is ordered

that civilization must forge ahead with all its increasing hazards, but with it we must push right along, as a service of supply and welfare, the attendant guardian host of safety.

It is befitting the importance of this magnificent work that you should be addressed by notable men engaged in one or another aspect of it.

Most of you safety representatives are old enough to remember some of the terrible disasters that have happened to steamboats on which people went to enjoy a little recreation. Our memories make it seem that in the old days many such vessels were often not fit for travel. Thousands of men, women and children have been drowned because greedy, selfish, criminal owners did not protect their passengers. But times have changed. Today you are to understand that you are as safe on a steamer as in your own home.

You are going to hear what Uncle Sam is doing to protect you and yours when on board a steamship. And the man who will tell you about this development is an authority. I refer to Mr. D. N. Hoover who is the Supervising Inspector General of the U. S. Steamship Inspection Service, Department of Commerce, Washington, D. C.

We are, indeed, gratified to know that two big men of the same name are personally interested in the National Safety Movement and particularly in our own Council. All of you know what Mr. Herbert Hoover has done to encourage the Public Safety meetings which have been held at Washington and in which the officers and members of the Council participated.

You will now be addressed by Mr. D. N. Hoover of Washington, D. C. While his title is Supervising Inspector General I think we should call him Admiral.

SACREDNESS OF HUMAN LIFE

D. N. Hoover, Supervising Inspector General, Steamboat Inspection Service, Department of Commerce, Washington, D. C.

I want to cover about two thousand years in about ten minutes, and hence, in order to do that, I must speak rapidly and, of course, go into very little detail in regard to the subjects that I intend to touch.

My subject is the "Sacredness of Human Life," and first of all it might be well to examine the definitions and find just what some of these terms mean. In the first place, a thing we call sacred is that which is set aside for religious or divine use. In the next place, we know what life is and it is not necessary to go into any extensive definition of it. But, as compared with the word life, there is also the word death, which is exactly the opposite and we know it to be the cessation of this active life we are here living. Lastly, there is the word human as distinguished from that which is divine or material or animal.

Has it ever occurred to you that, notwithstanding that we live this life, and notwithstanding that we are told that in the midst of life we are in death, yet that very seldom do people undertake to express the thought that none of us has any control whatever over the fact that we

are here, and that none of us is able to escape from here by any other door except that of death? Has it ever occurred to you that while good friends and while the clergy may undertake to make the passage through that door as easy as possible, yet neither good friends nor the clergy can erect a different door through which to pass. Possibly this is the thing which is at the back of the love of human life, for should it happen that there should be a disaster in this city in the way of an earthquake that would affect the foundations of this building, the first thing that each man would do would be to try to protect himself, to try to get out, the law of self-preservation asserting itself at once. And yet, notwithstanding how dear human life is to us, has it ever occurred to us how cheap human life has in the past been held?

The Pyramids a Monument to Human Waste

Some of you have doubtless been to Egypt and have seen the great Pyramids there. If you have, you know that surrounding those Pyramids is a great waste of sand, a dry desert. Has it ever occurred to you that those Pyramids, concerning which engineers have been prone to debate as to their construction, were built with human blood? Has it ever occurred to you that they were built almost entirely by slave labor and that they were not particularly careful as to how they destroyed the labor? Has it ever occurred to you, as you read of the life of the Hebrews in Babylon, that a certain number of tribes of those people were absolutely lost, were wiped out, were consumed? We do not know where they have gone. There have been interesting treatises on what became of them, but all of it goes back to the period of the world when there was absolutely no value placed on the individual life.

If you come down from that ancient time to the time of Rome, you will find it was the custom of those people to have gladiators and circuses and prize-fighting rings. You may say, in the light of modern rings, that we, too, have prize fights. We do. But they had contests between men and beasts in a way such as is not known today and such as would not be permitted today even in those communities that are considered to be the most progressive.

Again, if you come down to our own times, to the Middle Ages, you will find life was sometimes even less valuable than in those very ancient times. I am sure all of you have read of the crusades conducted by the Church during the Middle Ages, the purpose being to take the city of Jerusalem from the Turks. But I do not remember reading in any history of an event which was known as the Crusade of Children, when little children, three, four and five years old, were marched across Europe to the gates of Constantinople, where many of them were taken slaves. They had the idea, honest enough to be sure, built upon a faith perfect but ignorant, that if soldiers could not take the Holy City the faith of the little children could. But that idea, perfect as it may have been in faith, gave no consideration whatever to the value of the life of a child.

Coming down further we come to the time of the feudal system. Any of you who have read of it must know that while our law of real property is based upon it, it is also true that under the feudal system the barons had rights which even at times permitted them to take the life of a serf or servant.

It may seem that from that day to this day is a long step, and it is. Yet in this day things are by no means perfect. But we have made tremendous advance, namely, there is a public conscience now awake that demands that human life shall be given proper consideration. Over against that period of time, covered from the ancient down through the Middle Ages to modern times, has stood, however, a force that has forever fought for right—you may say not always intelligently, sometimes with fanaticism; you may say sometimes with bigotry; yet, nevertheless, it is a force we must take account of in Christian civilization, and I refer to the work that was done in the Middle Ages, even as it is done in modern times, by the Church. Because while it is true that in the Middle Ages there were violence and darkness and ignorance, yet on the other hand there was kept alive in the monasteries and schools of learning conducted by the Church the idea that, after all, it doesn't necessarily follow that might is right—the idea that there is such a thing as righteousness for its own sake.

Men Progressed Rapidly After the Reformation

After the Reformation and after the Renaissance and after the general revival of letters, there then came a rapid step forward by people thinking along the line of protecting life more than they had done before; until now, today, we may see, as we travel over this country, all kinds of refuges, schools, hospitals, and the like, that have their origin in what is essentially Christian training. And we find in modern times all of the public welfare associations working hand in hand with religious organizations for the betterment of conditions.

As I came down the streets of Detroit this morning after I had gotten off the train from Washington, I was impressed by a certain fact, (and possibly you may have been, too). Have you ever stopped to consider the number of windows that there are in the buildings of this great city? Have you ever stopped to consider the number of window panes in those windows? They must run into millions. Remember and keep in mind this thing: that in the Middle Ages, especially in France, every opening in a house was taxed. Hence you can find in France today houses owned by the poor peasants where there is but one opening, a door, because in the Middle Ages, if they had more than a door, more than a window, every one of them was taxed. Compare, if you please, now, therefore, the city of Detroit or any modern city and the millions of instances where you have windows, holes cut in the walls, in order that light may come in.

In other words, it seems to me we have turned our faces to the sun and to the fact that it is not sufficient to be content with a mere saving

of life, but, what is just as essential, that we shall have life and have it more abundantly.

CHAIRMAN WILSON: Ladies and Gentlemen, with respect to our second speaker, Dr. Finley, I am sorry to have to tell you that through a combination of circumstances which he could not foresee it was impossible for him to be here. He sent this telegram to President Scott:

"Regret exceedingly that it will be impossible for me to be in Detroit Monday. Conditions here which I could not foresee compel me to be in my office here in New York. I am deeply disappointed for I wanted to say a word for children and pedestrians, but you do not need me with such a fine list of speakers.

"JOHN H. FINLEY."

We should congratulate ourselves on having with us this afternoon a physician recognized as a specialist of renown. Hundreds of children whose deaths would be mourned by their parents are alive today as a result of his skill. Dr. Chevalier Jackson, Consultant Bronchoscopic Clinic, Jefferson Hospital, Philadelphia, is going to tell you how to safeguard the lives of children. His message is one that should be in the hands of every parent in America. I hope the newspapers will give a full report of his address because of the pertinence of his suggestions for the safety of children—the hope of every nation.

Dr. Jackson will relate to you facts that it has been part of his life work to obtain.

WHAT 2,000 CHILDREN HAVE TAUGHT ME

Dr. Chevalier Jackson, Consultant, Bronchoscopic Clinic, Jefferson Hospital, Philadelphia, Pa.

(Address illustrated by numerous lantern slides)

Many afternoons would not suffice to tell you the lessons I have learned in regard to safety of children from the children themselves, from say 2,000 children. Broadly speaking, the children have taught me that mothers in general, almost without exception, are unaware of many of the dangers that confront their children every day in the home, even in the mother's arms. A mother instinctively feels that there is no place on earth where the child is so safe as right in her arms; and yet we have hundreds of cases showing that the accident happened right there in the mother's arms because the mother did not know. It is necessary to educate the mother in regard to these particular dangers.

Railway executives have concentrated on the elimination of avoidable accidents until today the passenger is about as safe as the pedestrian. When I was a boy one of my intimate friends was an engine man and he was a great hero to me. One day one of his friends said to him. "Chev, if you keep on running an engine, you are going to get killed." And killed he was in a disaster some 50 years ago. Today the engine man is just about as safe as the man in the street, and probably safer than the man in the automobile.

It is unnecessary for me to refer you to what boards of health have done, to what industrial men are doing, to what the executives of railroads have done. I only refer to those things, because you probably know more about them than I do, by way of contrast. While all of that accident elimination has been going on, the same dangers are lurking right in the household, right in the mother's arms. So far as I know, up until the last few years, until we who are especially interested in it took the matter up, nothing was done to educate the mother, nothing was done to prevent accidents to children in the home.

(*Slide*) My subject is divided into two separate parts. The first part is in regard to household lye. Here is a little child who was brought into the hospital unable to swallow a drop of water. The tongue was swollen until it clove to the roof of the mouth and there were big patches of burns. This child had swallowed common household lye. Every household in the country has this lye on the floor—not up in the medicine cupboard where they put the carbolic acid and other things. That is the first point I wish to make.

The Little Child Was Unable to Swallow

What happened? These burns around the mouth healed, but in the course of about a month or two the mother discovered that the child couldn't swallow very well. She delayed bringing the child in until finally when she was brought into the hospital we gave her a glass of milk to swallow, but it came right back into the basin. She had swallowed common household lye which was on the bottom shelf, and is on the bottom shelf of pretty nearly every kitchen in the country, and the mother doesn't know enough to keep it out of the reach of the children. We have hundreds of cases like this.

(*Slide*) Here is a second child burned with lye. He couldn't swallow and a surgeon was called in and saved the child's life by putting a tube in through the abdomen. Because the child couldn't get food or nourishment, he is emaciated to a skeleton and completely dehydrated for want of water. That child couldn't get down one drop of water for nearly a whole week because he had swallowed lye.

(*Slide*) Here is another case of a similar accident with a different brand of lye. You all know perhaps that a burn makes a fearful scar. Lye burns just like a red hot iron. After the ulceration has ceased and the scar has taken its place, the scar contracts and that makes what we call a stricture and that shuts up the tube through which the food is taken from the mouth to the stomach. This child couldn't get any food into his stomach. An operation was performed and a tube was put right in his stomach in order to save his life. No picture was taken when he first came in, but after a few weeks when he had had some water and food and was feeling better a photograph was taken. All of the food and water he can get is what goes through the funnel which gives him the necessary nourishment to live. He chews up the food and

spits it into the funnel. We will get that passage opened up eventually but it takes a little time.

(Slide) All of these children were victims of that same accident—a household lye burn and a stricture, and they couldn't swallow and they were sent in for treatment. Most of them can be cured; it is true, but there is a long agonizing time and it is a preventable accident. You can't tell me that it can't be prevented, that is, that these children can't be prevented from swallowing lye.

It isn't always necessary to do the operation to put the water into the stomach, but valuable time has been lost somewhere and the surgeon is called in from some distant city and puts in a tube and saves the child's life until he can be shipped into one of the now numerous centers where that kind of trouble can be completely cured. All of these children were shipped into the hospital within a few months of each other.

(Slide) Here is a clipping from a newspaper: "Left alone baby eats lye. May die." Mrs. Karick was carrying the family supper home from the corner grocery store when she saw some of her neighbors all excited about her house.

"Where is George?"

"He ate the lye you left on the table."

When he did that she was probably buying more lye at the grocery store, that is where it is sold. (Laughter.) The druggist must put a skull and crossbones on carbolic acid and such things, but the corner grocery store doesn't have to take any such precautions. I just want to ask you a plain question: Would she leave carbolic acid with a skull and crossbones on it on the table where a child could get it?

The Mother Doesn't Know the Danger

She doesn't know. If she had known that lye could kill her child, she wouldn't have left it within reach of the child. The mother must be educated. The first point in the education is to put a label on the can so that she will know that it is lye and that it is poison.

(Slide) This child came in in a very pitiable condition. Notwithstanding my 40 years of being more or less immune to human suffering, I can not help but cry when some of these children come in in the pitiable state in which they arrive. But here is this child fattened up because a surgeon has done an operation. She has since gone home entirely, cured. The tube has been taken out and she can swallow the same as she ever did, through her mouth. She swallowed "Cleanall."

(Slide) The label on this package says, "Does not injure the finest fabric or the most delicate skin." Not only is there no poison label on it, but there is a directly misleading statement. What mother would ever think this could possibly harm her child when it won't harm the most delicate skin or the most delicate fabric? That is over 75 per cent sodium hydroxide. That takes water out of the tissue and it burns just like a red hot iron.

(*Slide*) That is not an isolated instance. Here is another as a result of the same preparation and the child was burned in the same way. It meant months and months of suffering and of treatment.

(*Slide*) As a result of agitation we finally secured a poison label on this package. But you don't see it and you won't see it. It is camouflaged. I don't say that it is done intentionally, but there is a checker-board design and that is printed in red obliquely. After the agitation it was printed horizontally and a little more conspicuously. As a result of a law passed, it is now printed horizontally in type of specified size.

When these cases first began to come in we discovered that there was no poison label. As the result of agitation a law was passed in Pennsylvania and the word poison was printed in prominent type.

Laws have been passed in thirteen states simply specifying that they put the word poison on in type of a certain size, but it is a law only in those thirteen states.

Camouflaging the Label is Unfair Business

(*Slide*) What is the effect of that? The worst kind of unfair, unjust competition. Here is a firm that puts the word poison on here as required by the state of Pennsylvania in large letters. Now then you go into the grocery store and you find there a preparation that won't injure the most delicate fabric and another preparation that is marked poison. You wouldn't hesitate a moment in buying "Cleanall" and yet that is just as dangerous as this. In the state of Pennsylvania the packer of lye is compelled to put this scare-label on it, while up in Massachusetts, which has no such law, the packer can put on anything he pleases, even that it won't hurt the most delicate skin. What is needed is federal legislation that will be absolutely fair to all. It won't stop the sale of lye; it won't stop anybody from buying a single can of lye; but they will know when they buy it that they must put it up out of reach. (*Applause*)

When I was a boy and worked in the mill we had a big pair of miter gears that we called man eaters. The law now requires that all of these gears be guarded. In those days there wasn't any such law and the gears took their toll of arms and legs and heads or anything that got in their way. Not only does the law now require that all such gears be guarded, but those gears are in mills where there are trained mechanics and where the child labor law forbids children to go. But here, in such packages as I have been describing, is your man eater, your child eater, and it goes into the household without a guard on it. They might as well put on it, "This is safe!"

What is needed is a federal law requiring that the word poison be put on the can. It is poison if swallowed. It will burn the eye and fingers, but it would be sufficient to put on it, "Poison. Keep it out of the reach of children."

There is such a bill pending in the Federal Congress and here are the numbers—S. 2320, H. R. 8305. I hope everyone present will write to his Congressman in Washington about it and ask his support on the

Federal Caustic Act with these respective numbers. It can be modified, if you please. I don't know anything about law. I don't know an earthly thing about legislation. But these pitiable cases come to me and I feel something must be done.

(*Slide*) Now we take up part two of the subject, another class of danger that lurks in the home.

These pieces of meat, each one of them, was taken out of the throat of an adult, not a baby, but every gluttonous eater who choked on a piece of meat learned to eat gluttonously in childhood. Children ought be taught to eat slowly. It is not my province to tell you about digestion and mastication—that is the province of the general physician—but all of this choking and strangling and many of the fatal cases you see or read about in the papers are cases where a man has choked to death at the table.

(*Slide*) We get hundreds of cases of bones lodged in the throat, nearly always due to carelessness in two forms, carelessness in hasty eating and carelessness in preparation of the food in the kitchen. Bones are not properly an article of diet. Somebody is careless if they get down somebody's throat, whether it is the individual or the cook, and it happens very, very frequently.

One Result of Carelessness in Eating

(*Slide*) This was a patient who was eating oysters and not wearing her glasses. She gulped down an oyster and thought she had a piece of shell stuck in her mouth, and here you see it was the cap off the catsup bottle. (*Laughter*) It goes without saying that that is careless eating. Nobody could possibly gulp that down unless he was careless—he would feel it in his mouth. However, the matter of glasses must be considered. Everyone who needs glasses for reading needs them also for eating. Inspect the food before you put it in your mouth. If the cook needs glasses for reading, the cook needs glasses for preparing food.

(*Slide*) Here are nuts, seeds, and shells. For instance, we have some 35 or 40 kinds of water melon seeds taken out of the lungs of children because someone was careless in giving those children water melon without taking the seeds out. The same is true of orange seeds and various pits of fruits, and so on. These grains of corn were being used as toys. This dried corn was being used as toys and not as food.

(*Slide*) Every one of those represent a peanut kernel out of the lung of a child, and a very, very sick child. Peanut kernels in the lung of a young child under two or three years of age set up a violent trachia bronchitis and very quickly runs to bronchial pneumonia. There is no reason why little children should be given peanuts. It is very careless to give a child who has no molars peanuts or any other kind of nuts in candy or in cake or in any form whatever.

(*Slide*) We know there is a pin in this lung and we know there is a peanut kernel in this one. How we know is a matter for the x-ray expert, but we know it is there. It is the worst kind of carelessness. That little baby should not be allowed to have such things.

(*Slide*) All of these coins were taken out of lungs of children where they had stuck. Coins are filthy things, to begin with. Think of the railroads being compelled to supply individual drinking cups and then think of the mother giving a coin to her child and allowing it to put the coin in its mouth. (*Laughter.*) That is a circumstance which actually happened. Think of all of the filthy hands that handled that coin. That is all because the mother didn't know any better. She wouldn't do it wilfully.

(*Slide*) Here is a baby who saw his mother putting coins in her mouth and he naturally thought that was the place to put them.

It has struck me very strongly that one of the safeguards is, never set a bad example to a child by putting any inedible substance in the mouth smaller than a spoon.

(*Slide*) We get many pieces of jewelry. Here is a bead. We have had about 12 or 14 cases of beads down in the lungs of little babies.

(*Slide*) Here is a three-months-old baby who had a cuff link in his esophagus, that is half way between the mouth and the stomach.

(*Slide*) Here is a baby who, when he was only one month old, had his own little finger ring in his throat. If you want to give the baby a finger ring, tie a string on it. Here is a very serious condition and a very difficult one with which to deal but entirely needless. There is no reason in the world why a three-months-old baby should be given a thing like that to play with.

And a Daddy Who Tried to Amuse the Child

(*Slide*) Here is a case where daddy was careless. He was leaning over the baby and a loose collar button fell into the baby's mouth while the baby was crying. We have a great many cases of this kind where people try to amuse the children with collar buttons because they are bright and take the baby's attention.

(*Slide*) Here is a collection of hardware. We have all kinds of hardware which we have gotten out of the lungs of children. There is no reason in the world why any child should be allowed to play with double pointed tacks. We have had 14 or 15 cases of double pointed tacks and we have had some 40 cases of brass umbrella headed tacks. That tack acts as a regular parachute—any deep breath will take it into the lung.

(*Slide*) These are all x-ray pictures, you understand. They show the shadow of the foreign body. Here is a staple down in the lung of a little child only 14 months old.

(*Slide*) Here is a screw. We have a great many cases of accidents with screws.

(*Slide*) Here are pencil caps. Some of those are other kinds of caps. We get ammunition occasionally, which the child has been given for a toy.

(*Slide*) Here is a primer taken out of a child's lung. It had been in quite a long time and no one knew about it. No doctor was consulted and that lung has almost gone to smash.

(*Slide*) This is a bullet that was setting up a very violent reaction,

making the child very ill. It was inspired through the mouth. There are more children who have died from these foreign bodies than have ever died from firearms.

(Slide) Here is a tin whistle. Nearly every old hospital has in its museum a record of some child who died with one of those whistles in his throat. Modern methods permit removal through the mouth, but in the old days it was always a case of a museum specimen after the post mortem. Little children ought not to be given those toys.

(Slide) Here is a pair of toy opera glasses stuck in the throat of a doctor's child.

(Slide) Here are jacks. We get a good many cases of jacks, and children ought not to be allowed to put them in their mouths. They are a very serious danger. A child too young to teach should not be allowed to have them in his hands.

Many a Toy is a Dangerous Thing to Children

(Slide) Here is a toy that went into a child's larynx. It is about as big as half of your little finger and it almost strangled the child to death; they barely got him to a hospital in time to save his life. But the point is that a child should not be allowed to have such a small toy. Have the toy big enough so he can't get it down his throat.

(Slide) Here is a toy dog. Those small toys should not be given to very young children.

(Slide) Here is the wheel from a toy automobile. The child detached the wheel. Care ought to be taken that there is nothing detachable that a child can get down into the throat.

(Slide) Here is a washer from a Ford automobile.

(Slide) Here is a commutator spring from a Studebaker.

It is true that in the modern clinic we are able to remove probably from 95 to 98 per cent of these foreign bodies and save the child's life, but it is a preventable accident. These accidents ought not to occur. There are many that occur that are never discovered and the child is dead and buried in consequence.

CHAIRMAN WILSON: Next on our list is an engineer who once upon a time was a college professor. Then he stepped into industry as the assistant general manager of a large industrial corporation. From business he entered into the service of the Red Cross. His ability was recognized by the American Engineering Council, which induced him to become their executive secretary. He is noted in engineering circles for his constructive research work and his books and articles have been widely circulated. Many of you know him as having been elected President of the Eye-sight Conservation Council of America.

I am not going to dwell any more on his achievements, as I don't believe in "painting the lily," but will ask Mr. Lawrence W. Wallace to address us.

RELATIONSHIP BETWEEN INDUSTRIAL ACCIDENTS AND PRODUCTION

**L. W. Wallace, Executive Secretary, American Engineering Council,
Washington, D. C.**

Accidents and production are common to industrial activity. Each has been the object of thoughtful attention and effort. Probably nothing startlingly new can be said or done concerning either accidents or production. But a consideration of their relationship—of the influence of the one upon the other—is a new approach. No comprehensive study has been made to determine their relationship. Some have held that accident prevention effort interfered with production, while others have expressed the view that a reduction of accidents resulted in an increase of production.

No one has definitely determined whether high or low accident frequency rates accompanied high productivity, or if effective management as expressed in high productivity was also reflected by low accident frequency rates.

There is no body of data available by which to judge the effect of accident prevention efforts upon the quantity of production. This is not surprising, perhaps, inasmuch as accident prevention effort has been based upon humanitarian considerations rather than on economic ones. The economic phase is important, nevertheless. It is reasonable to suppose that accident prevention effort has economic advantages as well as humanitarian ones. If this be so, there is a two-fold reason why accident prevention effort should receive careful and continuous executive direction and support. That some executives do not give the matter careful attention is undoubtedly true.

Mr. Albert W. Whitney and associates of the National Bureau of Casualty & Surety Underwriters, as is well known, are very directly interested in all phases of the accident problem. They have most carefully considered the relationship between accidents and production. Their deliberations led them to the decision that a comprehensive study of the subject should be made by a competent, non-partisan and influential group. Their investigations satisfied them that the experience, ability and integrity of American Engineering Council was of such character as to fulfill all requirements. Consequently, an invitation was extended to the American Engineering Council to make such study.

The Council, following its established policy, formed a special committee to make a thorough investigation of the need—the possibilities—the practical value of such a study. This committee recommended that American Engineering Council undertake the study, which recommendation was approved. Later articles of agreement were drawn up by representatives of the National Bureau of Casualty & Surety Underwriters and American Engineering Council. This agreement specified that the National Bureau of Casualty & Surety Underwriters would place at the disposal of American Engineering Council a sufficient sum of money to

defray the expenses of the study. The agreement further specified that the American Engineering Council would plan and execute the study and prepare a report thereon according to its established policy of independence of action and freedom from bias and interference in any particular.

Considerations leading to making the agreement extended over a period of more than a year. Consequently, all angles of the problem were most carefully considered and weighed.

In the fall of 1925, the American Engineering Council named the personnel of its Committee on Safety and Production, the duties of which were to develop the plan of action, employ the necessary staff, direct the investigation, and prepare a report.

The personnel of this committee was carefully selected. It includes: A. W. Berresford, past president of the American Institute of Electrical Engineers and the executive vice-president of the Nizer Corporation; L. P. Alford, officer of the American Society of Mechanical Engineers and editor of *Manufacturing Industries*; L. W. Wallace, past president of the Society of Industrial Engineers and executive secretary of American Engineering Council; C. F. Loweth, past president of the American Society of Civil Engineers and chief engineer of the Chicago, Milwaukee & St. Paul Railway; L. W. Hatch, Chief Statistical Bureau, Department of Labor of New York; J. P. Jackson, past Commissioner of Labor of Pennsylvania, with the New York Edison Company; W. W. Nichols, vice-president, Society of Industrial Engineers and chief engineer of D. P. Brown & Company; L. A. DeBlois, past president of National Safety Council, formerly safety director for the Du Pont interests, now with National Bureau of Casualty & Surety Underwriters; Bradley Stoughton, formerly secretary, American Institute of Mining and Metallurgical Engineers, and now professor of mining and metallurgy, Lehigh University.

The committee employed as director, J. E. Hannum, formerly efficiency engineer of Diamond Chain & Manufacturing Company, and Red Cross Institute for the Blind, now research engineer for the Eye Sight Conservation Council of America, and as assistant director, P. E. Holden, formerly assistant manager, manufacturing department of the Chamber of Commerce of the United States, now professor of industrial management, Stanford University.

The Plan of Action of the Committee

The plan of action adopted and followed by the committee in brief was as follows:

(1) Concerted effort was made to obtain data from the ten basic industries: (a) Iron and Steel; (b) Steam Railways; (c) Mining; (d) Cement; (e) Machine Building and Metal Working; (f) Woodworking; (g) Paper and Pulp; (h) Textile—cotton, woolen and silk fabrics; (i) Building Construction; (j) Electric Utilities. In addition to the foregoing, information has been obtained from a very wide variety of other industries.

(2) Assurance was given each firm supplying data that the firm name would be held in confidence by the committee and by American Engineering Council. This assurance conforms to the established practice of American Engineering Council in regard to such matters.

We regret that during the progress of the work some people were so unscrupulous and unfair as to endeavor to give the impression that the names of the firms would not be held in confidence and the data would be used for some ulterior purpose. We desire to impress upon such people that American Engineering Council is an honorable body, with an enviable record, and is directed by reputable men.

(3) Fifteen areas for intensive study were blocked out and an experienced engineer placed in charge of each. This organization covered quite thoroughly all industry east of the Mississippi. Territory not thus covered was reached either by local engineering committees or by correspondence.

The officers of the National Safety Council and managers of its affiliated Community Safety Councils were exceedingly helpful in organizing the work. In many instances the local manager was chairman of the local committee. In practically every instance he served on the committee.

Many Local Committees Cooperated

(4) Forty-six local committees functioned. Since some five men served on each committee, therefore approximately 230 engineers contributed time and effort to the study. One local committee, at its own expense employed a field engineer.

(5) A carefully prepared manual of instructions was given each field engineer and committee. This manual and a questionnaire comprise the working tools of the men in the field. The questionnaire was made as simple as possible and as far as practicable information was sought in the form supplied to the National Safety Council and state commissions. The study has been conducted along two lines, with two objectives in view.

The first objective has been to establish the trend of accident frequency and severity rates and production rates by plants and groups of plants. For this purpose, accident and production data have been secured from the experience records of as many plants as possible for as long a period as the records permitted.

The number of plants covered is of interest and significance. From the Bureau of Mines, Department of Labor, Interstate Commerce Commission and several trade associations, information was obtained relating to 13,362 companies. Through the work of field engineers and local committees, and by correspondence, some 5,000 plants were approached. Up to October 21, data had been received from 927 of these plants. Therefore, information is now in hand from 14,289 plants.

The information obtained from the 927 plants represents 3,342 company years. The approximate number of employees in the 14,289 plants is 2,250,000.

The foregoing discloses the wide scope and spread of the experience record collected.

The second objective has been to endeavor to determine exactly what took place in the way of loss of production and time when an accident occurred.

For this purpose, a selected number of plants were requested to collect such information during July and August. We recognized this effort as purely an experiment, hence we did not undertake it on a broad scale. Some most illuminating information has been secured. The analysis will disclose some sidelights never before thought of or considered. One observation is that the indirect losses accompanying an accident are more pronounced than has been assumed. This phase of the report should stimulate further studies in the same direction.

The foregoing discussion may be determined as the background for the findings to be set forth in the report. The significance and value of any report is determined by the scope and character of the investigation upon which it is based and the carefulness and ability of the investigating agency. It is hoped that you will agree with us that the particulars named have been so adequately cared for that the report will be authentic and important and hence deserving of the most careful thought.

We are now in the midst of compiling the data. It is a difficult task and will require the utmost care and constructive thought. In many respects there are no precedents by which to be guided. Some features involve mathematical and statistical procedure about which apparently little is known. We have already consulted with some of the best authorities about them and some are now endeavoring to solve the problems confronted. We believe a solution will be evolved and hence the report will contain unique and striking results.

Significant Sidelights Upon the Data Collected

As is always the case in making a national study, many interesting and significant sidelights came to view. It is fitting at this time to mention some of them.

Of the 3,438 plants approached by the field engineers, three per cent refused to give information; 30 per cent could not supply the data in the form requested—many of these had neither accident nor production data. Forty-six per cent promised the data, 15 per cent actually sent in the data.

Many plants report accidents to their insurance carriers and keep no records themselves. Some seem to feel that it is a matter about which they need have little concern, inasmuch as they carry insurance or else operate under the provisions of some compensation law. We view this attitude as being most unwholesome. There is no meeting ground for employer and employees where there is no mutual understanding and cooperation through accident prevention; such a condition inherently offers opportunities for developing a low morale and a large labor turn-

over. Consequently, the potentialities for good or bad results should not be entirely left to a third party, be it an insurance company or a compensation commission.

There appears to be an attitude on the part of some that, since, they operate under a compensation law, accidents are of little concern. This apparent result of compensation acts is indeed serious and should be counteracted.

A rather thorough canvass was made of all industrial plants of any consequence in the territory east of St. Louis, Chicago, and Milwaukee, and north of the Ohio and Potomac rivers. In general, there appears to be no marked difference between the conditions prevailing in any locality as compared with other localities, as disclosed by the percentage of plants having reliable information and willingness to release it. However, the Pittsburgh, Cincinnati, Detroit, St. Louis and Grand Rapids territories showed a much higher percentage of plants not having the information desired than did the other territories.

Council Influence Encourages Keeping of Records

Many plants stated they had recently become a member of the National Safety Council and had found the connection very valuable. A number also stated that they were beginning to keep records as advised by the National Safety Council. There is a marked attitude regarding the desirability of keeping better records. There is also a feeling that the form in which accident data are recorded and reported should be standardized. This is in line with the objectives enunciated at the Accident Prevention Conference held under the auspices of the United States Department of Labor in Washington, last summer.

Many complained of the number of reports which had to be made to Federal and state agencies. This condition, more than any other thing, accounted for some refusing to supply us with information. Undoubtedly industry is really burdened in this regard. The National Association of Manufacturers and others are now giving the subject constructive study and some remedy may be anticipated.

Apparently piece work is an important factor as regards the loss of production incident to an accident. If the employees are distracted by an accident, they put forth more effort following it, resulting in the same amount of production. Some also hold that since the men realize that if they are injured there will be a reduction in their earnings, they are more careful. A few employers seem to feel that their interest is fully protected by compensation insurance and the piece rate system of payment. The influence of piece-rates and other forms of wage payment upon accidents should be carefully studied.

Since the task of compiling the data has not been completed, no definite conclusions or recommendations can be made at this time. However, in general, the data that have been analyzed clearly show a marked increase in production per worker during the last five years. The trend

curves thus far drawn also show a reduction in the number of accidents per worker. We are confident that the complete analysis will show that, industry by industry, there has been an increase in production per worker and a decrease in accidents per worker. In other words, as management has become more effective, greater production and fewer accidents have been the result.

In conclusion I wish to acknowledge the splendid and valuable assistance we have received from your president, Mr. Charles B. Scott, and to no lesser degree from Messrs. W. H. Cameron and Sidney J. Williams. Through their influence and the inherent interests of the managers of local safety councils far more has been accomplished than could otherwise have been the case. If the findings and the recommendations of the report are to find lodgment in fertile soil, and accomplish the good we hope for, it must of necessity, arise through your good auspices. Your attitude and action in the past assures us that the report will be sympathetically received, carefully studied, and the recommendations earnestly applied.

CHAIRMAN WILSON: "Ashes and the Undertaker" is the title of our next address. The subject does not sound very pleasant. It is not a talk for morticians and undertakers, however, but a serious presentation of the dread hazards of our ancient friend and enemy, fire—fire, which the ancients themselves dignified as one of the four elements of the universe, with air, earth and water. The man who is going to deliver it is known to everyone in fire prevention circles as manager of the Fire Prevention Department of the Western Actuarial Bureau, with headquarters in Chicago. He has achieved a wide reputation.

It would be futile in the presence of this authority to attempt any figuring of the toll taken by fires. That they can be prevented in the majority of cases is just as clear as in the prevention of accidents. There are few so qualified to speak on the damage and prevention of fire as Mr. Richard E. Vernor of Chicago.

ASHES AND THE UNDERTAKER

Richard E. Vernor, Manager, Fire Prevention Department, Western Actuarial Bureau, Chicago, Ill.

I am very happy to be here today with the privilege of addressing so fine an organization, for two reasons. In the first place, I am permitted to return to my home city, and in the second place I am permitted to address you upon the subject which is closest to my own heart. I want to thank the National Safety Council for permitting the time to be taken on their program for the discussion of this subject which I think is so important.

Did you ever try to write that word "safety"? Just visualize it for a moment. After you have started to write it and you write the "s" and "a"

you come to a letter which takes up all of the space above the line and all of the space below the line. That letter "f" stands for "fire," and to me that is a very important feature as connected with safety work.

Somebody has said that any fool can start a fire, but it takes a careful man to prevent one. Why should a Safety Council or a Safety Congress be interested in so dry and uninteresting a subject as fire prevention? The other day in a city not very far from here—in this state, if you please—there were four families living in an old barn which had been converted into a dwelling.

A family on the second floor expected to move that day down below, and the mother of three small children was downstairs conferring with the man who was working in the apartment which she expected to occupy—a twenty-two-year-old mother. Something happened upstairs. Whether an oil stove was tipped over or a fire came up from below is still a question. But in a fraction of time the mother discovered that her apartment was afire and she did what almost every mother is almost certain to do under the circumstances—she dashed up the stairs through the flames thinking of her babies.

The Tragedy of a Mother and Her Family

By this time one of the neighbor women had come, and taking a position outside of the window she called to her to drop the young baby into her arms. This twenty-two-year-old mother, groping about in the smoke, managed to pick up a pillow, which she wrapped in a curtain, and, thinking that it was her baby, she dropped it out of the window. Then, having discovered her mistake and although the flames were burning her, she groped about until she did find the baby, and succeeded in saving its life, after it had been severely burned, by dropping it into the arms of this waiting woman. The two other children, four and six, crawled under a bed and the mother collapsed. When the fire department arrived the first rush of the water in the room washed the bodies of these two children out from under the bed.

That is why you ought to be interested as safety people in fire prevention. That isn't the only fire that ever took human life in the United States. Allentown, Pennsylvania, had a hotel that existed for a great many years without any great trouble. It was built in eighteen hundred and something, early in the century. Originally it was a three-story building made of stone, and in 1890 they remodeled the building and put two more brick stories on the three-story section; then they built a four-story wing in the rear and connected the two together with a wing. There was one fire escape on the section in front and one in the rear.

Everything went along beautifully in that hotel until on a January night last winter, when a fire broke out upstairs in the early morning hours. It was discovered by a taxicab driver and he rushed in and told the clerk that the hotel was on fire. The clerk jumped over to the telephone and tried to warn the people on the upper floors, but discovered that the telephone connections were burned off. Then he jumped into

the elevator and tried to go up there himself, and when he got as far as the third floor he discovered there was something wrong and he jumped off of the elevator just in time to save his life as the cable broke and the elevator dropped to the bottom of the shaft.

Then somebody thought of the fire department. The first piece of apparatus that arrived consisted of a hook and ladder—automobile equipment manned by two men past 60 years of age. When they stopped in front of the hotel in the car track in some manner the forward truck on the apparatus turned at right angles to the rear truck, and there the rescue apparatus stuck. They called another piece of apparatus and that was a hose cart without sufficient ladders to be of service, and it was 30 minutes after the fire was discovered before it was possible to commence taking people down from the upstairs windows, and it was too late. Only two people succeeded in reaching the fire escape and 13 bodies were dug out of the ashes. You can't afford to take into consideration in your city any safety program that doesn't include the matter of the prevention of fire.

Incidents Gathered in State of Oklahoma

I don't want to be melodramatic. I want to tell only what is true. I have here an innocent looking little piece of cloth. Do you remember a couple of years ago out in southwestern Oklahoma on Christmas eve when a schoolhouse burned down at a Christmas tree celebration when Santa Claus pulled a branch over a lighted candle? Here is a piece of the overall of one of those country boys who died in that fire. Thirty-seven bodies were taken out of that ruin.

I have been up and down the countryside in southwestern Oklahoma and I have talked with the survivors of that fire and I have seen the tragedy of that thing written in their eyes. And you talk about safety precautions! What possible safety precautions were taken there? Every window in the one-room schoolhouse was fastened securely shut with heavy wire mesh screen and was bolted clear through the building from the outside with seven-inch bolts. Nobody even thought of a bucket of water to have handy around the Christmas tree. No blankets were available. There was one exit door opening in and that one stuck on the floor as it swung in its arc.

Fire prevention is a safety matter. It is a humanitarian matter. I have in an envelope a picture that I would not be permitted to show to this gathering because it is too ghastly. It is just a pile of bodies of little girls from six to 18 years of age in a certain California city. A Boy Scout was riding his bicycle along the street one day when he passed a schoolhouse in flames. There were subnormal girls housed in that frame schoolhouse. When he saw that fire he didn't do what most every Boy Scout in America would do now. He didn't stop on the corner and send in an alarm, but he rode his bicycle for two miles past a number of alarm boxes to the fire station. Then the fire department re-

sponded, and of course by the time they got there, after all of that delay, the walls of the building were falling in. They dug 22 bodies out of that ruin.

If you will just refresh your memory you will remember a fire in a school down in Cleveland, South Carolina, a year or so ago during their commencement exercises, when 76 people were burned. So on it goes up and down the line.

I happen to be a member of a committee that is attempting to gather some reliable fire casualty statistics and I would like to read you two or three brief cases that have come to our attention; all of these things happening in 1926.

A List of Injuries Through Fire During 1926

I will read you the injuries first. You can't imagine people doing such foolish things and yet they are true.

From Watertown, Massachusetts. The man's name is Parsecan. A friend told him to take a foot bath in gasoline to cure rheumatism, and so he tried it. It did feel nice, so he sat back and lighted a cigarette. Somehow the two got mixed. This cured completely the tired feeling that Parsecan's feet had suffered. His burns were dressed at a hospital.

Here is one from California. Mike Caldine, aged nine, fires toy pistol into 50-gallon distillate tank. Badly burned.

Lawrence, Massachusetts. Mrs. Joseph Reitel, badly burned using stove polish thinned with gasoline on hot stove.

Bluefield, West Virginia. William Pugh, aged two. Baby climbed upon hot stove, burning feet and hands. Condition serious.

E. A. Johnson, adult. Was getting gallon of gasoline from the barn. The gasoline became ignited and the hay and straw started to burn. The farmer with Johnson threw a bucket of gasoline on him to extinguish the flames, but he had presence of mind enough to run and jump into a pond and thus save himself.

William Dederman of Saint Louis, Missouri. During a rest period three employees started a water fight. One threw gasoline and then they started throwing matches. Dederman caught fire and was severely burned. They submerged him in a water tank and sent him to the hospital.

Mrs. Higginbottom, from Missouri, put a hot iron in a pan of gasoline in which she was washing clothing. Burned on hands and arms.

Here is another one from Missouri. Fred Monehan took a nap on roof of chicken coop and awakened to find that his shoe was a mass of flames. Evidently someone had tried to play a joke on him. Man in critical condition.

Here is a case where a cigarette was dropped into an uncorked five-gallon can of denatured alcohol, causing a blaze.

Mrs. J. W. Andrews, of Kansas City, was washing clothing in gasoline when friction of rubbing caused explosion. Burned hands and arms.

Pearl Smith, at Cape Girardeau, Missouri, poured gasoline into an automobile tank and then took a lantern to see how much gas she had.

L. Crawford, of Danville, Arkansas, playing with matches and dynamite stick in barn.

These are deaths:

Mrs. Uterle and son Chares, two. Attempted to rekindle fire by pouring coal oil on smoldering flame. The son died en route to the hospital.

Esther Nevenin, on a Minnesota farm, seven years old. Oldest boy resorted to the dangerous practice of starting a fire with coal oil and the can exploded. The father picked up the two children and was obliged to pass through the fire with them. He lost Esther, and although he was back in an instant he was unable to recover her.

Butterfield, Missouri. Daughter of Mr. and Mrs. L. W. Nichols. The girl and brother were playing in backyard with old stove. She lit paper in stove in order to burn some ants and her dress caught fire, at which she started to run and the brother could not catch her until she was badly burned.

Miss Clara Dyer, aged 50. Fire from paper she was tossing in the furnace when the paper ignited.

Mrs. Sophie Komelman. Asphyxiated from smoke from burning clothing in wash boiler, the water of which had boiled away, permitting the clothing to catch fire.

Wilbur Davidson, four, in the city of Detroit. Electric iron left turned on in the kitchen of dwelling. Burned to death while sleeping.

Two Boys Playing With a Gasoline Hose

William Lindsay. Playmate turned gasoline hose on him and soaked him with it. Then he fired a cap pistol and the spark ignited his clothing.

Here is a seventy-one-year-old lady burned to death preparing dinner. Her apron caught fire.

Three daughters—this is a rather peculiar name and I won't attempt to pronounce it. They were three years, five years and four months old. I won't give you the details.

It is a continuous story. You can scarcely pick up a paper anywhere in the United States without finding somewhere in it an account of a death by fire.

Safety to your life: it is also a matter of safety to your pocketbook. It is a question of such great importance that the President of the United States annually asks us to spend a week of our time thinking and studying about fire prevention, about this billion dollar fire waste of ours, because it runs easily over that.

The speaker before me indicated something along the line that accidents and misfortunes were more or less the concern of the insurance companies and that other people ought not to be interested in them. There are too many people in the United States who have an idea that a fire is only the concern of the insurance company, the fire chief and the man having the fire.

Suppose an industrial plant burns down in a moderate sized city. What happens? The wage earners are thrown out of employment. They may be buying their homes in building and loan associations. They have to suspend their payments. They may have a little money saved up. Of course, they have to live, so they go to the savings bank and withdraw their savings accounts, and they can't spend money on luxuries, on amusements, on church contributions, and frequently they can't spend it on necessities. Let us get this insurance thing straight once.

Everyone Pays Toll to the Fire Fiend

There are a lot of people who seem to think that fire prevention as well as accident prevention is a matter for the insurance companies. Insurance is a necessary institution. It is the foundation of our whole system of credit. You couldn't borrow five cents on a piece of property on which you couldn't secure adequate insurance. No exchange of a few dollars from one pocket to another has ever replaced destroyed property. The minute you have a fire the national wealth of the United States is reduced immediately by that amount. Why, you pay the fire loss and I pay the fire loss, and if you don't like the high cost of living remember that a billion dollars of it has to do with our fire waste!

When you check out of this hotel you will be handed a nice bill. They say, "We are very glad to have had you gentlemen for visitors and guests in our hotel, but will you please kick in with your share of our insurance overhead before you leave?" The Book-Cadillac Hotel doesn't pay the insurance on this hotel. You do and I do and there isn't any escape from it. And the same thing applies to any commodity that you purchase whether it is a pair of shoes or a hat or a bunch of bananas. You can't get away from it. You have an interest in it. It affects your pocketbook just the same as it does that of anybody else.

What is being done about the fire waste? Where does the safety movement come in in connection with the solution of this problem? If you noticed President Coolidge's proclamation recently you may have observed that he said this: "We must rely upon cumulative contributions of communities throughout the land if fire prevention is to be made an actuality."

The vice-president of the United States Chamber of Commerce said this: "Fire waste is a problem which affects the entire country, but unlike our other so-called national problems, such as transportation and immigration, it must be treated locally. You can't legislate the fire waste out of existence. You can't force people to be careful."

It must be treated locally. Well, what is being done to treat it locally? There are a good many men and women in this room at this time who can tell me some very startling things that are being accomplished in their own communities, and I think I owe the safety movement the fact that I am standing here addressing you at this moment.

The Detroit Industrial Safety Council a few years ago had an industrial school, a plant superintendents' school, and I was just enough interested

in the safety movement so that I went over and enrolled and attended the lectures and graduated and received such an inspiration from that school in fire prevention that I have the pleasure of standing here today talking to you about it.

Have you ever been over in Milwaukee? Have you seen that wonderful fire prevention movement they have over there? You will find the Safety Council of the City of Milwaukee a prime mover in it.

If you will pardon a personal reference again, a couple of years ago I had the pleasure of standing in the Milwaukee auditorium and addressing that safety school. There were over 5,000 enrolled in it last year. I want to tell you that when I got up on the platform in front of those people my knees certainly did rattle together. You can go to almost any of our larger cities now and you will find fire prevention courses being conducted under the auspices of the local safety council.

A Noteworthy Campaign Going on in Kansas City

I hope that Julian Harvey is in this room. He has done a wonderful thing in Kansas City in this prevention of fire movement. There is a city which is growing and yet the Safety Council in Kansas City has succeeded in reducing the number of dwelling house fires by a very simple method. Every child in that school for the past four and one-half years has taken home an inspection blank designed by Mr. Harvey and has filled it out after inspection and returned it. Julian told me a few minutes ago that he has received some 60,000 of these filled-out inspection blanks which have just been returned in his ninth semi-annual campaign.

In Kansas City, in 1922, they had 2,217 dwelling house fires. In 1923 they had 1,931. In 1924 they had 1,633. In 1925 they had 1,430, a reduction of 800 dwelling house fires in Kansas City and there isn't any other explanation of the situation than the good work of the Safety Council there.

I just returned from performing a little service in the city of Cleveland for our good friend Carl Smith, and I saw some of the most interesting literature for the teaching of fire prevention in the schools that I have had the pleasure of seeing anywhere.

So I say to you that you are contributing a great deal to the cause of fire prevention. A gentleman called in our office the other day and he said, "We would like some material to put on the back of the National Safety Council 1928 calendar." It may surprise you when you see that the 1928 calendar is going to be pretty largely concerned with the matter of fire prevention, because fire prevention is certainly a safety measure.

Not very long ago I had the pleasure of standing on the shore of Little Traverse Bay in Northern Michigan. Some of you have seen that beautiful bay. As I was looking across that bay I saw what I thought was a brush fire, and a gentleman standing close by handed me a pair of field glasses. He said, "It looks to me as though a summer home was burning." I looked through the field glasses and I saw that it was a summer home and I also saw that there wasn't any part of it that was

going to be saved. As I watched, the upper floor fell in and the side walls of the first story collapsed. Then several of us got in the motor boat and went over there.

We climbed up the bluff along by the roaring brook and we passed along by some beautiful cottages. I noticed that the faces on the people standing there were very grave. As I came up a little closer to what was then just a smoldering ash pile I noticed the fire department was just dribbling water in one spot and a hearse standing close by. Then when I came up within a very few feet of this tragedy, I had the experience of seeing the most ghastly thing that I hope I ever have to witness as long as I live, the roasted body of the forty-eight-year-old mother of four children. A boy and a girl were in swimming down on the beach. A fourteen-year-old boy came up and stamped around and said, "Where is my mother?" The father was in Europe with the other two children.

This lady had violated one of the simplest laws of physics, that when you rub silk you generate static electricity, especially if the silk has been dipped in gasoline. If you rub silk you may expect an explosion.

A man working in the garage tried his best to rescue that woman, but it was impossible. What a terrific tragedy to pay for just the violation of a simple law?

Here is something you have probably heard a thousand times: "I am more powerful than the combined armies of the war. I am more deadly than bullets and I have wrecked more homes than the mightiest of siege guns. I steal, in the United States alone, more than one billion dollars each year. I spare no one, but find my victims among the rich and poor alike. The old and young, the strong and weak, widows and orphans know me. I massacre thousands upon thousands of wage earners each year. I lurk in unseen places and do most of my work silently. You are warned against me but you heed me not. I am relentless. I am everywhere—in the home, on the street, in the factory, on the railroad, and on the sea. I bring suffering, degradation and death, and yet, if you seek, you can avoid me. I give nothing but I take all. I am your worst enemy. I am carelessness."

ADJOURNMENT

Safety in the Small Plant

October 26, 1926

THOMAS P. KEARNS, Chairman
Superintendent, Division of Safety and Hygiene, The Industrial
Commission of Ohio, Columbus, Ohio

THE General Session on Safety in the Small Plant convened at 2:15 o'clock in the Reception Room, Fourth Floor, Book-Cadillac Hotel, Detroit, Michigan, Mr. Thomas P. Kearns presiding.

CHAIRMAN KEARNS: I presume I need not say that I am delighted with the large attendance here this afternoon. I am more than pleased to see so much interest manifested in the important subject that we are to discuss. We regret very much that we haven't larger quarters in which to hold this session, but no one expected such an audience as this, it being the first session of this kind that has been held by the Congress. Next year, we shall make provision for a larger meeting and will furnish much better quarters.

The National Safety Council is organized to advance the cause of safety in industry, in public and in the home; its business is to know where it can render the most effective assistance in the prevention of accidents.

In industry the Council logically and wisely has been directing its efforts toward enlisting the cooperation of large employers of labor but has not been unmindful of the important position held by the smaller employer in connection with the industrial accident prevention movement, as it recognizes the fact that universal safety can not be attained until safety methods are practiced in the small as well as in the large industrial establishments.

The Safety Council officials inform me that for several years there has been an increasing demand amongst the membership of the Council, especially the smaller employers, for a meeting such as we are holding today, where the accident prevention problems of small employers, which differ in many respects from those of the larger plants, might be discussed with a view to working out, insofar as possible, a practical solution of them.

With the thought, therefore, of complying with this demand, coupled with the desire to be of service to all employers, you have been invited to this Congress, and this special meeting has been arranged as an

initial step in extending greater service to, and ~~stimulating~~ increased interest among the small employers, in this great humanitarian movement, namely the conservation of human life and the preservation of the life, limb and health of our fellow workers and citizens.

Probably one of the first questions that will be asked is, what constitutes a small plant? This has not been definitely determined, of course, but I think that for the purpose of this meeting we could differentiate between the large and small plant by somewhat arbitrarily drawing the line at approximately 300 employees. I believe that the employer of that number or less can maintain a direct contact with and wield a certain amount of personal influence over the entire personnel, as well as plant activities, which can not be maintained when that number is exceeded.

My work as chief of the Workshop and Factory Division of the state of Ohio, over a period of more than 12 years, brought me in close contact with most employers of the state, and as the small employers are in the large majority, I feel that I am intimately familiar with most of their problems, their trials, their disadvantages and advantages. I appreciate the fact that competition is keen and that they are frequently confronted with serious labor and financial problems and that production is a vital question at all times.

The Small Shop Manager Has One Outstanding Advantage

But on the other hand, the small shop manager does have one outstanding advantage over the big shop manager, in that it is possible for him to get a greater degree of efficiency; assuming of course, that the management itself is efficient. In the large establishment, authority and responsibility must necessarily be delegated to others and the larger the organization, the more must authority and responsibility be extended down the line; and every degree that authority and responsibility are broken down or removed from the manager, may mean a lesser degree of efficiency.

The small employer does not have to depend on others to execute his plans but his failure or success depends generally only on his own managerial ability and business acumen. If he is possessed of the qualifications necessary to successful management, he will be able to imbue his whole organization with that spirit, that efficiency, which emanates from him to all with whom he comes in contact. This direct personal contact also tends to build up the morale in the plant which is a very important factor in the success of every phase of the plant's activities and in particular safety and welfare activities.

The experiences of industry for the past 15 years have proved that it is good business to protect the lives and health of employees. The more that has been done to make the work safe and to make employees contented in their work, the greater have been the results. The beginning of this awakened interest in the welfare of the employee was born largely of safety. The whole structure of safety and welfare or indus-

trial relations came into being because it was realized that efficiency and these activities go hand in hand.

While you are rushing production and doing your utmost to keep ahead of the other fellow, you can not afford to neglect the protection of your workers from illness and injury, for without them your machines will not function and your production will suffer. Don't allow yourself to argue that the installation of safeguards is an unnecessary expense and that the adoption of safe practices will retard production, for it is not a true argument. Practical safety measures and devices wherever adopted, not only do not retard your output but actually increase production, either directly on the particular machine or operation, or indirectly by the conservation of men and material; reduction of your labor turnover; less interruptions of the work; improved morale; all of which ultimately result in reduced cost of operation.

Safety Devices Have Speeded Up Production

I could recite case after case where the installation of safety devices has speeded up production and increased efficiency of workers but time will not permit. Our new Division of Safety and Hygiene, the primary duty of which is industrial educational safety work, has been in active operation for less than one year, but I wish I might read to you some of the many letters we have received from employers (mostly from the group of small employers), expressing their sincere appreciation of the services rendered them by the division in the promotion of safety in their plants, and of the reduced accident experience resulting from the installation of mechanical safeguards and safety educational programs amongst their workers in accordance with our recommendations and instructions.

The results have been highly gratifying and are, I think, an indication that employers generally, large and small, have commenced to realize the importance and necessity of accident prevention and the advantages of providing a safe place for their employees to work.

The point I wish to emphasize to the small employer is the importance of taking more interest in the safety and welfare of your employees and becoming more familiar with the methods and devices that will prevent accidents, not only because you are morally obligated to do so, (and I am sure every one of you does sense the humanitarian side of this question), but because it is a business proposition; because it pays in dollars and cents. Preventable industrial accidents—and it is conceded by those who have made a study of the problem and ought to know that 75 per cent of all accidents are preventable—are an economic waste, a waste of men, money and material, that can not be satisfied from any point of view.

The first speaker on the program is the Industrial Commissioner of the state of New York. I have the pleasure and honor of introducing the Honorable James A. Hamilton of New York.

THE NEED FOR SAFETY IN THE SMALL PLANT

James A. Hamilton, Industrial Commissioner, State of New York,
Albany, N. Y.

In discussing this subject it is necessary to adopt *a priori* methods almost entirely. This is due to the lack at present of statistical data of a kind to afford precise information on the relative seriousness or the nature of the problem of industrial accidents in small plants as compared with large plants or enterprises.

Yet it is generally recognized that there are undoubtedly important variations in conditions between large and small undertakings, for which there are more or less obvious reasons which it is important to take into account in developing safety work.

The following discussion will endeavor to point out some of these differences and some practical points as to safety work suggested by them. In the present consideration of the subject, attention will be confined chiefly to the manufacturing field of industry.

Relative Importance of the Small Plant

Taking New York as an example of the situation, in a state with highly developed and diversified manufacturing industries, the U. S. Census of 1919 returned a total of 49,330 manufacturing establishments in the state. These concerns had 1,228,130 employees. These figures may be taken as a general measure of the field of industrial accident hazard. The census classification of these factories and shops by size, measured by number of employees, affords the following very suggestive comparison:

Establishments with employees numbering—	Establishments			Employees		
	Number	In grade	Percentage Cumulative	Number	In grade	Percentage Cumulative
Over 1,000	106	0.2	0.2	226,236	18.4	18.4
501 to 1,000	206	0.4	0.6	143,650	11.7	30.1
251 to 500	432	0.9	1.5	151,320	12.3	42.4
101 to 250	1,309	2.6	4.1	204,318	16.7	59.1
51 to 100	2,107	4.3	8.4	148,875	12.1	71.2
50 or less	45,170	91.6	100.0	353,731	28.8	100.0
Total	49,330	100.0		1,228,130	100.0	

These figures become very significant when it is recalled on the one hand that the problem of bringing about safety in industrial plants is primarily that of inducing individual employers to act, and on the other hand that one measure of success in safety work is the number of employees brought under safe conditions. They show unquestionably that the problem of safe conditions of work for the great majority of factory employees lies with a comparatively small number of employers. For nearly 60 per cent of the employees it is a matter of action by only four per cent of the employers, and for 72 per cent of the employees it is less than eight and one-half per cent of the employers who are involved.

Or to put the matter in another way, in New York state, if only 4,162

employers out of a total of nearly 50,000 should maintain maximum safety conditions in their plants, the problem of accident prevention in manufacturing would be solved for nearly three-quarters of the factory employees of the state.

If, therefore, the common impression be correct that accident prevention has been better developed in large than in small plants, that can only be regarded as development of the most fruitful portion of the field and as sound strategic development of the moment.

But that does not, of course, imply that the remainder of the field may be overlooked or neglected. It is indeed a smaller field in numbers of employees to be benefitted, but from the point of view of those employees and from the social point of view, it presents the same degree of need for action as the field of the large plant. Life should be made as safe for the 29 per cent of employees in New York factories having 50 or fewer employees per plant as for the 30 per cent in plants having over 500 employees per plant.

Special Problems of the Small Plant Field

1. *The Number of Plants.* If for purposes of discussion the small plant field be considered to include those having not over 50 employees per plant, the figures above show that in New York, in 1919, the problem of safety in such plants and shops was one spread out in over 45,000 different establishments scattered throughout the state. The mere number of detached and separate units presents obvious difficulties to any agency, public or private, which undertakes to inspire them to or guide them in, accident prevention.

2. *The Remoteness or Infrequency of Accident Experience in the Small Plant.* The number of employees in a single small plant, and consequently the exposure to accidents, is so low that accident occurrence in it is too infrequent to impress its own object lesson upon the employer either through his humanitarian or through his business instincts. It is difficult to create an impression in such a case by the less lively, but just as truly significant, group experience of his particular industry as a whole.

3. *Inapplicability of Insurance Carrier Merit Rating.* Closely akin to the foregoing is the fact that small plants are largely below the minimum limits at which schedule or experience rating can be applied by insurance carriers, so that that pointed method of bringing home to the employer the lessons of accident experience is unavailable for this field.

4. *Preoccupation of the Small Employer with Production and Marketing.* The proprietor of the small plant, under the stress of competition and with an executive or supervisory staff limited or lacking, naturally relegates to second place or brushes aside anything not on the face of it essential to his main necessity of success in producing and selling goods, which is what he is in business for. This, under the circumstances, entirely natural attitude not infrequently finds expression in statements to the effect that compensation insurance has been paid, and that takes care of the accident proposition.

5. *Limitations on Expenditures for Accident Prevention.* Nearly related to the foregoing is the limited capacity of the small firm to make expenditures for safeguards, rearrangement of apparatus, or plant, etc., which safety consideration might dictate. The fact that such expenditures may actually be good business and only seem to be uneconomical does not alter the special sensitiveness of the small proprietor toward such outlays.

6. *Inertia in Organization.* It is probably true that for almost any purpose it is more difficult to bring about combination or organization of small concerns than larger industrial units, and this may also be mentioned as a potential factor of difficulty in the small plant safety problem standing in the way of local or trade cooperative efforts.

Without attempting to push this enumeration of the factors entering into the small plant problem to a complete analysis, the foregoing is sufficient to make it clear that the small plant presents in many ways a distinct problem in accident prevention work with a number of factors producing special difficulties. This being so, the question next to consider is—how may the problem best be dealt with?

What Agency Can Best Deal With Safety?

Recalling again that the problem of safety in industry is fundamentally a problem of inducing the right action by employers, the peculiarities of the small plant situation seem to indicate quite clearly that the question of safety in small plants is more than anywhere else a question of action by some outside agency. In other words, while experience has shown that in the large plant, accident prevention has frequently and naturally developed through internal initiative of executives and management, in the field of the small plant the situation of the employer is such as largely to preclude such initiation and make progress chiefly dependent upon initiative and aid from outside. If this is so, which of the possible outside agencies is best adapted to handle the problem in this field?

Such agencies include the state, insurance carriers, safety organizations, and trade or commercial organizations. If the relative capacity or appropriateness of each of these be considered in the light of the peculiarities or needs of the small plant situation, either those above enumerated or others, there seems clear ground for concluding that the state is in the best position to deal with this field of accident prevention work. The peculiar difficulties above enumerated, which give the small plant situation its special aspect, are more serious or even impossible for other agencies to deal with, whereas the state is in a position to overcome them so far as necessary.

Glancing briefly over some of the peculiar features or difficulties of the small plant problem, as above noted, the advantageous situation of the state to deal with them is not difficult to see. To refer to the two most significant ones, the great number of small employing units to be

dealt with, which means that if covered at all by other agencies they will be split up between them, offers for the state only a matter of volume of work and no problem of divided jurisdiction or effort; and again, while the other agencies are in a position only to persuade or educate for accident prevention the state has in addition to those means the unique one of being able to require and enforce safe conditions.

Without undertaking to make further comparisons along this line, it may be well to point out the two general features of state accident prevention work which make it peculiarly well adapted to the small plant field. One is closely related to some points already noted about that field, the other touches a fresh aspect of the matter.

Taking up the first of these, the state undertakes in its accident prevention work to do two main things. First, by statute or, more progressively today, by industrial safety code rules, it establishes standard safety requirements which are uniform for all employers under like conditions. In the second place, it insures universal observance of these standards by inspection and enforcement proceedings.

Uniformity over the whole field is thus a distinctive characteristic of state accident prevention. By this uniformity two important results are obtained. One is the obvious one of full effectiveness over the whole industrial field affected; the other, which is less frequently noted perhaps, is the removal of any obstacle to improvement of safety conditions growing out of considerations of business competition as preventing the necessary expenditures for the purpose.

Economy of Accident Prevention Work by the State

With all employers required to come to the same standard conditions for safety, competition so far as such expenses are concerned is equalized. This essential element of economic justice in universal safety standards is one of much deeper significance that is sometimes realized. The state, and it alone, is in a position to apply safety standards free of any obstacle, real or imaginary, growing out of consideration of business competition. Its safety requirements set the plane of competition itself.

In the second place, a point, not of principle but of practical weight, not heretofore touched upon is the general economy of accident prevention work in the small plant field by the state. The great number of units to be dealt with in this field suggests at once that it offers some problem of economy of effort. It would seem to be fairly obvious that the more generally the work can be organized the more economically per unit it can be handled. The comprehensiveness of the state's jurisdiction over the field seems to make it clearly the agency to handle such work under one general organization.

Add to this the fact, that the state exercises regulatory supervision of the same field for other closely related matters, such as child labor, hours of work, etc., by the same general methods, and the further consideration that in this part of the field of accident prevention, more

perhaps than in any other, it seems feasible to combine accident prevention with other state service, and the economy of state work becomes still clearer.

While data for precise appraisal of the small plant problem in other fields are even more scanty than for manufacturing, there is no reason to doubt that the problem has the same general aspects in those other lines. In fact, it is probable that in some lines the small plant or firm presents difficulties even more serious than is the case in manufacturing. The significance of this is considerably increased by the fact that these other fields as a whole present a larger accident problem than is always realized.

For example, in New York state the construction industries, in the year ended June 30, 1925, contributed one half as many compensated accidents and nearly three-quarters as much cost in compensation as did manufacturing, and trade and personal service enterprises contributed 44 per cent as many cases and 46 per cent as much compensation cost as did manufacturing.

In these other fields, the view that, just as in the case of manufacturing, the state would seem to be in an advantageous position to deal with the problem, seems for similar reasons logical.

Every Aid of Private Agencies to be Encouraged

Lest any false impression should be conveyed that the conclusion above reached, implies any idea of opposition to other efforts, it should be added most distinctly and emphatically, that any such inference would be wholly false. Anything that private agencies can develop in this field is to be welcomed and encouraged to the utmost.

There can be no conflict of interest in this matter. Whatever one's conclusions as to the most strategic agency or means may be with regard to any phase of accident prevention work, cooperation of all agencies which can render service can not be too widely extended.

CHAIRMAN KEARNS: I am sure you have all enjoyed this wonderfully instructive and interesting paper by Mr. Hamilton. I am wondering if there is any one who would like to ask Mr. Hamilton any questions in reference to the subjects covered?

R. B. MORLEY (Industrial Accident Prevention Association, Toronto, Canada): I was very much interested in what Dr. Hamilton had to say in enumerating the four phases, or four groups, who might carry on accident prevention work in the small plants.

We have in Toronto, as Dr. Hamilton has said they have in New York state, a very high percentage numerically of our plants of the small type, that is to say, about 85 per cent of our plants pay an assessment to the Workmen's Compensation Board of less than \$100 per annum.

We have in Toronto a state fund, that is to say, there is no competition. I want to call your attention today to something that I think will supplement what Dr. Hamilton said in regard to the state. We have in

Ontario a condition that you have not in any of the states on this side of the line, a combination of state and employer that works out very satisfactorily. Under our Compensation Act, the industries may form Accident Prevention Associations, and my office is simply a federation of 15 of those Class A associations. We have the employers directing the activities of the organization, determining how much money will be spent, and how far they shall go in their individual plants. That, I think, gentlemen, is perhaps just one step beyond absolute state control, because you have the people who are furnishing the money in the first class for compensation determining exactly how far this whole proposition shall be carried.

CHAIRMAN KEAENS: The next speaker on the program is Mr. Albert Curry, Harry Brothers Company of Detroit, Michigan, whom I take pleasure now in introducing to you.

WHAT CAN BE DONE TO PREVENT ACCIDENTS IN THE SMALL PLANT?

Albert Curry, Harry Brothers Company, Detroit, Mich.

One of the first tasks, and sometimes the hardest, is to get the officials or board of directors or both, as the case may be, to interest themselves in safety work, or appliances, for as a rule they are too interested in profits and sales, and do not seem to grasp the idea, either from a humanitarian or financial standpoint. Right here let me say that I am pleased to state the officials of the firm I am associated with are real humanitarians, and mighty interested in safety work.

Little can be expected of foreman or employee when such lack of interest in safety is shown by the officials. In fact, they show their short-sightedness, for when an employee is injured, his services are lost for a short or long period and time and money are lost breaking in someone else to his work; also machine hours and production are at a decline during this period.

Once this task of getting the officials interested is completed, the next step should be to appoint a safety committee.

In some plants this is done by picking an employee here and there from certain departments, and sometimes this kind of a committee works out all right, but it puts the responsibility onto a few employees, for those who are not on the safety committee feel no responsibility.

So to my mind and experience, the proper plan for a safety committee is to place every foreman or his assistant or both on the committee.

Then you have every department covered, and the proper persons to be held responsible, for when an employee in the department is the safety committee man, and an accident happens, it is very easy to make excuses of being too busy, or didn't think, etc.; and also he has to leave his work in order to investigate safety work, which causes loss of produc-

tion; and if he is a piece worker, you can rest assured he will not give it much time or study.

But when the foreman or his assistant is the committee man, he naturally feels the responsibility, and in most cases, he endeavors not to let any other foreman get ahead of him, by having a clean record.

This can be carried out further, by offering a bonus or prize to the foreman whose department has the least accidents, consistent with the hazards of his department, or some such plan, so as to have some incentive for competition.

The foreman also naturally is the proper person for safety committee man, for he is continually cruising around his department, or at least he should be; he can keep in touch with all conditions at all times, during the working period, which is the danger time; and he can stop wrong doing, or report bad conditions of machines or tools and dies, to the maintenance or tool departments, as the case may be.

The next step is to throw around each point of hazard a safety guard; whether it is a guard around a die in a punch press, or a rail in the rear of a shaper to prevent employees getting bumped by the ram, belts, gears, emery wheels, or anything whereby they can get injured in the slightest way, even to a small cut.

Next in line, and not the least by any means, is the education of the employees. This part of the safety work should not be periodical, but continual; eternal vigilance is, and should be, the daily slogan.

By constant attention to this part of the safety work, I find that after awhile the employee is also helping in the safety slogan of eternal vigilance, and is reporting to the foreman or safety committee man points of danger, or machines and dies that are not working properly or are not guarded. And so this education of the employee helps in a great measure the work of the safety committee and he should be encouraged and given credit for his interest.

Some Employees Are Naturally Insubordinate

Again, you will find some employees who will absolutely disregard rules, and even personal instruction or orders, especially if they are on piece work. They think such rules or guards retard their speed, and so take a chance, even when they haven't a chance, and thereby get injured; and then they have to take time off to get well, which is a loss to their employer and to themselves; and nine times out of ten these are the ones who usually get injured, and add to the troubles of the safety committee, thereby spoiling their record for a clean slate as far as accidents are concerned.

This has been my sad experience; in fact, practically all the serious accidents have happened by the employees deliberately disobeying instructions or orders, which were given them for their own welfare.

When an employee wilfully disobeys rules and instruction given to safeguard him against accidents, that employee should be immediately discharged, as he is better out of danger; and this also has a psychological effect on the other employees in that department.

Further along the line of education of the employee, I would advocate that the superintendent or factory manager on his trips around the plant, keep a lookout for points of danger, and call the foreman's or safety committee's attention to the point unguarded.

Let me enumerate here a few things he should watch out for: namely, strip or sheet steel piled up unevenly, and the corners not properly guarded with a wooden corner piece; steel arranged in the racks so that some of the pieces protrude unevenly, which may cause injury to one passing, such as an eye injured or lost, ankle or leg badly cut, etc.; also in the tool or die department and screw department, little pieces of round steel, such as the ends of rods, or screws, sometimes drop on the floor and cause a badly turned ankle, or possibly a fall, and I remember one employee who lost an eye by striking his head against a machine in this way.

These little pieces on the floor may seem trivial, but I have seen many a bad accident in my day, caused by just such conditions, also badly lacerated hands, by allowing nails to protrude in barrels and boxes in the shipping and packing departments.

Another suggestion is to have all the aisles lined or marked with safety zone white paint, and be kept clear of barrels, trucks, boxes, waste materials, and even rubbish; these aisles should be kept clean also and free from holes.

I have tried to outline what can and should be done to prevent accidents in the small plant without the services of full time safety men, and I have tried to show that the responsibility for the prevention of accidents in the small plant really and rightfully should be placed on the foreman and his assistant.

May I say, in concluding, that I trust I have in some way given some ideas that you may be able to put into practical use, and thereby save some employee from an unfortunate accident?

CHAIRMAN KLEBS: The next speaker on the program is Mr. S. C. Van Wormer. The Wei-Ever Piston Ring Company, Toledo, Ohio, whom I am very pleased to present.

GOOD HOUSEKEEPING PRACTICE IN FACTORIES

S. C. Van Wormer, The Wei-Ever Piston Ring Company, Toledo, Ohio

The first question that entered my mind, after being asked to speak on plant housekeeping at a safety meeting, was just what "Plant Housekeeping" could possibly have to do with safety. Upon investigation, I found that in the city of Toledo 46.6 per cent of fatal accidents in the home happened in only 12 per cent of the area of the city. This area consisted of the colored, Polish and tenement districts, the places where you would naturally find poor housekeeping conditions. This seems to prove the statement that the mind reacts with the body; alertness, cleanliness and

neatness go together. This law is just as true in the factory as it is in the home.

Some of you may say that yours is a small plant and you do not need the methods used by larger factories; but no plant is too small to be kept clean. That is good housekeeping.

When it becomes necessary to consult your banker on financial matters, or see a customer on a big deal, would you go with unpressed and soiled clothes, dirty linen, and unbarbered; or would you be as neat and as perfectly dressed as possible? When the wife invites guests for a bridge party is there usually two weeks' dust on the furniture, are papers scattered all over the floor, and is everything in a state of confusion, or do you find everything as neat and clean as a pin and in perfect order?

These matters are psychological to the extent that they affect both the minds of the individual and others with whom we may come in contact. Just as proper dress and personal neatness eliminate that indescribable embarrassment that comes to us when we have neglected our personal appearance; and in the same way, the host and hostess are in a much better frame of mind to entertain, when they know that their home will create a favorable impression on the minds of their guests, so by the same laws of psychology, good housekeeping practice in the factory affects the minds of the employees in a similar manner and creates a mental attitude that promotes efficiency and safety.

Six Fundamentals of Good Plant Housekeeping

We will assume that guards and protective devices have been provided; that there are the proper number of exits, fire escapes and fire fighting apparatus; and that provisions have been made for the prompt and effective treatment of such injuries as do occur. These are purely safety measures apart from good housekeeping practices.

Good Plant Housekeeping comprises: 1, Arrangement or Layout; 2, Proper Illumination; 3, Proper Heating and Ventilation; 4, Proper Sanitation; 5, Decoration; 6, Neatness.

The first four of these items are technical in character and we will pass over them in a very few words. Your layout problems have probably been taken care of, and your floor space used to the best advantage. It is well known that bright light makes things that are fast seem slower and darkness make slow movements seem faster. You have frequently proved this to yourself by walking through a room under a range of conditions varying from darkness to light. I believe most factories do provide adequate illumination.

Proper heating and ventilation is the method of providing good weather inside even if atmospheric conditions outside are not so good. Good weather promotes good health, good health promotes efficiency, and efficiency promotes production. Proper sanitation is merely keeping the toilets and washrooms as clean as you might wish them to be at home, and in a good state of repair. These are all technical matters and if you have any unsolved problems along these lines, a technical engineer should be consulted.

But the items I have headed "Decoration" and "Neatness" are the ones that I want to tell you about. They are very important and probably the most neglected of all good housekeeping practices. Under the heading that I have called "Decoration" comes the question of painting and general cleanliness. In a great many plants it is not practical to have the entire wall white, and at least the wainscoting must be of some dark color, frequently black. It is well, however, to have the side wall above the window line, and the ceiling in white, as this adds considerably to the efficiency of the lighting system.

Around the base-board should be a white collar extending six to eight inches on the baseboard and four to six inches on the floor. This accomplishes the same general result as a white collar on a man. It gives a dressed-up appearance and helps to provide the right mental attitude in the workmen so that they will assist in keeping the room clean. It eliminates the throwing of refuse and waste into dark corners and makes easy the checking of the janitor to see that proper cleanliness is maintained.

Fresh Paint Has a Psychological Effect

All aisles should be plainly marked with white borders about two inches wide and should lead to outside exits. If these aisles should merge into passage halls or stairways, the white lines should broaden into white collars as used around the base-board. This not only assists in the function of cleanliness but is of considerable assistance should anyone find it necessary to pass out of or through the building in the darkness. The white borders are more easily seen in the dark, act as guides to aisles and show turns in stairways.

In order that all machinery may be properly cleaned and kept in repair, it is well that they be painted a suitable color, preferably a battleship grey. All safety devices might well be painted green, the color of safety, and all moving and dangerous parts could be red. This would give a piece of machinery in which the operator will take a certain amount of pride. He will use considerably more effort to keep it clean than if it were black, greasy, and poorly maintained, and will notify the foreman or maintenance department at once if anything is broken, instead of making a temporary repair himself.

The point that I want to make might well be illustrated by the care a man gives his automobile. When it is new, shiny and unmarred, he is always exceptionally careful to keep it free from dust and dirt, and should anyone do anything to mar its beauty he would be up in arms in an instant. But when age dims the luster of the paint and the fenders have been dented a time or two, the owner becomes considerably more careless. Dirt doesn't bother him so much and if he has an accident, he says, "Oh well, the old buggy was looking pretty tough anyway."

It is only human nature to take good care of anything that looks nice, and neglect what does not look so good. You can readily see that it is to your advantage to make your machinery look as attractive as possible.

This part of the housekeeping plan is a paying investment as it prolongs the life of your machinery and tools.

Neatness in the factory means a place for everything and everything in its place. Proper floor space should be marked off for the storage of raw materials and finished parts waiting to be moved to other departments. All tools, dies and other equipment should have a certain place where they will be when not in use. This helps to prevent the misuse and abuse of expensive equipment. In convenient places about the factory there should be metal containers for all refuse and a definite place for scrap.

In a shop where good housekeeping practices have not been in effect it may be necessary to sell the idea to the employees and everyone from the president down to the foreman must assist in the selling process. If one of the executives should be passing through the shop and find a tool on the floor, he might well stop, pick it up and put it in its proper place. The workman whose negligence permitted the tool to lie on the floor could not help but feel ashamed that the president would do what he had failed to do. This little act might sell him more strongly on the idea of good housekeeping than to be disciplined, then and there.

Neatness, cleanliness, and safety are all more or less a matter of habit. Good habits should be formed and bad habits discouraged. This can be largely accomplished through good housekeeping practice and we will find that we have more contented, happier and careful workmen. Habits of carefulness in minor matters, once formed, are easily enlarged to take care of the more important safety element.

To summarize briefly, good plant housekeeping provides: a reduced fire hazard; reduced accident hazard; greater and cheaper production; more contented workers; less interruptions in the day's work, less broken tools and machinery; less spoiled material; and improved morale through the entire plant. You can not help but see the advantage of conducting your factory with the same care that you give your personal appearance or with the care your wife gives your home. You can always remember that good housekeeping, safety and efficiency go hand in hand, and that there is no plant so small but that it can be kept clean.

CHAIRMAN KEARNS: The next speaker on the program is Mr. G. F. Griffin, Director of Education of the American Seating Company, Grand Rapids, Michigan, whom I am now pleased to present to you.

IS A SAFETY COMMITTEE WORTH WHILE?

G. F. Griffin, Director of Education, American Seating Company,
Grand Rapids, Mich.

It is a rather dangerous thing, if I may be permitted to say so, to state the subject of a talk in the form of a question. You put yourself in the position of the sergeant who, endeavoring to inspire a little patriotism in some of his men, picked out a sturdy Irishman and said, "Pat, why should a man die for his country?"

Committees. I am very glad to say that the ideas I am presenting this afternoon were suggested to me very largely by department executives and foremen who are handling the department and who have welcomed the work of Safety Committees.

The other ideas I gathered from the reports of our Safety Committee over quite a long period of time. I couldn't bring all of those reports with me. I brought one along, and I believe it is worth while because some of you are not familiar with the work of Safety Committees. I am going to read some of the items from this report. It is just a report that I picked off my desk by accident. It is not an unusually good or bad one, and probably it is fairly typical of the reports that are issued.

Two Safety Committees Are Steadily Busy

We have at our plant two Safety Committees. One is composed of four, not all foremen, but a small group of foremen. The other is composed of rank and file workers. The one composed of rank and file workers is chosen by the workers themselves, and the one composed of the foremen is chosen by the other foremen. It is somewhat of a democratic organization. I will read some of the things that were recommended by one of our Safety Committees at their last inspection.

"There is a pile of material lying outside of one of the passages which should be cleaned up. The water pipes on the first floor of a certain building, west half of the building, are hanging down and should be suspended by better hangers. The toilets in this same building are all right, but the wash bowls are filthy. (They cover not only violent accidents but also matters of sanitation.) The steam line in a certain building, fourth floor south section at the fire door division, should be supported by more hangers."

These matters were all taken up by the superintendent. When the Safety Committee makes a recommendation, they usually hand it over to the superintendent or foreman and he takes care of it without any question, but they include it in their report to show that they had something to do about it. Others items in this report are:

"In the iron room, the committee is of the opinion that two tumbling mills should be better guarded. The foreman said he would take the matter up with the office and see that it was remedied. The committee saw some things in the steel plant that they didn't like, but were glad to give the supervisor the benefit of the doubt that they were all right.

"Fire Hazards. The committee paid particular attention to this on their inspection, due to the fact that it will soon be time to use the steam lines again. We urgently ask the cooperation of all foremen and their men in trying to keep their respective departments free from oily waste and rags or anything in the line of combustible matter.

"There is an open stairway leading from the second to the third floor of building five, and the committee is of the opinion in view of possible fire hazard that this should be closed. The committee was approached

by some of the employees regarding this matter. They said they were subject to cold on account of the draft."

And so it goes. Perhaps I better not take the time to read any more, but that is the sort of thing the Safety Committee reports on.

I believe a Safety Committee is worth while. We believe a Safety Committee is worth while in the first place, because the foreman does not become aware of all the hazardous conditions in his own department. There are two reasons for that. The first is that the foreman is too close to his own department to see all the hazardous conditions which may exist. You perhaps are too close to your own homes to know there is a hazardous condition in your basement, and you are not aware of the fact until the fire inspector calls in and tells you that you are in danger of burning the house down, and then it is perfectly plain to you. You may think that I imply by that that our foremen are not of such a high standard as they ought to be. I don't mean that. I think the foremen in our plant are about the same as they are in any other plant.

A man said to me the other day: "The foremen in our plant are just about 100 per cent. We don't need a Safety Committee, because our foremen can look after those things. We don't need this and that and the other thing because our foremen are perfectly competent to look after them." While I didn't say it, I thought this: "Well, old man, we have the same kind of foremen that you do, except that we tell the truth about it."

The Problem of Foremanship Enters Committee Work

I dare say that those of you who have had foremen and those of you who have had experience with foremen know that the problem of foremanship is such a big one that we are very likely to overlook some of the hazardous conditions in the plant.

There is another reason why the foreman does not always see the hazards in the plant. Those hazards are almost always apparent to the workmen because of their close contact with a particular machine or particular piece of work. For some reason or other, the rank and file workman will tell those things to a Safety Committee man or some man outside of his department when he wouldn't go to his foreman and tell him about it. We don't like that. We would much rather that our men in every case would take the matter up with their foreman. We do everything possible to encourage it, but either through diffidence or because of some personal feeling toward the foreman, we find that men have things on their chest that they will not take up with the foreman. When the Safety Committee man comes around, they will tell him about it. And while, as I say, we would rather have them tell the foreman, rather than not get it at all, we want them to tell the Safety Committee.

Another reason why we believe in Safety Committees is because safe practices in one department are about the same as they are in another

department. The Safety Committee in going through the plant requires a certain amount of professional expert knowledge about safety which is valuable to them as they go from one department to another. I think of one incident in our plant (and if I tell you everything about our plant, I don't want you to feel that we need a lot of looking after; just remember I am telling the truth) we had an emery wheel go to pieces. It was a pretty bad accident.

We checked up on that accident, and the Safety Committee, in going from one department to another after the accident occurred, found wheels similarly situated in nearly every department of our plant, other wheels which were just as hazardous as the one which caused the accident. Now, if we had not so centralized our work, what would have happened? That foreman would have installed a new wheel and would have seen that it was properly taken care of and guarded, and that would have ended it. But as it was, the one accident which occurred in one department enabled us to guard against a similar accident all over the plant.

One Standard of Plant Housekeeping Throughout

The matter of plant housekeeping is another thing which is standard throughout the plant. Good housekeeping here is good housekeeping over there. The committee in going through will naturally concentrate on things that they have seen in other departments and find places in the department in which they are investigating where a similar condition exists.

Another example that I happen to think of is the remote control of machinery. We had a little accident over at our plant resulting from remote control of machinery. I know what I mean by remote control, but I do not think you do. I mean that the operating part of the machine was here, and over on the wall was the switch that starts and stops the machine. As I say, we had an accident because of that condition. When we investigated, we found conditions of remote control all over the plant, and through the work of the Safety Committee, we were able to check up on those.

There is another reason why we believe in Safety Committees. There are certain places in every plant over which no foreman feels a matter of responsibility, and such places are the passage-ways between two departments. Neither foreman wants to put in an order to have a passage-way kept in good condition and have the work charged to his department. Stairways, often very hazardous things, are in that class.

We had a condition in our plant where (remember I say we look after sanitary conditions as well as safety conditions) a certain toilet and washroom was situated in a room occupied by men from three departments. We had the dickens of a time trying to find out whose responsibility it was to keep the place in good condition. The Safety Committee finally tackled the thing and they said they didn't care whose

responsibility it was, it was to be cleaned up. The place was cleaned up and is in pretty good shape right now.

Another reason why we believe in Safety Committees is because of the idea of conference. I don't need to ask you if you believe in conferences. Some of you have traveled a thousand miles or more to come here. You all agree with me, I think, that two heads or three heads or a dozen heads are better than one. Some illustration of that may not be amiss.

I once owned a Ford. It was an old 1917 Ford. I discovered a place where I could improve it. Do you remember the cock which drains the radiator on the old style Ford automobile? In the cold weather you would break your back trying to get that choke open, and it was very difficult to reach. I was surprised that a man as wise as Henry Ford permitted a thing like that to happen on his car. I thought to myself, why wouldn't it be nice to extend a long pipe below the cock, put the cock on the bottom so that you could reach it with your hand, and let the water drain out? I didn't consult with anybody about that; I just went ahead with it on my own hook. Before I got home with the Ford, the pipe was frozen.

Two Heads Are Usually Better Than One

I would also like to tell you of an instance which occurred in our plant where two heads were better than one. A fellow was doing a little assembly operation in which he put a nut on a part and he did it with a nut setter, a brass nut setter you call it. You put it up against your side and grind it. He developed something or other in his side, a sore. The foreman after some study of the thing decided that what he needed was a heavy pad of some kind to wear on his abdomen so that the sore wouldn't develop again. The Safety Committee came along and it didn't look so good. They studied the thing for a while with the result that they threw the old brass nut setter away and installed an electrical nut setter. That is another example where four or five fellows getting together and working on a thing will bring out something that will be better.

There is another reason why we believe they are worth while, and that is because safety is very largely a matter of education, and I don't know any better means of education than a Safety Committee. We have five men on each of our Safety Committees, 10 men all the time. These committees are rotated every year. That means that these men are constantly taken from the organization and fed back into it. These men for a year give considerable attention to the work of accident prevention and the old adage, "Once a mason, always a mason," holds true in safety work; once a safety man, always a safety man. A fellow can't go around studying hazardous conditions in a plant without having that get into his blood. So, as I say, from an educational standpoint, Safety Committees are decidedly worth while.

There is another reason (I don't think you will disagree with me on this) why Safety Committees are worth while and that is because the workmen in a plant have a right to have one of their representatives check-up on conditions occasionally and find out if they are safe. After all, who has the greatest interest in accident prevention? Certainly the worker has. We pay a little compensation and forget it, but the worker loses more in cash, loses more in suffering, loses more in every respect than the employer does, and it is the worker we are mainly interested in.

I can't swear to the truth of this story, but I have been told that during the War, in plants where gas masks were manufactured, the final inspection of those masks was always done by girls who had very near relatives serving at the front. What is the psychology of the thing? Simply this: that if a girl has a brother or husband or sweetheart at the front, she is not going to pass that mask over without being sure that it is absolutely okeh.

So, as I say, the workmen, who after all have the most at stake, have a right, and it is good policy to give them the right, to serve on Safety Committees.

There is another reason (and this is the last reason, I think) why we believe they are decidedly worth while, and that is, Safety Committees have in many plants proven the forerunner of committees or bodies of one order or another, composed mostly of workmen, who sit with the management and council on problems of mutual interest. I don't claim originality for that statement. I heard it first from Mr. Arthur Young that their system of Works' Council developed from the old Safety Committees.

A Word of Warning About the Safety Committee

In our plant I know that to be true. Our Employees' Congress sits with the management and consults about various matters, and it developed from the old Safety Committees. The psychology of it is simply this: when the management learns and the men learn that they can work together and consult together on matters of mutual interest, such as safety, they gain a respect for one another and immediately see other problems upon which they can consult profitably. That is the last reason why we believe that Safety Committees are worth while.

This isn't exactly an answer to the question. I would like to say just a word or two of warning, to some of you who haven't experimented with Safety Committees, that it is possible to have a Safety Committee that goes all wrong, and, of course, the effect is very bad. In the first place, the management must respect the Safety Committee, and must sympathize with them. I don't mean that the management must be sought, and I don't mean that the management must adopt the questions and policies put forward by the Safety Committee. I simply mean that the management must take an intelligent interest in the work of the Safety Committee. Sometimes the management says, "No, that happens occasionally

in our plant and I suppose in every plant." But when the management says, "No," and gives a reason, the committee is usually satisfied, and then mutual respect exists between them.

Another thing that should be done is never to permit a recommendation of the Safety Committee to just die. It must always be followed up. If you haven't somebody on your staff who can give the time to follow-up the recommendations of the Safety Committee and see that some action is taken on it, or some answer is given, don't start a Safety Committee, because you are simply spoiling your chance of starting one at some future time.

And there is another thing (and this may be a debatable question, but I don't think so), we at the American Seating Company believe that Safety Committees should be at least in a measure democratic. A Safety Committee appointed by the management may do a great deal of good, and some of them probably do, but from the standpoint of the education of the employees, which is very important in securing their cooperation, I think there is nothing quite like having democracy in the selection of the Safety Committee members.

Summarizing the Reasons for Safety Committees

In concluding, then, I would like to summarize some of the things I have said. We believe that Safety Committees are worth while because foremen do not always see the hazards in their own department, and the Safety Committee can call to their attention such matters.

We believe in Safety Committees because Safety Committees learn to detect what are safe practices in one department so that the whole plant can profit by the mistakes of each department.

We believe in Safety Committees because there are some places and some conditions in plants over which no foreman feels the responsibility and some central organization ought to look after those places.

We believe in Safety Committees because they embody the idea of conference.

We believe in them because safety is a matter of education, and the Safety Committees are excellent educators.

We believe in them because we believe that workmen have a right, inasmuch as they have the greatest interest in safety, to be represented on the body which inspects the plant and checks it.

We believe that Safety Committees are worth while because safety can never exist unless it is a part of a general plan of industrial relations between the management and the men.

Finally, I might submit my evidence at the American Seating Company. We have had them for a number of years and we have had the Employees' Congress for the last seven years. During that time, our labor turnover has fallen from 200 per cent to 20 per cent; wages are 10 cents an hour higher than they were at the time following the War (I mean wages to the individual workers, and along with that, our unit

cost has fallen off, simply meaning that the workers have attained greater productivity, and not that we are trying to give any money away. Good will exists throughout the whole plant and that wasn't always true. Accidents have fallen (and I will put this in terms of frequency and severity): frequency of accidents has fallen from 17 accidents per million hours to two per million hours, a decrease of 80 per cent. Severity of accidents has fallen from 79 days lost per thousand hours of work to 16 days lost per thousand hours, also a decrease of about 80 per cent.

With those reasons, ladies and gentlemen, we believe that Safety Committees are decidedly worth while.

Discussion of the Merits of Safety Committees

CHAIRMAN KEARNS: Your chairman feels that if you are not, you should be convinced by this time that Safety Committees are worth while. However, I don't want to make up your mind for you, and if there is anyone in the audience who would like to ask a question of Mr. Griffin, I am sure he will be glad to answer it.

ALBERT CURRY (Harry Brothers Company, Detroit, Mich.): I would like to ask Mr. Griffin if his Safety Committee devote their entire time to this work, or do they take their time periodically during working hours? I understood from his talk that his committee must devote most of their time to that work. In that case, I would say that a Safety Committee outside of the foremen is the only thing. I understood the point at issue was safety work in small shops where the Safety Committee could not put their whole time in on the work. That was the reason I gave that foremen should be the right ones for the committee. I would like to have Mr. Griffin answer that, because if they only give part of their time, why then it puts a different light on my idea, and I may get some ideas on it.

MR. GRIFFIN: I am glad you brought that up. Each of our committees takes about one day each month to make a general inspection of the plant. In addition to that, when there is an unusually severe accident, we call the Safety Committees together and they go out and investigate the accident immediately after it happens. The foremen, of course, are on a salary and lose nothing by the time they put in. During a safety inspection, the workmen are paid their average hourly wage.

They don't put in all their time in our plant on this safety work. It takes them about one full day a month to make this inspection. We employ about 1,000 men in our plant. In a smaller plant, the length of time it would take them to make the round of the plant would be proportionately less, which would automatically make the cost proportionately less and within reach of any plant.

MR. CURRY: That brings out the point at issue. Mr. Griffin speaks about the Safety Committee which is exactly the difference that I have gone through in my previous long experience. I may not look it, but I have been in the manufacturing business from apprentice boy to the

present time, a period of 42 years. I have seen the Safety Committee work done in more than one shop. I have worked in plants from the Atlantic Coast as far as Chicago. I have found that the Safety Committee work has done these very same things that Mr. Griffin has just enumerated.

Don't forget that in my talk I tried to emphasize that eternal vigilance was the slogan, not only today, but every hour in the day. Prevent accidents now and not after they have happened. Please bear in mind that the thing we are trying to do is to prevent accidents. That is why I have argued with every employer I have worked for that the foreman is responsible. You can also have a Safety Committee from the employees, but don't forget eternal vigilance hour after hour, and not once a month when you have your Safety Committee meeting.

DR. WOOD (Frederick Stern): This last address brings up very vividly the difference between an accident and an injury. The last speaker here is saying that we should prevent accidents and not investigate them afterwards. What Mr. Griffin said was that we should do everything possible to prevent accidents, but when an accident happens go and investigate it as a special occasion.

An injury may be caused by neglect on somebody's part. It may be caused by the inefficient installment of machinery or the negligence of a workman or a foreman. An accident in the legal sense of the word, is something which can not be anticipated and for which no one is responsible. Mr. Griffin says that an accident is a thing that can not be anticipated and should be investigated on the spot.

How the Safety Committee May Be Chosen Democratically

MR. COREY: Mr. Griffin has stated that the Safety Committee should be chosen by the employees. I would like to ask him to elucidate just the manner in which the employees go about it to choose this Safety Committee? I would like to know who nominates them and whether they have a sort of election?

MR. GRIFFIN: In our plant (and this may not help you very much, because we have, as I said, an Employees' Congress) the members of this Employees' Congress, which acts not only on safety but matters of mutual interest, mutual to the management and men, is chosen by election, each department or sub department having a representative. The chairman of that body is then elected by the body, and they appoint the Safety Committee every year.

All the foremen sit in at the foreman's meeting, which we choose to call the Senate, and, of course, that is not a democratic organization; they simply hold office because of their position in the firm, and their committee is appointed by the chairman of their body.

CHAIRMAN KEARNS: The next speaker is Mr. William C. Corey, President of the Delaware Leather Company, Wilmington, Delaware. I take pleasure in presenting Mr. Corey.

WHAT WE HAVE LEARNED FROM EXPERIENCE IN A LEATHER WORKING PLANT

William C. Corey, President, Delaware Leather Company, Wilmington, Del.

The first question that came into my mind when I entered this room was, "What is a large and what is a small plant?" Mr. Kearns says 300 men is a small plant; Dr. Hamilton says 50, and I employ 100. Where do I stand?

However, I am going to tell you that we have been teaching safety to our employees for seven years; I have been teaching it myself. We executives at the head of 50 or 100 hands have far better prospects of teaching safety than the head of a corporation who has 1,000 hands. You may not believe me, but my experience will show you before I get through. The reason is this: I know every foreman by his first name, and I know where he lives, and know something about him. I know many of the men personally, and I come into personal contact with many of them, and I am interested in safety myself.

When we have a meeting, a mass meeting which we hold twice a year, I always talk to the men myself. I open that meeting myself and I generally make a few remarks, and then I introduce a speaker who comes to us from an insurance company who supplies the service.

I told my help at one time that I was interested in safety work for two reasons. The first was a selfish reason on my part, which was reducing my insurance rate. The second reason was that I was personally interested in each and every employee and I didn't want to see them get injured. There was my personal contact with my men.

We paint up most of our machinery, and we have most of it painted the battleship gray. We paint the sprinklers red and our cold water pipes green. Our steam and hot water pipes are painted black, and our gas lines yellow. In that way, everybody knows what pipe they are touching and what they are looking at in the factory.

Whether safety comes first, or whether efficiency comes first, I do not know. My argument is that safety is one of the elements of efficiency. If you have a safe plant, you have an efficient plant, and that is true all the time.

I want to back up my few remarks by some comparative figures from our plant, which is a leather working plant, and two of my neighbors or competitors who employ from five to six times as many hands as we employ. This will bear out the statement that the executive of a small plant with his personal contact can have just as good results and oftentimes better results than the executive of a larger plant.

These are some figures that I had the insurance company, which also insures the other companies, make up for me. Our lost time accident frequency per 100 employees per year for the year 1925 was 2.05 per cent. One of our neighbors had a frequency per 100 employees per year of 4.56 per cent, which is more than twice as much, and the other had

a frequency of 2.45 or 20 per cent more than we did for the same year;

Our loss ratio for four years averaged six per cent; our neighbors, 20 per cent and 49 per cent, respectively.

The longest time that either one of our competitors operated without a lost time accident was one year and four months. Some of the different departments in our plant have gone five, six, seven and eight years without a lost time accident. In the last eight years, since the advent of compulsory liability insurance, we have had only 10 lost time accidents, none of which has caused permanent injury of any kind nor the loss of any part of the body.

I think my record shows that the executive at the head of a small plant has just as good an opportunity to teach his employee safety as the man at the head of a big corporation. In order for you to teach the employee safety, it is necessary for the head of the company to get down and do some of the work that is done by paid men who put all their time into it. Those of you who are at the head of these small companies are not handicapped in anyway, because you can make just as good a record and a better one perhaps than the big companies.

Committee Inspections Made During Working Hours

CHAIRMAN KEARNS: A question has been handed in intended for Mr. Griffin. The question reads, "Does your Safety Committee make their trip of inspection during working hours or at such time as the plant is closed down? Do you pay any bonus to foremen's committees?" This question was submitted by Mr. W. F. Spranger, of the Doehler Die Casting Company.

MR. GRIFFIN: The committee makes its inspection during working hours. As I said before, it usually takes all day in our plant. It starts out at 7:00 o'clock and winds up at 5:00 o'clock.

We do not pay any bonus or give any special inducement for service on these committees, other than the payment of their regular wages. There is one exception. The chairman of our committee is usually taken to the National Safety Congress, and he may be around listening to me.

W. D. PRICE (Warner Gear Company, Muncie, Ind.): Does anybody, especially the man from the American Seating Company, have a budget for expenses for a Safety Committee? In other words, how much money can a Safety Committee spend for safety work?

MR. GRIFFIN: It is pretty hard to draw the line on what you mean by safety work. If a committee recommends that a stairway be fixed and that stairway is fixed, that is just plant maintenance, and you wouldn't think of having a stairway that isn't safe. The same is true of machine guards or the cleaning up of a pile of rubbish. That is mainly what the committee finds. The committee just finds things here and there that somebody overlooked which ought to be done, and you can call it safety work or just good plant housekeeping.

Of course, we do have a budget. Our budget for safety work goes into the purchase of posters and membership in the National Safety Council, the care and servicing of our bulletin boards, the trip that some of us fellows make to the National Safety Congress once a year, and the wages of the men who are making safety inspections. Probably everything that results from the findings of the Safety Committee is chargeable to some department as maintenance.

MR. CURRY: If we have anything wrong in our plant, we don't consider the money; we fix it. The cost does not enter our heads; we fix it.

MR. PRICE: I am afraid the gentleman got me wrong. I just wanted to find out if certain organizations had budgets, or if they had a certain sum that they could spend. I appreciate the fact he brings out that we should fix it, and we do. I would like to know how others run their budget. We buy compensation insurance. Should we spend a certain amount of that or an equal amount on the time of safety men?

H. R. WHITNEY (General Industries, Hamilton, Ontario): In our plant, there is an order issued with an order number the same as any other job that goes through the plant. When that order is finished, it goes back to the auditor, where it is paid for.

CHAIRMAN KEARNS: Is that the information you wanted?

MR. PRICE: I would like to know whether there is a budget provided for the Safety Committee and the safety work that is to be done in the plant?

Women Are Active on Some Safety Committees

D. C. FAHY (Du Pont Company): All our safety work is charged up to the job which the Safety Committee recommends. If it is new work, it is taken up with the manager. He in turn appoints that Safety Committee and a master mechanic to investigate the job. If it is a little job to be attended to, it is authorized done, but the department must stand the expense. There is no appropriation of any description made, other than the expense of the Safety Committee to the Safety Congress.

C. MATTHEWS (American Radiator Company, Michigan plant): In regard to these Safety Committees, we have one in our place, and I happen to be the chairman of it. We have five members and we make our inspection every two weeks, generally on a Tuesday. Each man gets his list of things to look for. We have the shop divided into four units, and each man goes to his unit.

MR. WALKER: I would like to ask Mr. Griffin if he has any women representation on the Safety Committee, and if so what the results are? We have about 15 or 20 per cent women employed in our factory.

MR. GRIFFIN: I can't answer that question for our plant. Our nurse is automatically a member of the Safety Committee. She does not make her inspection with them. Unfortunately, she can not get away from her first-aid room. I think she is a very valuable member of the committee. When the Safety Committee gets ready to make an inspection, they go in and sit down with the nurse, and she throws her books open

and shows what has been going on for the preceding month. They check up on the direct causes of accidents and look around for some place that might be hazardous.

In a plant where there is a large proportion of women workers, there should be a woman represented on the Safety Committee. There is a woman representative in our Employees' Congress, but to the best of my knowledge, they never served on the Safety Committee.

MR. DUNDEE (Hamilton, Ont., Canada): I represent the textile men. We probably have two-thirds women, and we have that proportion of women on the Safety Committee. For purposes of inspection we take the men through the plant only. The women only come to the regular Safety Committee meetings every two weeks. The reason we don't take them through, is because they don't understand the mechanical hazards the same as the men. The women work with the men during the day, and they confer and talk their hazards over together, but the men, as I say, conduct the inspections.

The Safety Committee Helps Lower Production Costs

CHAIRMAN KEARNS: Is there any other plant represented here that has women on the Safety Committee and would like to have a word to say on this subject?

MEMBER (Haynes Stellite Company, Kokomo, Ind.): We have one foreman in our company that understands safety. He decided to put this thing over the entire plant a few years ago, regardless of what anyone else thought. I have kept a pretty close record on that department. He works safety with his men. He lets the men work with him instead of for him. In that department they went 21 months without a lost time accident. I have figures also to show that he increased his production 22 per cent, and reduced his costs 16 per cent, and raised the wages of almost every man in his department.

We have another department there where the foreman doesn't seem to think that the Safety Committee is worth while. It takes a good deal of work to keep those men interested in that particular department. I believe that this one man's department has enough evidence to prove beyond a doubt that you can afford to pay what the committee is worth. That is all there is to it. If your committee is not doing the right stuff, it is not organized right or somebody is not doing his duty.

MR. BATTLE (Hollingsworth & Folks, East-Fall River, Mass.): Our East Walpole factory has an average of 225 men, and our West Groton, Massachusetts, factory employs 270. Without being personal, I am supposed to look after the safety work, but my regular vocation is traffic management. I find in my work that I secure the best results by actual cooperation with the Safety Council in Chicago. If this will help you, I want you to know it. The Safety Council will help you to get the moving pictures which they have and will send them to you at a nominal cost. If you can get a hall where you can put them on, everything will be fine. I put on a picture every other month from the first of November to the

first of March. I also secure from the Forsythe Dental Institute in Boston health pictures about the care of the teeth. I get the men interested in that way.

At the end of the year we put on an amateur show that is conservative and nice. I have a great deal of pleasure in stating that I have reduced my lost time accidents considerably. I had 71 at one mill, and there were 588 days lost. This year, thank the Lord, I only had 31 and 280 days lost, and I owe it all to sanctified commonsense together with moving pictures.

CHAIRMAN KEARNS: We have on our program a number of subjects for round table discussion. The first one is, Capitalizing personal contact; second, What to do about machinery guards; third, How to keep employees interested in safety; fourth, How to secure and use experience of others; fifth, Value of cooperation with other plants nearby; and sixth The first-aid problem.

I had intended to call or pick out a few people in the audience to discuss some of these questions, but I have changed my mind. I feel we had better just have a round table discussion and throw the meeting open to anyone who cares to discuss any one of these subjects.

We have National Safety Council question cards here, and we will be glad to pass them out to you; but I would much prefer that you ask your question now and have someone here in the meeting answer it for you.

The General Round Table Discussion

S. C. HUETT (American Lime & Stone Company, Bellefonte, Pa.) Referring to the subjects listed for discussion, I would like to ask about the next to the last one, "Value of cooperation with other plants nearby. I would like to ask especially about the nature of experience that any of the smaller plants have had, especially those not located in the large cities, with the cooperation of other plants in their vicinity, the nature of that cooperation and what the results were?

MR. GLIDDEN (Ohio Public Service Company, Mansfield, Ohio): We started a safety organization in our company a short while ago, and a starter asked one of the steel mills, not a large one, but one that is actively engaged in safety work, to assist us. The safety director spent a good deal of time and gave talks to our men on the subject and really gave us wonderful assistance. I believe that we would not have been able to start had he not given us that assistance.

MR. WHITNEY: With reference to "What to do about machinery guards," I would like to find out from one of the other men here in what way they keep a record of them and how they keep them in place?

MR. THOMPSON (Detroit Insurance Company): It happens to be my lucky or unlucky duty in life to visit many plants, purely from a service and engineering standpoint. I have the very question that this gentleman is asking now put up almost every week, "What are we going to do about our guards? Here we spent thousands of dollars every year, and

at the end of the year we take our inventory and our thousands of dollars are gone, also the guards."

I tell them there is only one way, and that is to identify a guard with a machine, the same as you tie a can on a dog's tail, you make it conspicuous, and if you will paint the guards a conspicuous color, and have an ironed rule in your shop that anyone caught with a scrap or a piece of metal painted in that color will be up with the angels, you will have all your tools left in the plant.

I have found that by painting them one color—and why not make it green?—helps tremendously in keeping the tools where they belong. By painting it green, it will lend harmony to the plant, and will also lend to the scheme of things that that piece of metal is a guard. You can paint it any color, it does not make any difference.

Keeping the Machinery Guards in Place

MR. WHITNEY: I started this. I want to explain our method. One of Mr. Kearns' men came up to my place and issued an order to put guards on an oil furnace. About three months after, he wanted to know if they were on, and I told him certainly. He then said to me, "Let's look at them." I felt as big as life. When we got there we found two of them all right, but the third was gone. I didn't think there was any use in asking the foreman or the man that was running the furnace anything about them, but it set me to get out some cards and card every guard that is made and turn it over to the foreman.

Any accident that happens on the machine that has that card record is filed away with that card, with the date the guard was put on and who installed it, who the foreman was, the kind of machine, and the department it is in. I think you will find that all this information will be of great help to you in case an incident like that occurs. I don't think there is any man living that remembers all the guards that are ever put on.

MR. CURRY: We paint all our guards green. We endeavor to build the guard so that the machine is as accessible as possible without removing the whole guard. We put the side of the guard on hinges so that the man can unlock the two buttons and get at the machine without removing the guard.

If we find a guard missing from a machine, I do not lecture the man, I simply ask him who took it off. He may say he does not know, or he does. I then say to him, "What is the guard put there for?" He may look at me and not answer the question. I then tell him the guard is put there to keep you and some of your fellow-workers from getting injured. Put it back and put it back the way you found it so that you or some of your fellow-employees will not get injured.

If you take that course, you will get good results, I am sure, because he feels that you are doing something to help him or his fellow-worker. That is our plan when we find guards removed.

MR. FAHY: Those two questions, "What to do about machinery guard and "How to keep employees interested in safety" (both of them apply to the same thing), can be answered by the one answer.

We have a method at our plant, whereby if there is a guard removed from a machine, it is done by the foreman. If the foreman goes away and leaves it off the machine, he is immediately charged.

I have been chairman of our Safety Committee for three years, and the last two years, I failed on our inspection ever to find a guard on a piece of machinery, and our plant covers in the neighborhood of 200 300 acres. We have a paid Safety Committee. We have to travel on a week all over that entire plant. Any time we find a guard off a piece of machinery, we are duty bound to report it to the management, and the man that removes it is going to suffer. All our machinery is painted the same color as our beltings.

"How to keep the employees interested in safety?" The answer is keeping your guards on the machinery.

MR. WILSON (Cleveland Safety Council): I would like to go a step forward along that line of guards. I think when we are contemplating a program of guarding, that if we would take into consideration the foreman and the employee on the particular machines that are going to be guarded and get their suggestions and their help, that will solve to a great extent the permanency of that guard.

Keeping the guards on the machines, as a means of keeping up interest is only solving about 30 per cent of your accidents. In other words, your mechanical protection is around 30 or 35 per cent, and there is still 65 per cent an educational program, entirely foreign to your mechanical protection. I think that involves the coordinated individual effort of each employee in the plant. The painting of individual guard with specific color is fine. It does lend to the safety atmosphere of a plant. I do think, however, if we can invite the foreman and the man using the machine and get their cooperation and aid when we design and construct these guards, that it will aid very materially as a permanent on the part of that machine.

Getting the Cooperation of the Employee

O. J. LEWIS (The Davis & Farley Co., Cleveland): In furtherance of Mr. Wilson's remarks, we had a particular case in our reaming department. I think that Mr. Wilson visited our plant when we went into that department and found practically all the guards on the reamers had been removed. We called together a number of the employees working in that department and talked the matter over. One of the employees suggested a type of guard to replace the old-time guard. The old guard we could never keep on. As a result of that employee's suggestion we put on this new guard, and in about six months we did not find any of those guards removed. This was all due to the suggestion and cooperation which they gave us. I think if we can get the cooperation of the individual fellow that is using the type of machine, we will

no trouble. He understands more about the workings of the machine than any mechanical engineer you can bring in.

MR. LANG: It would seem to me that inasmuch as Mr. Jay Thompson is here, who has a message on first-aid, that the meeting would be incomplete without hearing from him. I would like to suggest to the Chair that he call on Mr. Thompson for a discussion of first-aid in the industry.

CHAIRMAN KEARNS: We would be delighted to hear from Mr. Thompson if he is in the hall.

PRACTICAL DEMONSTRATION OF FIRST AID

Jay E. Thompson, Manager, Toledo Safety Council, Toledo, Ohio

I liked very much that statement the gentleman made about "sanctified commonsense." It applies a lot to first-aid.

Briefly, I want to leave this thought with you in regard to minor injuries: make an examination for the minor injury and a vaccination scratch for smallpox. You don't know where the germs are, and you can't afford to take a chance, and for minor injuries, "sanctified commonsense" is to have them treated with some antiseptic solution.

I am going to ask this man from Cleveland (I came from there originally) to be the victim for a minute. A man gets a cut in the wrist. You put one finger above the cut and one below the cut and you have shut the blood off, and he is not going to bleed to death. If you do that, you have got him in good condition from that time on until the doctor comes. He won't be any worse off when the doctor gets there than he was when you found him. That is the whole secret of first-aid, to keep your patient in as good condition as he was when you found him.

The twin of that trick is in the neck. Place one finger right here, back against the bony structure, one above and one below. In that way, you shut off the blood. A two-year-old boy died in Toledo as a result of a cut he had received in the neck from a broken windshield. Loss of blood was the verdict of the coroner. That grip will stop the blood. It is the same as in the wrist, one above and one below.

For a cut in the lower arm, you have got to put your finger on the arm and use a little pressure. In that way, you stop the flow of blood. You don't need to take an overcoat off to do it. The same thing is true of a cut in the hollow of the knee. Place one hand on one side and the other on the other side and you shut off the blood.

Another pair of grips is used for a cut in the shoulder or in the upper arm. If you have a cut right up here in your shoulder blade, put your finger down there and wiggle it as if you were turning a tape.

The twin to that is for a cut in the center of the groin, and you use the heel of your fist. If a man has a leg caught in a switch, walk up

and throw your fist there in the groin until the doctor finishes the job. It is the layman's job to keep him in as good condition as the man is found.

For a slice in the palm of the hand, fold the meaty portion below the thumb back, close the fist, and hold it back that way and take him in your car to the hospital. He won't bleed to death.

For a cut on the forehead, one finger below and one above closes it up. People have been known to bleed to death because of cold water being dropped into an open cut to make it stop bleeding.

For a cut any place on the body, close the lips of the cut, look at it as a mechanical proposition. On this one, consider the bone as a broomstick with a rubber tube running underneath and a cut in that tube. The tube contains valuable liquid and you want to stop it. Put your fingers up against that rubber tube, and exert a little pressure against the broomstick.

For a cut on the scalp, a belt or a piece of string tied around the forehead will stop the blood, and he is ready for the doctor to come and do his job.

Stopping the Flow of Blood in Puncture Wounds

For puncture wounds like hitting a man in the neck, you have 10 plugs in your fingers, so use them. Don't worry about the fact that they are dirty. Your victim will bleed to death from a serious wound in two, three or seven minutes. That is the remedy. A three-year-old girl in Omaha, so I was told, was saved from death by a girl scout. A plate broke and the girl got a puncture in the neck. The mother screamed. A girl scout came in and put her fingers there the way I told you, and held it for thirty-five minutes until the doctor came.

You can take these things home with you and pass them along and help everybody that you tell them to. I think they are simple enough for anyone. If any of you had fainted while I was talking about this, to bring you back I would just push the head between the knees. He is conscious when that blood gets back.

For a cracked skull, you reverse the process. You want to get blood out of the head. You elevate him, lower the heels, and apply your cold compresses to the top of the head and the back of the neck.

For a broken bone or an arm, you tie the arm to the torso, and then he is ready for transportation. If it is a broken leg, you tie the two legs together, putting the first of four bandages above the break, and then putting one above the knees and one below and one at the ankles and tie the toes together so that the foot of the leg which is broken will not wobble. In doing this, you are just trying in the case of a broken bone to prevent it from becoming a compound fracture and reduce the shock on your patient. A broken shoulder is the same as the arm.

When a person has had the flow of blood stopped and his broken bones taken care of, you have to bring him back to consciousness. One of the methods is the same as for fainting. The other is a question of setting up

a circulation of air again, such as is necessary from an electric shock or being overcome by gas or drowning, and in that case, you have got to set up the circulation. You have got to use resuscitation in setting up that circulation, squeezing the air out of your victim and letting nature push fresh air back in.

In an electric shock, you need a counter shock and that is easily applied by slapping your victim in the face. There is a best way of doing this act of resuscitation and you should all learn it. I don't intend to take your time by going into it now. It is available. All of these things have a practical every-day application in your work.

Too Rigid Discipline of Employees is Criticized

CHAIRMAN KEARNS: Is there anyone else now who has any questions he would like to ask on any one of these subjects?

MR. GRIFFIN: I have heard repeatedly this afternoon that if an employee doesn't do so-and-so, discharge him. Well, occasionally it is necessary to discharge men. I don't know of any more prolific cause of accidents than labor turnover, and I can prove it to you. Why ruin your labor turnover because a man has violated a safety rule? You make yourself more liable to accidents by getting in green men who are entirely foreign to the organization.

The other thing is, that if you want men to cooperate in safety you have got to gain their good-will and sympathy. Use discharge as a last resort when you can't do anything else.

I would just like to remind you, and call to the attention of those who may not have heard him this morning, that Mr. Clarence Howard spoke in this other room. He is president of the Commonwealth Steel Company. He brought out very strongly that the way to accomplish results is to get the cooperation and friendship and good-will of the employee. He said that the thing to do is to get them interested in helping the organization along. I wish very heartily to second the words of Mr. Howard, in that we should keep our employees wanting to be with us and not make them feel antagonistic by discharging some one of them.

CHAIRMAN KEARNS: Ladies and Gentlemen, I feel, although we have been handicapped to some extent by some restrictions and inconveniences today, that we have had a very profitable meeting. I am sure that all of you have enjoyed the papers and addresses presented by the speakers, as well as the discussion on these papers, and that the knowledge and information gained will prove of material benefit to you in the future.

In closing this conference I want to take this opportunity, personally, and on behalf of the National Safety Council, to thank the speakers who were kind enough to come here this afternoon. I also wish to thank you all very kindly for your time and attention, and to indulge in the hope that we will all meet again next year at a similar conference.

ADJOURNMENT

Health Service Division

Wednesday, October 27, 1926

DR. LOYAL A. SHOUDY, Vice-President for Health
Chief Surgeon, Bethlehem Steel Company, Bethlehem, Pa.

THE meeting of the Health Service Division was called to order in the Grand Ball Room of the Book-Cadillac Hotel at 2:15 o'clock, Dr. C. F. N. Schramm, chief surgeon, Fairbanks, Morse & Company, Beloit, Wisconsin, presiding.

CHAIRMAN SCHRAM: I have a promise to make to you for next year. Those of you who have attended the National Safety Council meetings for the last three or four years have seen only one face in front of you as chairman of the Health Service Division. I am promising you a change for next year. I was elected once and then reappointed year after year but I understand there is a change recommended for the future, so next year you are going to see a new face. I hope you will find the change well worth while.

I am anxious that Dr. Phillips have a big audience this afternoon, so we will wait for a moment until all of those who are standing in the back of the hall are seated.

Three or four years ago our plan of the Health Service Division was a sort of mid-year meeting of the physicians; we had a certain group who came in from the outside, but as a general thing physicians talked to physicians. We had only a small room but that was all we needed.

Then some of the physicians conceived the idea that our real job was to sell health, and so we started out on that basis and placed in various Sections of this Congress physicians to speak on various medical problems, some medical phases of their work, especially applicable to the problems of that Section. If you will glance through this year's program, you will find we have 26 physicians on our program. Some of them you will hear this afternoon, while others have spoken or are to speak in the various Sections.

In medicine, and it applies in industry as in every other place, there is one group who are doing the very best work known. Medicine is not an exact science but the best known methods of treatment, the best known methods of prevention, and the best health outlines are taught

by the men who are practicing from, and who have gone to the regular schools of medicine. I think industry has seen the handwriting on the wall and is calling upon the scientific men to come in and help solve some of the problems of industry.

This afternoon we have the pleasure of listening to the man who holds the highest office in that regular group of physicians who are doing the best known work in health lines. We, the physicians who are here, and we of the National Safety Council are deeply grateful to Dr. Phillips for the message he will bring to us in "The Gospel of Good Health."

THE GOSPEL OF GOOD HEALTH

**Dr. Wendell C. Phillips, M. D., President, American Medical Association
New York City**

A healthful man is a safe man.

It is fitting that safety movements in the realm of industry should anticipate the hazards incident to modern industrial endeavor, and provide means for the prevention of injuries, occupational diseases, deformities, disabilities and fatalities. Gradually our great industrial organizations have assumed their full responsibility in safeguarding the lives of employees. Furthermore, the history of the National Safety Council, representing 4,200 industries, its proceedings, publications and demonstrations, mark the progress which has been made in the interests of industrial safety. It was inevitable that the experience gained by your great organization in the promotion of the principles involved in all the phases of industrial safety should lead you to enter the far wider domain which you have wisely termed industrial health.

Industrial health is primarily a medical problem and the promotion has only been made possible through the cooperation of trained medical men. It involves the application of exactly the same principles as those encountered in health problems in general. In the promotion of this newer phase of your work your purpose seems to be to safeguard as far as possible the health, sanitation and welfare of your employees. For instance, a trivial accident to a normal healthy individual is less serious than the same accident to an employee whose resistance is undermined as a result of tuberculosis, malnutrition, or chronic ailments.

Your industrial health problem is secondarily an economic one. In one of your publications¹ I note a statement that "A high standard of health has a decidedly favorable influence not only upon output, as to cost, quantity and quality, but also on continuity of service or labor turnover, as well as upon morale, working conditions, etc. It is, therefore, as good business for an employer to keep his men's bodies in good order as it is to keep his machines in good order, and it is as

¹Memorandum with regard to the formation of a health division of the National Safety Council.

much worth while to sharpen their wits as it is to sharpen their tools. The industrial health movement, with its fringes extending into the social field, has come to be recognized as not only a legitimate but an important part of any industrial enterprise that is organized for getting efficient results." The necessity for your newer health enterprise seems justified by statistics already available which seem to show that the loss from industrial ill health is fully seven times greater than from industrial accidents. In its fulfillment you are making liberal appropriation of funds and you are following the advice and counsel of qualified and devoted industrial physicians and surgeons, and while your health efforts are necessarily somewhat limited in scope you are commendably filling an important niche in the health problems of our country.

Universal Health Education and Health Preservation

A healthful man is one properly educated in the fundamentals of personal and public hygiene.

I venture today to stimulate your vision by defining a still broader field of activity for the promotion of the gospel of good health, by means of a plan of universal health education and health preservation, and to outline a working scheme for its accomplishment. I would make effective good tidings of health in every community, in every home and in the life of every individual from his cradle to his grave. In the accomplishment of this purpose the primary need calls for a broad and comprehensive scheme of personal and community health education, which must be our slogan, and the millennium which is so necessary can only be reached when permanent and continuous preaching of the gospel of good health is maintained in every community, in every home, for every individual of the land.

In the discussion which is to follow I shall give large emphasis to a keen conviction that our object can never be fully reached until the public realizes that the educated physician by tradition, by education and by experience is the only possible person qualified to teach the principles of health, hygiene and sanitation. Furthermore, I shall emphasize a still further conviction that our success must center around personal contact with the individual, and particularly in the family home. I shall also contend that this entire work can best be accomplished through the agency of the properly qualified family physician.

Let us admit that in the consummation of this scheme the physician must prepare to assume new responsibilities as public health teachers. In the field of preventive medicine physicians have already accomplished and are still accomplishing marvelous results.

This address would be incomplete without a brief enumeration of some of the historical events which have marked the progress of preventive medicine. About 1796, Edward Jenner, practitioner of Gloucestershire, in England, boldly transferred cowpox infection from the hand of a young milkmaid in the arm of a young lad named Phipps, and

immediately established the fact that immunity could be produced. As the result of vaccination, smallpox, the dread blemisher of human beauty and destroyer of human life, has become a thing of the past, except with people who foolishly neglect to avail themselves of the protection thus provided. But for Jenner's discovery, the faces of at least 50 per cent of this audience would be marred by pock marks. The decimation of cities and communities from smallpox had continued throughout the centuries. But for this discovery, the continued high death rate from smallpox in foreign countries would have made it impossible for the United States in 1926 to have anything like a population of one hundred and ten million.

In the light of this great discovery and boon to humanity, the proofs of which are positive and unassailable, is it not strange that prejudiced, benighted individuals and believers in cults like the antivivisectionists, the antivaccinationists, the chiropractors and the Christian scientists should presume to question the effectiveness of vaccination and inhumanly attempt by precept, by example, and by propaganda, to prevent its employment? Unfortunately, during the last few years in various parts of our country these forces for evil have succeeded in creating prejudice. Neglect of protective vaccination against smallpox has resulted in more or less alarming outbreaks of the disease. The state of Florida has just furnished an example of this kind². Wherever states have been lax regarding vaccination of school children, smallpox has spread, and yet this disease is an example of contagious disease which we know can be prevented.

Development of the Germ Theory

Louis Pasteur, father of the conception that bacteria (germs) are the direct cause of many diseases, gave to the world the key to the causes of putrid and suppurative diseases. Then came a positive demonstration of a specific germ—Robert Koch's discovery of the bacillus of tuberculosis. Today tuberculosis is well under control.

Surgery adopted the principles first of antiseptics and later of asepsis. Few surgeons had ventured previously to perform major operations on the vital portions of the body, on account of the frightful mortality which

²In an editorial published in the American Medical Association Journal, June 6, 1926, it is recorded "that 163 persons are known to have died of smallpox in California during the first quarter of the year. The cases reported numbered nearly 2000. One hundred and thirty-six of these deaths occurred in one of the most enterprising cities of the world, Los Angeles. This heavy toll of human life is not attributable to any local impossibility of securing advantage of the triumphs of modern prevention of smallpox. It was not due to the incompetence of the medical profession. The real cause is to be found in the indifference or even active opposition engendered through the influx of antimicrobial forces. As truth is the best defender of the faith, no opportunity should be overlooked to make the records of history tell their story to those who may waver in their acceptance of the help of modern medicine or even sneer at its claims. In the Jubilee Volume of the American Public Health Association, Chapin (*A Half Century of Public Health*, Am. Pub. Health A., 1921, p. 145) significantly records that during the last 50 years only one school child in Providence, R. I., has had smallpox, and that was one of the exceedingly small number of children who, for one reason or another, escaped vaccination. If vaccination were compulsory for all school children, the same record would prevail in all the schools throughout the United States."

resulted from suppuration. Joseph Lister, in 1878, showed how bacterial infection of wounds may be prevented by applying the principles of antiseptics in surgical operations. This momentous discovery revolutionized surgery and greatly lowered the mortality from surgical operations. Today surgeons, applying aseptic principles, do not hesitate to operate on any portion of the body, even the human heart.

In the 50 years since the discoveries that have just been mentioned, chemistry in medicine has made rapid strides, particularly in its relations to studies in physiology and metabolism. Chemical estimation of blood urea, proteins and gastro-intestinal contents and laboratory studies in cardiorenal and blood efficiency enable the physician to estimate the conditions of important organs of the body. Meanwhile, physics, pathology, bacteriology, sanitation and preventive medicine have been developed to a high degree. The discovery of antitoxin for diphtheria has proved a boon to the child. The various animal carriers of disease have been determined and classified.

Further Rapid Strides in Recent Years

The work of Gorgas in making possible the building of the Panama Canal by the application of our knowledge of insect transmission of yellow fever and malaria, and the employment of anti-typhoid and paratyphoid vaccine, together with sanitation of water and food supplies, have practically annihilated these diseases. In the Spanish-American War the typhoid death rate of American troops amounted approximately to 12 per cent. In the World War as a result of the universal anti-typhoid vaccination the death rate from typhoid amounted to less than one-half of one per cent.

The future may bring about the complete eradication of diphtheria, scarlet fever, whooping cough, and possibly all the eruption diseases; while yellow fever, typhus fever and all plagues are falling before the march of preventive medicine, based on bacteriologic discoveries.

The discoveries made on the virtues and the relation of light to rickets represent another real achievement in the advance of science. The toxin-antitoxin prevention of diphtheria has been definitely and positively proven. An intensive anti-diphtheria campaign carried on in the city of Auburn, N. Y., has been so successful that no deaths from diphtheria among those vaccinated have occurred in that city for the past two years. An anti-diphtheria campaign now going on in New York state carries the slogan "No diphtheria in New York state in 1930," and the State Commissioner of Health believes this to be possible. These are representative of the marvelous contributions which the physician has made to the march of human progress. Truly, neither the physician of the present nor the physician of the future need ever blush when contemplating his professional heritage.

We build on the experience of the past. The rapid strides in medical discoveries of the last two generations, together with the more practical employment of sanitation and preventive medicine, have already

effected great changes in the actual duties of the practicing physician. The daily round of our immediate predecessors was made up largely of the treatment of infectious and contagious diseases. The daybook of the family physician usually recorded visits to families for the treatment of measles, scarlet fever, diphtheria, typhoid fever, or malaria only. Formerly his medical education provided more for the treatment of disease than for its prevention.

National, state and municipal departments of health have already become powerful and controlling factors in preventive medicine, sanitation and hygiene. Health and welfare organizations, both national and local, have also invaded the field of preventive medicine. Great industrial organizations have introduced various health measures, believing it to be for their own best interests from an economical viewpoint, as well as for the benefit of the hundreds of thousands of employees. Pay clinics and group practice have made some slight imprint on the modes of practice today. Furthermore, the publicity work of all these agencies together with that of the American Medical Association, has gradually created a demand from the public for more information regarding personal health. The outcome of these measures has led to confusion regarding not only the present but also the future of medical practice.

The Health Trusteeship of the Modern Physician

During the past few years many of our leaders of medical thought, and particularly those clothed with the responsibility of outlining medical policies, have given serious consideration to the subject of public health education. There has been an awakening of the medical conscience as to the trusteeship of physicians as promoters of individual and community health. The pioneers have become alive to the fact that physicians only are qualified by heritage, by education and by experience to propound to the public the basic principles of health preservation, and the protection of life which is afforded by sanitation and the scientific application of all the phases of preventive medicine.

It sounds like a simple thing to do, but the reticence of medical men and the innate fear of publicity, the supposed restriction of ethical limitations, have tended to prevent these great educators from fully covering this proper field for a physician's activity.

The editors of great daily newspapers and magazines, the newspaper syndicates, and university and public school teachers are calling on the medical profession as never before to enter this field. They freely admit that health knowledge is a valuable commodity for which the people are willing to pay. This tendency is leading great newspapers, magazines and newspaper syndicates to realize that the public must be given the true facts regarding individual and community health. This further knowledge in turn is showing its influence by the gradual elimination from these great publications of the publicity which is sought by nostrums, cults, quackery, and other menaces to the public health. This naturally engenders a desire to purvey to their readers

only well-founded information regarding health matters. In the quest for such information they have learned that organized medicine is the only possible source from which correct information can be obtained. Furthermore, they properly contend that the educated physician must remain the source from whence it must come.

The *Saturday Evening Post* recently said that the "science of medicine, as far as laymen are concerned, is the most tongue-tied of all the learned professions." It called attention to the difficulties surrounding the scientific vocabulary of medicine as a means of teaching the public, and the shrinking attitude of the medical profession toward the lay press. Then followed the statement: "The enlightened physician has a great body of news of the highest importance to communicate to non-medical readers. When the medical profession becomes more fully awake to its responsibilities in this field, it is to be hoped that it will perceive the gravity and importance of its problem and attack it in force over a nation-wide front. Some national body, such as the American Medical Association, which has made such a good start along these lines, ought to take up the matter in a big way and work out a comprehensive program which would unify the efforts of the agencies already in the field, and cover the lay press of the whole country."

These friendly criticisms are perhaps well deserved. Our answer is that organized medicine has already entered this field. Considerable progress has been made in overcoming the reticence of medical men when called on to prepare health talks for schools and other audiences, for the radio, or to write articles for lay publications. If the radio had been available during the ministry of the Great Physician, He would have made it hum and thrill while it adroitly advertised His message. The radio likewise should serve the physician and be made by him to illuminate his gospel of health.

Physicians Teach Their Patients Principles of Health

I am proud to state with the greatest emphasis that the medical profession is well able to supply the brains for any and all nation-wide efforts for individual and community health education that the great business publications and the advertising world will undertake to promulgate and finance. This statement is the challenge of organized medicine! Today every licensed physician is being urged to prepare himself to teach his own patients the principles of health. Organized medicine has approved this measure. The house of delegates of the American Medical Association is on record as favoring every measure of public health education, including periodical medical examinations of the supposedly healthy.

Two years ago the board of trustees of the American Medical Association established *Hygeia*, a monthly public health journal, published distinctly for the lay public. *Hygeia*, devoted to individual and community health, has already qualified as the leading public health journal of America. Its columns contain information of the utmost value cover-

ing the whole field of medicine. The lay reader is told what to do and what not to do regarding health affairs, and every issue contains exposures of vicious nostrums and quackery. Clip sheets from every issue of *Hygeia* are furnished to hundreds of newspapers, so that already millions of our people are receiving this direct and valuable health service.

Furthermore, many of our great newspaper syndicates, great daily newspapers and reputable magazines refuse to publish any material pertaining to health except on reliable medical approval. The propaganda of quackery and vicious nostrum advertising are refused by these great publications in the interest of the public health. Indeed, in health matters, many of these publications rely constantly on the advice received from the American Medical Association headquarters. Radio programs of instruction in public health are offered by state and county medical societies.

Periodical Examination of the Apparently Healthy

Periodical examination of the apparently healthy is one of our projects which promises well for the future as an important agency for preservation of individual good health. Our Association is pledged to this measure, and state and county societies are rapidly becoming alive to its importance. Sufficient progress has already been made to demonstrate the fact that many of the illnesses of life are unknown to the patient during the incipient stages. This procedure enables one's physician to detect the first danger signal of any form of disease and to cope with it during its incipient and curable stage.

Physicians believe that whenever this great task shall have been accomplished in any nation, state or community, the average life of the inhabitants involved will be increased at least another seven years over the 20 that have been gained in the last half century.

In his role of personal health administrator the family physician's chief duty and his chief service will be to keep his patients well. Evidently, such services can be made possible only by maintaining intimate, clinical information, well recorded, regarding every man, woman, and child who seeks his service. And every man, woman, and child in every community should have his chart of health recorded in the files of his family physician. Too many of our inhabitants worry through life with only fairly good health and while they accomplish their daily duties, these fairly well persons may never know the exuberance and happiness of perfect health. Hence, one goal of the future practitioner of medicine will be the attainment and maintenance of exuberant health, which is the inherent right of every person. A higher average of overflowing good health means a higher average of happiness, comfort, usefulness, and economic value of the individual. The superman will never materialize without superhealth.

The proposed plan is creating a new contact between patient and physician. Physicians are giving a new significance to the word "pa-

tient," for in the new order of things both the sick and the well must and will be recorded in the lists of their physicians. The family physician should remain the foundation of medical service. His field is great and his opportunity for service boundless. Such service will go far to limit the advent of insurance methods of treatment, state systems, industrial groups, and other socialized principles which the true psychologists and humanists in medicine look on as mechanistic, soulless, and bureaucratic, at the same time discounting the spirit of individual relationship characterized by the better way. Furthermore, such service upon the part of the family physician who is properly prepared educationally, morally, psychologically, and sociologically, will enable him to prevent the unfortunate adoption of so-called state medicine, and to make the painstaking intimate personal contact with his individual patient so effective, outstanding and unassailable that no other form of medical practice will be permitted by the layman himself.

This scheme would need most careful and painstaking card indexing of health records upon the part of the family physician, and these records should be passed down from generation to generation.

Whenever the proposed foregoing plan shall be realized by placing in charge of the family physician all matters of personal and family health records, the expense of which might well largely come from the patient, this form of health activity on the part of corporations and other institutions might well terminate.

Knowledge of the great principles involved in the preservation of health is gradually leading legislators to accept the responsibility of protecting every community from the blandishments of unlicensed quackery, the enmity of antimicrobial propagandists, and the evils of nostrum medication. Public officials are already beginning to appreciate their responsibility regarding public health measures.

A Governor Urges Conservation of Public Health

In his recent message to the New York state legislature, Hon. Alfred E. Smith, governor of New York, proclaimed that "one of the great functions of government is the preservation of public health." He further said, "I renew my recommendations of a year ago that careful consideration be given to the protection of the people of the state from unlicensed and unqualified persons practicing medicine. The cooperation of the medical profession is an essential factor in the protection of the public health, as well as in the care of the sick. A very large part of modern public health is urging people to get the advice of their physicians before serious and perhaps incurable conditions have developed. Such effort comes to naught if unqualified persons are allowed to hold themselves out as physicians. The subject is a difficult one, but the state of New York should take the lead in establishing high standards of medical practice, and providing a practicable plan for their enforcement. It is a matter of justice to qualified physicians and of protection to the public."

Let us hope that all state governors and legislators will emulate the fine example of humanitarianism set by the governor of the Empire State.

I now come to the question of financing this great project, for it never can meet its full fruition without appropriations of large sums of money, particularly for public health education. Sufficient progress has already been made to prove the necessity for the appropriation of millions annually, especially for the most important program of personal and public health education, and the ratio of progress in the promulgation of this great scheme will depend not only upon the devotion of the medical profession, the good will of industrial and various health organizations, but additional immense sums must be provided from sources yet unknown in order to accomplish this great undertaking.

Millions of dollars are appropriated annually for the care of the physical derelicts of our nation. Asylums, hospitals and all other forms of eleemosynary institutions dot the landscape of every nation and people. Inmates of these institutions suffer largely from the results of preventable diseases, and suffer resultant untold agonies and tortures. I only predict that under a proper scheme of personal and community health education the millions now needed for salvaging humanity may be turned into channels of prevention which in turn will produce infinitely larger returns in health, happiness, and longevity. Let us hope that in the near future some individual or combination of individuals will establish a vast foundation for the single purpose of financing our great scheme of personal and community health education and health preservation.

Conclusions

1. Public health education is the outstanding need of the hour. The gospel of personal and community health is complex. It should be promulgated by health departments and agencies, by lectures, radio and film; but it will never reach its highest efficiency until it includes a maximum of direct personal instruction by properly qualified family physicians.

2. The patient of the future, in view of his perfected health education, may be expected to derive from it a wise judgment which will lead him to seek the continued advice and counsel of his personal physician. Furthermore, in view of our perfected system of individual and community health education, cults and other menaces to public health, all of which are founded on theories, for the most part baseless and futile, will gradually disappear before the rising sun of enlightened public opinion.

3. The family physician of the future by training, by experience, and by expert knowledge of health conservation will in turn possess a potential power which will qualify him to control and direct the health problems of man. Health education and conservation are services of value even greater to the patient than the sums paid for helping the body to repair the ravages of disease.

4. The maintenance of individual practice in the person of the general practitioner, or family physician, is of the utmost importance for the survival and continuation of the family home as the foundation of the nation.

5. "The laborer is worthy of his hire." The National Safety Council and other great organizations should never be unmindful that all their efforts to promote health are utterly dependent upon the services of the educated physician. These physicians expend at least eight of the best years of their lives in preparation for their high calling. This process of education necessarily provides men of culture. Their services should never be exploited, nor should their remuneration be insufficient to enable them to live in like circumstances with the higher officers of the corporations which they represent.

Carry the Vision of a Healthier, Happier World

The family physicians of all communities should likewise receive sufficient financial support to enable them to enjoy for themselves and their families at least the average privileges and advantages of leading citizens of their respective communities. It is true that the material interests of the physician must always remain a secondary consideration and that his emoluments may never be reckoned in terms of finance, but in no sense should his devotion to services in the interests of his fellowmen become an excuse for financially embarrassing him in his personal and family life.

6. In the matter of public health education full appreciation should be recorded for the extensive programs which have been inaugurated by the various industrial organizations and other health agencies.

Finally: let us hope that we shall all become fully conscious of the vastness of the causes which we must advocate and the usefulness of the deeds we must accomplish; that we may have wisdom, poise and capacity of understanding that will breed an extraordinary confidence and esteem; that we may have a vision of a healthier, happier world which will blossom into unheard-of activity. May we hope that to this end we will be constrained to dedicate ourselves through service to all that will advance, maintain, and increase the sum of human happiness.

Every man who looks toward the future is charged with being a dreamer. But the verdict of history has always been that the onward march of science, religion, and civilization has been led by dreamers. I have ventured modestly to tell my dream, knowing that it will find a thousand responsive chords in the hearts of my fellow workers whose ambition and passion are to serve our fellowmen.

CHAIRMAN SCHRAM: The next speaker of the afternoon needs no introduction to this audience. Dr. Mock, who is going to talk to us on the topic "Human Salvage," represents the American Conference on Hospital Service.

HUMAN CONSERVATION AND HUMAN SALVAGE

Harry E. Mock, Senior Surgeon, St. Luke's Hospital, Chicago; Assistant Professor of Surgery, Northwestern University Medical School; Representative of the American Conference on Hospital Service to the National Safety Council

This is the fourth time I have had the honor of addressing one of the sections of the National Safety Council. I have followed the growth of this wonderful organization since the days of its inception, and I am exceedingly proud to be classed as an associate, if not an actual member.

I have always recognized the great service the National Safety Council is rendering to humanity, a service so closely allied to medical prevention that, with others, I have felt deeply that there should be a closer cooperation and working alliance between this great lay organization and the medical profession—two groups striving for the same purposes—viz.—the prevention of disability or death due to accident or disease.

In both groups there is a common ideal, an ideal shared by the safety engineer in the field working in the smallest industry and by the general practitioner of medicine caring for the sick and disabled in his daily visits from cottage to cottage. Both vision the day when our nation shall change from one prodigal of human life to a nation exerting every effort to conserve human life and human energy.

In the medical profession there are a great many different organizations all striving for better preventive measures and better service to the sick and disabled. Seven years ago it was felt that a working alliance between these various groups would further this end, chiefly by a better knowledge of each other's purposes, and therefore less duplication of efforts. As a result of the deliberations of leaders of various medical societies, the American Conference on Hospital Service was organized. This conference is composed of representatives of 16 of the leading medical organizations of the country.

Its efforts thus far have been largely devoted to the importance of hospital service to the sick and disabled. The conference now recognizes that it must extend its efforts into other fields of endeavor, especially, the field of prevention which precedes that of hospital service and which should materially reduce the number of individuals needing hospital service; and secondly, the field of human salvage, which follows that of hospital service, and which involves the construction and elaboration of methods giving more complete functional restoration and rehabilitation to the permanently disabled. Thus, it was perfectly natural for the American Conference on Hospital Service, entering upon this broader program, to seek a better understanding and closer affiliation with the National Safety Council, the greatest organization for prevention in the lay world.

Today the participation of the American Conference on Hospital Service in this program and the welcoming of that participation by the National Safety Council, is prophetic of even greater efforts and greater results in the conservation of human life and limb.

There has been a gradual change of styles in sickness, just as there has been a change of styles in modes of dress, amusements, living conditions, etc. Not more than three decades ago typhoid fever and tuberculosis were the great ravagers of our industrial army. Typhoid fever in the majority of the American cities is almost eliminated and tuberculosis is rapidly being conquered. Twenty years ago a whole ward in St. Luke's Hospital in Chicago was filled with typhoid fever cases, whereas during the last year only three cases of this disease have been treated in this large hospital. Similarly, malaria, yellow fever, the plague and other scourges of humanity have been stamped out. There are many diseases still unconquered and on which the best brains of the medical profession are focused, with a view of prevention.

In spite of these great monuments to the preventive efforts of the medical profession, the doctor is not suffering for work. Styles have changed. Today our hospital wards are filled with victims of our industrial life, the victims of our craze for rapid transportation, the victims of the rapid pace at which the American people are today living. The doctor alone can not conquer the present day causes of human disabilities. He must turn for help and collaboration to both industry and labor, to the safety engineers, to the educators and to the churches. Only by firmly re-establishing the principle of "I am my brother's keeper" can the present enormous toll of human life be eliminated.

Credit is Given for Elimination of Accidents

Already great advances have been made in the present day causes of human disabilities. The National Safety Council deserves great credit in the elimination of many accidents. The medical profession has helped solve many of the causes of occupational disease, and has assisted in the elimination of some of these. The most notable advances have been made in certain large industries where careful cooperation between the plant physicians and the safety engineers has resulted in marked reductions in accidents and disease. But the ground has only been raked and fertilized. Greater results must follow greater cooperation of all forces concerned.

The whole question of human conservation involves other considerations than that of prevention alone. In spite of all our preventive efforts and of all our present day medical and surgical skill, there are over a million individuals annually being cast upon the scrap heap and labeled "Permanently disabled." It is upon this group that I desire to focus your attention in this paper on "Human Salvage."

We have developed great hospitals in every community of any size with highly specialized and carefully selected staffs of physicians and surgeons. The sick and injured are skillfully treated until the disease is arrested or the broken body repaired. Sooner or later these cases are discharged to make room for other acute cases. The great majority of these patients return to homes where convalescence can progress normally and eventually they return to their former employment.

But there is a certain percentage of these who, under our present system of wasteful, disconnected efforts, are bound to become derelicts. They are discharged from the hospital as permanently disabled, unfit to return to their former employment and unable to secure employment elsewhere. Sometimes this is due to the fact that they can not pass the physical examination of an applicant for work; sometimes they are rebuffed because they are cripples and only the able-bodied need apply; sometimes their mental attitude has become dwarfed, making them unsuitable for employment. At other times they accept odd jobs, floating from one job to another, constantly sinking to a lower level. Discouragement and mental anguish are now added to their physical disabilities. Finally, in desperation children are taken from school and put to work in an effort to help support the family; the wife must leave the home and go to work or the family becomes dependent upon the associated charities. Thus the effect of a single accident may wreck a whole family—make a loafer out of a man who with proper training and placement could be a producer, rob the home of a mother, deprive the children of equal opportunity for advancement, and lower to a certain extent the man-power of the nation.

The Patient is Often Handicapped in Convalescence

Other cases are discharged from the hospital who must return to homes or environment absolutely unfit for proper convalescence.

The efforts made in the hospital toward curing these cases are soon nullified and shortly they are back in the hospital in worse condition than when first discharged. This is especially true of tuberculosis and of heart disease. There is a period of hospitalization with the disease arrested, a period of rest at home which is often entirely too short because of the necessity of supporting the family, a period of return to work at a job unsuitable for one in their physical condition, a break down and return to the hospital. This wasteful, unsupervised handling of these cases after they leave the environs of the hospital until their re-admittance, not only once but often six, eight or a dozen times, again leads to the road of dependency—dependency of the patient on the county institution and of the family on the charities.

It is frequently stated that 75 per cent of the dependency upon the associated charities is due to disability from sickness and accident.

We have a great prevention program, we have excellent hospital facilities for the acutely ill and injured and we have bountifully supported charities for the dependents. But we have no well organized, unified plan to reduce the number of dependents. Think of these tens of thousands of permanently disabled individuals who have ceased to produce and provide as being thrown upon the human scrap heap. Then think of the great number of ways in which many of these could be reclaimed, re-trained and replaced at remunerative employment and you have the very essence of "Human Salvage."

The rehabilitation of the disabled involves all necessary means to

render a disabled person fit to engage in a remunerative occupation, or to return to his or her proper place in society.

The disability may be either a physical or mental defect the result of disease, accident or congenital condition, but, no matter what the handicap, rehabilitation endeavors to restore the person to a position of usefulness and independence.

Rehabilitation is not a charity, but the fulfillment of an obligation of society to its handicapped citizens—an obligation based on medical, educational, industrial, social and humanitarian considerations. Such a program, applied not necessarily to each handicapped individual, but to the whole plan of rehabilitation includes the following lines of endeavor:

- (a) Prevention of disabilities.
- (b) Adequate medical, surgical, hospital and convalescent care.
- (c) Vocational training of the disabled.
- (d) Placement at suitable occupations.
- (e) Supervision—medical, economic and social, to see that rehabilitation is completed and so remains.
- (f) A further step to make rehabilitation possible includes the education of the public and the medical profession.

Thus the work requires the closest co-ordination of effort between medical men, educators, industry (employers and labor) and the social and economic agencies of every community.

A Program For Modern Human Salvage

This is not a new endeavor, for a great many agencies have been attacking some portion of this work for many years. But the innovation here proposed is the co-ordination of all these efforts into a complete, well rounded program for the sole purpose of reducing dependency due to physical and mental disabilities, and substituting therefor opportunities for every handicapped person to become a useful member of society.

The program of human salvage can be divided into three stages, each dovetailing with the other.

- (a) The prevention stage.
- (b) The hospital and medical and surgical stage.
- (c) The rehabilitation stage.

In this atmosphere of prevention where innumerable plans and suggestions are being offered for the elimination of accidents, there is no need of my dwelling upon the first stage. In large industries we have had the best examples of accident prevention, the result of cooperation between the medical departments and the safety departments. If an accident or an occupational disease case presented itself to the plant physician, not only was it his duty to treat the case medically or surgically, but it also was his duty to report the case to the safety department and secure all the information from the injured individual which might help the safety department in preventing a similar accident to a fellow employee. Consider, as an analogous situation, the community as a large industry and consider every physician in that community as working for this large

industry. Further, consider that community as well organized as our best industries are organized for the prevention of accidents and disease. In such a community, whenever an accident or occupational disease was admitted to a hospital or to a physician's care, the same would then be immediately reported to the safety or prevention group of that community. There is no reason why the methods which have been so successful in certain large industries should not be applied to every community as a whole, for the purpose of preventing the almost daily recurrence of similar accidents.

The second stage in this human salvage program represents the adequate hospital, medical and surgical care of all disabled. The majority of our communities have developed hospitals ever ready to receive the sick or injured and to furnish them the necessary medical or surgical treatment which will carry them through to the stage of convalescence compatible with their return to their home. This hospital service has been markedly improved during the last decade, thanks to the group efforts of the American College of Surgeons, the American Hospital Association, the American Nurses' Association, the American Medical Association and other groups, most of them represented in the American Conference on Hospital Service.

A Greater Service to the Disabled Contemplated

This idea of human salvage, however, involves a greater service to the disabled than the majority of hospitals today have considered within their scope of work. The hospital must provide departments of physiotherapy and occupational therapy capable of assisting in the functional restoration of the injured individual as a definite part of his medical and surgical treatment. Physicians must be trained that the immediate saving of the life of the patient is not his sole duty but he must see that the individual is functionally restored as far as is humanly possible. Many patients are far from functionally restored and are far from being able to return to work when discharged from the hospital. Provisions must be made for their continued treatment until this goal of ultimate restoration is secured. Many of these are forced to leave the hospitals for homes absolutely unfit for proper convalescent care. For these an adequate place of convalescence must be provided. Therefore the vision of hospitals and hospital trustees must be extended and must include that development of a proper convalescent center in every community.

Such a convalescent center would provide continued medical supervision of the patients after their discharge from the hospital. A certain small percentage of these cases would develop conditions that necessitated their return to the hospital for further treatment. But because of this daily medical supervision they would be returned earlier than if left to their own devices. The great majority, however, would be carried safely through their convalescent period.

In such a center, properly located, sunlight and skylight, recreation and exercise, physiotherapy and a graduated amount of work would fur-

nish the *modus operandi* of treatment, leading these patients back to full health, to a more complete functional restoration of their injured parts and to a sense of fitness for re-employment. Many cases who, because of their disability, could not return to their old employment could here receive vocational training for new employment. In these centers many of the problems of the State Industrial Commission, the compensation boards, could be solved. At present when a man is classed as a permanently disabled individual and is awarded compensation or a pension, he must remain a useless dependent citizen in order to continue to receive this compensation. But the purpose of this center would be to remove the stigmata of permanent disability, to refit the individual for an earning power greater than his compensation award and make of him a useful independent citizen.

A Central Rehabilitation Agency in Every Community

In every community there should be a central rehabilitation agency to carry out the third step in this program. This agency should be in close touch with every hospital, dispensary, convalescent center, compensation boards, industry, employment agencies and the charities. Its work should be to register every permanent disability case; to see that all such cases received proper medical, surgical and hospital care until functionally restored as far as was humanly possible; to secure proper retraining for work when this was necessary and finally to secure suitable employment for every handicapped individual.

This is not the dream of an idealist or sentimentalist. Abundant proof of the practicability of such a program has been furnished by many organizations, only a few of which time will permit mentioning here, as follows:

The large clothing industry, developed by the Jewish Aid in New York for the discharged tuberculous patients, has become self-supporting, and has removed thousands of cases from the lists of the Jewish Charities and made them happy, self-supporting individuals.

The workshop established two years ago in Chicago by the Jewish Aid has furnished employment to almost 1,000 disabled Jews, and has saved the Jewish Charities large sums which would have been given outright to these people. The Service League for the Handicapped in Chicago for a period of almost three years found hundreds of disabled individuals, furnished the medical and surgical service necessary to reduce their disabilities and to refit them to carry on, trained many cases in useful lines of work and secured employment for a large number of handicapped persons. The League maintained a little workshop in rooms furnished by the Board of Education and here many who could not work a full day or who were not physically fit to compete with their fellows in regular industry were given employment—individuals who would otherwise have been dependent upon the charities.

The Chicago Association for the Shut-Ins, composed of a group of ladies who have found many permanently disabled persons shut in their homes

unable to go out and seek employment, have taught these people certain lines of work, have furnished them material and have sold their products; this organization has proven that handicaps can be retrained and can be made self-supporting.

In several of our large cities, medical men have organized Associations for the Study and Prevention of Cardiac Disease. These groups are daily demonstrating the value of medical supervision plus selected occupations as the means of reducing dependency due to heart disease. The Spaulding School for Crippled Children in Chicago furnishes the best example of co-ordination of effort between medicine and surgery, convalescent care, education and, finally, placement of these handicapped children in useful walks of life. Any program for crippled and disabled adults copied after the work of this school would almost abolish dependency among our people. Several states have developed fair rehabilitation programs for disabled employees. The first state to pass such an act was New Jersey and this state has, in my judgment, surpassed all others in conserving their man power and in reducing human wastage.

The development of hospitals in almost every community of any size in the United States for the succor of the sick and injured has been one of the greatest humanitarian attainments of our time. It has depended to a large extent upon the generosity of philanthropists and upon donations from the state and community and from religious bodies and other groups to finance such a development. Several of us here represent this great hospital organization.

The development of this National Safety Council with all of its ramifications in the field of prevention and of industrial health has been another one of the greatest humanitarian attainments of our time. It has depended to a large extent upon the generosity of industrial corporations to finance its development. With the field of prevention and the field of hospital, medical and surgical care so well organized it behooves us to co-ordinate our efforts and to seek financial backing from these same sources to the end that we may accomplish "Human Salvage" as another of the greatest humanitarian attainments of our time. Every able-bodied man with a drop of the milk of human kindness in his heart, with a desire of service to mankind in his soul should respond to the unspoken appeal of the disabled in our midst:

"Once more to be useful—to see the pity in the eyes of my friends replaced by commendation—to work, produce, provide—seeking no favors and given none—a man among men in spite of this physical handicap."

CHAIRMAN SCHRAM: Dr. Mock's paper will be discussed by Dr. John M. Dodson, Secretary of Public Health and Instruction, American Medical Association, Chicago.

DISCUSSION OF DR. MOCK'S PAPER BY DR. JOHN M. DODSON

I esteem it a real privilege to appear before you as the second of each of the gentlemen who have preceded me. I am glad indeed to second

Dr. Phillips, the distinguished president of the great American Medical Association, in his pledge of cooperation in this great safety first movement.

As chairman of the directing agency of the public health instruction, I am especially interested in the medical needs, the health education, of the public. I am glad to second what Dr. Mock has said in regard to this work. The American Conference has had a great deal to do with the initiation of this work and in building it up and I believe it is destined to be a very useful organization.

I want to approve Dr. Phillips' remarks about the family doctor. You hear a great deal these days about the passing of the family doctor, about medicine having become so specialized that proper service can be had only at the hands of a large group of trained men assisted by nurses and laboratories, so that the family doctor is no longer needed.

I am reminded in this connection of a little incident that happened 15 or 20 years ago when specializing had got pretty much along on its way. This happened at the annual banquet of the medical school from which I graduated. Dr. B. W. Murphy, of St. Paul, now deceased, was called on to speak to the old graduates and he contrasted his student days with those which then obtained. He referred to the long horse-back rides to school and he contrasted that with the swift night rides over railroads now. He told of the crude buildings, the crude equipment, and how the practice of medicine had changed so that everything had become specialties: there was a specialist for the eye, a specialist for the ear, nose and throat; another for the legs, and so on, until there wasn't much left for the family doctors but a little place around the navel.

The "Naval Surgeon" Gave Him an Awful Scare

"Why," he said, "not long ago I had a terrible scare. I was down at Washington to a meeting and I saw a man wearing a button in his lapel and I asked him what it represented. 'Sir,' he said, 'I am a naval surgeon.' I found out afterward that he belonged to one of the ships but for the moment it gave me an awful shock!"

Before speaking on Dr. Mock's paper more specifically, I should like to mention two or three of the accidents which are not remediable as a rule but which we can very readily prevent and to which we should give particular attention. One of the things that has impressed me is the general use of lye, so commonly used about the households and carelessly left where young children can get at it.

Dr. Chevalier-Jackson spoke of this the other day; he has been instrumental in getting the manufacturers to label their cans of lye distinctively, and he has helped to secure some helpful legislation in the way of proper labeling of lye and other substances. It should be said, however, that some of the smaller dealers who handle this material have not been friendly to that movement. I am sure that the members of this National Safety Council everywhere would condemn any such attitude as inhuman.

Fourth of July celebrations are still marked by accidents which can be prevented. For many years the *Journal* assisted in the movement to reduce these accidents and the public press has made an effort to secure a sane celebration on the Fourth, but during three or four years there seems to have been a relaxation on the part of some of these agencies so that this last year and the year before the numbers of accidents and deaths on the Fourth were appalling and not at all creditable to a safety-first nation. I hope you will all join heartily in an effort to suppress this danger.

The next is the serious results of wounds, especially of slight wounds. I should like to make a suggestion here, that all wounds be treated promptly. A neglected wound becomes contaminated from contact with other things and presently serious results are under way. Dr. Mock could tell you, I am sure, a very pleasing story of one of the most striking things in his experience, how he diminished the tremendous loss of time due to hand wounds in a great industrial establishment where he built up a medical department. He has done a great deal toward securing uniform safety-first packets in railroad and industrial work.

Young School Children Trained in First Aid

There is the pocket-size safety-first packet which can be carried anywhere just as conveniently as a lead pencil. I should like to see the children in our schools trained in first aid methods before they leave the grammar schools and educated to carry with them everywhere one of these little packets. They contain a little dressing and are no bigger than a good sized envelope.

In the matter of rehabilitation I can do little more than heartily endorse what Dr. Mock has said of these pitiful cases of men who have been incapacitated for life. The provisions we have so far made for this work have been utterly inadequate. I should like to call attention again to the relations of the family physician to this matter. Many of the smaller communities are not equipped to do these operations. Here is where the family doctor must become active as he never has been before and as Dr. Phillips has emphasized, the family doctor is going to be a larger factor in community life than ever before because his possibilities for usefulness have been so greatly enlarged. It has become his duty to know if his patient needs an oculist and to know the best oculist to whom to send him. It is his duty to know many other specialists, and what are the institutions best suited to the needs of his patients. In this way he can render a larger service. I need not say that he should be thoroughly familiar with the laws regulating public health.

There is coming a change in the attitude of public officials about the medical profession generally; they are seeing their mistakes and realizing their narrow viewpoint. The most encouraging sign of this can be seen in going among the children in our schools. I have had an oppor-

tunity to become rather familiar with this because for 15 years I have been a member of a joint committee on health problems, national as well as local, and I can say to you that within a decade at the outside, the educational world, in reference to health and preventive medicine, has revolutionized its attitude.

Up to about 10 years ago the school curriculum was almost antagonistic to health hygiene, physiology, the whole group of subjects; what physiology was taught was built up around rather absurd notions. Today, wherever you meet a great group of educators, the one thing you will hear is that health is the fundamental in the whole school curriculum. If we don't train our children for health and in health habits we can't expect the best progress. As the superintendent of schools in Pittsburgh has said about Heart, Head, Hand and Health: "Give me education for health and I care not who does the rest." That is the most significant thing about it; it is bearing fruit.

The New Generation's Attitude Toward Health

Two years ago, *Hygeia*, magazine of health, offered prizes to the high school children of this country for posters on health topics and they received the most amazing number of health posters I ever saw. I wish you could have seen them. We have been using them for cover pages for *Hygeia* for two years. It was a most amazing demonstration of the fact that the children are beginning to think in terms of health; they are thinking seriously, logically of building their bodies into more effective machinery for the healthy life.

I predict that this generation of young people who are being prepared to take your places for the next 25 or 30 years, is going to have a totally different attitude to the matter of health and all that pertains to it. They are educated to cooperation, intelligently sustained cooperation, and if they maintain that with the health officers and the physicians we shall reach ideal conditions.

Another movement that needs especial commendation and which I should like to call your attention to, is the work of the American Parent Teachers' Association, a group of over a million teachers. They have been carrying on a campaign for the examination of the pre-school child, to correct his habits and defects.

All these things have a very direct relation to safety first, and I am sure you will be interested in the fact that the great American Medical Association, representing 90,000 doctors, united in state and county, pledges you its hearty support.

CHAIRMAN SCHRAM: The next speaker this afternoon is Dr. G. H. Van Emburgh, Jr., Medical Director, Clark Thread Company, Newark, New Jersey, who will talk to us on the Fundamental Requirements for Successful Industrial Medical Work.

**FUNDAMENTALS OF SUCCESSFUL INDUSTRIAL
MEDICAL WORK**

G. H. Van Emburgh, Jr., B. S., M. D., Medical Director, The Clark Thread Company, Newark, New Jersey

Doctors, the world over, are beginning to realize that the key-note of medical practice for the future is prevention. Those physicians who are working in industry recognize this fact most keenly, and are daily applying the principles of prevention to all of their work. For it is their duty to protect the employer and employee by preventing sickness and accidents, infections, deformities and permanent disabilities, high compensation awards, excessive labor turnover and dissatisfaction with work, due to physical unfitness. In fact, they are concerned with the prevention of all mental and physical states in the employee, which might lead to inefficiency and carelessness. And they are equally concerned if the management is indifferent to or lacks a sympathetic understanding of the worker's problems, and if it is unwilling to improve existing unsafe or unsanitary conditions.

The industrial doctor fills a position of trust and unique responsibility in the company organization. If he makes the most of his opportunities, his will become one of the most strategic positions for interpreting the wishes and desires of both management and worker, and by his knowledge and advice he will often be able to influence their actions into channels which are mutually satisfactory and benefiting.

Whether or not a medical department is a success depends entirely upon the physician in charge. The successful industrial physician must be well-versed in the most modern methods of medicine and surgery, and, in addition, he must have a thorough knowledge of public health problems. He must use the same tact in approach, and the same care and thoroughness of diagnosis and treatment of the individuals of his large group that he would use in private practice.

Our employees do not want to be treated superficially and hastily. They resent any attempt to treat them as a mass. And I would advise any industrial doctor, who wants to avoid utter failure, not to strive too hard to establish a speed record for the number of cases he can pass through the hospital per hour. It is a fatal error to make a snap diagnosis in case after case, and then treat all of them from a few stock remedies. Our employees compare notes and draw conclusions, sometimes correct, and at others incorrect. But it is these opinions that win or lose their confidence. And unless we have their absolute confidence it would be better to close up hospital and go home.

I recall the case of a patient whom I saw in the hospital recently. He had a bad carbuncle on the back of his neck. From his history, I learned that he was working in a plant which employed a physician. I asked him why he had not reported there for early treatment. His reply was illuminating: "Our doctor is a fine fellow, but he's got about a half a dozen different kinds of pills, and no matter what's the matter with

you, you get one of them. We never go to him for anything if we can possibly help it. We call him the 'Pill Doctor'." It is evident that this doctor's department is a failure.

The industrial physician must learn all of the processes of manufacturing involved in his plant, and he must be thoroughly conversant with all special hazards involved. He must work in the front line trenches, in the factory as well as in the hospital. The doctor who is content to sit in his office and wait for patients to come to him for surgical dressings or simple conditions might better be replaced by a good nurse. His only value is the protection afforded the company by his medical degree.

Companies have come to realize that this type of doctor often does more harm than good. While his salary may be less than that of a competent man, he is far more costly in the end. It is men of this type who will look upon high accident rates without great concern. Infections will be prevalent, compensation claims will mount high, absenteeism will be excessive, and labor turnover great; but he will feel no alarm or concern—he is only the doctor and does not bother with these things.

Fortunately, many of the men who have been attracted to industry in recent years are men of judgment, broad vision, energy, and a keen desire to investigate the problems in their field: the stigma of industrial medical work is passing with the factory doctor. The physician in industry is being looked upon more and more as a specialist.

Industrial Medicine Is a Specialty

This, I believe, is as it should be. Industrial medicine is as much a specialty as any of the other branches of general medicine. It requires years of painstaking study and application to become a successful physician in industry. Medical schools are now beginning to add courses in industrial hygiene and offer opportunities for study in this field; and their instructors are men who have been drawn directly from the successful medical departments of some of our larger industries.

It is really within about the past 15 years that industrial medicine, as such, has come to be known. It was one of the forms of misnamed, but so-called "welfare work" to survive the post-war economies industry found necessary. It had little in common with many of the welfare activities carried on during the war. It is not, and can not, be construed to be an effort to advertise the plant, or to offer the workers something in lieu of an actual wage increase. Those forms of welfare activity are soon discovered by the workers, and fail utterly. Besides, workers do not like either charity or paternalism. If we use as an index the amount of use made of any of these opportunities by the workers and this, I believe, is the only correct index, we will soon see that our employees like to be left alone. As soon as we attempt to "mother them" they begin to drop out. They are reluctant to accept charity because of the comment it may cause among their fellow workers.

The medical department is not looked upon as either charity or an attempt to paternalize. It is an integral part of the plant, maintained for the mutual protection of the workers and employer. And if the department be properly organized, equipped and managed, both executives and workers will accept it as such.

The industrial physician is frequently called upon to play the role of interpreter between company and employee. If he be broad-visioned and have an intelligent understanding of both sides, his advice is worth a great deal. But he must not bias his opinion in favor of the company because he is a salaried employee, or he will forfeit the workers' confidence, and will misguide his superiors into trouble.

A medical department, in order to be a maximum success, must have the unqualified backing of the management. I believe the medical director should be directly responsible only to the higher company executives. To subordinate a physician in charge to the personnel director, employment manager, or a mill superintendent is very undesirable, and often is the cause of having a mediocre department, instead of a wide-awake, up-to-the-minute organization.

Maintenance of a Medical Department Economically Sound

While the maintenance of a medical department is a humanitarian effort, still it is economically sound. Mr. Howell Cheney in his address, "Why Industry Profits by Health Supervision," very ably pointed out the losses to both industry and labor from ill-health, and indicated how this might be influenced by health supervision. Dr. Schram has shown us that industry may add years to the useful working life of its employees as surely as an individual can increase his life span by carefully guarding his health.

But health supervision is only one of the duties of an efficient medical department. While much of the value of our work is difficult to measure in dollars, still we should be able to show a real saving, due to our efforts. No industrial doctor may feel himself above this need.

In fact, the needs and duties of the industrial doctor are many and varied, and to this end he must have the assistance of a specially trained corps.

I shall not attempt to describe the organization of a medical department here, as it differs in each case, according to the nature and size of the industry. Drs. Mock, Clark and others have very ably described in detail such organizations in their books. But there are some duties common to all. I should like to speak briefly of these, and add a few personal experiences.

Of course, one of the medical department's chief duties, (and many people think it is the only important one) is the treatment of mill injuries. During the past three years in our plant, this function has taken about 34 per cent of the time of our department, and has consumed 38 per cent of the cost of our department operation. Thus you can see it is an important function, but not by any means, the only one.

I wish to register a protest here against a habit I have often encountered, that of speaking of this type of treatment as "First Aid." It is no more first aid than the whole of winter is the first cold day. First aid is emergency treatment which is rendered the sick or injured to prevent death and to prevent the development of serious complications. When repeated treatments or treatment beyond the elemental emergency types are given, it is no longer first aid. Real intelligent surgical treatment can not be lightly, carelessly and wrongly referred to as first aid without danger of creating a wrong impression of the work done, and of lessening respect and confidence in the medical department.

I do not mean to minimize the importance of first aid, but it is only the first line trench of defense in traumatic emergencies.

The Doctor Can Get the Confidence of Workers

Another fact is sometimes wrongly understood. I have several times been asked, when showing the records of our work, how I can explain the increase in accidents that seems to follow the organization of a medical department, one of whose chief duties is to prevent accidents. It should not be thought that the organization of a medical department will lessen the number of accident cases reported. If it did, something would be radically wrong.

One of the most important duties of a medical department is to get the confidence of the workers, and educate them to the need of reporting at once all of their injuries, no matter how trivial. It is wise to reinforce this by a company rule. This will, of necessity, bring out a host of cases that would otherwise be neglected unless they became serious. This is exactly what we want to prevent. I have many times told our superintendents that it is not the total number of accidents which will be counted against their departments. It is the serious and preventable ones. This has done much good and in safety work it has not offered any excuse to hide minor accidents to better a departmental record. I would rather have a thousand minor cases than one serious one due to neglect. The only way to prevent serious complications is to get all of the superficial injuries under treatment at once.

Naturally, the harder we work in this direction, the greater will be the probability of having all cases reported. Our own record has been:

1921.....	3,007	accidents reported.
1922.....	3,901	" "
1923.....	3,856	" "
1924.....	4,188	" "
1925.....	3,261	" "

Of course, this takes the time of doctor and nurse, and uses surgical supplies in treating cases that many consider trivial and not worthy of care. But as we can not be sure where infection will strike, all cases must be reported in order to be safe. A man may neglect a hundred scratches, but develop severe blood-poisoning from the one hundred and first.

Infections are the dread scourge of the industrial physician. If they occur after treatment, no amount of explanation or camouflage can shift the responsibility from the medical department in the eyes of either worker or management. But these should be very few indeed. Infections developing as the result of failure to report for treatment are one of the greatest problems we have. By means of hard work, we have been able to lessen the number in our own plant, but we still have much to do:

1923	165
1924	92
1925	54
1st 9 mos. 1926.....	11

I do not believe in a division of the responsibility for the control of the industrially injured. It is a great mistake to send the injured worker to outside doctors or the public wards of a general hospital. The company surgeon should have outside hospital affiliations which will permit him to look after his company's injured from the time of the accident until they are returned to work. Of course, he will need assistance and consultation. But think of the beneficial effect on the injured worker not to be changing doctors, but to have the same doctor, and best of all, his, the company's doctor, caring for him.

This increases the confidence of the workers in their own medical department. Besides, it assures the company that its own best interests will be safeguarded. A physician doing much traumatic work is naturally better qualified to care for the mill injured than the ordinary doctor who may have only an occasional accident case.

The Functional and Economic Possibilities After Repair

The industrial surgeon must keep in mind, not only the anatomical result, but also the functional and economic possibilities after repair. Often the latter are of more importance than the former. The physical reconstruction and rehabilitation of our injured is of the utmost importance, and whenever possible, should be done under the guidance of the company's own medical department. This makes for unity in treatment, and will save much time and money otherwise spent in traveling to and from outside hospitals.

The prompt and proper treatment of accidents is important, but the prevention of accidents is even more important. And still, I have often heard doctors say, "I'm not interested in safety—that's the job of the engineers."

I do not believe this! The medical department holds the key to safety's advancement in its records and the tabulation of the causes and types of accidents. Safety engineers must first know what type and cause of accident is most prevalent before they can take effective steps in preventive work. There should be the closest cooperation between the medical and safety departments. The doctor must be as interested in preventing accidents as he would be in preventing an outbreak of contagious disease. In fact, the health of the worker is so

closely related to accident prevention, that no line can be drawn at the end of one and the beginning of the other.

It is becoming a well-recognized fact that ill-health predisposes to accidents, because it distracts attention from work. The person with stomachache, headache, or pain in the back will not give the same keen constant attention to his work that a well person might. In these periods of distraction or lapses of attention, accidents are very likely to happen.

Besides, it is very often difficult to differentiate between accidents and disease. Many conditions developing during the eight working hours are classified as accidents, which, if they occurred during the other 16 hours of the day, would be called by something quite different.

Relief for Serious But Hidden Ailments Common

I recently saw a woman who claimed she had wrenched her back because she had experienced a pain when she attempted to pick up a spool of thread which had fallen from her machine. Examination showed her to have very bad teeth, and she also gave a history of previous attacks of lumbago. But this time she was sure it was a work-responsible condition.

Another woman claimed she was unable to work because of severe pain in her feet, legs and lower back, due to her work. Her job required the pushing of a very light foot pedal, while seated—no strain at all. But examination showed her to have third degree acquired flat feet.

Bodily disease, of which the victim is often unaware, is many times the exciting cause of accidents, and it is even more often the predisposing or contributing cause. I have seen many such cases.

Falls may often be the result of high blood pressure, heart trouble, kidney trouble, or indigestion. Fingers are many times caught in machines because of defective vision. I have seen some extremes of this in persons with only one eye; they lack bifocal vision, and are therefore not able to judge distance properly. Anaemia and constipation are two conditions which we frequently find that might well be suspected back of many of our accidents classified as careless. Late hours, worry over home troubles, rushing off to work without breakfast, and many similar conditions tend to a disturbed mental or physical state, and thereby make their victims more liable to accident.

I am much opposed to the rather prevalent tendency to classify the majority of accidents as due to carelessness. It obscures the issue and tends to block complete investigation. I believe some of the causes mentioned above really operate to cause many so-called careless actions. I recently saw a girl who had a finger torn off when it was caught in a moving part of her machine. She had worked at that machine seven years, and had never before had a serious accident. The safety

committee reported the responsibility for her accident was her own carelessness. But a quiet intimate talk with her brought out the fact that she had been thinking about her brother who had just been buried.

After every major accident, and every accident whose cause is not perfectly plain, I believe the employee should be carefully examined physically.

The employee who returns to work too soon after an operation is predisposed to trouble. Where he may have performed his duties easily before, he now is an increased hazard. I have known of several accidents which have occurred when supervision was not exercised.

The industrial doctor should also be familiar with department operation, and the actual agents causing injuries. I was rather puzzled until I learned that the mule in the textile mill that causes broken toes is not an animal, but a piece of iron machinery, and the waves are not wet—they are cotton. An intimate knowledge will help the doctor in detecting fraudulent claims.

I have stressed the importance of avoiding accidents, and the part the doctor may play in this work. But this is possible only when physical examinations are made, and dispensary treatment given. Industrial health supervision and treatment is not in any sense a forerunner or entering wedge for state medicine. Industrial doctors will oppose such a system as vigorously as the general practitioners. The industrial physician should be on friendly terms with all of the doctors in his community. He needs their good-will because of their influence with his employees' families. I have found this of great help in keeping the confidence of our workers. For a family doctor who is antagonistic toward a factory physician can do much to undermine a worker's morale and confidence.

Cooperation Between Plant Physician and General Practitioner

It is not difficult to show the general practitioners that we really are helping them. A get-together at the plant hospital, a frank explanation of industry's aims, a demonstration of cases, followed by refreshments, has done much to win the good-will of the 21 doctors in the vicinity of my own plant. I have had many cases in which these doctors have referred our employees, who came to them for help, back to us with a note requesting some special form of physiotherapeutic treatment for which they were not equipped.

All workers should be examined prior to employment, and should be classified according to their physical fitness. They should then be placed at work for which they are suited. This step will do much to prevent accidents, lessen labor turnover, prevent labor interdepartmental transfers, and prevent dissatisfaction. Physical misfits are costly! A man with large relaxed inguinal rings will then not be placed at heavy lifting. There will be less opportunity for hernia or other serious troubles to develop in these cases, for we will know what the employees weaknesses are and will help them protect themselves against over-

strain. A worker with heart trouble will not be put at work on the fifth floor and made to climb stairs, nor will he be given work that will require undue physical strain. I recall the case of a woman in a cotton mill who was required to reach above her head many hundred times a day during her work as hankwinder. Her work began to fall off, and she was reprimanded by her foreman, and finally threatened with discharge. Examination showed her to be a victim of heart trouble. She was placed at work which relieved her of a strain her heart could not stand, and she is now happy, and one of the best workers in her department.

The physical examination is not used to exclude, but rather to properly place workers. The number of actual rejections is between two and three per cent. Physical examination will detect infectious diseases and existing disabilities, the degree of which should be noted in case of future accident, so that the last employer will not have to pay for all of the trouble. Physical examination will also reveal defects which are remedial, and if measures are instituted to correct these, and a careful follow-up carried out, we will have a factor of greatest good.

Time Loss From Accidents and Sickness Compared

Much has been said about preventing loss of time accidents. But it is even more important to prevent loss of time from sickness, for this toll is about 20 times greater than that for accidents. To industry, time transformed into production is money, and the opportunity for greatest service comes to the medical department which realizes this fact early, and uses every possible means to prevent the existence or development of conditions which would produce or prolong absence from work.

There are degrees of ill-health; not every sick person remains at home. But when they come to work they are predisposed to injury, the quantity and quality of their work will fall below par, and they are in an irritable condition and predisposed to quarrels and dissatisfaction.

Many of these conditions are neglected until serious consequences have occurred. No other class of people are so subject to charlatanism in medicine, to fears and superstitions, to attempts at self-treatment. They easily fall prey to the cults, and are many times treated wrongly or inadequately, while valuable time is lost and the disease progresses.

We industrial physicians have a marvelous opportunity to teach the need and value of health education to our thousands of workers. And, by our careful examinations, our earnest efforts to arrive at a correct diagnosis, and our readiness to use every means of treatment indicated, we not only set an example which would make them hesitate before accepting less at the hands of irregular practitioners or cultists, but we also render a service of greatest value to the company and community, as well as the workers, themselves.

I believe that dispensary treatment for our employees' personal conditions, combined with physical and health examinations, is of more value to industry than the treatment of accidents alone. In our plant,

these duties consume 40 per cent of our medical department's time, as compared with 34 per cent spent on accidents.

No person should be permitted to go home because of illness or return to work after an illness of more than one week without the consent of the medical department. I have seen hundreds of cases of illness in which, if sick leave had been granted by the foreman, the employees would have gone home and suffered under self-treatment or no treatment at all for one to three days. Whereas, when they come to the plant hospital and are treated and permitted to rest, they often recover and are able to resume work. Counted over the year, this service alone saves thousands of working hours to both company and employees.

When our workers are absent because of illness, our nurse should be sent to see that they are receiving medical attention and adequate care. If they are not, she should advise them accordingly. She should also deliver relief or benefit money. By our health program we may definitely expect to lessen absenteeism.

It is in its health service work that I believe a medical department can be of most benefit to its company and workers. By means of physical examinations, careful attempts to arrive at accurate diagnosis, painstaking followup, dispensary treatment of minor and chronic ailments, and health instructions and education, it makes for greater health. A healthy, contented worker on the job every day is one of industry's greatest assets. The ability to bring home a full pay envelope for a week's work under satisfactory conditions is the aim of most workers.

Medical Department Responsible for Sanitation

It is the direct duty of the medical department of any industrial organization to see that the working conditions of its employees are safe, and not detrimental to health. The doctor must have a thorough working knowledge of the effects of temperature, humidity, ventilation, dusts and lighting on the health of the workers and their ability to produce. These physical agents do affect our workers' health in great measure, and where it is necessary that changes be made, the doctor should be ready to recognize the necessity for such changes and should promptly call the matter to the attention of the company officials.

The medical department should also be directly responsible for the cleanliness and sanitary maintenance of the wash-rooms, toilets, dressing rooms, and the mill in general. It should maintain close supervision over the water supply and all food and food handlers.

In addition, the doctor must be thoroughly familiar with industrial poisons and the most modern methods of preventing and combating their manifestations in the industrial employee.

I have frequently heard a foreman or mill superintendent say, "Why, I never knew there was any danger from that." He may not have. That is the doctor's job. I recently had a case of lead poisoning develop in a man who did soldering much of the day. His superintendent told me that in 21 years he had never seen a similar case. It is our duty

to know where the dangers lurk, and to be ever on the guard for them.

In order to be a maximum success, an industrial medical department must be composed of a personnel of specially trained workers, it must have the whole-hearted backing and support of the company management, it must have the absolute confidence of the mill workers, it must be on friendly terms with the doctors in the vicinity, and it must be imbued with the idea of preventing accidents and disease, rather than simply to apply the most modern methods of medicine and surgery to healing or curing troubles after they have developed.

CHAIRMAN SCHRAM: We had expected to have Dr. Torrey with us this afternoon. In his absence, however, I take pleasure in introducing the president and general manager of the Michigan Mutual Liability Company, Mr. P. W. A. Fitzsimmons, who will read Dr. Torrey's paper on "Organizing for the Care of the Industrial Wounded."

ORGANIZING FOR THE CARE OF THE INDUSTRIAL WOUNDED

**H. N. Torrey, M. D., Surgical Director, Michigan Mutual Liability Co.,
Detroit**

Before discussing present day standards for the care of the industrial wounded, I wish to call attention to the great improvement over conditions of a few years ago. Today, in general, the industrial worker is receiving competent medical service; the factory doctor of yesterday has developed into an up-to-date industrial surgeon; the best hospital facilities are now available to every injured man; in the factory the dark closet which once served as a first aid room has been replaced by a room which is large, well equipped and in charge of a trained attendant. These changes are most encouraging, yet the situation today is far from ideal and there is still much to be done.

Now to review briefly the most important causes which have led to this beneficial change.

First. The Workmen's Compensation laws of the various states have been of great value to the employer, the employee and to the industrial world in general, conserving, as they do, the nation's greatest resource, its man power.

Second. The present day employer realizes that his most valuable asset is his men and he is keenly interested in any measure which conserves their life and limb. He insists that his workman be protected with the most modern safety devices and that when they are injured they receive the best medical care.

Third. The workman of the present day knows and demands the proper attention when he is injured and he is no longer satisfied with the service as rendered by the old time factory doctor.

Now that the state, the employer and the employee all demand this service, it is up to us who are interested in this conservation work to render it, and only by the proper organization can it be done. I feel that in general the medical and the nursing professions have met these demands and stand ready to make still further advances. Some of the medical schools, realizing that industrial surgery is fast becoming a specialty, have offered special training in industrial work, and many hospitals in our cities have set aside industrial wards and services, these with special equipment and trained personnel.

In discussing medical service to the industries, it must be understood that certain requirements are necessary to the proper care of the injured. These requirements in brief are:

1. Competent surgery.
2. Proper hospital facilities.
3. Well equipped first aid stations with trained attendants.
4. Special departments covering social service, physio and occupational therapy, safety work, etc.

This outlay is surely a big order for any one employer and the question is, how can he get this service in a practical and economical way. Of course, it can be done by a large employer, but even then it is much more efficient and certainly cheaper when handled by a group of employers. On the same principle, the average employer would not find it paid him to make all the parts entering into his product. He will get this work done cheaper and better by other manufacturers making a specialty of them.

Buy Surgical Service of the Trained Specialist

Why, then, not buy surgical service of a surgeon or group of surgeons who are trained and equipped for this special line of work?

The next step is a combination of employers employing industrial surgeons with proper hospital affiliations, or better still having their own hospital. It stands to reason that no single employer can hope to compete with the facilities offered by such a combination. This arrangement gives each employer, whether he be large or small, real service at a low cost, and real service means conservation of men, money and time.

In this connection it might be interesting to tell of the development of the surgical service of the company with which I am associated. In 1912 when the Michigan Workmen's Compensation Act became a law, this group of manufacturers numbered 12, today there are over 2,500 Michigan employers in the organization. The medical service has developed from one surgeon to a state wide organization which includes field surgeons in every locality, and consultants in all large centers.

In Detroit, the company owns and maintains its own hospital, especially equipped and manned for industrial work, and with special departments of social service, physio and occupational therapy, safety and claim work. Besides the hospital, there is a corps of surgeons and nurses who handle the first-aid work of the various plants. I cite this progress

simply to show what can be done by organization. We have successfully demonstrated that real surgical service can be obtained in an efficient and economical manner for large and for small employers and furthermore such service pays.

We have been considering medical organization in general and now I wish to take it up from the standpoint of the individual employer, under the following headings: the surgeon, hospital facilities and first aid measures.

The selection of the surgeon is the most important step in organizing a medical service. It should be born in mind that there are two classes of injured—the slightly wounded or minor cases and the seriously hurt or major cases. The minor case usually can be handled in the first aid room by a young surgeon, but the major case needs the care of a skilled and experienced surgeon, with hospital facilities and special equipment at his command.

Handling Major Accidents Requires Special Treatment

Naturally, it is difficult to secure such a combination of services from one surgeon except under prohibitive expense. It is much more practical to select a competent, industrial surgeon to handle the situation by appointing an assistant to make calls at the plant and to care for the minor cases, but to be responsible himself for the major cases. It seems needless to say that this surgeon should be selected because of his efficiency and training and not because he is located near the factory or will do the work at cut rates.

Modern methods of handling major accident cases require special treatment and equipment and these can only be obtained in a hospital. Therefore, it is essential that the surgeon have hospital facilities at his command. This is a most important point and one usually overlooked by the employer.

Besides offering the usual surgical services an up-to-date hospital also maintains other special therapeutic measures which are necessary to the rapid recovery of the patient. I refer especially to the departments of physio-therapy, occupational therapy, electro-therapy, and thermo-therapy which by the use of massage, exercises, electricity and heat do so much in the conservation and reclamation of the injured. It will be interesting in this connection to know that with the use of these therapeutics in our Detroit clinic we have lowered the disability days of our patients by a substantial margin.

The installation of the first aid station in the factory is another important step in the organization of the service. The room, or rooms, should be located in the cleanest and quietest place in the plant and, furthermore, should be large, well ventilated and well lighted. I regret to say that many times the first aid room is one that can not be used for anything else. This is a very short-sighted policy and a careful examination of results will show that such a room costs many times what it is supposed to save.

The space for first aid work naturally depends upon the amount of work done. One room may be used in small plants provided screens are used about treatment stalls, as we have found it necessary to have privacy in the treatment of cases. It has a very bad mental effect upon patients to have them watching dressings done on others. An ideal unit consists of a waiting room with small dressing rooms arranged along a hall.

As to equipment, much depends upon the work to be done. We have always equipped our stations to care for all dressings and minor operative cases which can be done under a local anaesthesia. Major cases and all minors requiring a general anaesthetic are sent to the Hospital. A clever, young surgeon can keep practically all his cases under his care at the factory, which procedure saves the employee's time and the employer's money. Concise records of patients are necessary and the card system seems the most practical. These cards, listed under the patient's name, are simple, easy to handle and have the additional value of keeping all the data upon one card.

The Plant Surgeon Should Have Trained Assistance

The plant surgeon must have well trained assistance, not only to aid at dressings, but to operate the station during the surgeon's absence. An industrial nurse or a trained first aid worker is absolutely essential. In many small plants such an attendant will handle most of the routine cases, while the surgeon visits the factory at stated hours besides being upon call. Furthermore, there is no objection to a first aid worker doing other work, provided it does not interfere with the care of the injured.

The important point of it all is that this worker must be properly trained in first aid measures. A case improperly treated, an infection neglected or a fracture transported without the proper splints—these together with hundreds of other crimes against surgical technique are committed by well meaning but ignorant and inexperienced helpers. The employee and employer pay the penalty in life and limb, let alone the loss of time and money. Any employer can readily see, when this point is brought to his attention, that inexperienced help in this important work is not only bad business but a serious responsibility.

Social service work in its true sense, I feel, is of distinct value to all concerned. I realize that under improper conditions this work may assume a patronizing attitude and as such is repudiated by the deserving employee. However, under a tactful and competent social worker we have found this evidence of the employer's interest is welcomed. Happy home conditions make a more efficient workman and anything the employer can do to promote this condition is good policy.

We have used the social worker to good advantage in our hospital by seeing that the family of the injured patient is not in need during his illness. The fact that all is well at home has a strong stimulating effect upon the patient's convalescence. Following up cases who fail

to report for treatment and promoting closer cooperation between the employer, the foreman and the convalescing patient—all these are important duties of the social service. In small factories the industrial nurse can handle this work besides that of the first aid room.

As I said before, the present day improvement in medical service is most encouraging yet there is much to be done. The improvement as outlined is by no means universal and there are many plants today with almost medieval medical conditions. Yet I must confess that in my experience I have found that practically every employer welcomes constructive criticism and is eager to do his share in this great work of human conservation. Competent medical service in the industries pays—and it pays not only from the humane standpoint of priceless lives and limbs but it is good business and saves time and money. This truth must be sold to every employer and employee in this great land, and we who are the missionaries have a great opportunity before us.

CHAIRMAN SCHEAM: I wish we had time this afternoon for discussion but we simply haven't.

The next paper, which is the last, is on "The Relation of Preventive Health Measures to Labor Stability." It will be presented by Dr. Thomas McElroy, Health Department, Maryland Refining Company, Ponca City, Oklahoma.

RELATION OF PREVENTIVE HEALTH MEASURES TO LABOR STABILITY

Thomas McElroy, M. D., Chief Surgeon, Health Department, Maryland Refining Company, Ponca City, Okla.

Modern industry has many noteworthy achievements to its credit, for the reason that it has never been backward in accepting and utilizing scientific discoveries. Once they have been shown to be of real value in increasing output, decreasing cost, or improving the quality of the product, they are quickly adopted and made a part of the industrial program.

The growing importance of the human element in industrial progress and development has received wide recognition among most industrial managers in the past few years. How the human element must be cared for in order to receive its greatest efficiency has been attacked from all angles. Among the many agencies that industry has set in operation for the benefit and improvement of the worker's efficiency, few have brought richer returns than has industrial health service.

This branch of service has been accepted by industrial managers because of the following reasons:

The employer, who theoretically is better informed and more widely experienced than the worker, has a duty to perform in providing a health service for his workers. In justification of the first or the duty motive, it can be readily seen that much good can be derived from any work,

public or private, which provides for surgical treatment, medical care and advice to the worker, particularly to those who are not educated to the modern methods of prevention and the unfortunate ones who are unable to obtain proper advice because of financial reasons. The employer who makes this service easy for the worker to obtain is performing a service of the highest importance.

It is good business to provide these modern facilities as it lessens the expense of illness and injury and is instrumental in keeping the worker up to the maximum of physical efficiency.

From an utilitarian motive, there is no doubt that attention to the health of the worker pays large dividends in increased efficiency. Industry is just beginning to realize somewhat of the staggering loss incident to preventable illness and to lowered capacity for physical and mental work resulting from conditions most of which may be corrected. This loss is of particular concern to industry which pays most of the bills, and anything that can be done to reduce this loss is well worth the effort and money which it costs.

The justification for this service not only lies in the reduction of the time lost on account of illness, but a far more signal service of prolonging the lives and usefulness of the older and more experienced employees.

Health service in industry, it should never be forgotten, has as its foundation the theory that disease is preventable. The value of preventive, as distinguished from curative, medicine in industry can hardly be emphasized sufficiently. Ordinary medical work has to concentrate on curative processes in family practice merely because the preventive function can not be exercised when people neglect seeing a doctor until they are too sick to move; while an industrial plant, as a unit, is particularly adapted to prevention. The importance of consulting the plant physician at the very beginning or onset of an illness, even for the most trivial cases, which in community life are neglected or often aggravated by patent medicine as a result of friendly counsel or self diagnosis, has been brought out many times both from an economic and restorative factor.

Progress in the Prevention of Infectious Diseases

Great strides have been made in the progress of the prevention of infectious diseases. Typhoid and smallpox are practically exterminated in most all industrial centers. While preventive measures have succeeded in very materially reducing the mortality and morbidity from infectious disease and increasing the length of life, there has, however, been unfortunately an increase in mortality of the middle aged and of the organic diseases of the higher age groups.

The incidence of heart disease, apoplexy, paralysis, Bright's disease and cancer have doubled in the last decade. The diseases which usually attack those from 60 to 70 years of age have been creeping down to the forties and fifties. Fifty-one per cent of the deaths occurring after 40 years of age are due to degenerative diseases and are preventable to a degree. Eighty per cent of the mortality from these organic diseases is

postponable anywhere from a few days to many years by judicious treatment—often a matter of change of diet and of habits rather than medicine. We know it to be a fact that if we live long enough, a large majority of us will ultimately die from diseases of the heart, arteries or kidneys—diseases that usually cause very little or no pain. The individual claims to be in perfect health until too late to remedy the condition.

There is apparently something wrong with the habits of the middle age class judging from the rapid increase among them of chronic maladies after 40. Multitudes of executives, skilled workers and useful citizens of great constructive value to society are rapidly degenerating in their physical prime and die without any indication of disease. Although robust and cheerful and never really sick, the physical dynamo can not carry the load, the reserve is gone, the strain too great. When useful men are disabled and crumble down and die from 15 to 20 years before their time, it is something more than a great family misfortune, it is an industrial loss—an inestimable loss to society.

Man Should Reach Maximum Power Late in Life

Man was made to come to his maximum of maturity, his maximum power of efficiency, relatively late in life. It is not a part of the Creator's plan that man become decrepit at 40 or 50, when they do not come to full maturity until 30. There is no analogy in the animal or the vegetable kingdom or anywhere in nature to show that anything that takes so long to come to its maturity as a human being should decline so quickly. In fact, outside of men, animals generally live from four to six times the length of their maturing period, and certainly the Creator's grandest work should not begin to touch decrepitude ten years after maturity.

Everywhere we see old men who are filling responsible positions quite as ably as any young man. If a man has not squandered his life forces by vicious living, if he has lived simply and sanely and obeyed the laws of nature, the rightness of his wisdom, the strength of his judgement, the accumulation of his expert knowledge, the broadening of his mind and the enriching of his experience is an industrial asset that can not be purchased in the open market. It is recognized as never before that men who are trained for a certain work are an asset, and that with proper care their lives can be prolonged. The older men are now regarded as the most valuable, they are trained for the work, their habits are steady and their views less inflammable, thus discouraging industrial disturbances. Given the proper attention and means, the average life of the worker can be lengthened at least ten years, and his industrial efficiency will be prolonged in proportion.

If America is to succeed in maintaining her industrial supremacy and continue to pay the laboring man wages proportionate with American mode of living, it must be done by rendering the worker more efficient and longer lived, that he may produce more. There is no question but

this nation has been wasteful of many of her natural resources, but the greatest waste of all has been that of health and human life.

The commonly called organic diseases are all quite fully understood as regards their causation and prevention, and depend less upon the environment of the worker and more upon intelligent individual action and development of positive personal health. While it is both encouraging and refreshing to record and recount the development of modern sanitary science and the achievements of recent efforts along the lines of public health; nevertheless there has been a failure to decrease the disability and death rate from the so-called organic disorders. The great body of important facts dealing with organic disease has developed in the past few years, and there has been as yet no opportunity for this information to find its way into the lives of the industrial population.

The man who is able to work each day gives little thought to his future physical fitness. The present health propaganda, while perhaps not dealing any less with sanitary science and public health measures than in the past, is giving a good deal more attention to personal hygiene. And the proper place to begin education and instruction in health maintenance is in the early grades of the public school, and follow the pupil throughout his educational career. In this way the coming generation will be taught the importance of both periodic dental and medical examinations. No doubt, a considerable amount of this hygienic teaching will be carried home by the pupil, which will afford considerable help to the passing generation.

Build the Health Program Upon Positive Knowledge

The basis of a periodic physical and dental examination in industry is prevention, and the condition of the worker, as disclosed by the results of this examination, is the only sure foundation upon which to build a scheme of health education, which is so necessary a feature in prevention. The employee's complaints and susceptibilities are elicited and every effort made to discover the cause and any predisposing factor in the hope that it may be eliminated and every assistance offered to him in the eradication of these defects.

Advice in the details of diet, dental hygiene, sleeping, exercise, recreation, and the care of the human body must be fitted to the individual like a suit of clothes if it is to be of any use to him. General rules are of little value, especially if presented in printed circulars and in a hasty off-hand way. The rules must be applied, reshaped and modified to suit the individual's needs after these needs have been studied with care. Moreover, since these rules often call for the reform of a tough old habit, one must use every effort to arouse sufficient interest to make the employee put himself to so much trouble. The fear of disease and the physician's authority can accomplish much towards making a man change his habits of diet, of work or of thought, but it is necessary that he is acquainted with the individual and understands his circumstances, his difficulties and his point of view.

The analysis of a detailed record of the employee's sickness experience, coupled with periodic examinations, and his interest and cooperation in following out recommendations, gives a comprehensive insight into the employee's future physical efficiency.

There are a surprisingly large number of employees who have been trained and advanced to where they are holding responsible positions, that have incurred some physical disability, and are unable to give their best services. And in many cases these employees have to be given indefinite leave or retired at the peak of their efficiency.

Most every one should appreciate the value and savings of disease prevention, and this activity must have the hearty support of the men in industry if it is to be successful. Just as 75 per cent of accident prevention depends upon safety organization of the workers, so health is acquired, maintained or lost by the individual. Health is like salvation—no one can secure yours for you. Health education in industry should not be built from the top down—but from the bottom up. The general manager can not limit preventable disease, but the willing cooperation of the worker can do it. The health expert in industry who can interest and organize the men and women of the factory for health betterment both in the shop and community, will accomplish more than a reduction in the morbidity rate. For after all, life is not a matter of the pay envelope, and the more men and women of the industrial class that are interested in the conditions of the home, the conditions of labor, the health and welfare of their families and their fellow-men, the more efficient will be our industries, the more stable our laboring class, and the more intelligent our government.

ADJOURNMENT

General Round Table

October 28, 1926

ISAIAH HALE, Chairman

**Safety Superintendent, Atchison, Topeka & Santa Fe Railroad System
Topeka, Kan.**

THE General Round Table Session held in the Grand Ball Room of the Book-Cadillac Hotel, Detroit, Michigan, convened at 2:20 o'clock, Mr. Isaiah Hale of the Atchison, Topeka & Santa Fe Railroad, Topeka, Kansas, presiding.

OPENING REMARKS OF CHAIRMAN HALE

There is not a man here who can not take out his memorandum book and fairly note therein that for the opportunity to attend this Congress and enjoy the pleasure of again rubbing elbows with those good fellows met here in former years—for the privilege of spending a half-day at this General Round Table Session tuning in on the comments of some men who may play the safety game a bit better than he does, and absorbing a lot of information which he will turn to his individual and organization profit in the direct ratio of his willingness and ability to absorb it—these are some of the things for which he should feel truly thankful when the last Thursday in November rolls around.

In my second consecutive appearance as "Referee"—or is it not, more properly, as "Timekeeper?"—at this General Round Table Session, my innate, if not ingrowing, modesty actually gets a more jarring jolt than any one jolt felt by either of the two gentlemen who recently featured a largely attended social function at the Sesqui-Centennial stadium, when one, a member of the intelligentsia who has owned a book ever since he hired a press agent, essayed a come-on and the other who has nothing but an alibi and seven hundred thousand dollars, essayed a comeback, when one actually came and the other went, and when, you may recall, 120,000 men were rudely snubbed by Lady Luck and added their tears to the copious and humid offering of Jupiter Pluvius; I say I am the harder hit of the three because I am again wished on you as chairman for no other or better reason than that the Program Committee

had nothing but deaf ears turned to their invitations scattered hither and yon for someone to come on and be the goat.

In the seventh grade of the public school in my old home town, from which, with some misgivings, the Society for the Prevention of Cruelty to the Innocent, sent me out into a cold and unsympathetic world, I was much impressed with that page of the world's history, upon which was recorded the fact that the Romans, Athenians, Carthaginians, or some other of those belligerent peoples of an earlier day, never gave burial to a soldier found on a battle field shot in the back. "Shot in the Back" could never mean but one thing—the shottee was running away; although the markmanship of the chap who took a shot at him is entitled to complimentary mention.

A Resolve Not to be Shot in the Back

My one youthful resolve that has stood the test of time was that if ever I was shot, as I probably might and undoubtedly would be, it would never be in the back. And so, whenever I've felt the urge to run, as run I have, and still can upon occasion, I have carefully ignored the old axiom that a straight line is the shortest distance between two points—"Here" and "There"—and invariably have negotiated a flank movement. The word "flank" is used advisedly, because, if shot, it would be in the flank, a location which admits of some doubt whether it is actually front or back, a doubt which might secure for me an interment commensurate with my carefully concealed valor and my willingness to serve.

So when I was offered this job that no one else wanted, (and even a larger number refused to take), I essayed my usual flank movement, was finally shot, and surrendered only upon the assurance that following the close of this session, as something justly due you, a requiem would be sung over me as chairman of the General Round Table Session.

Since this is to be my valedictory I have felt it not unfair that I take this much of your time to properly horn myself into the permanent records of the Congress.

We pass here to the more serious and important part of the program. Last year we had a wonderful out-pouring of the safety spirit; through cooperation of the right sort we can have just as interesting and profitable a session today; or, reversely, we can have one everything else but.

There are necessarily a few hard and fast rules; the first one is, please do not take the floor unless you have something to say which is pertinent at that particular moment; but having arisen and been recognized by the Chair, you will save annoyance to the reporter and possible embarrassment to yourself and to me if you will preface your remarks with your name, the concern with which you are identified and do it in your most distinct voice.

My injunction at this juncture, last year, still holds; let there be no

lip-reading here today; there is not a man here who can not make himself heard in every corner of the room—if there is, I hope he may not feel the urge to get up, as delighted as we would all be, under other circumstances, to have him.

I have been asked to repeat during the afternoon, under the topic "The Best Safety Kink I Have Known," certain remarks I made before the Round Table Session, Safety Section, American Railway Association, last spring, so if time permits and the public clamor that I do so becomes so riotous as to get beyond the control of the Chair, I shall be glad to oblige.

The first thing on the program is "Getting Men to Wear Goggles." Frankly, I get quite a kick out of this. You will see by referring to the program that Mr. Kuechenmeister, of the Dominion Forge & Stamping Company, Walkerville, Canada, is going to sell, as the safety man, the goggle idea to Mr. J. Taylor of the Ford Motor Company of Canada. It seems to me this sale might have been more of a cinch if they had picked the workman from somewhere in the States, because I have been told that a man from Johnny Walkerville finds it reasonably easy to sell his wares to a man across the river. So it is my very great pleasure to step out of the way momentarily and surrender the stage. I will let them introduce themselves in their own way.

GOGGLES? H—L, YES!

(A Playlet)

G. A. Kuechenmeister, Dominion Forge & Stamping Co., Ltd.,
Walkerville, Ontario, Canada

Cast of Characters

Miss Lovitt, A Nurse.....
Bill Tate, Injured Workman.....
Mr. Nixon, Plant Superintendent.....
Mr. Billings, Safety Man.....

Synopsis

The manager of the Meanwell Manufacturing Company, having been convinced that the services of a safety department were needed, has hired a safety man. Although the manager is "sold" on the idea, the shop organization is not. The safety man has discovered that eye injuries make up a large part of the accident records and has started a "goggle campaign." The plant superintendent is not in favor of compelling men to wear goggles and has made an appointment with the safety man to discuss the matter.

(Safety man's office. Flat top desk in center of room. Extra chair beside desk. Paste-board box with old goggles on top of desk. To one side of room is typewriter desk with typewriter, etc. Telephone on flat top desk. Safety banners and posters on the wall. Hat rack near door. As the curtain rises the nurse is seen sitting at the desk making out report cards on the machine. A moment later the superintendent enters.)

SUP'T.—Good morning, Miss Lovitt. Where is that safety man?

NURSE—He is out in the shop. You know, we had a serious eye injury the other day and Mr. Billings is out trying to get the other men in the department to wear goggles. Don't you think it would be a fine thing to have all the men wear goggles all the time?

SUP'T.—Huh! Have all the men wear goggles all the time? Good gracious, that safety man is a fast worker. He's got you filled up with that bunk of his already. You are beginning to talk as crazy as he does. Listen, Miss Lovitt, I have worked in shops since I was a kid; I've been through the mill from A to Z—from apprentice boy to boss—and I have seen big changes in the conditions in our shops and many new methods and ideas put across; but there are a few of these new fangled notions that I know will never work. This goggle idea is one of them.

NURSE—But all the men wear goggles at the shop where Mr. Billings came from.

SUP'T.—Yes, they say that all the men wear them over there. I haven't seen them; but, anyway, that shop is different from ours. You can do things in such shops that you can't do in one like ours. Conditions are entirely different.

NURSE—Have you ever worn goggles, Mr. Nixon?

SUP'T.—Have I worn goggles? Say, girlie, I've worn about every kind of a goggle that ever was made. Maybe I shouldn't say that I have worn them—I never could get used to the darn things—but I have tried often enough to know that it can't be done. Look at this junk *(runs hand through box full of old goggles)* it's a crime to ask men to wear stuff like that. I, for one, won't do it and I won't ask any man to do what I won't do myself.

*(Safety Man enters. Hangs hat on rack and takes off goggles.)
(Exit Nurse).*

SAFETY MAN—Hello, Mr. Nixon. Have you been here very long? I've been out in the radiator department having an argument with the foreman about his men wearing goggles. You know, Bill Tate got both eyes full of hot lead the other day and may never see again. It does seem as though, after a thing like that happens, the men would quit taking chances with their eyes, but if they won't, then there ought to be a rule compelling them to do so.

SUP'T.—Now wait a minute. Don't get too fast with your compelling men to do this, that, and the other thing. I know something about trying to wear goggles, myself. I was just telling Miss Lovitt about it when you came in. Look at this stuff (*points to goggles in box*) how in the world you have nerve enough to ask a man to put such things in front of his eyes, is more than I can understand. I have tried every one of the goggles you have in that box and I want to tell you right now that I wouldn't wear any of them nor ask any man in this plant to wear them.

SAFETY MAN—Neither would I.

SUP'T.—What?

SAFETY MAN—Certainly not. The very first thing that has to be done is to provide the proper kind of goggle. That stuff in the box was made to sell—not to wear. The trouble in so many plants is that the purchasing department buys the goggle on "price" and not because the goggle is suitable to the man or the job.

Now take this pair (*picks out pair of goggles*)—a perfectly good goggle to look at—but when it comes to fitting it onto men's faces you soon find that you can only fit about a half dozen types of face. It is not adjustable and unless worn by a man who happens to fit the goggle it is not comfortable.

And unless goggles are comfortable you can not expect men to be enthusiastic about wearing them.

This pair (*picks out wide vision goggles*) fulfills all the claim made for it as far as "wide-vision" is concerned but you notice it has a curved lens of such shape that it would be difficult to grind. The result of an unground curved lens is a lot of distortion that will give any man a headache in a hurry. Then, too, the glass is thin—and lots of it. Not a very safe thing to wear in a shop.

Here is an old pet of mine (*picks up pair of cheap leather cup goggles*.) I would not recommend the use of a goggle like this in our plant but I do have a warm spot in my heart for it. The first goggles we bought for the grinders, years ago, were this kind. We paid fifty-nine cents a dozen for them. Even now I always buy each of my boys a pair for use on the Fourth of July.

SUP'T.—You mean that you have your children wear goggles on the Fourth of July?

SAFETY MAN—Sure. Why not? I want the kids to have the fun of shooting off a lot of fire-works but I don't want them to get hurt doing it. My boys are so used to wearing goggles on the Fourth that we look at them as sort of "standard equipment" and buy them at the same time we buy the fire-works. Stepping on sons-of-guns and exploding torpedoes is very likely to produce eye injuries. We would not hear of so many children suffering the loss of eyes if people would put goggles onto the kids on the Fourth.

SUP'T.—I never thought of that. That sounds good to me.

SAFETY MAN—It is good. You know, this whole matter of whether you wear goggles or whether the men in the shop do or do not wear them, depends entirely upon the way you look at it. If you look at wearing goggles as a most disagreeable, uncomfortable, unnecessary proceeding then you can not get very enthusiastic about it; but when you realize that goggles *do* save eyes and that such saving more than compensates for the slight inconvenience caused by the goggles, then you do become interested.

Workmen are no different from you and me and when they once understand the value of proper eye protection they will not work without them.

SUP'T.—Well, if these goggles are no good, what kind would you provide?

SAFETY MAN—I have several kinds here—

SUP'T.—How many different kinds do we have to have? We have had so many goggles in our tool cribs that were no good that I'm fed up on throwing them away at inventory time each year. It seems that every time a salesman gets to the purchasing department we get a new kind of goggle in the tool crib. I'm sick of the whole goggle business.

SAFETY MAN—There are only two types of goggles necessary in any shop. The cup type and the frame goggle. These two types—fitted with the proper lens for the work—clear glass for ordinary work and colored lens for welding and working at furnaces—are all that are needed and will take care of all the men.

These cup type goggles (*shows several kinds of cup type*) are very comfortable and with the annealed lens will give wonderful protection. They should be used at the rougher work such as chipping steel, cutting rivets, working at punch presses and in blacksmith shops and forge departments.

This frame goggle can be worn in the assembly departments and machine shops. The adjustable frame makes it possible to fit any type of face. Let me show you how easily they can be fitted and how comfortable they are. (*Fits goggles to Supt's face.*)

SUP'T.—(*Shaking head and feeling of goggle, etc.*) They do feel pretty good but what would you do if a fellow had to wear glasses?

SAFETY MAN—That's easy. Have a special lens ground and put into that frame. That has to be done more often than you think.

SUP'T.—Well, to get down to business, just what do you want to do?

SAFETY MAN—I want to get every man in this plant to wear goggles all the time.

SUP'T.—It can't be done.

SAFETY MAN—It can. We did it at Wilson's and we can do it here. All that is necessary is for you and the manager and the foremen to get behind it and soon the men won't work without them.

SUP'T.—It that so? I'm telling you we have tried to get men to wear goggles and they won't do it.

SAFETY MAN—They won't do it? Surely you don't mean to say that the men in the shop can do as they please about obeying orders. Did you ever issue an order making it compulsory to wear goggles?

SUP'T.—No, and I don't intend to, either. I don't believe in compulsion.

SAFETY MAN—You don't? That's funny. You make men be on time in the morning; you prohibit smoking; you have signs all over the place warning men that if they get caught running they will be discharged. This whole rule book is full of "you must do this" and "you are forbidden to do that," and then you sit there and tell me you do not believe in compulsion. You make me laugh.

I guess you are like a lot of other old time bosses. Whatever rules you were taught while you were at the bench, you believe in and make a big fuss about enforcing; but when it comes to something new, you either haven't the brains to see the value of it or the "guts" to put it across.

If a man breaks one of your old rules too often you fire him, but you are willing to let the men go right on losing eyes without doing a thing to stop it. You give me a pain.

SUP'T.—We can't fire all the men because they won't wear goggles.

SAFETY MAN—Of course you can't and you don't have to. You don't "fire" all the men for breaking the other rules. Once in a while you have to let one or two go to maintain discipline. The same can be true of the goggle rule. When men realize that they must wear goggles they soon fall in line and you have very little trouble.

SUP'T.—But what's the use of all the men wearing them? The men in the grinding room wear them but I can't see any sense in making all the others do it. I think it is silly.

SAFETY MAN—That shows that you do not know what you are talking about. Here—look at the record of your own plant for the past two years. It is just like the record in all other shops where they think they can tell where and when men should wear goggles.

Here you are:—You haven't had a lost time case from the grinding department for the past two years.

(Opens loose leaf book and reads record of several departments and total for all.)

Machine shop; 8 cases; 41 days lost.

Assembly floor; 14 cases; 48 days lost.

Testing department; 2 cases; 7 days lost.

Power press; 5 cases; 110 days lost; (2 eyes lost).

Wood shop; 1 case; 14 days lost.

All these cost you a little over \$12,000.

Goggles have stopped the eye injuries in the grinding room; they will stop them in the other departments. Our record at Wilson's was exactly like yours. For five years our eye cases cost \$9,178, an

average of \$1,600 per year. We only had a few minor cases from the grinding department because all the men wore goggles. After we put goggles on the men in the other departments our eye costs dropped to a total of \$346 for the next four and one-half years, or an average cost of only \$88 per year.

SUP'T.—You mean you cut the cost from \$1,600 per year to only \$88?

SAFETY MAN—Yes, we reduced the cost of eye cases a little over 94 per cent.

SUP'T.—How do you account for that?

SAFETY MAN—I just told you that goggles did the trick. And that wasn't all the saving, either. Men instinctively try to protect their eyes. We used to see them, in the forge shop, throw up their arms every time the hammer struck and in other departments we could see them duck their heads and squint their eyes. Now they can stand right up to the work and lose no time.

But for goggles to be effective they must be over the eyes and not in the locker or on the forehead.

It's just like being prepared for a snake bite. You've got to have the whiskey inside before the snake bites. And you can't ever tell when a snake will bite or something hit you in the eye.

It isn't in places like the grinding room where we have the eye accidents. Everybody knows that goggles must be worn there. It is the unusual accidents that give us most of the trouble.

I know a man who took a Westcott wrench out of his hip pocket to tighten a half-inch cap screw on a punch press. The screw broke and the spring washer shot the head against the goggles so hard that it shattered the lens and bent the frame.

Here is a pair of goggles worn by a man working at a shear. He was pulling pieces out from behind the shear when suddenly—without warning—this piece of shim snapped off and struck his face. It loosened two teeth, cut his nose, broke the lens and knocked him coo-coo. He was dizzy for 20 minutes and then went back to work with a new pair of goggles.

This pair (*shows another pair*) was worn by a boy in the punch press department. A piece of hardened punch flew off and knocked the lens out of the frame but only cut the side of the boy's nose. See how this screen was cut.

The worst eye case we had at Wilson's, the last year I was there, was an injury to a man in the office. He was breaking locker keys by holding them with pliers and hitting the end with a tack hammer.

SUP'T.—Do you mean that an office man should wear goggles?

SAFETY MAN—No, I don't think that an office man should wear goggles all the time. I don't think that is necessary, but that incident proves, to me at least, that whenever a man does any work where there is a possibility of an eye injury he should wear goggles. And I don't care where he is—in the shop, in the office or in his own home.

SUP'T.—That may be true enough. I never had it put up to me like that before. What would it cost to put goggles on all the men? Two thousand men are a lot of men to equip.

SAFETY MAN—It would be kind of high to begin with. It would cost about a dollar and a half per man for goggles and about a dollar each for examination—with special lens for some of them it would bring the cost to pretty close to \$6,000.

SUP'T.—That isn't so bad. I thought it might be much more. It must be hell to be blind. Eh? How is Bill Tate getting along? He and I used to work together. Think he will be totally blind?

SAFETY MAN—The doctor does not know yet whether Bill will ever see again. One eye is gone but he may save the other.

SUP'T.—You say goggles will save a lot of eyes in the plant?

SAFETY MAN—Yes.

SUP'T.—If we wanted to make all the men wear them what would we have to do? Do you think we would have a lot of trouble?

SAFETY MAN—There isn't any reason why we should have trouble. Getting men to wear goggles isn't as difficult as you think. In every shop there is a small group of men who are convinced that wearing goggles is the right thing to do. We have them here. What we must do is to get all the men to see it that way.

That means, of course, that we will have to get the foremen to wear them. You can't expect the men to wear them when the foreman does not—and anyway there is just as much danger of the foreman getting hurt as the men.

You will have to set the example for the men. It won't be hard for you to get used to wearing goggles. I can see that right now. Mr. Meanwell will wear them, and while we are at it we may as well make everybody—visitors and all—wear goggles while they are in the plant. It makes the men feel better when everybody wears them.

As I said before, a lot of the fellows will need special lens so we might just as well examine them all as soon as we can and know exactly where we stand. The fact that we are examining eyes will create interest and help us along.

But the big thing, of course, is the order—signed by you and the boss. That is the real beginning. The rest will be merely detail and routine work for my department.

SUP'T.—(handling some cup type goggles on table.) Some of these look as though they might be too heavy.

SAFETY MAN—They would feel heavy if they were not properly worn. Your shoes feel awfully heavy when you walk without having them laced. If you wear your goggles like this (puts on goggles with strap low over the ears) they are very comfortable.

SUP'T.—A lot of the fellows tell me they can't wear them on account of fogging and steaming. What about that?

SAFETY MAN—Any glass will fog, sweat or steam up when it is exposed to sudden changes of temperature. Your house windows do it, your windshield and car windows do it, and any man who wears glasses will tell you that his glasses do it. That is one good reason for not having glass panels in our radio sets but it isn't serious enough to keep a man from wearing goggles.

Don't let anybody kid you into believing that it is the ordinary condensation on the glass that causes the trouble. That isn't it. It's the perspiration from the forehead running down into the eye that causes the trouble. In the old days the men used to smear heavy oil or grease over their eye brows to keep the sweat out of their eyes. We now provide them with this sweat pad. That makes it possible for the men to wear goggles in hot places.

There are cases though where a man may be up against constantly changing temperatures or a nasty steam condition. In that case a little glycerine soap or liquid glass polish rubbed onto the lens and then wiped off will do the trick.

SUP'T.—Will that stuff do the trick?

SAFETY MAN—It surely will.

SUP'T.—What about the complaint about headaches? One of the fellows in the die room stopped me about two weeks ago and told me that you had asked him to wear goggles and that he had suffered with terrible headaches ever since.

SAFETY MAN—That was two weeks ago. Go talk to him now. When he told me about the headache I took him to Doc. Crouch and had his eyes examined and we fixed him up with the proper lens. He should have been wearing glasses for the last ten years.

Go talk to him now, he is the happiest man in the shop and a darn sight better workman than ever before. Now he can see what he is doing.

The complaint about headaches is a real one. I don't call a tickly feeling across the nose or soreness back of the ears a headache but it is true that some men get headaches when they begin to wear goggles. That isn't caused by the goggle but is due to a defect in the eyes. I have seen any number of cases where men never knew they should be wearing glasses until they began to wear goggles.

When they had the proper lens put into the frame and found they could see better than ever they thanked us for making them do it.

Gee! Nixon, I wish you could see this thing in the right way. I wish you could realize that putting goggles onto men isn't being cruel to them. If you had to take men to the hospital as often as I do and if you could witness the suffering of the man and the agony of suspense endured by the wife you would understand. When I think that all that is needed is just a little firmness on the part of the management—just a little extra effort to get men to protect

their eyes—it makes me feel sick to think of all the needless suffering.

It isn't imposing a hardship on the men—it isn't cruel to make men wear goggles. I can show you hundreds of men who are thankful for the day they were compelled to wear them. They realize what it has meant to them.

Nixon, won't you issue an order making it compulsory to wear goggles in this plant?

SUP'T.—Billings, I think I'm hooked. I think I begin to see what it is all about. I'll think it over and talk to the big boss.

SAFETY MAN—Mr. Meanwell says he thinks it's good stuff.

SUP'T.—No doubt he'd say that. He falls for a lot of your crazy notions. *(Superintendent starts for door still wearing the goggles.)*

SAFETY MAN—Oh, Mr. Nixon, before you go you'd better sign a receipt for those goggles. You might as well keep them. You will want a well fitting pair.

SUP'T.—H—I, have I been wearing these damn things all the time? Guess they are comfortable all right. What do you want me to sign?

SAFETY MAN—This receipt.

(While Sup't is signing receipt the nurse and Bill Tate enter and stand near door. Tate has bandage over both eyes.)

(Sup't turns to leave and sees Tate.)

SUP'T.—Hello Bill, how are your eyes?

TATE—Not so good. The doctor tells me one is gone and he isn't sure about saving the other one. God! Nixon, this is h—I. It isn't that it is only h—I for me—think of the wife and kids!

SUP'T.—How is the wife taking it?

TATE—She is out in the car now. She won't come in! she says she doesn't ever want to see this shop again or any of the men in it.

SUP'T.—I'd better go out and see her.

TATE—You stay away! She is sore enough to kill you. She says that any outfit that knows how to protect its men and won't do it should be put out of business. God! if we had only listened to that new safety man. He had the right dope. Here I am—past forty—a wife—a couple of kids—and crippled for life.

Guess the wife is right. She says she will go to work as soon as I'm through with the doctors and hospital.

SUP'T.—Listen Bill, you tell your wife that she isn't going to go to work for a long time yet. We'll see you through on this and if your one eye is O.K. you can come back in here.

There is going to be a change here, Bill. . . . Billings you make

out the order you want—I'll see the boss and arrange to have him sign it. Come on to my office, Bill, we want to talk about this.

(Exit Sup't., Tate and nurse.)

SAFETY MAN—*(Grabs phone.)* Get me Doctor Crouch. Hello—hello, Doc? This is Billings. Say, did you see Bill Tate this morning? You did? Now Doc, listen! I want to know the truth—will he be able to see out of that one eye? What? He will? Thank God! *(Hangs up receiver.) (Jumps up and grabs cap off rack.)* I'm going to tell his wife. *(Exits.)*

CHAIRMAN HALE: That was certainly a very interesting and illuminating play, and it ought to sell a lot of goggles.

Getting down to the second subject, "Getting Workers Back to Work." Frankly, I get a back fire out of this. Since all workers do not always work, I take it that what is really meant is "getting workmen back on the job."

This discussion is going to be led by Mr. A. P. Williams of the Chrysler Corporation, Detroit, Michigan. May I stop just long enough to mention the fact that every Santa Fe man feels a pardonable pride in the Chrysler Corporation for the very good reason that Mr. Walter P. Chrysler began his career as a mechanic, as an engine wiper, in a Santa Fe round house in a little city in Kansas?

I have the very great pleasure of introducing Mr. Williams of the Chrysler Corporation.

GETTING THE INJURED WORKER BACK ON THE JOB

A. M. WILLIAMS (Chrysler Corporation, Detroit, Mich.): The psychological angle, so far as the injured employee is concerned, undoubtedly will be well covered by some of the doctors this afternoon. There is one element that we have found that the doctors may not possibly touch upon—the spirit of competition in our intra-plant contests.

If the department is pretty well up towards the top and doesn't want to sink to the very bottom of the contest in the performance rating reports, in lost days because of accidents, we find many employees actually begging to come back on the job in order that they may not lower their departmental standing.

Another element that we have found of value in selling the employee, in getting him in the mental attitude where he really wants to come back, is in handling all compensation on our own corporation checks. We settle with the insurance company afterwards, but when that employee is injured, he deals with our own adjusters, and settlement is made with our own compensation checks.

If the young man has ambition to get ahead with the company—the young man in the moulding department where it is important not to develop the habit of malingering—when he gets the first check, it is a corporation check and he feels that some place up the line somebody knows he is a burden, and he wants to get back.

With the hard-boiled, old-timer who has been off on compensation periodically, it won't have any effect, I will admit, but in a great many cases we have found it of extreme value.

The interest that the man loses day by day in his job, in his department, in the schedules, is one of the great losses that we can't measure. If the man is away from his department two days, when he comes back one of the first things he wants to know is, "Where are we at on our schedule?" If he is gone a week, the interest has waned. If he is gone three or four weeks, the interest has vanished entirely and he may have gotten out of step and possibly he may get a hunch, in his contact outside, that may take him to some other plant.

It is a constructive job. We may not be able to put that man back on his regular job. We may not be physically qualified at that time, but if we can bring him back and put him on other work and maintain his interest, make him feel he is independent, that he is not a load, I think we are doing a constructive job with that man mentally and possibly physically.

General Discussion on the Malingerer

CHAIRMAN HALE: I neglected to say that these discussions are limited to three minutes, and following each group you people from the floor are to be given a chance to be heard. We want to hear today from the shrinking violet type, the fellow who doesn't often get up on his hind legs; we want volunteers, not the old guard. Let's hear from you on the subject of "Getting Workers Back to Work," something that concerns every man in room.

F. L. WANZER (Steel Co. of Canada, Ltd., Hamilton, Ont.): Naturally, we have a great many accidents in our plant. It falls upon my department to try and get them back as soon as possible. The ordinary rule is that as long as they are under the doctor's care, he keeps them out and he has to return them to health. As soon as the doctor gives us an order for the man to go back to work, he is called upon by my assistant or by myself and we see that he comes back. We bring him back if it is possible, and we generally succeed in doing so.

The employment agent also is of great assistance in this work. He knows all the men very intimately and he is notified that the doctor has discharged the injured man, and he gets after him to see that he comes back.

Unfortunately every little while, mostly among the foreign element, we have men who delay coming back. With those men we make a point to go to their houses and see them and argue with them, and if our arguments fail and they do not come back, when they do come back, they are not given the job for a week or two, or sometimes three weeks. They are penalized to that extent until they get hungry and they want a job. That is passed on down the line—"If you boys don't come back, you won't get your job." We don't always carry it out, but we let them understand it might be carried out and we find it is a great help in bringing the men back to work.

SIDNEY W. INGHAM (Head, Accident Prevention Division, Ludlow Manufacturing Associates, Ludlow, Mass.): As I conceive the problem of getting the injured worker back on the job, there are two sharply defined classes with whom we have to deal. They may be called high and low mentality cases.

The high mentality cases are usually amenable to reason and can without difficulty be shown the advantage of an early return to work. With them the task is a simple one, demanding a straightforward statement of facts regarding the worker's condition from the viewpoints of the medical, employment and production departments. This case appreciates the intent and application of the compensation law and returns to work satisfied that he has not been imposed upon.

This Man Wants the Limit of Compensation

But the low mentality case is very different and a difficult one to handle. He has two thoughts in mind: first, that he has been injured; second, the law makes somebody pay for the injury. He thinks that where the law is involved in compensation he has entered into a kind of game where his wits must keep him out of employment as long as possible. His only idea is to get the limit of compensation.

He has a misconception of the intent and application of the law, and a lack of confidence in his advisers, at least those who do not advise him to malingering. No one sympathizes with him; he imagines himself up against a conspiracy of the safety man with the insurance company to rob him of his rights. Disability in such cases must be handled by the Industrial Accident Board and compensation should be paid wherever possible in a lump sum, whereupon the case usually makes immediate recovery.

In between these extremes we have cases where the worker suffers from a chronic or progressive disease and associates a disabling condition with some minor injury. He is perhaps honest in this conviction, even when it is evident that the trouble was present before the injury; it may even have been the cause of the injury. Chronic neuritis often precedes an injury and persists long after it has healed. Chronic fibrosis of a joint or a sinusitis that is undoubtedly chronic may suddenly become acute and the claim for compensation and resultant unwillingness to work ensue.

There is also the old employee who may be injured moderately and who decides that the compensation law is a pension law and often gets away with it. The chances are that he could not do much work before the injury and is not any worse after it, but he thinks himself unable to return to work.

Each of these cases is a study in psychology and must be worked out as circumstances direct. The man is either of high or low mentality and this determines the line of approach to the problem. The physician must decide so far as possible whether he is a fakir or not. That determines medical treatment. Finally, the accident prevention department must assimilate the information available, coordinate the factors and reason with those who are amenable to reason.

The production departments should work in harmony with the accident prevention and medical departments in placing partially disabled and fully recovered cases back at work. If it is possible to keep an injured man on the job in some capacity compatible with his condition, so much the better.

President Walter G. King Is Introduced

CHAIRMAN HALE: I am informed our meeting is honored by the new president of the National Safety Council. Some of you gentlemen may not have had the pleasure of seeing him, so I will ask Mr. Walter G. King to arise and give you a chance to give him the once over. (*Applause.*)

PRESIDENT KING: It was regrettable that there was not space enough to accommodate all of us at the banquet last night, but I want to say the party looked very good to me.

E. C. HUNTER (National Cash Register Co.): What do you men do with the fellow who has had an injury, who belongs to two or three benefit organizations and his total wages are more when he doesn't work? How do you get him back?

C. F. McGUIRE (National Foundry Co., Erie, Pa.): We keep a check on all injuries with the doctor every morning. That is one of the main duties of the nurse—to find out from the doctor the condition of the worker, whether he is able to return to work. If not, can he do any kind of work? Yes. What kind? Anything you like. We then go to that gentleman and tell him, "We want you to report to work tomorrow morning at 7:00 o'clock. Report to the labor foreman. Give him this slip. He will know what to do with you. You are keeping down our accident record. We don't give a continental if you belong to the Sons of Italy; your place is here. We are providing work for you."

For that very particular reason we have what we call the cripple pile, the gagers straightening department. We have no regular man on that job. That is where I take care of the cripples.

W. H. STUART (National Carbon Co., Cleveland, Ohio): What is the effect on other employees when these men can't do over 10 per cent of a man's work?

MR. McGUIRE: We have a mutual benefit association that is run by the men; it is their money; they keep that association going. There is nothing they hate more than to see one of their own fellow workmen trying to take some money out of their pocket, because this pays the death benefit besides. It is their ambition to keep building up that little fund, so that if they have a series of deaths, they won't be taxed or assessed, and they are just as anxious to see that fellow walking around the shop, and not drawing any of their benefit money.

H. D. LIVERS (Southwestern Bell Telephone Co., St. Louis, Mo.): The Bell Telephone Company also has a benefit fund from which all of the employees draw benefits when they are sick or injured; but one of the main things that we believe in is to keep the man out of the hospital, if such a thing is possible, away from the lawyers, so that we are not expos-

ing him to the danger of false representation. Then we try to create a loyal spirit toward the company and toward the department, to get him back on the job.

When we find a man is injured, or he reports that he is injured, whether he can work or can't, his supervisor goes out there immediately to find out something about it. If we know he is injured we go anyhow. He is off the job. We try to induce him to come back and we are usually successful. If he can't do any kind of work at all, we think he can go some place where he can learn a little more about the business; so we have in the larger cities schools where we can send a man when he can do little or no work and make him acquainted with some other branches of the business. We think it is a good thing to do that. It keeps him away from the lawyer sharks and it builds up his mind and his ability to do something more in a different and better work than he is in.

Mr. Williams expressed a very good idea, that instead of letting a man get a check from an insurance company as compensation, to have a company representative pay him with a company check. That is a mighty good idea. We do it, except when he gets into hands of a lawyer shark and we have to come across to the lawyer. Of course, you all know the lawyer gets half of anything that we pay. We thoroughly believe in educating our employees at a school when they can't work. If they can work, so much the better.

The Loyal Man Hates to Break the Safety Record

As an illustration I am going to tell you one thing that happened in our company and maybe some of the Bell Telephone men who are here will jump all over me for this, but I will tell it anyhow.

We had a fellow fall off a pole. His left arm was broken at the elbow. When the doctor was through, that arm was bandaged up. The other hand was broken here (indicating). He was in a department of 250 men in St. Louis, which had had only one accident during that whole year, and when the doctor told him he would have to lay off (I was there myself; I know it), that fellow cried, "My God, am I going to be the first man that breaks that record?" The other had been a fatal accident, no lost time. Here is a man who cried to go back on the job, regardless of the fact that the doctor told him to go to the hospital. We put him in the school.

CHAIRMAN HALE: Because of the uncertainty of the length of this program, we are going to pass this subject only temporarily, I am quite sure, and we will come back to it because it is a mighty important thing.

We now come to the subject, "Effective Use of Accident Statistics." Frankly, I am speechless and find myself in fear and trembling in the presence of one or two or three men who are clever enough to discuss statistics.

I take pleasure in introducing Mr George S. Thompson of the Detroit Insurance Agency, Detroit.

EFFECTIVE USE OF ACCIDENT STATISTICS IN SAFETY WORK

George S. Thompson, Detroit Insurance Agency, Detroit, Mich.

In discussing a subject of this kind, owing to the constant misuse of words of our English language, I feel that it is incumbent upon me to first define the word "statistics." We find that the definition reads something like this:

"Statistics is the art of collecting and combining facts in so far as they relate to any particular subject."

Let us repeat that first sentence again. "Statistics is the art" and let us stop there for this reason. We can accumulate no end of data and to no particular purpose. Hence, it is quite true that the word "art" should be stressed. In my opinion, statistics is the yardstick with which to measure accomplishment, and if this is so, then the next step is "what kind of statistics shall we use to accomplish the best purpose?" For if we do not use the right methods we are merely carrying on a post mortem examination, and as you know, there isn't much interest in data of this kind.

It has been my experience that all data should take two classes—a visual class and a tabulation in the language of the day. In looking about for something of the first class (that is, visual) I found that anything that appealed to the eye made a lasting impression. So, back in the year 1914 when the nation was in a war frenzy it became necessary to tabulate certain conditions so that in an instant a person could grasp the situation. The result was the adoption of colors that, with very few exceptions, everyone was familiar with. We reduced these colors to a minimum number, allowing each one to represent a situation, and then with the aid of cross section paper and colored crayons we could depict the situation from day to day and maintain a balance by keeping our colors in line.

The results were so gratifying that in 1916 when installing a safety system in a plant, the speaker embodied this method and applied it to the accident frequency condition, with the result that the first month it took nine feet of cross section paper, the second month less than six feet and the third month a three foot sheet was ample. I have operated this system in a number of plants with very gratifying results. In the city of Detroit, a similar chart is being kept by a number of manufacturers, and after a brief explanation of the colors and what they represent, I do not believe there is anyone who could not at a glance instantly locate the kind of accident and where it has taken place.

This is statistics, and in presenting it, I do so with the idea of giving you the thought of visualizing the conditions in your plant. While it may be effective for you to have this on a sheet of paper in the shape of figures, the figures are all the same, and they do not impress one as a solid block of color would.

This is proven by a recent experience of mine. In installing this chart system in a plant recently and calling the foremen together to witness it, one of the foremen noticed that his line on the chart indicated 16 eye accidents. He immediately said, "I did not know that I was having as many cases as this and you can make up your mind that there won't be that many during the next 15 days." The result was that there were only two additional eye cases for the balance of the month. That foreman was sold in less than five minutes and he had the reputation of being hardboiled. This is only one of many instances and again the word "art" is brought into prominence by this fact.

This chart can be overdone and become burdensome—so I suggest that you first show lost time accidents only. Next, after lost time accidents disappear or become less frequent, cases that call for medical aid and redressing should then take their place on the chart; and after these are reduced then report all cases regardless. This would stretch out over a period of possibly a year and the progress can be noted by the engineer in charge.

As we are all at the best grown up children and endeavor to travel along the lines of least resistance, if we are to obtain the desired impression we should make our implement of impression as simple and have it operate with as little brain exertion as possible.

CHAIRMAN HALE: Next we will have Mr. H. G. Hensel, Safety Director, The Youngstown Sheet & Tube Company, Chicago.

ACCIDENT STATISTICS

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

Accident statistics are the basis of all good safety work. We know from experience that those companies that are not interested in accident prevention do not know how many accidents they are having in their plants, nor do they take the time nor trouble to keep accident records.

On the other hand, every company I have ever heard of that is interested in accident prevention keeps accident records. They can tell you exactly how many accidents they have each year, how much they cost, how much time lost they represent; they analyze these records by causes, by departments.

It is foolish in the short time assigned to me to try to tell you how to compile accident records. There are various standard methods of doing this work and these standard methods are outlined in various Safe Practice Pamphlets and other publications of the National Safety Council.

I would, however, like to take just two minutes to show how these accident records and statistics can be used to the best advantage.

There are four main uses for accident records and statistics.

1. To convince the management that accidents constitute a real prob-

lem in the plant and to secure the support of the management in adopting all reasonable suggestions for preventing accidents.

2. To convince foremen and other supervisors (many of whom are skeptical, hard-boiled individuals) that men under their supervision are injured from time to time and that they (the foremen and supervisors) must be interested in accident prevention if they wish to hold down their jobs.

3. To convince the workmen that accidents are happening in the plant and that in the majority of cases these accidents can be prevented by carefulness on the part of the very men who are injured.

4. To show the safety department where accidents are happening and to enable them to pick out the most important points for immediate correction. A properly devised accident report will enable the plant managers to know just what departments are having the lost-time accidents and, therefore, which department heads he should ask to check up on their accidents and take steps to eliminate them.

CHAIRMAN HALE: I have a very delightful surprise for you. Through the courtesy of Mr. Harry Guilbert, Safety Director of the Pullman Company, we are going to hear their justly famed quartet of porters.

(The Pullman Porters' Quartet sang amid applause.)

CHAIRMAN HALE: I knew you would enjoy them. There is enough harmony in those boys to supply an army of men. I want you to know they are in regular service of the Pullman Company. They are the fellows who give you more comfort and privileges than many of you have in your own homes.

THE EDUCATION OF CARELESS CAL*

A PLAYLET—By Geo. M. Aitken

Reproduced by G. E. Burns, National Safety Council, and A. Berquist, Youngstown Sheet & Tube Co.

CHARACTERS—Safety Sam and Careless Cal

Scene: Bulletin Board near the fireroom showing part of the brick wall.

(Enter Safety Sam with a bundle of bulletins under his arm, dressed in ragged, greasy overalls.)

SAM: Well, we sure had a fine meeting last night. I wasn't caring much about going, but the boss asked me to come: so I couldn't very well refuse. And I was glad I did. Got a lot out of it, too. The Safety Engineer from the National Safety Council was there with movies. He also gave us a nice talk on what Safety means to the worker. He said that if every man would learn to be reasonably careful there wouldn't

*Originally played by H. E. Reynolds and Geo. M. Aitken, at the Safety Conference September 8, Portland, Oregon.

be half as many accidents. I wish that bone-head, Cal, had been there. I asked him to come but he said he had a date. Out with that Jane of his, I suppose. Well, I guess it is up to me to get a little safety into his system, or he is liable to hurt someone else. The boss made me a member of the safety committee. Also made me wet nurse to the First Aid Kit and bulletin board. I have a little time before my rounds. I think I'll put it to a good use.

(Holds up a bulletin. Baby's picture—"The Greatest Safety Booster of Them All!")

Now that's a humdinger. Anyone with any horse sense at all could see that Safety is meant for him and his family. I'll post that one at the front gate.

(Picks up another one on ragged clothes.)

Here's this poor fellow caught on a shaft because he wore loose and ragged clothes. By Gosh, mine ain't any better. Lesson No. 1 for me. Got to practice what I preach, or these guys 'll razz me off the plant. *(EXIT.)*

(Enter Careless Cal.)

CAL: I wonder where that doggone oil can is. I left it somewhere around here. Hello, what's this? A new sign board? Lots of signs around this plant. I don't know what good they are. Makes you think we are running a kindergarten instead of a factory. "Safety First!" Well, that's all right for kids and old women, but I am not interested. In fact, if the truth was known, it's a scheme to save money for the boss who gets a simp like Sam to do the boosting. Gee Whiz, but I am tired. That stuff had an awful kick in it. Damn that oil can! *(Sits down and falls asleep.)*

(Enter Safety Sam with a new suit.)

SAM: Wake up! This is no place to sleep. Out with that tin Lizzie last night?

CAL *(Still half asleep.)*: Lizzie? No, Susie. Red hair. Awful pretty. Some Kid!

SAM: You've got to quit this stepping out late at nights. It ain't safe, Cal.

CAL: What do you mean, safe? What's eatin' you? Been to a revival meeting?

SAM: No, Safety Meeting, last night. Learned a lot about safety, too. You should have been there. You would have got a lot of this hard-boiled stuff out of your head.

CAL: So that's where you got this lecturing bug. All spruced up this mornin', too. Glad rags, face clean, 'n' everything. Got a stand in with the boss, so he gave you a new soft job to put up the bulletins. Did he raise the ante with it? I guess not, it's one of them doing-it-for-love jobs.

SAM: No, I am going to do it for the love of humanity.

CAL: Male or female? Well, I see my oil can. Guess I'll go oil the engine for the love of the dollar.

(Exit Cal.)

(Sam proceeds to post a bulletin on falling objects. A noise is heard.)

(Cal enters with a cut on his head.)

SAM: Hello, Cal, what happened?

(Leads him to a seat and begins to bandage up his head, illustrating proper head bandage.)

CAL: I left a hammer on the ledge above the old engine, and when I started up, the hammer slipped off and hit me on the bean.

SAM: Well, the cut isn't very deep. You're lucky. Better go down to the doctor and have him take care of it.

CAL: All right, Sam, I will tonight.

(Exeunt both. Sam re-enters and posts another bulletin on eyes.)

SAM: Lots of people get their eyes knocked out. The safety man told me the other day that there were 52,000 industrial blind in this country. Not so bad to lose an arm or leg, but with both eyes gone a man is in pretty bad shape.

(Noise is heard. Cal enters with a black and bloodshot eye.)

CAL: By George, that was a narrow one! The damned emery wheel broke and just missed my head. A piece hit me in the eye.

SAM: Did you have the hood over the wheel?

CAL: No.

(Sam proceeds to bandage eye, illustrating proper eye bandage.)

SAM: What's the use of the boss providing safeguards, if you don't use them? It don't cost you anything to wear goggles. I say you're lucky you didn't get an eye knocked out.

CAL: Well, fix me up, and quit your lecturing. I am the one that's hurt; so quit your crabbing.

SAM: I am only giving you a little good advice, you bonehead. Why don't you get wise and use a little safety precaution?

CAL: I'll think it over. Maybe if you keep after me long enough, you'll wear me down.

(Exeunt both. One week elapses.)

(Enter Sam, and posts a bulletin about a man being caught on a shaft.)

(A louder noise is heard.)

(Cal enters with a broken arm.)

SAM: Cal, you've got a bad one this time. Likely lay you up for three or four months.

(Proceeds to bandage Cal up, illustrating proper arm bandage and sling.)

What were you doing to get into a mess like this?

CAL: Don't just exactly know. Must have been that old jumper of mine that caught first. I put down my hand to get away, the shaft caught my hand and I guess,—well, my arm's broke. Ow! Sam, it hurts like hell!

SAM: Well, Cal, I am not going to say much to you. You will have plenty of time to give this safety business a once over when you're in the hospital.

(Exeunt Cal and Sam.)

(Four months later. Enter Sam.)

SAM: I have been posting bulletins for a long time around here. Last night we had our Safety Committee meeting. The secretary reported that accidents had been reduced 50 per cent since we took up safety work under the committee system. A new committee was formed and I was elected chairman. I like the work; it's mighty interesting. I haven't seen Cal for some time. He's out of the hospital and should be showing up one of these days. If he hasn't learned his lesson by this time he never will. It's too bad that some people have to get it by experience. They'd save a lot of suffering if they'd get the spirit of caution into their system. I have no hard feeling for Cal, or anyone else, but I don't like them to be hard-boiled about it. Well, I'll be damned! The fatted calf has returned. Let's kill the prodigal.

(Enter Cal with a new suit of overalls on; and Cal and Sam shake hands.)

SAM: Well, Cal, I am sure glad to see you, old chap. How are you feeling?

CAL: Fit as a fiddler. I sure had plenty of time to think what a damn fool I was not to fall in with your Safety First ideas. A hospital is all right when you get hurt, but who wants to get hurt? No, sir, no more hospitals for me. I have learned my lesson. Say, when you have another safety meeting I want you to count me in, and give me something to do.

SAM: Well, Cal, I am glad to hear that you are going to be one of us. I have just been made chairman of the committee. I am going to appoint you custodian of the bulletin board and the first aid box. I am sure that you will fill the office with credit to yourself and honor to the company you serve.

CAL: You used to call me Careless Cal. No doubt I deserved the title, but you can call me Careful Cal from now on, because I am going to live up to it.

SAM: Congratulations, Cal! Shake!

(They shake hands.)

CHAIRMAN HALE: That, too, was a mighty interesting demonstration. I am wondering how many got from it the thought I did; that is, if accidents and injuries must occur, wouldn't it be a fortunate thing if they were confined to the hard-boiled.

We have come to topic No. 5, really one of the most important, and easily can be made one of the most interesting subjects on the program, "The Best Safety Kink I Have Known."

Mr. Ira V. Kepner, Pennsylvania Salt Manufacturing Company, Philadelphia, Pa., will talk from the standpoint of a chemist, I believe. The salt business, as you know, is an all year round proposition rather than a seasonable one.

"THE BEST 'SAFETY KINK' I HAVE KNOWN"

Ira V. Kepner, Pennsylvania Salt Manufacturing Company, Philadelphia, Pennsylvania

One of the best "Safety Kinks" I have known,—for the prevention of explosions, fires and accidents, in a chemical plant consisted of two discarded "automatic sprinklers" with the heads removed,—connected to a water line and suspended inside a storage bin where sulphur was being dumped from railroad cars, overhead.

The chemical concern I have the honor to represent manufactures heavy industrial chemicals, among this group being sulphuric acid, oil of vitrol, and oleum, all of which are made from sulphur. We receive our sulphur in ships; it is unloaded into drop-bottom railroad cars, which are taken up a trestle to the top of the storage bins and dumped. As the sulphur falls dust arises, causing the ever present possibility of a dust explosion. At one time we had a great many dust explosions from this cause, and many a poor workman had his clothing blown off and was severely burned on account of them. Safe clothing, goggles and respirators were a great help in the protection of the workmen, but we were at a loss to know what caused these frequent explosions and how they could be prevented.

There were several iron rods passing through these bins, and inspectors from the Board of Fire Underwriters, who called frequently to investigate the fires caused by these explosions, were of the opinion that the sulphur, striking the iron rods, caused "static-electricity" which ignited the sulphur dust.

The underwriter inspectors, as well as the state factory, and insurance inspectors and our own chemical and electrical engineers were asked to help solve this problem. They certainly made an honest effort; they

grounded all the bolts, rods and other iron work about the bins and made a number of other experiments; but the explosions of the sulphur dust were just as frequent, and to this day the cause of them is still unknown.

An Idea Gathered From the Round Table Discussion

Now to illustrate how much good can come out of a ROUND TABLE DISCUSSION, such as this: At a Round Table meeting of the Chemical Section of the National Safety Council, held in the City of Wilmington, Delaware, a few years ago, I presented my dust problem. In answer, one of the members informed me that the firm he represented had a similar experience while loading a vessel with sulphur by means of a "clam-shell" bucket. As the discharge of sulphur from the bucket dropped into the "hatch" an explosion occurred; the vessel took fire and was burned to the water-edge. Before the next ship was loaded some one in the employ of the company conceived the idea of spraying water from a hose on the sulphur as it left the "clam-shell" bucket. They tried the experiment; it worked, and since that time they have had no more fires or explosions from that cause.

Bringing the thought of that ROUND TABLE discussion back to our own plant, and discussing it with our boss pipe fitter, he hit upon the plan of installing a water line, equipped with two old, discarded automatic sprinklers, minus the heads, inside the sulphur bins. This plan was carried out; we now turn on the water, which sprays the sulphur as it is being dumped. Some two years have passed since we installed the first sprays, and we have not had one single explosion or fire in the sulphur bins since. At this time all our sulphur bins are equipped with sprinklers.

The first installation and cost of this little device was not more than \$5, and I estimate it has saved our company hundreds of dollars each year in fire losses and compensation payments alone; and it has saved our employees untold pain and suffering. Truly, Round Table Discussions pay big dividends.

CHAIRMAN HALE: On the subject of round table discussions and their potentialities, there was a gentleman in the Steam Railroad Section this morning who told the story of a bachelor who gave a dinner. One of the choicest morsels offered was watermelon. He gave instructions that the watermelon should be thoroughly saturated with a very choice brand of liquor.

It was noted when this course was finished that the melons had been eaten down to the green of the rind and while no one said anything about it, it was subsequently noted that every gentleman present put the seeds in his pocket and carried them away with him.

It is not constitutionally possible for us to consume all of the melons offered to us at this Congress or at this session, but it is possible for us to put into the pockets of our minds seeds from which we may subsequently grow many useful and constructive thoughts.

I do not believe that Mr. Auel of the Westinghouse Electric & Manufacturing Company is in town. Has anyone Mr. Auel's paper?

W. F. DIRMER (Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.): At the conclusion of this morning's meeting I was handed a special delivery letter advising me that Mr. Auel was ill and unable to attend and for me to take his place. Those of you who know and have heard Mr. Auel know what a difficult job I have.

SAFETY INSPECTION CALENDER

ANNUALLY

CRANE OPERATORS TOOL AND EQUIPMENT INVENTORY ELEVATOR TANKS
HOOKERS ON

SEMI-ANNUALLY

ELECTRICAL HAZARDS	WINDOW HOOKS	MUSHROOM TOOLS
FOOD HANDLERS	OVERHEAD WALKS	LADDERS
FIRE DRILLS	WINDOW CLEANERS BELTS	GAS MASKS
STRETCHER CABINETS	STAIR TREADS AND RAILINGS	BELT LACING
TRUCKS-ALL TYPES		

QUARTERLY

LIGHTS
ENERGY WHEELS-WATER TANKS
LEATHER GUARDS
WARNING SIGNS
ACETYLENE & ELECTRIC WELDING OUTFIT
GOGGLES-STERILIZING OUTFITS
SHOWER BATHS SOLDER POTS
HIGH PRESSURE AIR LINE
SAFETY BROOMS
STAIRWAYS

MONTHLY

VENT PIPES
FLOOD GATES
SAFETY MEETINGS
PUNCH PRESS -TRIPS

WEEKLY

FIRST AID CABINETS
BULLETIN BOARDS

CONTINUOUS

DIP TANKS-ELEVATORS-CRANES-CRANE SLINGS-VENTILATING FANS
FIRE EQUIPMENT
FIRE EXTINGUISHERS-BUCKETS-DOORS-VALVES-HOSE-SAND DUST BOXES
INDICATOR POSTS AND HYDRANTS
VENTILATORS DUST COLLECTORS

I have a chart on which he proposed to speak and inasmuch as the chart is self-explanatory, it leaves me out very nicely. If I may, I will post this chart and if there are any questions to be asked later, I will be pleased to answer them, and as far as the correctness, or rather in your judgment whether the time allotted for the inspections is correct, that, of course, concerns your own individual departments. This is as we thought best for a safety calendar inspection.

It is easy enough, as you all know, to set out to do something, but the biggest part of the job is to do it, and this is the method we have followed to keep us regularly on the job.

CHAIRMAN HALE: While all of us who know Mr. Auel personally regret his absence, Mr. Ditmer, we are very happy to have had you.

We come now to Mr. R. C. Salisbury, manager, Health and Safety, The Fisk Rubber Company, Cudahy, Wis. I take it there is very little chance that Mr. Salisbury will stretch his time allowance since his company for years has been trying to teach the public when "It is time to retire."

MR. SALISBURY: It might be becoming if I could retire. You will notice on the program that this is "The Best Safety Kink I Have Known." That is just singular, and if you get one idea from what I say, you will be doing well.

Find the Most Careful Man in the Plant

We recently discovered an idea, not original with us in any way, but we put it into service about four weeks ago. The idea met with considerable favorable reaction and we are very well pleased with it.

Recently we made some additions to our buildings which necessitated the purchase of a number of mirrors. Before the mirrors were put into the rest rooms, we mounted four of them on four separate flat trucks. The mirrors were then covered with a canvas and on the canvas we painted—"Lift this canvas and see if the most careful man in the plant is shown." And on the face of the mirror we printed that old familiar slogan—"The best known safety device." We tried to bring out that the best known safety device is a careful man. The trucks were moved from one part of the plant to another and it met with considerable favorable reaction. A great number of employees looked at themselves and a great number didn't because they were told it wasn't necessary; but it did have a favorable psychological effect.

CHAIRMAN HALE: That was very interesting.

We will pass on to Mr. Dalzell of the Ferro Concrete Construction Company, of Cincinnati.

JOHN W. DALZELL (Ferro Concrete Construction Company, Cincinnati, Ohio): It is a pretty well conceded fact that 80 per cent of our accidents are intellectual hazards and probably 20 per cent are physical hazards. I am not going to try to say very much about the best safety kink I know as far as physical protection is concerned, but I have something very deep in my own mind that I am convinced we missed a bet on.

One of the first things I knew about safety was that if we could get men to think safety, our whole problem would be solved. That has been tried. That is trite and like so many trite sayings, there is a good deal of truth in it. After all, if we can get men to think safety, we have solved our problem.

What we think, we do. On the opposite, it is a tentative psychology that what we want to forget, we forget. Now it seems to me those two diametric theories are worth thinking about in getting men to think safety.

When we present safety as a bugbear to a man, as something he must do or something he must not do, I don't think we will get very far. I

think we have gone too far on the negative idea of safety. We have gone too far on the "thou shalt not" theory when what we need more is the positive theory of accident prevention to put it (as we have heard probably a good many times today) on a productive basis.

Accidents Are Caused Because Men Forget

Accident prevention is part of your production cost or savings and so we need accident prevention on a positive basis. There are a good many agents for putting over the positive theory of accident prevention—house organs, safety meetings, a thousand and one things you know to put over the idea of safety in the minds of men, but the idea, as I see it, must be positive; we must get away from the negative idea of safety.

After all, accidents are caused because men forget. I think maybe it is because we painted accident prevention as something that we force our men to do. Men forget to be safe. Men are not safe minded. You know it doesn't take very much training for a man to form a certain habit, a fellow to become girl-minded, and lots of fellows are religious-minded. That has something to do with the subconscious. We hear a lot about subconsciousness these days. Let's see if we can't through some positive means, not negative, make men safety-minded, and let's get away from the idea that safety is a bugbear. Negative accident prevention is made psychologically. When we tell a man "thou shalt not," it is bad psychologically. If we can lift him up, if we can get the positive idea to him that safety is something productive, that safety is something for his own good and for the good of our plant, I think we are going to get some place.

I believe that is what all of us have to do. Let's get over the positive idea of safety as against the negative idea of accident prevention.

CHAIRMAN HALE: It is to be regretted we did not have more time for you, Mr. Dalzell.

We come to Mr. F. H. Rosebush, Department of Industrial Relations, Nekoosa Edwards Paper Company, Port Edwards, Wis.

MR. ROSEBUSH: The previous speaker has taken the words out of my mouth. The best safety kink that I know is the man in the main office who has time in the 12 or 14 busy hours of the day to sign an order putting safety into the mill on the same basis as he has in his production program. I think the manufacturing and business men of the United States in a large measure are responsible for the success of the safety movement. I think they are entitled to their just returns. I do not minimize at all the humanitarian side of safety and I can not hope to point out that side to you as well as Dr. Wishart did on Monday in our first session; that is admitted; but I do think as the former speaker has said, the time has come, and it is so in our plant where we have told our men that we expect profits from the safety movement and that they expect profits from the safety movement. We tell them there is a direct return to them in money and in things that money can not buy, if they are good safety men. We tell them that the company in putting safety into the

plants expects better production, better men, because our idea is that the same qualities that go to make up good safety men, go to make up good workmen.

We use safety kinks as well as other mills. We believe in them because we think they are necessary to put across the safety idea, but as the speaker before me has stated, eventually we must get to the positive side of it.

Safety Markers Along the Walk to the Plant

The best thing we ever employed in our plant was this: we had a concrete wall running from the employment office to the mill in which there were some 150 concrete blocks, and in order to put this thoroughly into the men's minds, we started at the block nearest the office with the first day in which there was no accident. On every day there was no accident we put the date on that block. At the side of the block we set up a wooden standard also with the date, calling attention to the fact there had been no accidents. The men got interested in that, and as they walked down that way every day, they could pass over the record of the previous days and see what they were doing. That got into everyone's mind in such a way that for five months we did not have a single accident in that mill employing about 440 men.

That was the best safety kink we used.

CHAIRMAN HALE: There is not a man in the room, Mr. Rosebush, who would not willingly and joyously join in singing the chorus of your song.

We come to Mr. W. F. McClellan, safety engineer, Armour & Company, Chicago. If I remember correctly, this is the first time we have ever had one of the largest industries in the country at one of these general round table sessions—the packers.

MR. MCCLELLAN: Gentlemen, I may represent the packers, but I didn't come here today to throw the bull.

I notice that I am the last speaker on this program and I am not going to wait until the chairman tells me I am at a period or comma. I am proud to stand before you today and happy to know that the two speakers who preceded me practically had the same idea of the best safety kink. I don't know whether you want to call it a kink or a kick, but my conception of the best safety kink that I have known is getting out and getting up on a soap box, a truck or a table and getting among the boys with overalls and talking to them. Then for weeks afterwards stand back and note the results of those labors.

Mr. Chairman, that is the best conception I can get of a safety kink. I am not going to take up more of your time, but I want to let the boys hear the discussion of all previous speakers and I will be glad to answer from the floor any of your questions that I can.

CHAIRMAN HALE: We now want to go back and hear from the floor, taking the subjects as they come. Let's hear about getting workers back on the job.

R. B. MOREY (Industrial Accident Prevention Associations, Toronto, Canada): I have listened to this discussion on getting men back to work and

I have set up in my own mind this question. How much do you want to get men back to work? From time to time we hear about people wanting to do things. We have been told today that if men will think, there will be fewer accidents. What I want to say is this: as far as getting men back to work, if you will think and act, they will get back on the job.

CHAIRMAN HALE: You fellows are going to force me to fill out this program by a few minutes unless you come to my rescue, or your own rescue.

Making Effective Use of Accident Statistics

We will go to the next, "The Effective Use of Accident Statistics." Surely someone has something to say on that.

H. D. LIVER (Southwestern Bell Telephone Company, St. Louis, Mo.): I would like to say just one word—good.

CHAIRMAN HALE: If I understood him correctly, he grabbed the short horn of his dilemma there.

MR. MCGUIRE: I believe it is a true saying. The president who has just gone out of office, paid \$20 for a memory course in Chicago last week. Of course, he expected to get a large volume of papers. He told me when he got his diploma, the answer to that \$20, it contained a little slip of paper, "You can remember 10 times longer what you see with the eye than what you can hear with the ears."

CHAIRMAN HALE: The next is the playlet on posters.

MR. HEWITT (American Lime & Stone Co.): I have heard conversation to the effect that it would be very nice if the two playlets were available for the use of the members.

CHAIRMAN HALE: I have been told by Mr. Kuechenmeister that the manuscript for these playlets can be had by asking the home office of the National Safety Council for it.

MR. KING: When the convention was held in Detroit the last time we witnessed a very interesting play. After we went home, one of my associates and I wrote up a play that was quite successful. I would suggest that perhaps a play of your own can be more effective than somebody else's. I know ours went across big. We took a chance when we asked the general manager to see it, but it went across big.

MR. THOMPSON (Detroit Insurance Agency, Detroit, Mich.): I often think that most of you boys who are wishing for success in a lot of your enterprises do not really wish hard enough, and I want to leave this little story with you.

There is a story told that in the days of old, a youth was looking for knowledge and he naturally drifted to the great Greek god. Finally when he came into the presence of this great Greek teacher, he said, "I would wish knowledge."

The teacher said, "How badly do you want it?"

He said, "I wish it."

"Then follow me," and he took him out into a field and then down into a stream and he walked into the water until they came up to their chins, and the teacher being much taller than the student, pushed him down and

held him down until he ceased to struggle. Then he brought him out and laid him on the bank, and gradually let him come to. As the student came to, he blinked his eyes and began to breathe. And the teacher said, "Do you still wish knowledge?"

He replied, "Yes."

The teacher said, "What did you wish the most for when you were in the water?"

He said, "I wished for air."

The teacher said, "When you wish for knowledge as you wished for air, you will get it."

Must Create the Proper Mental Attitude in Men

ISAIAH GORDON (Bureau of Safety, Chicago): It seems to me that we might rightly cover this entire program by trying to get into the minds of our men the proper mental attitude. It has been touched upon to some extent here this afternoon, but I don't think we go far enough along that line. We must create the mental attitude that was evident in the little boy down South. This little colored fellow was engaged in a baseball game with other boys of his age when one of our men from the North was passing by. Seeing this game of ball, he thought he would be friendly. He went up to one of the fellows and said, "Buddy, what's the score?"

The little colored fellow said, "Let's see; I think it must be along about 88 to nothing now."

The man said, "They must be mopping up with you."

The colored boy said, "How do you get that stuff? Why man, we ain't been to the bat yet."

That is proper mental attitude. That is what we want to get into the minds of our employees.

Recently I went into a shop two hours before I was due for their meeting. They didn't know I was in the shop. I saw the fire flying from the emery wheel. I was anxious to see whether the man had his goggles on, and I was glad to see that he did. That is proper mental attitude.

Just recently we had a contest and we have it now between two large electrical plants. Both of the plants have the same number of lost time accidents. However, one of the plants is just a few more man-hours ahead of the other. In the plant that was ahead, a man using an air hose and holding the nozzle rather loosely was injured when someone turned on the pressure, causing the hose to fly up and hit him in the mouth. He spit out a mouthful of blood and three teeth. He said, "Let me go to the dentist or doctor, but I will be back on the job tomorrow morning. I am not going to cause this contest to be lost on account of my carelessness." Mental attitude—that's what we want to get into our men.

A. R. GRAY (Peoples Gas Co., Pittsburgh): Just a word as to what mental attitude will do. In the year 1924 we had a rate of 13.46 on our accidents, just common accidents. We decided we had to get the proper mental attitude. We succeeded in getting it by personal contact with

the individual men, and I must say we have an average of 1,200 employees. As a result of that, our severity rate for the year of 1925 is .18, and for the first nine months of 1926 it is .10.

CLOSING ADDRESS OF CHAIRMAN ISAIAH HALE

CHAIRMAN HALE: The gentleman gives me the chance I really wanted but as stated, felt a hesitancy in taking. As I said in my opening statement, I have been asked to make a statement here which I can probably do in a few minutes and still let this discussion go on. It fits in. The substance of it was contained in an address I made last spring before the section of the A. R. A. and comes under the head of "The Best Safety Kink I Have Known."

A great many foremen, gentlemen, have as their understanding of their responsibility, that they must not only watch their men, but must stand over them to see they make more than a mere bluff at doing an honest day's work.

I am telling the foremen on our railroad that their principal function, as I see it, is to give their men a right viewpoint on their relationship with the Santa Fe Railroad, to give them higher ideals in life, to teach them not only their own individual responsibilities but to give them a decent appreciation of the rights of other people; to make them realize that their job is the best friend they have in the world, to make them realize that the man who has a job that is paying him, say, \$1,800 a year is receiving a six per cent investment on \$30,000. This may help make him realize that his job is worth \$30,000 to him, and is therefore entitled to be very carefully guarded.

I claim that a right mental attitude towards his job is the one thing that every man must have if he is ever going to become an efficient or safe workman, if he is ever going to get out of the ruts along life's great highway and over to the middle of the road where the way is smoother and where the route to success is now direct and sure providing only you can so change the man's viewpoint on life that he will feel reasonably sure of himself; to make men realize that no man can fairly expect recognition and advancement until he has earned it, but having earned it, recognition is sure to come to every man; to make men realize that the secret of real happiness or success lies not in doing the things we like to do, but liking the things we have to do, regardless of what those things might be; to make them realize the limitation of a man is not what he wants to do and can't, but rather his limitations are the things he ought to do but doesn't do because of indifference or laziness; to make them realize that while it is easy enough for a small man to make a big job shrink, it takes a big man to make a small job bigger; to make them realize that doing only what is necessary to get by is never doing enough.

We should hold up as a motto the man who from a sense of duty does the best he can today and forgets about it, and we should warn against the type of man who when spoken to about his shortcomings, promises to do the best he can tomorrow, and forgets all about it.

I contend that the foreman who undertakes to build locomotives or dig oil wells or make steel or refine salt and who does not at the same time undertake to build character among his men presents a mighty sorry spectacle as a leader of men.

I no longer talk safety in the orthodox way I did 15 years ago. To the limit of my feeble capacity, I am trying to build up the morale of our men. I am trying to increase their loyalty to themselves and to our company.

A Man's Job is the Best Friend He Has

As I said, I am trying to make each man realize that his job is the best friend he has, reminding him that no man has any number of friends who do a fractional part as much for him as his job does for him, and if his job is his best friend, it is only a matter of common decency and fair play for him to treat the job like a friend and be good to it.

One of the problems in industry, with you the same as with us, is the man who knows a lot of things that are not so. My observation on that is that the thing a man is down on is generally something he is not up on, and that opens a very wide and expansive field for whatever educational efforts our supervisors may want to put into effect.

We must have cooperation, of course. The other day I got a new slant on what cooperation meant. I heard of a man who was asked, "What is meant by cooperation?" He thought a moment and said, "As I see it, the first essential toward cooperation between others and myself is for me to make myself so other men can work with me." There is a lot of food for thought in that for the man who finds difficulty in working with other people. The real trouble is that other men not only find it difficult at times but actually impossible to work harmoniously with him, and with him means with you and with me, if you please.

A rather impressive number of summers and an equal number of winters have taught me a lot of things, but unfortunately it has come rather late in life. I have been taught that other people meet me just about as I treat them. Time has taught me that when I go out looking for trouble, I invariably find it. And time has also taught me that the Golden Rule is the sum total of all wisdom for getting on with the world.

Teaching a man to be loyal to his employer will bring about a certain loyalty to himself and a loyalty to his company. This is the best world that any of us have ever lived in, and if you are an American, your home is in the best country in that world; with that much of a start, I claim no American has any right to complain about anything because if he is willing to shoot straight, if he is willing to sweat a bit upon occasion, if he is willing to give a little as he is to grab a lot, his ultimate success will be beyond his dreams.

We hear a lot nowadays about service. Service is only a modern symbol for countless human virtues that have been known since the beginning of time. Service is the mother's solicitude for her children; it is the long hours of toil your father and mine gave to us; it is the promises kept and burdensome debts unrepudiated. It is all of these

and a million other things that only the recording angel will number, but I am trying to make our men realize that service is the one thing that every man must put into his work and life if he ever expects to take anything worthwhile out of either one of them.

John Burrows, the world's great naturalist, said that "a man's life may stagnate as literally as water may stagnate, and just as motion and direction are the remedy for one, so is purpose and activity the remedy for the other."

I never have been able to get very far nor stay long away from the underlying thought in safety work, as I see it, that in an improved viewpoint, in a little fairer mental attitude towards their jobs, in an awakening in workmen of an ambition to be somebody and do something worthwhile, lies the panacea for most all of our troubles; and by the same token I am convinced that a realization of that ambition, that a man's advancement in responsibilities, the acquisition of those things every man wants most in life, the respect of his family and friends, are all absolutely dependent on his mental attitude towards his job.

The average man has no conception whatever of the latent force of his own personality and he hasn't any appreciation of it simply because he has never drawn from it.

Only One Man Out of Fifty Really Thinks

Roger W. Babson made a very illuminating statement not long ago when he said, "Only one man out of 50 thinks, only one in 500 ever originates anything, and at the age of 50 years 53½ per cent of the male population of America are down and out because of indifference or laziness."

I tell you, gentlemen, it is a very sad commentary on our intelligence as a nation when we are told that at 50 years of age, the best years of any man's life, that 53½ per cent of our male population are down and out, because at no time in their lives did they give a damn, and the reason why that is true is because you men and I have failed to function as we properly should. Following that thought, I am daily warning our men, especially young men, against the tendency for giving counterfeit labor in exchange for honest money, trying to make them realize that in time a man will become what they think and act, a counterfeit themselves.

In railroading just as in every activity, catastrophe is only a step or two behind integrity, and if you will look under the hood of any failure on life's highway, you will find there unmistakable evidence of where some fellow has tried to use a substitute for common honesty, when there is no such thing, when there has never been and never will be. Thus many men go cheating through life because of a wrong viewpoint, and again I remind you that many of them have the wrong viewpoint because of your shortcoming and mine.

I didn't mean to trespass on your time to tell you that, in my humble opinion, in an improvement of the mental attitude of a man lies the best safety kink that I have ever known.

ADJOURNMENT

Annual Banquet

Wednesday, October 27, 1926

**CHARLES B. SCOTT, Chairman
President National Safety Council**

THE Banquet Session came to order at 8:55 o'clock, President Scott presiding.

PRESIDENT SCOTT: Ladies and Gentlemen: This is our fifteenth birthday party. This is our sesqui-decennial birthday for we are 15 years old today. We are growing. Our parties are getting bigger and bigger. We are becoming more and more interested and we are becoming happier and happier in our work and in our anniversaries. Those who come to see us once always come again. There are new faces here but the old faces are always with us because those who have been associated with us in the past have always remained true to the cause and loyal to our Council.

We welcome you to this birthday party. We hope it will be a happy one for you and we hope that it marks our entrance as a Council into the years of life when we are just beginning to appreciate our responsibility, just beginning to get a vision of the work that is before us in our later years, and at this party tonight we wish you a happy time and a most cordial welcome.

We have some birthday greetings from some of our friends. This is from the International Labor Office of the League of Nations:

**FROM INTERNATIONAL LABOR OFFICE, LEAGUE OF NATIONS,
GENEVA:**

Safety men throughout the world are looking to the Fifteenth Annual Safety Congress to develop new ideas and ideals for universal war on accidents. May your efforts be crowned with success.

(Signed) International Labour Office,
League of Nations.

FROM NATIONAL SAFETY FIRST ASSOCIATION, ENGLAND:

In the name of National "Safety First" Association, I send you hearty greetings for success and utility of your Fifteenth Annual Safety Congress at Detroit.

Fifteenth Safety Congress

We are holding our first Public Safety Congress on 26th and 27th of this month, and trust our joint deliberations may prove ~~universally~~ helpful.

"The safety of the public is the supreme law. Safety work has no national boundaries. We join with you in one common aim.

(Signed) W. Joynson-Hicks, President.

National Safety First Association, London, England.

FROM ASSOCIATION DES INDUSTRIALS DE FRANCE:

May great results come out of your sessions. Feel sure reports of your congress will inspire us to fresh efforts.

(Signed) Julien Caen, Director,

Association des Industrials de France, Paris, France.

FROM CANADIAN NATIONAL SAFETY LEAGUE:

Best wishes for your greatest meeting in the history of Safety. May your cooperation with all Accident Prevention organizations, including our own, be as limitless as the boundary lines of safety work.

(Signed) Canadian National Safety League.

It now gives me pleasure to report to you the result of the election of your Executive Committee, which was determined at a meeting of your Board of Directors this afternoon.

"The following gentlemen will serve as members of your Executive Committee for the ensuing year.

Members of Executive Committee

C. B. Auel, Manager, Employees' Service Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania.

W. F. Austin, President, W. E. Wood Company, Detroit, Michigan.

Ernest W. Beck, Supervisor of Safety, U. S. Rubber Co., New York City.

T. C. Brabston, Superintendent of Transportation, Birmingham Electric Co., Birmingham, Alabama.

A. D. Brown, Claim Agent, New York State Railways, Syracuse, New York.

W. W. Cloud, President, Yellow Cab Company, Baltimore, Md.

R. W. Campbell, Knapp & Campbell, Chicago, Illinois.

Lewis A. DeBlois, National Bureau of Casualty & Surety Underwriters, New York City.

Marcus A. Dow, Vander Poel, Pausner & Jefferson, New York City.

E. K. Eastham, Safety Director, United Railways of St. Louis, St. Louis, Missouri.

Isaiah Hale, Safety Superintendent, The Atchison, Topeka & Santa Fe Railway Co., Topeka, Kansas.

G. T. Hellmuth, Claims Attorney, Chicago, North Shore & Milwaukee R. R. Co., Chicago, Illinois.

Charles E. Hill, General Safety Agent, New York Central Lines, New York City.

Captain W. P. Kain, Manager, American Steamship Owners' Mutual P. & I. Ass'n., New York City.

Walter G. King, Director, Safety Division, American Optical Company, New York City.

T. H. McKenney, Superintendent Labor and Safety, Illinois Steel Company, South Works, South Chicago, Ill.

Chas. J. Moore, Longmeadow, Springfield, Mass.

Arthur T. Morey, General Manager, Commonwealth Steel Co., Granite City, Illinois.

Homer E. Niesz, Manager Industrial Relations, Commonwealth Edison Co., Chicago, Illinois.

George Opp, Safety Engineer, Detroit Edison Co., Detroit, Michigan.

Lew R. Palmer, Conservation Engineer, The Equitable Life Assurance Society, New York City.

C. E. Pettibone, Vice-President and Manager Engineering Department, American Mutual Liability Insurance Co., Boston, Massachusetts.

W. B. Pettibone, Factory Manager, Willard Storage Battery Co., Cleveland, Ohio.

Henry A. Reninger, Special Representative, Lehigh Portland Cement Co., Allentown, Pennsylvania.

G. E. Sanford, General Electric Company, Schenectady, New York.

Henry W. Schlidt, Employment Manager, Plankinton Packing Co., Milwaukee, Wis.

W. L. Schneider, Safety Director, The B. F. Goodrich Rubber Co., Akron, Ohio.

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

Loyal A. Shoudy, Chief Surgeon, Bethlehem Steel Co., Bethlehem, Pa.

C. P. Tolman, New York City.

Harry M. Webber, Superintendent, Department of Claims, Illinois Bell Telephone Co., Chicago, Illinois.

J. D. White, Superintendent of Safety, Illinois Central System, Chicago, Illinois.

S. E. Whiting, Assistant Chief Engineer, Liberty Mutual Insurance Co., Boston, Mass.

A. W. Whitney, Associate General Manager and Actuary, National Bureau of Casualty and Surety Underwriters, New York City.

W. H. Winans, Manager Industrial Relations Department, Union Carbide and Carbon Corp., New York City.

David Van Schaack, Director Bureau of Inspection and Accident Prevention, Aetna Life Insurance Co., Hartford, Conn.

Arthur H. Young, Industrial Relations Counsel, Industrial Relations Counselors, Inc., New York City.

Your new Executive Committee held a session later in the afternoon at which the officers for the ensuing year were elected and as these newly elected officers are announced I will ask the gentlemen to arise as their names are presented so that you may see and know your new officers of the Council.

The Vice-presidents elected by your Executive Committee are as follows:

Vice-Presidents of the Council

Vice-President for Education.....	A. W. Whitney
Vice-President for Local Councils.....	H. A. Reninger
Vice-President for Public Safety.....	C. E. Hill
Vice-President for Engineering.....	W. F. Austin
Vice-President for Health.....	Dr. L. A. Shoudy
Vice-President for Industrial Safety.....	C. E. Pettibone
Vice-President for Public Relations.....	H. E. Niesz
Vice-President for Finance and Treasurer.....	H. M. Weber

Now I have a surprise for you. This year the Executive Committee gave unusual study and care to the selection of a managing director for the Council (*laughter*), and I am sure you will be greatly surprised to learn the result of that deliberation in which an effort was made to secure the very best managing director in this country. After a great deal of careful study and prayerful thought your Executive Committee has selected as its managing director Mr. W. H. Cameron of Chicago. (*Applause.*)

Now, gentlemen, comes the most pleasant act that I have performed during the year in which I have been president of your Council. The happiest moment that I have had since the time you gave me the honor and the distinction of being your president has arrived. Next to being elected president, the happiest thing that can happen to you is to be relieved of the responsibility and see it placed upon someone else whom you know and love and in whom you have confidence. If the Council had asked me to select my successor I should have chosen the man who has been selected to lead you during the coming year.

He has been associated with us and has been at 13 of our birthday parties and he has been working for us for 13 years. Everybody knows him. Everybody loves him. Everybody will be pleased with the announcement of his election. This man was born in the state of Ohio. Later in life he moved to the state of New York and for many years he has been residing there. He has been our counsellor in times of trouble. He has been our advisor when we needed advice. He has always helped to bear our burdens. He is a friend of our cause. He is a worker in our ranks. He is a friend of man. His heart is in the work, and, as I have said, the greatest pleasure that I have had since the night of my acceptance of election is the announcement that your new president is Walter G. King, of New York. (*Applause.*)

RESPONSE OF PRESIDENT-ELECT WALTER G. KING

Mr. President and my dear friends: I can hardly respond to what you have said. I do love the Council and always have and always expect to.

Charlie has referred to Ohio as my birthplace. Perhaps some of you may recall that it has been said that some men are great and some men are born in Ohio. (*Laughter.*) You see, my native state is running true to form tonight.

I thank you, my dear friends, most sincerely for your confidence and trust in asking me to serve at the head of the table. I can assure you that I will render the best service that is in my power. I am not afraid to work and in our Council we all work together. There will be cooperation and help from those who can be relied upon—men of outstanding ability and experience, a group in which there is loyalty and good-will.

The most inspiring and elevating experience of my life has been the privilege of membership in the National Safety Council and my association and friendship with you. It seems to me in this wonderful gathering here tonight the real spirit of safety finds expression. We have faith and confidence in what the Council stands for—the saving of life and needless suffering, a relentless fight against accident causes.

While the activities of our Council have been developed to a very high degree of efficiency and the influence of the Council is felt throughout the United States, yet we can see the possibility and need for far more and greater service.

Now, more than ever before, there will be an opportunity for all to have a part. We have a record of achievement as a result of our enthusiasm in the safety work of which we have every reason in the world to be proud.

Let me, in closing, quote two lines from Edgar A. Guest for something to think about this coming year:

"The thing accomplished merely leads the way
To more and greater deeds."

(*Applause.*)

PRESIDENT SCOTT: I have no more surprises for you. What is to follow is to be expected. (*Laughter.*)

We are advocating continually the careful selection and placement of men in our industry. We believe in selecting that peculiar type of man for that particular job for which he is fitted and we are practicing what we preach. We have brought with us tonight our regular humorist. (*Laughter.*)

He has served us well and loyally since 1916. In all my knowledge of humorists and comedians I have never known of a contract of such length; and I have never known a man to sustain his popularity with the

same audience for ten long years and be so popular that at every occasion on which we want to be happy he continues to be in great demand.

You all know him. He is a funny man. (*Laughter.*) You have all marvelled at his story telling and wondered how in the world he could bring us a new series for each occasion. Tonight I notice that his manuscript is marked No. 6, Group 6. (*Laughter.*) The last time, in Cleveland, it was Group 5. It was especially prepared for advertisers, but it fitted the occasion. (*Laughter.*) I hope the present one fits into the occasion as well.

I just expressed my appreciation of the announcement I made of our election of our new president and this marks the end of my own responsibility as your presiding officer. For that reason and the other reasons I have mentioned, and because of the great number of laughs I have had, I take great pleasure in introducing to you your toastmaster for the evening, our old friend of ten years of service, Mr. James Schermerhorn.

OBSERVATIONS FITTING THE OCCASION

James Schermerhorn, Editor, Writer, Lecturer, Detroit, Mich.

Mr. ex-President, Members with their wives and Members at large: After that presentation I find myself echoing the prayer of another post-prandial speaker who said, "O, Lord, from all introducers and traducers deliver us."

You remember he commented upon my ten years of relationship with this wonderful organization and you remember how he expressed it—ten long years. You remember the man who said, "Married life isn't longer than single life, it only seems longer."

I appear before you as the expected. That is different from the colored family who named their children after the characters in the Bible. The last one they called Verilly.

A friend said to Dinah, "Where did you get the name Verilly?"

She said, "Verilly, verilly, I say unto you."

Then she named the last baby Onyx and her friend asked her if that was named after the stones, and she said, "No, I called him Onyx because he was onyx-pected."

I accept the invitation to become a salaried and permanent member of this august group. Its dimensions impress me with the desirability of an official connection. I hope I will not be like Zezee, the acrobat, who was paid in the tent where they paid alphabetically. Sometimes the receipts were not sufficient to take care of Zezee and he was distressed because he needed the money. They were making the contracts for the next season and he went into the manager's office and the manager said, "Good morning, Zezee."

"Zezee, hell! My name's Adolph."

I am glad to see the change of administration take place without accident. (*Laughter.*) It is a fine transition from Great Scott to King William.

I am glad to have you reminded that this is my sixth meeting with you by accident. I don't know of anything that has occurred in the name of accidents so momentous since they organized the hole-in-one club among the golfers.

I see tonight that you have been true to your aspiring and progressive spirit because you have just about given Detroit all it can assume in the way of accommodation. I remember that incident where Adam was walking with the boys past the Garden of Eden and he said, pointing to Paradise, "There is where your mother ate us out of house and home."

Reflecting Glory Upon the Cause

So in numerical strength and in every way you are reflecting great glory upon your cause and its triumphant progress. You appear to be here in such congestion that you remind me of the man who came out of the Pullman compartment and said there was such a jam in there that he found himself washing another man's face.

I am very glad to have this immediate understanding of the sentiments proceeding from this department. There was an American who recently gave this toast at a dinner over in England: "My happiest hours have been passed in the arms of another man's wife, my mother." It was a very fine tribute to motherhood and an Englishman who was there decided he would repeat it when he got home.

He said, "My word, there was a bally American at that dinner who gave a topping toast. I will try to give it to you: My happiest hours have been passed in the arms of another man's wife. My word—I can't remember the lady's name."

So you have come in the name of conservation and safety and your speaker is glad to salute you and to know that your cause goes marching on. Detroit has recognized the significance of your visits by having more accidents than it has had in long weeks past. It was said the other day that the explorers in Africa had found an animal that had the shell of a tortoise, that could run like a fawn and leap like an ibex. Someone said, "The ideal pedestrian has been discovered at last."

I will say to you it is time you came, you crusaders of the safeguarded life, because the other day a farmer came to town with a load of hay. As he went up the street he heard the hissing of steam and the clanging of the gongs of fire engines; and the traffic officer said, "Get out of the way, the fire department is coming."

The farmer's wagon lumberingly swayed over to one side of the road and let the steam-hissing, gong-clanging machines go past and then he got back into the middle of the road and along came the hook and ladder and rammed him in the rear and killed the horses and upset the hay-

rack. The traffic officer said, "I told you to get out of the way because the fire department was coming."

The farmer said, "I did get out of the way to let the fire department go by but who in hell was looking for a lot of drunken painters coming along?"

So we need you. We need you in all the realms of earthly transition and your spirit goes marching on.

There was a delightful young English lady at Brighton Beach in England and she said one day to the nice old gentleman who came in to gather up towels and bathing suits, "See here, my man, you musn't be so precipitous about coming in here. Some day you will come in here and find that I am not ready for you."

"No danger, lady, I always peeps before I comes in."

Safety and Discretion are Pointed Out

Safety begins at home. You remember the incident where a man heard his friend call his wife Peggy.

He said, "Why do you call her Peggy when her name is Margaret?"

He said, "Come over here a moment and I will tell you confidentially. Peggy is short for Pegasus and Pegasus was an immortal steed and an immortal steed is an everlasting nag."

So discretion is coming into all the realms of life. It has even gotten into the nursery rhymes.

"Rock-a-bye baby, on the tree bow,
We are feeding you milk from a certified cow;
Your fond father and mother,
Before they were wed,
Decided just how you should be fed.

"Rock-a-bye baby on the tree top,
If grandmother should cradle you, make her stop.
Shun the trot horse that grandmother rides,
It's very disturbing to your little insides.

"Rock-a-bye baby, your mother's a scientist;
She knows all the laws,
She kisses her darling through carburized gauze.

"Rock-a-bye baby, don't wiggle and squirm,
There's nothing near you that looks like a germ."

It is the age of scientific presentation and safety. So throughout the various activities of life we are taking to ourselves the philosophy which you are inculcating, beginning with the safety pin and the safety razor.

We have now gotten up to where all of the activities of life are very thoroughly safeguarded. The other day a man was applying for a life insurance and he filled out the application as follows: "Age of father at death—32. Cause of death—Consumption. Age of mother at death—28. Cause of death—cancer." The agent said, "There is no use of going any further on that family record."

Then the man went to another insurance company and filled out the application as follows: "Age of father at death—94. Cause of death—thrown from pony in polo contest. Age of mother at death—92. Cause of death—childbirth." They wrote him for \$25,000.

Applying the Principles of Safety

Now, my friends, we are going to apply the principles of safety first and concern for the well-being of humanity in the developments of this festal hour.

You have perhaps seen this mechanism before you, which is the latest invention to safeguard the feelings, to consult the wishes of a large and exhausted audience. This timepiece which, by the way, was a great safety first symbol—is there anything more significant than the chronometer? As the poet says, it is worn out by eating time. You remember the old lines:

"Somewhat back from the village street
Stands the old-fashioned country seat.
Across its antique portico
And from a station in the hall
An ancient timepiece says to all,
'Forever, never! Never, forever.'"

That is a symbol that carries its warning to all of us. It is like the man coming out of the insane asylum. He had seen so many distressing cases of imbecility that as he went out he pointed to the clock and said, "Is that clock right?"

So this alarm clock is a part of your mechanism for insuring the successful developments of the evening with reference to our three speakers. The alarm clock has its place in life. Two young men didn't want to lose their jobs so they got an alarm clock. After a certain particular Sunday celebration they got up when the alarm went off as usual and reported at the office. They just arrived on time and said, "Johnny on the spot! Just 8 o'clock."

The man at the desk said, "Yes, just 8 o'clock, but where in hell were you Monday and Tuesday?"

This clock will measure the time that has been allotted to each one of our three speakers—splendid speakers, each one speaking out of experience, speaking from a background of observation and of experimentation, of science and all that. Five minutes before the time has expired we

will touch a button which indicates that there is still five minutes remaining for the completion of the discourse. So you can see that ample consideration is had for the physical safety of the speaker.

At the expiration of five minutes this button is touched. Each speaker stands upon a trap door. It is patterned somewhat after the garden variety of gallows and unhappily the speaker disappears, the victim of his own violation of the principles of safety first. He is carried through a chute something like the down-and-out arrangement at Coney Island and a police patrol is to be awaiting him at the end of that chute. This wasn't devised especially for this evening. The idea grew out of the Madison Square Democratic convention in 1924.

It Was a Very Natural Question

It has some relation to the speaker who says, "Now we have been discussing this subject for two hours. We think we have covered it in all of its ramifications but we would be glad to answer a question." And a man in the rear says, "What time is it?"

You exponents of safety first have been the witness of this sad phase of American life. Some one said the other day, "They have cut out all of the speakers for the sake of the popularity of a certain banquet."

The cynical man to whom he was talking said, "Now, if they cut out the banquet it will be a great success."

Chauncey Depew said, "This thing is getting to be a regular nickel-in-the-slot affair. You put down a dinner and a speech comes out."

Then someone said, "Sometimes you put down a speech and a dinner comes up."

Then Depew said, "It is better to have lunched and lost than not to have lunched at all."

Now that you understand the mechanism, and the speakers understand it, we will proceed with the very fruitful use of the time that remains.

First it is my great pleasure to bring before you one who has every qualification to address this representative gathering of industry, of business, of finance, of production. He hailed originally from the classic shades of Harvard. I remember a little boy who asked his father what was the difference between a college bred man and one who was not college bred and the answer was, "It's a four years' loaf."

Then there was the other young man who had finished his educational career. When he arrived at home his father said to him, "Now, my son, you have come back from the halls of learning splendidly equipped to go on with the business. I have borne the heat and the burden of the labor for all these years and never had a vacation. Now that you are ready, I think I will retire."

The young man, fresh from the halls of learning, said, "Dad, why not wait a year and we will both retire?"

That was rather a modern idea. That goes along with the inquiry a

boy made of his father: "Father, what keeps the earth up in space as it whirls and whirls?"

"That is the law of gravitation, son."

"What kept it up before they passed that law?"

So it is a pleasure to revert back to Harvard. Dr. Eliot, who lived his life in fullness and in scholarship and in benefaction, once said it was a renewal of youth to go to Harvard, and that when he went there everybody called him "Old Eliot." Just to show you how the years fall off in the society of the young and the aspiring, he said that some young men were passing him one night as he was coming home from a lecture and he heard one of them say, "wonder where in hell Charlie has been?" From "Old Eliot" to "Charlie" was certainly the renewal of youth.

Not long ago Sir Walter Raleigh, a direct descendant of the original American tobaccoist, came to lecture at Harvard in their fine series of introducing the celebrities—a man who had come straight down in lineage from the courteous and chivalrous Sir Walter—and they missed him at the train. The committee went about looking for him and they saw a distinguished man in a top coat and silk hat and they said, "Pardon us, but are you Sir Walter Raleigh?"

"Hell, no. I'm Christopher Columbus. Sir Walter is in the next room playing cards with Queen Elizabeth."

Characteristics of a Modern Executive

Gentlemen, that is enough to give you the setting for our next speaker. Mr. Howard Coonley went directly from Harvard to address himself to challenging opportunity, which indicates that there still resides in our great institutions the power to imbue men with the spirit of America—of achievement, of construction, of tireless activity. He found a business that was in something of the condition of Bridget's husband. When she applied for a job for him to the foreman of a section gang, the foreman said to her, "Is Pat steady?"

Bridget said, "Steady. If he was any steadier he'd be dead."

Here was a languishing institution. Our speaker tonight addressed himself to it in all the splendor of a fine equipment, physical and mental. He raised the business in a few years from sales of something like two and one-half millions a year to twenty millions. Then he went out for new worlds to conquer.

In the state of Illinois he succeeded in taking over a plant that had been used as a pawn in some of the corporate competitions by the great organizations. And he soon set in motion the wheels of another great industry.

But the finest thing I can say about him is that in his relations with his men and in his contacts with financiers he never had exactly that same financial system that they attribute to a certain man who was asked to overlook Paradise with reference to reorganization. He said

he thought it could be done, but he didn't think the Almighty would take the vice-presidency. Nor did he adopt that philosophy in reference to a little girl's definition of a lie—an abomination in the sight of the Lord and an ever-present help in time of trouble.

He is here for several reasons, but particularly because he considered, as Shakespeare says, "Corruption wins not more than honesty."

He made frankness the basis of his appeal to customers, to financiers, to stockholders, and to his great army of laboring people. He has a fine philosophy that you can disarm the other side with entire candor and frankness. If a man has something up his sleeve you don't know how much it is, but generally it is the ashes of blighted opportunities. To such a philosophy as that our friend has subscribed and such a philosophy as that he has enforced.

He was vice-president in charge of administration of the Emergency Fleet Corporation in time of war and Charles Schwab has borne tribute to his organizing and coordinating genius. He said of him particularly, "Our friend, Howard Coonley, is a man who sees things through."

I have great pleasure in introducing him as the head of the Massachusetts Safety Council.

SOME REFLECTIONS UPON BUSINESS PROGRESS

Howard Coonley, President Massachusetts Safety Council, Boston, Mass.

Mr. Toastmaster, Mr. President and Ladies and Gentlemen: I know I should feel an uncontrollable nervousness after the early part of this introduction had I not had a great lesson during the war.

As your toastmaster said, I was working under Charlie Schwab, one of the greatest executives as well as one of the greatest philosophers ever known. One day he called me into his office and said, "Howard, someone of us has to go out in the country to try to persuade the people that the Emergency Fleet Corporation is all right. I don't know anybody we can spare as easily as we can you, so you had better go."

I said, "Thank you very much, Mr. Schwab, for that compliment, but I am not a speaker and I grow very nervous when I stand before an audience, and then I suffer."

"Howard," he said, "you have got that thing twisted. You are not the one who is going to suffer. It is your audience that is going to suffer."

So I said, "I bow to you, as I always do." And I went out and in my speeches I wandered around, as I expect I shall wander tonight, because the toastmaster hasn't given me any particular subject; I asked him not to, because I wanted to touch on many high spots, but one in particular.

In spite of all the good stories he told, I am going to tell you just one of Charlie Schwab's that always amused me and is typical of my speaking.

Everything that Charlie has is the best in the world. He has the best company; he has the best organization; and, incidentally, he says he has the best band that was ever created. In those historic days before the Volstead Act the band had had a particularly good year and he decided to give them something to make them happy, so he sent them into New York for a large banquet; at the banquet they had some of the things we did not have tonight which were perfectly lawful in those days.

But something slipped in Mr. Schwab's arrangements because when they started back no private cars were provided and so the tickets had to be spread out among the individuals in the band. They went out on a late afternoon train and as the conductor went through the train he finally came to one big chap who was quietly sleeping in his seat. He shook him by the shoulder and when the man raised his eyes he said, "My friend, I want your ticket."

So this man began wandering through his pockets, one after another, and finally back again. Then he looked up slowly at the conductor and said, "I have lost my ticket."

"Why," the conductor said, "You couldn't have lost your ticket."

He said, "The hell I couldn't. I lost my big bass drum today."

A few weeks ago I was sitting with a group of very interesting men talking on all sorts of problems of life and of the world, and suddenly one of them asked this question: "Has business advanced in science and in ethics during the past generation?" You may imagine that that opened the arteries of talk and we spent most of that night discussing it. I already had my very firm convictions and they were made firmer before we finished.

Some of My Experiences During Twenty-five Years

I want to take that as my theme and just run over with you some of the experiences I have had and that probably all of you have had. It is almost exactly 25 years ago that I started in business. I started as an office boy and soon felt I must try my own wings in my own factory and I remember those early days of struggle when I was factory manager, sales manager, accountant, financier and office boy. I shiver now to think of some of the things that I did, some of the things that were common to most companies in that day.

For instance, we used to sit down to figure our costs and our costs were made up by taking the amount of materials that went into our product, the amount of labor that we could figure was needed for that product, and then we added what we called overhead. And not having any figures for that overhead we made an estimate and I can think back now to three or four of us sitting around a table and deciding what that overhead was. We felt sure it wasn't more than 25 per cent but we wanted to be generous so we called it 35 per cent and on the basis of that overhead we went out to compete in the open market. When we came back at the end of the year we wondered why we hadn't made a

profit. Incidentally, some years afterwards when we discovered some of those overheads we found they ran from 150 to 450 per cent.

Then I remember our methods of paying our men. Most of them were paid by a day rate and some of us then were thinking rather earnestly about piece rates, and so we tried piece work on some unsuspecting workman, and when we found at the first piece rate he could make more money, we cut that rate. Then we would pat him on the back and chuck him under the chin and urge him to use that for a while and he made the same amount of money on that. Then we would cut him again and so the process went on until the man either left or struck.

Then I remember that our method of producing goods was to wait until the orders came in. When the orders came in in these periods of high demand we would call for more men and we would call for more material and we would rush it through our plant at such a high rate of speed that it couldn't be made properly. By the time we had our warehouses full, some 30 to 90 days after the order was received, we would find the market had gone flat and we were left with a high inventory.

Changes in the Ethics of the Old Business

What changes have there been in these 25 years? Today each of us—I assume every one in this room—figures his costs in a way that makes them a fundamental part of his accounting system, and if his accounting is right his costs must be right. We have our factories not partially on piece work but almost entirely on piece work and that rate is arrived at by a careful and long time study and when it is once set we give a guarantee to our men that it will not be changed until the conditions under which they produce are changed.

More recently we have made a more radical departure on our production programs. Many of us today and more tomorrow are figuring on an estimate of sales a year in advance. On the basis of that estimate we lay out a production program which will give our men the maximum amount of work in a year. Knowing, as we can know, the periods at which we will have the peak of demand and the periods at which we will have the low point of demand, we can work to an inventory that will meet the demand when it comes and it will be liquidated when that demand disappears.

There can be no question that the science of business is improved. There happened to be in the group talking that evening the head of the Harvard Business School. He talked very little and when we were through he said, "Do you realize what is happening in your educational system today? I have just made a survey of the schools that give specialized courses in this country and I find that 55 per cent of the boys who ask for special courses ask for business courses."

What does that mean? It means that you and I have to go into a course of education, that we have to work night and day to keep up with this stream of intelligent youngsters that is coming along. It means per-

haps that 10 or 15 years from now a man, to qualify for a high executive job, will have to have a diploma to show that he has had the proper business education. It means that times are moving and if we want to accomplish what we must in this short span of life we must move with them.

What has this to do with safety work? To my mind it has everything to do with it. Safety work is one of the highest types of science. Unless we have our men properly guarded on their machines, they can't produce to the highest efficiency. Unless we keep them well and happy, they won't give us the full amount of work that is in them.

And what of business ethics? I also shiver when I think back to what was done 25 years ago—not done by everybody but winked at by most people. I happened to live in a railroad community and I remember that year after year at Christmas time the buyer of one of the great roads who lived opposite me used to have two and three and four new cars in front of his house—Christmas presents. I remember that it was not an exception at all to hear salesmen say that they had to buy their business. I know it was true that many of our salesmen padded their expense accounts and felt there was something smart about doing it. But those times are gone or nearly gone because today every forward-looking corporation teaches its men that the confidence of its customers is the thing most to be desired. They want good merchandise and they want good service but even more than that they want good business morality.

A Business Man's Advice to a Modern Boy

Just a few weeks ago—I can scarcely believe this—my oldest boy started to work and by his own volition he started to work for me. A few days after he had begun he brought me home a letter from one of my close associates and very dear business friends and the letter read something like this:

"Dear Howard: I am glad you are starting in business with your father. Many people will give you advice and therefore I will spare you, but I want to tell you just one thing. Most people think that the great executive is the one who makes decisions. Nothing could be further from the truth. The great executive is the man who knows how to analyze thoroughly and quickly, and if he can do that the decisions make themselves."

I think that is fundamentally true. I think that is the great change that has come about between the business of today and the business of a generation ago. That is exactly what you are here to do in this convention—to analyze your problems—and if you have properly analyzed them there will be no difficulty about the decision as to what steps you are to take.

I have always been an enthusiast about new things and I think nothing appealed to me more than the first airplane ascension that I read

about. So during the war when the airplanes came into considerable use, I tried several times to get a ride. In my position as vice-president of the Fleet Corporation I thought I could persuade someone to take me up, and so on three different occasions an arrangement was made—once by the army and twice by the navy—and each time I went out to the field to have my first thrill, each time I got out there, something went wrong with the engine and the pilot refused to take me up.

So when the war was over I began to think I was a hoodoo and was never going to have that experience. But some of my friends induced me to take the presidency of the Boston Chamber of Commerce and part of the work that I undertook there was the development of the air port; and the day that the air port was finished some of the flyers, in appreciation of what the Chamber had done, suggested that they would be glad to take any of the members up who wanted to go. So our faithful secretary called me on the telephone and said, "Why don't you take the first ride?"

An Aeroplane Ride Over the City of Boston

It was Friday afternoon and I was just about to leave and I told him to wait a minute. I called up my insurance agent and I said, "Now the company has quite a bit of insurance on my life. What will happen to me if I go up in a plane and get dropped?"

He said, "Just an instant." I held the wire for a minute and he came back to the telephone and he said, "Your insurance has been carried for more than two years. Commit suicide if you want to."

So with that kind suggestion I said to McGibbon, "I will go with you under one condition, and that is that the pilot gets me back in time to see the football game in the afternoon"—because I am a terrible football crank."

So that evening I thought about it and wondered how I was going to like that ride. I am not a very good sailor and I wondered whether I would be ill. I don't think I have any more courage than the law allows and I wondered whether I would be scared. So it was with a good deal of interest in self-analysis that I had a good night's sleep, worked hard the next morning and went out to the field without a qualm. Even when they made me sign a document saying that I didn't care if they killed me, and put on a suit of sewed up pajamas and a night cap because the plane was open, and stepped up behind the pilot, I didn't have an extra heart beat.

As we bumped over the field and rose ~~finally over~~ the water and swung around Winthrop Beach where the water was breaking and the spray seemed to reach us in the plane and ~~few directly above~~ the State House, I looked down and thought that if I fell at that particular moment I could arrive safely on the ~~spoke of the globe dome~~. Then as we swung out over the football field where the ~~enthusiasts~~ were already assembling for the game and finally to where the ~~Waltham~~ plant is situated, the

pilot turned to me and whispered with his lips (you can't hear anything in an open plane) "How would you like to see your plant?" I bowed my head with delight and we swung gradually down until I felt as if I could reach down and pick up one of the big stacks and move it from one place to another (and the Lord knows I would have liked to do that because that plant needs reconstruction).

Then we went up to see the city of Boston. I knew that the white ribbons must be boulevards and that the tiny little carts were trains or trolleys running along the streets and that in between these little specks that looked like ants must be people. From that great height I looked down and thought, "What are those people doing? Some of them are fretting about their work. Some of them are saying that they aren't getting enough pay. Some of them are gossiping about their neighbors. But in among that group there are a few who are constructive ants, who are doing something to better their community and better their country, some who are leaving work behind that will last after they are gone."

So when we settled down comfortably again on the field and I wandered back to my office more thoughtful than I had ever been before, I determined that after all there was only one thing worth while in life and that is to be one of those constructive ants, to do what little you can to make the world better, to make the world safer and to make the world happier, and I think that is what you are doing in this safety work.

Observations Leading to a Man of Science

TOASTMASTER SCHERMERHOEN: I know you have all been thrilled by this very direct and surprising example of introducing humanity and the safety-first principle in business. It means so much to have that attitude toward your men, rather than the attitude of that employer who never said "Well done," except when he ordered a T-bone steak. When the news came one day at the plant that he was ill, one of the old employees said, "My God, I hope it isn't anything trivial."

In the cause of humanity and the direct appeal and the shining quality of truth, Mr. Coonley has proven himself a brave man by tackling two such hazardous things as aviation and football in one afternoon. Which reminds me of the man who was asked if his son was on the team. He said, "No, the team is on him."

Now we will come down to the safe ground of science. We are much indebted to Farraday, to Steinmetz and all of those who have added, each in his own period, to this great era of scientific development. Mr. Hoover was right the other day when he said nobody can estimate the contribution of the pure scientist to the scientific life of the present time.

We are honored in Detroit by the presence of one who has delved deeply into science and invention.

Mr. Charles F. Kettering, at the head of the Research Department of the General Motors, is one who has come to Detroit to give to it an

engineering and scientific consciousness such as no other city in the world has possessed. We feel wonderfully pleased by the presence of one who started first in the telephone field and then brought out the Delco system of ignition and lighting, the self-starting appliance which has meant so much to the airplane and contributed so much to the exercise of the pedestrian, dividing our population into the quick or the dead.

There was an ancient people called the Batavians who were so warlike that they never cut their hair or beard until they had slain a man. Just look at the taxi drivers—all clean shaven and short haired. There was a man bowled over by a taxicab and the cab went over him. Then he heard the driver yell, "Look out! Look out!"

He said, "My God, are you coming back?"

The Delco system of ignition and lighting transmission has thrown more light on the farming problem than Mr. Lowden or Mr. Hoover or any other contributors to the agricultural realm and the farmers are greatly indebted to it. I remember they asked one of the rural visitors in New York if he didn't want to buy the Woolworth Building and he said, "All right, young man wrap her up!"

We are tremendously complimented, gentlemen, by the presence of Mr. Charles F. Kettering, one of the great scientists of today, one who has not only put into this great realm the fruit of his own investigations and studies and applications but one who also brings to you a genial and understandable philosophy.

PUTTING NEW VALUES INTO HUMAN LIFE

Charles F. Kettering, Vice-president, General Motors Corporation, Detroit, Mich.

Mr. Toastmaster, Ladies and Gentlemen: I was just wandering, after I listened to the Toastmaster, if that watch shouldn't work both ways because there isn't much time left for the speakers to work on.

Today we are using the terminology such as safety-first and all that sort of thing so frequently that we sometimes forget its meaning. The word "science" is used quite liberally today in a sort of an attitude of respect regarding certain lines of work, but we who work in it, play with it, have come to the conclusion that the only proper definition for something scientific is something you don't understand, because just as soon as you do understand it it isn't scientific any more. But the line of work which we call scientific, which applies to your line the same as any other in the world, is simply exploring and trying to investigate the future possibilities of whatever you are doing.

The greatest science that we have today is that of ourselves, understanding better the fundamental reactions of human nature, and that has been very poorly termed psychology. You people are fundamental

psychologists in that you are trying to study the cause of accidents. The principal cause of accidents is people. If we didn't have any people, we wouldn't have any accidents. The next peculiar thing about accidents is that they are never planned very satisfactorily.

So we have those two factors, the person and the unusual condition, and the fact that we react to normal instincts before our intelligence has a chance to work. So that you are trying to train people to think first and react secondly. We do not realize ordinarily in our great commercial activities one very important thing, and that is that of all of the things that civilization has done in this wonderful development the thing of first importance has been to place reason ahead of instinct. Every time that we make a departure in any line of human activity, it is to try to force reason ahead of instinct.

Human and Animal Reactions Under Stress

If you take an animal of any kind, a cat, for instance, the reaction is just exactly the same under all conditions. I thought a few years ago I was going to try an experiment. I happened to be in a foreign country, way out beyond all the lines of civilization in a little Arabian town, and here was an ordinary cat. I said, "Now this cat hasn't had any of the advantages of an education or anything and we will see how it reacts to certain things." I knew how one of our civilized cats worked and I thought I would try the uncivilized cat and I threw a piece of paper in front of him. He reacted just exactly like the cat at home did. He would hit it with one foot and then the other and run around and play with it. The cat nature has persisted all over the country and therefore a cat reacts a certain way.

I tried it on a dog and I tried it on an Arab kid, and I found that each reacted in just the same way. So there seemed to be then a pretty interesting relationship between those types of animal organisms and I wondered whether or not the grown up Arab would react in the same way as our American people did.

So I went around to the Military Attaché and I said, "Do you have any trouble with these people?"

He said, "Yes, we have quite a little trouble with them. We are being besieged by petitions and the particular petition which we have now is to make it prohibitive by law for anybody to plow, the reason being that in the last three years we have had very little rain and the crops have very little more than repaid the people for the seed they have sown. So this year they are trying to ask us to make it prohibitive for anybody to plow, based on the assumption, that if no one plows and it is a dry season, no one will have the trouble and the useless work; on the other hand, if they don't make it prohibitory to plow some of them will and some of them won't, and then if it should happen to rain the fellows who did plow and sow the seed will get a big crop and they will sell that to us for our sheep and goats and camels and we will be poorer

and they will be richer. If you don't do that everybody will be on an equality."

If you read our newspapers you will find we all have the same thing garnished up a little more; we have the same general proposition. So we, as people, react, whether we have been trained or not, to certain natural laws. In the accident, in safety work, which I have been very actively interested in for a great many years we have found that you have to treat your individual, not as an intelligent thinking human being, but you have to treat him as a normal, instinctive thing that reacts on impulse, and therefore you have to design your apparatus to meet the thing accordingly. It doesn't make any difference what it is. You know if he thinks, he takes the safety device off when you are not looking; if he doesn't think, he leaves it alone. If you get your piece-work too tight, he will try to break the safety device in order to hurry the thing up. So the thing you are doing is to study how you and I and everybody else reacts normally.

We Have Taught People to Think for Themselves

Sometimes the best thing to produce an accident on the street is to blow your horn at the proper time. You scare the fellow who would have gotten across the street all right if you hadn't blown the horn, because he can't observe, analyze and decide quickly enough.

We don't know how much safety work you have or how efficient it is, but we do know this, that through all lines of industry we have taught people to do some thinking regarding themselves. When the first aid stations were first introduced in the factories, for a period of over 10 years you couldn't get a man inside one of them. After a while we got them going up for first aid whether they were hurt or not, if we had a nice-looking nurse there.

We have safety devices on the machinery. We have things that will make the fellow stop and think. Those are simple devices that we are studying ourselves. If you can get those things which are simple and elementary, that will attract the attention and make the fellow consider first before he reacts, then you have done one of the greatest pieces of safety work.

In our work in research engineering and scientific development we have to deal almost exactly with the same type of thing. The public buys our product on two things: first, on the question of style, and that is a very large factor also in clothing, in dry goods, hats, etc. In automobiles style is an important factor. It used to be that transportation was the important factor but now it is transportation plus the style factor. People normally react to that perfectly definite thing, and if some of you want to read some interesting things go back and get the history of transportation and see how styles in simple elementary horse-drawn vehicles became an important factor in all lines of work.

Our industrial development has been very largely through by-products of other things. By that I do not mean the by-product that would come

from a coke oven but the by-products of fundamental conditions. In the early days of the sailing vessel the power used for that was primarily the wind. The wind was not running on any schedule and therefore boats could not be scheduled and marine transportation was purely a by-product of the winds. Not until we went to work and designed specifically for transportation purposes a power plant which was independent of the winds were we able to meet schedules.

In our land transportation we had the ox, the horse, and we had all of those things which were not primarily designed as transportation apparatus, and not until we cut loose from them and designed steam engines and our automobiles did this tremendous industry develop to the high point at which it is today. It is through the enormous development of transportation that we have one of our greatest hazards and that is one of the problems we are all working today to overcome.

On the question of light, we used the candle and the kerosene lamp but we did not proceed directly in the great development of illumination until the scientist developed the tungsten filament and the incandescent light became the prime illuminant. There is an interesting story about that. When the incandescent lamp was first discovered every large electric light company said, "If you build lamps which will take only one-third of the amount of current now required, you are going to put us all out of business because we can not continue our business with only one-third of the present output."

The minute the element was developed that would produce three times the light for a given unit of current, people used nine times as much current because the unit cost became less and they immediately responded to that.

Confusion Always Follows Radical New Development

Fifteen years ago nobody could have anticipated the automobile transportation we have today because we could not recognize the economic features that would come along with that. So in your safety work no one today can compute or estimate the by-product results that will come out of your work in the production of primary things which perhaps you haven't yet arrived at.

I know that in every new line of analysis the thing always results in confusion for a considerable number of years. I do not know whether you have been studying your subject long enough so it has begun to crystallize into definite practice or whether your analyses have resulted in increased confusion. Don't be discouraged if you are in this confused state, because that always continues up to the point of crystallization, and then the problem unfolds and you wonder why it took so long for you to find that out. That is true in the study of any problem in the world.

In our clothing we are using by-products yet to a very large extent. We are making our products out of wool, cotton and linen, etc. Not a single one of those, outside of wool, was designed primarily as protective

clothing. The sheep used that as protective clothing and we immediately saw the good points of it and took it. The cotton fibers were intended for little parachutes with which to float the seed away to some other locality. The linen was simply a part of the supporting stock of the plant. Only in one case, and that is in the manufacture of rayon, which is the new fabric material made of cellulose which can be had from cotton, wood pulp or anything else, has man built a fiber of his own. And the rayon industry is developing to an extent greater than anybody can imagine. It was called artificial silk and in it they tried to overcome some of the disadvantages of natural silk.

As you know, natural silk is made from the worm eating the leaf of the mulberry tree. The worm eats enough with which to spin a cocoon to stem him over the winter and also enough to provide for nourishment so that he may transform himself from the worm into the moth or butterfly. In winding that cocoon the question of flexibility, durability and all such things connected with our normal silk fabric had nothing whatever to do with the occasion, so our silk is a by-product of a worm.

In our foods we are in exactly the same position today. We are eating ham and eggs. Nobody can tell me that a hen ever had in mind an omelet when she laid an egg. Those are secondary things and as we learn these things we shall be able to build, to make and to construct out of primary materials, foods that will be far superior to anything that we have today.

In that line of work there is no limit. I am simply mentioning those as points of encouragement for you in the analysis of your great job. Every once in a while we are asked by some financial man, what is the economic position of all of this research and development which you are doing? Does it pay or does it not pay? Our answer is simply this: The economic position of research is to study and to develop new things, to improve things.

Research Produces Dissatisfaction with Old Things

The economist says, but when you improve the thing then you depreciate the value of all of the similar product that is on the market. But we do not. We do not in any wise affect the product that is on the market. If we build a new automobile next year we do not change any of the parts in the automobiles that were sold this year. If the customer riding in that new automobile sees in it a value which is greater than the one that he has and buys it, the principal thing we change is his mind, and for that change of mind he is willing to sacrifice on his old automobile and buy the new one, and he pays the price, not for the depreciation of the old automobile, but for an improved state of mind.

So the work of research is to keep you reasonably dissatisfied with what you have got, so that you will mentally advance from year to year and enjoy the great benefits of the new thing. But the economist will say, is that good economy? Is it a good thing to be changing and ad-

vancing all the time? Why don't you stay put and keep things going as they are?

Our answer to that is: that there are no monopolies on any type of thought in the world today, and if you accept the one that the article that you have is entirely satisfactory and you do not desire any further changes, then you must accept the thing that comes along with that. Whenever you standardize or super-standardize any product today you open the doors and invite cut-throat competition and degeneracy of that product. So the minute you standardize you immediately start competition from a price standpoint and that always means depreciation of the product; in other words, you begin to rob out of the product the essentials of its value while by changing and advancing you continually attempt to put new values into it.

Educate the Young People in the Schools

So that is the thing you are trying to do. You are trying to put new values into human life, you are trying to put new thoughts into human life; you are working upon the change of the mental attitude of the people with whom you work.

We do not need to go and study the workman. We can study ourselves, because in reactions we are just exactly like he is. Sometimes in this thing, efficiency and economy and one thing or another, we overlook one very important thing and that is that we must at the same time get something that will change his mental attitude as well as try to safeguard him physically. You can not do that unless he is thinking.

It seems to me one of the greatest things you can do in your safety program is to educate the young people in the schools, because there is a plastic way in which you can meet your issues. I think it is being done.

One of the interesting things about education is that if you will drive down through the country today you will find very few of the old type of chicken running back and forth across the road. I don't know whether by observation and education the younger ones have learned that it is somewhat disastrous to do this or not. We observed a dog in front of the General Motors plant who was watching for a chance to get across. I don't know whether he stopped on signal lights or not but nevertheless the dog was doing some thinking, whereas they used to run out and yap at all of the passing automobiles. You can always tell the percentage of population by the number of dogs barking at the automobiles in traveling through the country. So your safety code is applying out there.

If there is any one thing I can bring to you more than others, it is this: you are working with one of the very difficult problems, which is to get intelligent reaction ahead of instinct, and you are working under one of the most intensely fundamental problems that has to do with the future development of the great centers of population—the factories and every place men work. I saw a man discussing safety so intently today

that he fell down the stairway out here. He was perfectly absorbed in his subject. So you have that thing to guard against.

Whether or not you think you have made progress, do not let anyone discourage you from a continual analysis of the thing because complicated as the problem may seem today, as you work on it, as you get all of the information, with a large number of people, each one with a different experience apparently unrelated, they will bring it up to a focal point and the thing that is extremely complicated will become very simple. We have this motto on the walls of our research laboratory: "This problem when solved will be simple." That has been true of every problem in the world that has been solved, and the only hard problems are the ones that we don't know enough to solve.

Introduction of a Spiritual Leader

TOASTMASTER SCHERMEBHORN: Gentlemen and Ladies: We are doing well with our program. We are glad to hear from Mr. Kettering. He ought to be able to solve this matter of the chicken. The chicken is susceptible to experience. Pretty soon the farmers will have the chickens so well educated that when the time comes to take them to market they will find the chickens on the boxes with their legs raised ready to be tied for the semi-annual change of location.

I have a personal satisfaction in saying that there is in store for you a splendid treat, ladies and gentlemen. Our last address is by one who, by reason of scholarship and of looking deeply into the question, can bring you a splendid message on the heart interest in industry, how well we have touched upon humanity in industrial relations and in the relations of corporations with those who support them and those who patronize them.

We have gone into the relation of science to safety first. Now it is our great privilege to hear from one of the spiritual leaders of Detroit. Dr. Edgar Dewitt Jones has gone deeply into scholarship and his poetry, I believe, is not as modern as this verse that I read just recently:

The shades of night were falling fast,
When through the crossing gates there passed
A youth who stepped upon the gas.
When they opened his head they found
Excelsior!

Dr. Jones is a product of the South which has furnished the sort of things that the mothers of old prayed for—that their children might speak with the tongues of men and angels. From the South came Grady, that eloquent spokesman of the new South.

Educated in the land of his birth and also in Missouri, he has filled outstanding pulpits in Mississippi, Illinois and Michigan. He has represented various great causes in Edinburgh and in state and national conventions. Not long ago he traveled through Ireland to look more deeply into the question of the present situation there.

Perhaps he came across the very Irishman who was coming back from war with a leg and arm gone and with his eye out. He said to his friend, "Pat, it's a terrible war."

"Yes," said Pat, "but it's better than no war at all."

He may have met the very Irishman who was in the battle at Verdun. When he finally regained consciousness he saw the earth torn up, the buildings demolished and wreckage all around, and he said to the nurse, "Where am I?"

The nurse, hoping to please him, said, "You are back in dear old Ireland."

"Thank God, Home Rule at last."

We bring him to you from that realm where, besides authorship and travel, and besides intimate association with the great figures in our national history he is a man we love because our souls are knit to his as the soul of David was knit to the soul of Jonathan.

He hasn't the fervor of the old southern darky praying for the preacher who said, "We pray, O Lord, that thou wilt give your servant this morning the eyes of the eagle and the purity of the dove. Connect his soul with the central telephone of the skies; illuminate his brow with thy salvation; pour the oil of thy reclamation upon his lips; open his mouth with the sledge hammer of truth; fill him plum full of dynamite and cover him with gasoline of glory and set him on fire."

No wonder we need safety first when we have this element of spiritual exaltation.

HAVE A HEART

Rev. Edgar Dewitt Jones, D. D., Pastor of the Central Christian Church, Detroit, Mich.

Mr. Toastmaster, Ladies and Gentlemen: Do you know the three wonders of Detroit? I will tell you what they are: the Book Tower when it is lit up like a Christmas Tree; the pigeons at Grand Circus Park at feeding time; and James Schermerhorn.

A Scotsman was going down the street when he met a fellow Scot, and he said to him, "Andy, I found a good dentist, a very wonderful dentist. Every time he pulls a tooth he gives me a drink of whiskey."

"Well," said the other Scotsman, "what are you looking so gloomy about. Did he run out of whiskey?"

"No, I've run out of teeth."

James Schermerhorn never runs out of a story. His stories, like the dew are fresh every morning, and like the brook, they go on forever. When I think of my friend's stories I think of one classic utterance that can very aptly be applied to them: "Age does not wither nor custom stale their infinite variety."

I am to speak for a few minutes on the topic, "Have a Heart," and what I shall say is centered around a proverb. There is no more fascinating literary vehicle than the proverb. The proverb contains the concentrated wisdom of the ages. Every nation, tribe and people, have their proverbs. They gleam like jewels on the fingers of time and one of the fascinating things about a proverb is that so much is said in so few words. Their brevity is fascinating.

Consider how much you can say in a few words. In the Pre-Volstead days there was a liquor dealer who lived over his bar-room and there was a speaking tube from the bar-room up to his living quarters. One day the bar tender called up and said, "Is Charlie Stanley good for a drink?"

"Has he got it?"

"He has."

"He is."

It is extraordinary how much you can put in a few words, and the proverb is wondrously attractive because of this fact. Then again it has a law all unto itself. A proverb embodies a truth that admits of general but not universal application. There is scarcely a proverb you can think of that isn't directly challenged by another, and yet both are true, as for instance, this: "Look ere you leap." That is a proverb for this occasion. But then it is possible to look so long before you leap that when you get ready to leap there isn't anything to leap for, so you have the other proverb: "He who hesitates is lost." Yet both are true.

The Witchery of Old Proverbs

I could stand here for an hour talking to you about the witchery of proverbs, but all this is but introductory to one of the proverbs I bring to you tonight: "Keep thy heart with all diligence for out of it are the issues of life."

Here is a proverb that has in epitome the very urge of a great life and a most humanizing career. You have only to stop for a few minutes to think of the heart in the world and you realize its vastness and its potency. Take the realm of letters, for instance, the heart in great books. Out of the past come those characters of Dickens trooping their way—Oliver Twist and Paul Domby and Little Nell, great hearts put into those books by a very great heart—a man who dwelt in the realm of the affections.

My friend Mr. Schermerhorn went over to Munroe, here in Michigan, the other day to speak about Will Carlton, that Michigan poet. Before Will Carlton died he said something like this: "The masses of the people never read the great poets for they haven't the time even where they have the inclination, but with the passing years the masses will more and more turn to the dialect poets, to Riley, to Field, to Stanton, to Ruth MacHenry Stuart, that glorious company." And of course he spoke the truth. For instance there are these lines from Frank L. Stanton entitled.

"His First Day at School." We never start the children off for the first time without some pangs, even when we are proud that they are entering school, because we can not but think of the long way their feet are taking in sturdy sincerity. Here is the poem:

"He's such a little feller
But he minds the teacher's rule,
And takes his books and toddles
On his little feet to school.

"His mammy stand and watch him,
So mannish gwine by;
She hided with her apron
The teardrop in her eye.

"The first time she ever done
Miss his play and song.
'Tain't no ways to the schoolhouse
And yet the road seems long.

"He's gwine in the world today,
But what's the prize to win
If dat sweet little feller
Don't come back home agin?

"He's such a little feller
But he's learning fine today;
Yet his mammy miss him
Cause dat's his mammy's way."

Great poetry? No. But it has in it the power of the heart.

I think of the pulpit. I think of men who occupied pulpit thrones, like Beecher and Brooks, and I remember that while some of these men had cathedral brains and were men of extraordinary mentality it was the greatness of their hearts that made them so potent, so winsome, so successful.

Phillips Brooks Dissipated All His Troubles

Every time I pass through Lawrenceburg, Indiana, I remember that was Beecher's first parish and that his church was composed of 19 women and one man; and the house in which he and Mrs. Beecher began housekeeping was so small that Mrs. Beecher had to go outside the house and make the bed through the open window. I think of that great heart, and I think also of Brooks who, when he passed down Newspaper Row, was observed by a newspaper man, broken in heart and carrying a heavy burden—of Phillips Brooks that reporter wrote these words on a pad:

"Phillips Brooks passed down Newspaper Row today, and all the clouds passed away."

I think of a man who shall be nameless here, whose mind is interesting and whose mentality is arresting, but I think of his heart. I recall his antipathy for tobacco and especially for a pipe. Not all ministers have an antipathy to tobacco but he had and he especially detested a pipe. And it came to pass that by and by his son took to smoking and, by that curious turn of fate, preferred a pipe to any other kind of a smoke and his father adjusted to it in a great way. He said, "No, Baird, if you are bound to smoke, you don't have to go away from home to smoke. You know how I feel about it."

Baird proceeded to fill the house pretty full of smoke. Before the Christmas that came some months after this, the minister said to his daughter who was his housekeeper, "Olive, I am wondering what we will get for Baird for Christmas." You know how it is, after you have gotten gloves and handkerchiefs and neckties for a man you have pretty nearly reached the end. You don't know what else to get. So this minister said, "I have bought everything I can in the way of handkerchiefs, neckties and gloves."

Olive said, "Get him a pipe, Father."

He replied: "You don't think I ought to get him a pipe, do you?"

"Yes, I think you should. The thing he has is getting terrible. He needs a new one."

The Great Love of a Wonderful Man

A strange light came into the eyes of this noble man, this father of the great heart, and when Christmas morning came and they were unwrapping their presents—a little custom they had in this house—Baird was handed his package. Slowly he unwrapped it and when he came to the pipe he was amazed. He looked at the pipe and then he looked at his father and then back again at the pipe, and then again at his father; and when he saw that great face that was lit up with a love that made it shine like the face of Moses when he came down from the fastness of Mount Sinai, the lad gave one leap, threw his arms around his father, and said, "Oh, father, you're simply wonderful."

Why, I say to you men and women gathered here from the four points of the compass that there isn't anything so potent as having a heart, a heart that overflows with good will and tenderness.

I think of the pew as well as the pulpit and I recall the little girl who came home and when asked if she could remember the text, she said, "As near as I can recall, it was this: 'Many were cold but few were frozen.'"

I remember reading somewhere that when Admiral Bob Evans was alive he was in a certain city and attended worship in a strange church, and sat in a strange pew. The owner of the pew, when he came in, looked daggers at Evans, who was in civilian clothes. By and by the pew holder wrote a little note and sent it to Evans. When Evans opened

it here is what he read: "This is my pew. I pay \$2,500 a year for it." And Evans simply wrote "You pay too damn much," and sent it back.

I deplore the absence of heart power in many a church and remember the words of Robert Burns:

"Compar'd with this, how poor Religion's pride,
In all the pomp of method, and of art;
When men display to congregations wide
Devotion's every grace, except the heart.
The Power, incens'd, the pageant will desert,
The pompous strain, the sacerdotal stole;
But haply in some cottage far apart,
May hear, well-pleas'd, the language of the soul,
And in His Book of Life the inmates poor enroll."

"Keep thy heart with all diligence for out of it are the issues of life."

Heart power is seen at its best in the home. The other day I read a life of Thomas B. Reed, the famous man from Maine. There was an incident told by his biographer worth repeating, I think. Reed came into his library one evening, and curled up in his favorite chair was a cat, his little girl's pet. It chanced that the little girl was also in the library. She looked up when her father came in and sensed at once the cat's danger, sprang out of her chair, ran across the room and attempted to spill her pet out of the chair. But in her haste, alas, she pulled the chair too far away from her father, and he sat down heavily on the floor. He arose slowly and painfully, his face scarlet, and for a few seconds the air was electric with possibilities. Then he smiled and said to the little girl: "My dear, I should like for you to know that it is much easier to get a new pussy than a new papa."

"Keep thy heart with all diligence for out of it are the issues of life."

The Little Boy Had His Number

Bishop Potter, about whom so many good stories have been told, was dining in the home of a parishioner one evening and of course she asked him to say grace. The Bishop said grace and after it was over his host's little girl spoke up and said, "Why, Bishop, that isn't the way my father says grace."

• The Bishop, very suavely and silkily, said, "My dear, tell me how your father says grace."

She said, "He comes home in the evening and sits down at the table and looks around and then says, 'Good Lord, what a supper.'"

"Keep thy heart with all diligence for out of it are the issues of life."

I suppose after all that the finest test of the heart power of a man or woman's life is the attitude toward the child and the child life. Time and time again in the speeches that I have been privileged to hear in some of the sessions of this convention I have heard the wisdom of

beginning with the child. "Train up a child in the way he should go; and when he is old, he will not depart from it." The finest test of our lives is our attitude toward children."

Tomorrow is the sixty-seventh anniversary of Theodore Roosevelt's birth. Great heart; lover of children. The classic that he wrote was not any volume of his winning of the West or any account of his hunting trips in Africa, but the collection of his letters to his children.

Two children were being entertained in the White House while he was President—unexpectedly entertained. They were in his office and before they left his office he said, "Children, I must give you some little token of your visit to me." He looked around and saw nothing that was worth anything but two long stemmed roses in a vase. He took them out of the vase, but before he handed them to the children he stripped the stems of their thorns.

"Keep thy heart with all diligence for out of it are the issues of life."

To be able to smooth the pathway of a child and to understand the heart of a child—that is everything.

Memories of the Incomparable Sarah Bernhardt

I came to Detroit from a long residence in Bloomington, Illinois, and during my residence there the chief waiter in the Illinois Hotel was a colored man by the name of Wright. He was a rather unusual colored man and his wife was a worthy wife of a worthy husband. They had a little girl who was wonderfully gifted in public speech. By and by the various luncheon clubs and the lodges were having her recite for them. She was quite extraordinarily gifted. I did a few things for this man which he called favors. They were not much—just little things that anyone of you would have done. Well, it happened that Madam Sarah Bernhardt made her farewell tour of America and she came to Bloomington for a one-night performance.

About a week before she came I met this colored man on the street and he said to me, "Doctah, I want you to do me one moh favoh."

I inquired, "What is it, Wright?"

He replied: "You know this wonderful French actress is comin' heah—this Madam Bernhardt?"

I said, "Yes, I know she is coming."

"I want you, Doctah, to write her a letter and ask her if she won't heah Nellie recite while she is heah." (Nellie was his daughter's name.)

"Wright," I rejoined, "that is a pretty big order. I rather hesitate to do that. I don't know this famous woman. I never saw her. She doesn't know me. I have no approach to her."

Then, if it is possible for a black man's face to get blacker his did with discouragement; I saw he was very much distressed so I said to him, "Don't take it so hard. I will write the letter."

As near as I can remember I wrote something like this: "Dear Madam Bernhardt: I trust you will not think me presumptuous, an entire

stranger to you, but in behalf of a worthy colored man here in the city and his wife who have a little girl, rather remarkably gifted, I want to ask you if you could find time to hear her read two or three selections. If this should happen to be the case, this worthy colored couple will never forget it. It will be a very kind and gracious act."

I sent the letter care of the manager of the local theater whom I knew very well, and then I left town. I had business in the southern part of the state and I wasn't there when Madam Bernhardt gave her performance in Bloomington. When I came back one of the first men I met was this colored man and his face was all aglow.

He said, "Doctah, have you heard the news?"

"What news?"

"Madam Bernhardt heard Nellie."

"Why, that is interesting. Tell me about it."

"Doctah, it was wonderful, suh. She had my wife and Nellie and myself come to her private cah. Doctah, were you evah in the private cah of Madame Bernhardt?"

"No," I said, "I never was."

He said, "It was a most remarkable cah. It was fixed up like a room, like a parlah, with mirrors and pictures. She had Nellie and me and my wife come there and Doctah, she heard Nellie say three of her pieces, heah me—three of them. Then when Nellie had finished she had her come ovah and she put her hand on her head and spoke. 'Now, Nellie, you's got the gift but be careful how you uses it. Don't let it take you off your feet. Take it from me.' Madam Bernhardt said, 'Take it from me, little girl—from one who has been on the stage a long time—that there is something else besides getting the applause of the people.'"

"Then," said the head waiter, "she turned to me and my wife and she said: 'Don' you spoil this little girl. She's got de gift but you mustn' spoil her.' Then, Doctah, she took a rose—one of her own roses, a long stemmed rose—and gave it to Nellie. Then we came away. I never can forget it as long as I live, Doctah. It was wonderful, suh!" And so it was.

A Movement That Enlists the Finest Minds

When our papers were filled with an account of Madam Bernhardt's death, the story of her last hours, and when columns were filled with tributes to her talent and genius; when at last the tall candles were burning about her body, I fell to thinking of that family out in the prairie state and the little colored girl and the gracious hearted woman who took the time from her transcontinental journey with all of its annoyances and distractions to show her woman's heart and to bring a joy into that home and a memory that would last as long as life and beyond it.

"Keep thy heart with all diligence for out of it are the issues of life." You are bringing into this amazing movement—one of the most tre-

mendous movements of all times—the finest minds in the country, scientifically trained minds, men who are extraordinarily panoplied by nature and by training to lead in so wondrous a movement but who have a heart, yea, must have affections, deep and responsive.

“Keep thy heart with all diligence for out of it are the issues of life.”

The loosing of the affections, the play of the heart power upon such a problem as this is bound to be a mighty factor in the solution.

I want to close with another verse from Burns. I think perhaps here is the summary of all I have said:

“If happiness hae’ not her seat and center in the breast,
We may be wise, or rich, or great, but never can be blest.
Nae treasures nor pleasures could make us happy lang;
The heart ay’s the part ay that makes us right or wrang.”

The Samoan Natives Built a “Way of the Heart”

TOASTMASTER SCHERMERHORN: Will you tarry just a moment to let your Toastmaster say to you one thing, that this has been a memorable evening in two respects. One is that these three speakers from the realms of business and science and the spiritual realm have been more than speakers. You have seen the expression of their own souls and their own lives, and that is a tremendously important thing. The other is that this important convocation in which we have had so much joy and fellowship is closing at the unusual hour of 11 o’clock.

I always liked, when I was in London, to go see the Decameron Nights. I like the William H. Cameron nights very much.

When our good comrade, Dr. Jones, was talking about the heart I thought of the man who went to the market for some beefsteak. When the butcher cut it off and put it on the scale he said, “There is a good piece of steak, as soft as a woman’s heart.”

The man said, “I guess I will take sausage.”

All of the speakers have brought you this suggestion of the far sweep of your ministry because with all of your fine education and all of your well organized work, your influence upon this city just coming into full consciousness, in this movement you have been a tremendous blessing to us all in the many-sided operations of this cause.

In conclusion, I remember when Robert Louis Stevenson—to continue the thought that Dr. Jones has imparted to you so beautifully—went to regain his health if he could on the island of Samoa. He had a courage in his work such as Howard Coonley has had in the realm of constructive industry. The natives there loved the poet and they built a roadway that ran from the murmuring sea up to the portico of his home and in their beautiful language they called it the “Way of the Heart”—a beautiful island idiom.

Blessed men and women, in conserving life you are treading the Way of the Heart.

ADJOURNMENT

A B C Session

October 29, 1926

GEORGE HODGE, Chairman

Assistant Manager, Industrial Relations Department, International Harvester Co., Chicago, Ill.

THE opening meeting of the A B C Session held in the Grand Ball Room of the Book-Cadillac Hotel, Detroit, Michigan, convened at 9:50 o'clock, Mr. George Hodge of the International Harvester Company, Chicago, Illinois, presiding.

CHAIRMAN HODGE: In opening the A B C Session, which is primary safety for the junior safety man, I am sure that those of you who have attended this session in previous conferences will agree that instead of its being an A B C Session, it really is an A to Z session.

I am not going to be reckless with the other fellow's time and make a speech this morning. But I am reminded of a story they tell on James Whitcomb Riley, the old Hoosier poet.

In his younger days he was a sign painter for a medical house. In riding down the road, he passed the farm of a religious man on whose fence there appeared this sign: "What shall I do to be saved?"

Seizing the opportunity, he painted one of his signs on the lower board, which then read, "What shall I do to be saved? Take Carter's Little Liver Pills."

A few weeks later he was in the neighborhood, and wondering about the sense of humor of the old fellow, he drove by, and instead of finding the sign he had painted, this is what he read—"What shall I do to be saved? Take Carter's Liver Pills. Then prepare to meet thy God."

Being a lover of art, I went to the Detroit Art Institute, and there standing before a large canvas of "Daniel in the Lion's Den" I found my good friend, Arthur Morey. I wondered what was interesting him, and finally he said, "I was just trying to figure out why Daniel has such a peaceful look on his face." I said, "What are your conclusions?" He replied that he was quite sure Daniel felt there was to be no speech making after the feast.

Last spring I had the opportunity of addressing a meeting in St. Louis, and during the day I was entertained by some good friends at the Commonwealth Steel Mills. I took advantage of the opportunity to go through

their operations. I was struck with the cleanliness of the Commonwealth Steel plant. In our own organization, with its many operations, as we travel from place to place and go into some of our plants, the first thing we notice is the housekeeping because where there is good housekeeping and cleanliness, there we find efficiency and real accident prevention.

It was a real privilege to go through the Commonwealth plant and see something of the high spirit and splendid morale of that organization, and as I inquired into just what brought some of those things about, I found on every hand credit given to the general manager, Mr. Arthur T. Morey.

I think in this morning's session where we are looking at the safety proposition from the standpoint of management (being covered by a manager), and the interest of foremen (which will be discussed by a foreman), and the interest of a worker (which will be discussed by a worker), that we are extremely fortunate in having as a representative of management Mr. Arthur T. Morey of the Commonwealth Steel Company.

MAINTAINING INTEREST OF MANAGEMENT

**Arthur T. Morey, General Manager, Commonwealth Steel Company,
Granite City, Illinois**

You are participants in one of the greatest and most constructive influences that has ever come among men. We are entering into an age when truth is being made more practical and Christianity is becoming more an applied science than a profession.

As Abraham Lincoln wrote the Emancipation Proclamation, freeing America from African slavery, so has the National Safety Council and the safety man written an Emancipation Proclamation covering every man's inalienable right to freedom from accidents as an incident to his right to life, liberty, and the pursuit of happiness. This Proclamation was formally and publicly proclaimed some time back around 1912. The unbelievers have been silenced by the results obtained and you as safety men can be inspired and enthused by that demonstrated fact.

In the olden days they thought the safety man was a sort of crank, that he was going to cause more accidents than he could prevent. You who are beginners are coming into the work when men are more receptive to this demonstrated condition, and you should in proportion accomplish even better results.

Surely he who seeks good, finds many unexpected aids and feels the power of the right hand of Omnipotence behind him.

I would say to you safety men, that your value to your plant is not to be measured by your own individual responsibility for the safety of your plant, but rather by the responsibility you lead others to feel and exercise. You are the light-bearers and way-showers to your men and managements.

It is essential that you get and maintain the interest of your management, for there the greater responsibility rests. I have been asked to address my remarks to that phase of the work. How will we interest management? Well, what is it that interests management?

Whenever we approach a problem, we must first analyze it to see what the problem really is. Then, understanding our problem, we must discern what our relation to that problem actually is and what it ought to be. In management's hands lies the success or failure of business. Management is faced by stern necessities and can not be blamed for shying at anything that savors of mere sentiment or theory—no matter how idealistic its spending of money may appear. Their task is to use money to produce more money and they have not felt it right to divert it away from that object, no matter how much their personal sympathies may pull them. Those stern necessities have caused them to discount sentiment, so-called, and consequently we have dubbed them "hard-boiled." If we, in consequence, consider them as hard-boiled enemies of our safety idea and seek to circumvent or get around or over them, we fall into and make worse the very conditions that we are seeking to overcome and are thus of no aid to our idea, the management, or ourselves.

Help the Man by Removing His Ignorance

The way to aid a man who is wrong is to bring him the truth that removes his wrong concept. To leave him with his wrong concept and try to work around him or in spite of him, raises sometimes disastrous obstacles and may leave an enemy in our rear.

Many are now beginning to see that there is an eternal fitness of things; that there is a Principle governing human affairs and as we understand it more and more, we are astounded at its force and controlling persuasiveness.

Two scientific truths never conflict. If two and two equal four in arithmetic, they are never less and never more in any other department of mathematics and they fit in with all other truthful mathematical statements. If a thing is scientifically right, it is always right and fits in with every other thing that is right. I am referring, of course, to things in the realm of Truth and not to the realm of human opinion and human sense. Men are learning this more and more, and it is making better philosophers of us all.

I therefore state confidently, that if it is not right to injure and kill men, it is never right or necessary to maim or kill them in business—that the observance of this truth can only aid business and never involve prohibitive conditions. Business is right service and the proposition of right service can never include the maiming and killing of men. For business to do it, business is to that extent injured. For business to overcome it, business is to that extent strengthened and helped. That is a statement of a true scientific principle.

Now to return to our so-called hard-boiled manager, immune, as we

thought, to sentiment. He can be shown—and in every man, especially men of the type officering industry, is the desire to be and do right and enjoy its satisfactions. He can be shown that accidents are unnecessary and that their abolition will be an opening up of new conditions, strengths, and resources, that will fertilize and make his industrial plant grow better than he has ever dreamed of in his old experience of things.

It will, for one thing, lead him to find (and you can show him) that in industry his most important factor is his men, and that his plant, equipment, and raw materials are secondary. He will find that instead of just employing men's bodies, he can employ their minds, their good-will, their interest, their inventiveness, and their loyalty.

As I have stated, the men of management have had to be practical men, guided not by rainbow-chasing theories for they are accountable to the stockholders and are under the practical necessity to produce results and dividends. We must, therefore, approach the problem from the standpoint of aiding them to do just these very things and then to see that safety is a constructive force that will aid them in accomplishing those very ends. When they see this, they will be strong for the safety program. Their practical good sense has kept safety sane and result-producing and it has been well that this is so.

As a hungry man can be reached through his stomach, the easiest way to reach an (as yet) unevolved management on safety is through costs, profits, and efficiency—all of which are constant problems with him, and when safety is shown to be a great help in those things and not an added burden in cost, it gains management's attention, which later ripens into enthusiasm as the humanitarian and good-will fruitages of intelligent safety work are experienced and appreciated. Accident prevention reduces costs in many ways. Directly it cuts down accident expenses. My company was paying out 2.16 per cent of payroll for accident insurance under the old accident conditions. Safety work has reduced this item of cost to .3 per cent. On a payroll of five million dollars, this makes a difference of \$93,000 a year.

National Safety Council Service Emphasized

The headquarters office of the National Safety Council can furnish you many specific instances of reduced costs of accidents through safety work.

I wonder if we all make use of the information available at the National Safety headquarters. There is much information available there that could be useful to all industries.

Another delightful part of that service is that if the information you seek is not in the files, they can send to 50 or 100 of the best engineers in this country, the best men on the subject involved, and get you the very finest opinion possible that you couldn't get for love nor money otherwise.

Part of management's saving will no doubt be put back into the cost of the safety department. In our own experience, last year we spent about one per cent of payroll on safety and accident prevention work. Adding

the three-tenths per cent compensation cost makes a cost of under one and one-third per cent of payroll for safety conditions and the good-will of the men and the satisfaction of the management in having done the right thing. All of these fine things were accomplished and paid for, and still we saved money, in place of the old far greater costs and wastes of accidents, distress, loss of production, fear, heart-broken families and bad conditions all around. Here you safety men have as ammunition the positive proof for any manager what safety work can do.

Any efficient manager can be easily appealed to when such an elimination of waste is shown to be possible and good feeling and greater efficiency substituted. There is no worse waste in industry than accidents, for through them everybody is the loser. No longer need they be put up with because of the fallacy that they are industrial necessities involved with human fallibilities, once thought to be inevitable. When an intelligent manager sees that accidents are simply a leak of money, time, and production, and that the leak can be stopped, he will be interested purely from a managerial standpoint.

It is Criminal for Management to Endure Accidents

It seems to me the progress that has been made in this work, the understandings that we have attained, make it criminal for a management in these days to put up with accidents that have been proven by so many other plants to be unnecessary. We have the great force of experience and public opinion behind us now on this question.

But there is even a greater indirect benefit that you can show to management. When a preventable accident is seen to be an inefficiency, and safe practices and efforts begin to deal with the causes of accidents, the elimination of these same causes also will remove careless attitudes that have been wasteful in production lines as well as in accidents. Carelessness in safety matters is indicative of a bad quality of thought that works against success in production lines. The mental attitude that spells safety is the mental attitude that means intelligent and increased production.

Another matter of great interest which you can show your manager is in the matter of labor turnover which safety work reduces, and any manager would rather keep trained men than keep trying out green ones. Also whenever a man is removed from the shop by an accident, it takes the attention and interest of his shop-mates from their work and there is a collateral loss that is more or less intangible but very real. Besides this, a bad morale is caused by conditions that endanger life or limb.

Every manager is interested in effective organization and improved leadership by his superintendents and foremen. Good safety organization work is a great training opportunity toward better leadership, as it requires teamwork, a common ground on which to meet his men, consideration of his men, better influence with his men, better shop discipline, humanitarian considerations, and all of those things that go to make a better foreman and better conditions generally in the shop.

The whole safety program assists in training foremen for their jobs by developing human relationships. The safety program is an inspiration to any shop. The spirit changes the attitude. The whole contact is different. It is a leaven that produces greater opportunity in any shop and leads to better conditions. I don't see how we ever got along without it, and we didn't very well.

It is becoming more and more true that every manager needs the respect of his men and the respect of his community to obtain the cooperative effort that brings success. In these modern days, no manager can expect to have this respect unless he does all in his power to safeguard the lives and limbs of his men; and safety work gains for him the respect of his employees and the public. Safety work is a point of contact that is a great asset for the manager in getting closer to his men; by doing something for them and with them he gains their ready cooperation and support.

As a manager trains his men to think of safety in the shop, he is contributing to the public safety of himself and others out of shop hours. In other words, we are all interested in safety, 24 hours a day, in the streets and in the home as well as in the shop. Our employees are driving cars, and we want them to be safe because we may meet one of them at the next corner. There is a relationship between safety training in the shop and safety training on the highways and in public places.

Safety is a Universal Idea Throughout Civilization

Safety is a single idea and you can't separate it. A man is in the shop only eight hours and is at home or in public places 16 hours. If he is getting at home the training for public safety in the highways, he is getting a general knowledge of safety that is felt in the shop.

For a long time we felt this national safety program was an industrial safety program. We never could see how we could weave it into our lives outside of industry. But when we are doing public safety work, we are training the safety sense that will help us in shop safety as well. They are one and the same.

Safety work has been a leaven to industry—an entering wedge that began to remove the old sense of aloofness between employer and employee which could lead only to disastrous results. With the idea of safety has come better industrial relations that have produced plant publications, benefit associations, employee clubs, foremen's clubs, educational opportunities, civic safety activities, service departments, and other things of mutual interest and helpfulness; all of which have brought the management and men together in better cooperation and understanding; so that safety work has been that leaven that has saved our industrial situation from its sinister labor aspects and has established an understanding and cooperation that is making us all better friends, brother Americans in industry and, in fact, is producing a better America.

I am going to digress here just to tell you of one thing which has come out of our relationship that has been to me very gratifying. Our president, Mr. Howard, was with you here on Monday. When he was a boy, a little fellow fourteen years old, he had to leave home and go to work out in North Platte, Nebraska, in the Union Pacific shops.

One day at noon he asked a mechanic how the steam got from the boiler down into the steam chest and worked the piston; and the fellow said, "Well, kid, what will you pay me to tell you?"

He said, "I haven't any money."

The mechanic replied, "It cost me money to learn that. Pay me, and I will tell you."

That broke the boy's heart. When he got older he said, "I am going to see that no boy will ever lack for opportunity."

Helping the Worker to Rise Through Education

As we got into safety work and these things opened up, the old thought about the school came strong and we had an apprenticeship for many years. During the last year or two we found many boys who have had to leave school to go to work in order to help conditions at home. We said to the authorities, "What difference does it make where the boy learns a thing? Why can't we add to our mechanical drawing department for boys and have a high school teacher come and teach them history, English, physics and anything else they want to know—make a regular high school right at the shop?"

We got the approval of the principal of the local high school as well as that of the Board of Education; the State Department of Education has established credits in the University of Illinois, so we now have an actual high school right in our plant, with 76 boys going to that high school. When they graduate, they get the diploma from the regular high school uptown, which reads the same as other diplomas.

A little while ago some boys said, "We had to quit school when we were in the fifth or sixth grade. Can't you let us get training so we can take high school work?" So we now have about 15 young chaps taking the grade work. That will lead them to high school work and they will get an education.

You can't realize what it has meant to those 90 or 100 boys who had thought they had lost the opportunity to get an education. The kindness and friendship and fellowship that have come out of all this can not help but make a closer, kindlier feeling between the company and the men. It is service. We have to put our lives on the basis of service. Business is service, and no man can succeed now in business without the cooperation of his men, and no man can get the cooperation of his men without friendliness with his men, which is expressed in service.

This whole safety idea has leavened and inspired industry to understand the meaning of service, to get together as friends, Americans and Christians.

In my old school reader, I remember the story of Julius Brandt who

was one of those men called alchemists and who sought the secret of turning base metals like iron into gold. In his experiments, he discovered phosphorous and this led to the important invention of our match.

We are living, gentlemen, in a better day, when men are considered men and when land, buildings, equipment and money are more than mere material things; they are substances which, as men become more helpful and considerate toward each other, are transmuted into something better and finer than Julius Brandt ever sought—they are transformed through service into a fellowship that enriches all.

Arranging the School Hours for the Employee

CHAIRMAN HODGE: I am sure Mr. Morey has given us a splendid address on maintaining the interest of management. The discussion of Mr. Morey's paper was to have been led by Mr. H. W. Mott, of Marx & Bensdorf, Memphis, Tennessee. We have received a telegram from Mr. Mott stating that an emergency in his company has prevented his being present. However, this is such a live subject that I am sure we can well afford to spend a few minutes discussing how some of you are interesting your management in safety.

DR. G. H. WOOD (Frederick-Stearns Co., Detroit, Mich.): We are just starting a little technical school among the employees, and I would like to get a little more information about how this school of Mr. Morey's is arranged as to hours, as compared with the hours of employment. Does it lap over or is part of employment time taken?

MR. MOREY: We send an apprentice half a day to school on company time and he can use as much of his time as he wishes. The high school is conducted from 4:00 to 5:00 in the afternoon. The boys are out from work at 3:30, so they have time from then on. Then we give any educational assistance to anybody in the plant who wants it, blue printing, writing, printing, coaching them in correspondence school work, or anything of that sort, but it does not conflict.

Sometimes some of the evening classes for the adults and for the men not in these apprentice or high school classes interfere, and then I try to get that changed so these men are on the day shift.

A. E. SMITH (Singer Manufacturing Co., Bridgeport, Conn.): I would like to ask Mr. Morey how the teachers for this high school work, which is conducted in the factory, are supplied. Are they supplied by the board of education or by the factory?

MR. MOREY: Our company pays all the expense of instruction and books.

MR. SMITH: Are the teachers supplied by the board of education paid by your company?

MR. MOREY: We have our own educational instructor employed full time, and the assistance he needs is given by high school instructors from the high school in town, but we pay them.

CHAIRMAN HODGE: I have noticed Mr. Cox of the Canadian Industrial

Commission in several sessions. Mr. Cox, you ought to have something from the other side to put a kick into this meeting. We would be glad to hear from you for a moment.

W. H. COX (Industrial Accident Prevention Associations, Toronto, Canada): In regard to getting the interest of management, we naturally look at it from the humanitarian viewpoint; and then what gives the big kick is the economical factor, and that reasonably comes if you sell your story right. You must sell your proposition the same as any other work or idea. You must show the management that the proposition you are trying to put up to them is worthwhile. It is a matter of showing them that it pays to be safe and it pays to have human interest in mind, and with that comes the economic factor with the reduction of accident cost.

MR. WAXTER (Nebraska Power Co., Omaha, Neb.): we have about 500 employees. We get around the educational proposition this way. We can't afford to put on paid instructors and hire them to devote their entire time to it, so we meet the employees half way with the Y. M. C. A. schools. We find they put on some very good courses. We pay half the tuition and the employees pay the other half, and it is on the employees' own time. Then we make a charge against the employee for absences. We found last year that we paid the half rate, without any expense to employees other than the half tuition, and quite a number of our men dropped out. So this year we adopted the plan of paying half and charging them 15 cents for each absence, and we have reduced the number of absences.

Incidentally, we find we have helped the safety viewpoint by educating these men in the principles of electricity.

Make Other Workers Feel Their Responsibility

CHAIRMAN HODGE: Referring to Mr. Morey's paper, I would say to you safety men that your value to your plant is not to be measured by your own individual responsibility for safety, but rather by the responsibility you induce others to accept and fulfill. I think that is a very splendid statement about the relationship of the safety man to the safety problem in the plant. In other words, if you make your foreman feel that he is responsible for safety as well as production, then your safety department becomes a service to the foreman in helping him meet his greatest obligation, that of conservation of human life and limb.

MR. MOREY: I think it is very important for the safety man to take the attitude that he is an assistant to the rest of the shop. As long as a safety department is a collateral department running safety, they will all leave it to that department.

I think the biggest progress we made in our safety work was when safety was made an operating matter, not a matter of collateral safety department off on one side; then safety became part of the foreman's job, safety became an operating matter, and the safety engineer was simply there as an assistant, a news gatherer as to what was doing in

other plants. He put the responsibility right on the foremen and the superintendents and the management.

AL KROES (Employees Mutual Liability Insurance Co., Wausau, Wis.): I had the extreme pleasure a few years ago to speak at the luncheon of the Commonwealth Steel Company by courtesy of Mr. Morey and their safety engineer. I saw their school and it is the last word. It is the most wonderful institution for betterment of education and for stimulating the interest in their company and their work individually that I have ever seen.

I would like to know from Mr. Morey what influence this method has on the apprenticeship for one thing, and on labor turnover. What I mean to say is this, do the men who get the education at your expense stay there more readily than they would otherwise?

MR. MOREY: I think if I got started with this service to men, the gaining of their cooperation and good will, it would be hard to stop me. I will simply say that a great many of our apprentices do stay; some do not. This is to be expected. We want the boys to get positions elsewhere when it is best for them. However, enough stay to compensate us. I wish I had my labor turnover figures here. Our employment officer was in to see me only a few days ago and we had what we think is an incredibly low figure on labor turnover.

Even the Hard Boiled Foreman Can be Changed

CHAIRMAN HODGE: Some time ago in attending a safety conference, quite a bit of time was taken up about how you were going to sell safety to the hard-boiled foreman. In maintaining the interest of management in safety, the foreman is part of the management and it was quite interesting to hear the various methods as to how they were handling what they called the hard-boiled foreman.

I think our experience has been just as I related a few moments ago—where you place responsibility on the foreman and make it his job to prevent accidents, the hard-boiledness evaporates and he is soon coming down to the safety department looking for suggestions and help in meeting his problems.

J. F. H. WYSE (Canadian National Safety League, Toronto, Canada): I want to express my appreciation to Mr. Morey in emphasizing the necessity of the industrial manager using his influence and help in protecting his workmen outside of the factory. Outside of the factory the workman doesn't get any compensation if he is hurt unless he has special insurance. We are looking forward to compulsory automobile insurance, which will take care of his being hurt by traffic or motors, but I think that is one of the most important things that our industrial management should appreciate at the present time; not only from a humanitarian standpoint, but it reduces labor turnover to the industrial plant. If a man is hurt outside of his factory, the management of the plant and the production suffer.

CHAIRMAN HODGE: One of the outstanding things Mr. Morey brought out is that safety work has been a leaven to industries, an entering wedge that began to remove the old sense of aloofness between employer and employee and which only led to disastrous results.

ISAIAH GORDON (Bureau of Safety, Chicago): Mr. Morey tried to get the thought across, and I think he did, that we must reach the public. The way for us to reach the public is through our men in their contact with their fellows.

I wonder if we all realize the scope of the safety work, its breadth? I have always known it was wide and covered a large field, but I never saw it in just the light I did recently while in a hotel in Ohio. As one of your managers said while I was talking at a meeting, he knew I was full of safety, but he didn't know I dream about it.

That night I went to sleep and had this dream, it gave me a new slant on safety and showed me the scope of it.

A Dream That Carried a Fundamental of Safety

It seems the superintendent of one of our electric lines was sitting at a table with three other gentlemen engaged in a card game. I was standing by his side watching the game. All at once he jumped up and went into his hip pocket, pulled out a revolver and pointed it at the man sitting at the opposite side of the table. I didn't have much time to make a safety talk, but I did with just one word. I grabbed him by the forearm and I said, "Think," and his hand dropped. He put his gun in his coat pocket and he turned to me and said, "Mr. Gordon, that one word is all that saved his life."

Then I said, "What would have become of Mrs. So and So and your eight year old daughter had you done the thing you started to do without thinking?"

That word is the basis of our safety work. It is the foundation on which it is built, and I said to myself, is it so wide in its scope that it can actually prevent murder? I believe it is. Let's work along that line—that safety work is health and happiness in the shop and out of the shop and doing everything we do for our own good and the good of our fellow men; and let us do our thinking before we do the thing that plunges us into eternal sorrow. Loeb and Leopold are doing all their thinking now. The time to have done the thinking was before they did the deed that put them in Joliet penitentiary.

CHAIRMAN HODGE: I think that is a good statement to leave this particular subject with.

"Maintaining Interest of Foremen." I am glad I didn't get too far into this discussion of hard-boiled foremen. I don't know that I deserve any credit for thinking before I speak, but here we have a foreman with us who is going to tell us some of the things that maintain interest among foremen.

MAINTAINING INTEREST OF FOREMEN

Matthew A. Kalina, Foreman, A. O. Smith Corporation, Milwaukee, Wis.

I was asked to address this audience on the subject of maintaining interest of foremen in accident prevention. First of all, I want it distinctly understood that I am no orator and have undertaken to perform this duty so this body can get first hand information on what some foremen think about safety.

It must be understood also that what I am about to say has no application to my present employer, the A. O. Smith Corporation. Rather I shall attempt to speak of conditions in general and to reflect the attitude, as I understand it, of foremen employed in industry generally.

When accidents happen, the superintendent, the general manager, and in fact everyone in authority, all preach the same gospel of safety first.

Foremen have heard so much of this safety first business, especially at accident time, that they have become reconciled to a lecture when anything happens. But except for such occasions, one is apt to hear most about production.

Knowing these conditions and what really counts with men in authority, is it any wonder that foremen question the cry of safety first? Of course, we are all for safety from a humanitarian standpoint. We must comply with what our superiors demand, however, and that is production at as low a cost as possible.

We foremen know that accidents cost money. Accidents add cost to the product. Why not begin to interest foremen in the true meaning of safety? All foremen, if they hope to survive in their positions, are interested in cost. Why not make safety a matter of cost, which is a real important thing today? Everybody is looking for the product that is best and costs the least. Every accident that occurs means so much added cost; insurance cost against accidents is naturally in proportion to the nature and severity of these accidents.

Educate your foremen to a point where they will understand that safety is a matter of cost. In that way you have their interest and it becomes a thing vital to them if they hope to maintain the proper cost of production.

I have always felt the way to get results is to be honest and truthful. Why not be honest and truthful on the safety matter? It is an economic problem, a matter of cost to employers and also to employees, as they finally have to foot the bill.

Don't you think that if everybody actually understands that they have to pay a part of the cost of every accident that happens, it will maintain the interest of men and foremen in a way that emphasizing safety first only when an accident happens never has accomplished?

This viewpoint is advanced by a shopman in the hope that the decision afterward will be along this line. When asked, "What does accident

prevention mean economically to the foremen and men in the shop?" the answer should be: "Safety and cost of production go together."

CHAIRMAN HODGE: I think Mr. Kalina has made a statement that is intensely interesting. I am sure that we should have some discussion on the subject. Do you agree with him or do you disagree as to whether or not production comes first and safety second? I don't want to start anything, but that is just a suggestion.

PAUL G. WOODWARD (Viscoise Co., Marcas Hook, Pa.): A foreman or department head has an accident in his department. A man may lose a month or more in a serious accident and incur hospital and medical expense. I should say a very effective way to financial interest that foreman or department head would be to tack that \$500 or \$1,000 onto the department charge direct and apportion it to his unit cost.

J. M. STEPHENS (Standard Oil Co. of Kansas): I agree with the speaker that the money consideration is a very vital factor in this safety work, in fact it is the first. We may talk of the humanitarian aspect and without a doubt it is taken into consideration in a good many instances. However, I believe that the saving of money is the thing that any management has in mind primarily when they institute and organize safety. I know that in our plant a statement of what accidents are actually costing, not only the management, but the employees themselves, attracts more interest from the great mass of the employees than most any other statement that can be posted on the bulletin board.

E. ROSS FARRA (U. S. Gypsum Co., Staten Island, N. Y.): It was my pleasure to sit with 15 men in a conference. They reached the conclusion that safety in the industries represented there, would never go across as strong as it would if the men who are directly responsible for safety were understood to be production executives.

I think that bears out that thought—when those of us who are known as safety engineers are recognized in the plant as production engineers, then we will get safety because the foremen will recognize us as part of the organization.

You Can Not Fit All Men to One Pattern

A. J. VAN BRUNT (Public Service Corporation of New Jersey): I heard the definition of the designation of safety engineers some time ago in a manner which I think was illuminating. The question was asked, "What is a safety engineer?" The reply was that it was considerably like a Welsh Rarebit, which was neither Welsh nor rabbit. The safety engineer is not primarily a safety man, nor is he in all cases an engineer. There have been times when I sat in at meetings when I humbly thanked Almighty God that I was not an engineer.

I take issue with the gentleman who addressed us from the platform and with one or two who have followed him. Men, you can not put human nature in one mould. You can not appeal to all of the executives or all of the foremen on the plea of dollars and cents, nor can you appeal to all of them on a humanitarian basis. You have to combine those

things. Objection was made by this speaker, (and I want to compliment him on his speech; it was fine)—attention was called by the speaker to the words "safety first."

I have been in this game for sixteen years. I have heard that slogan criticized severely. I have yet been unable to find any man who could take two words and put them together which would mean as much as those two words.

Now let's look at the other angle just a minute. If you will preach and practice safety first, going at your executives and your hard-boiled or soft-boiled foremen, according to their individual feelings, one for dollars and cents, particularly if he hails from Scotland, the other from the humanitarian standpoint, particularly if he hails from New Jersey and get each man to consider that according to his own personal individuality, you will cut cost and increase safety.

Those thoughts are not antagonistic; they are as close together as Siamese twins and you can't cut them apart without killing one of them. Safety will increase production and it will reduce cost, whether it be in the shape of a mechanical safeguard or mental thought. Don't put men in the same mould. Use each man according to his individual preference, and practice safety first and you will increase production materially and undoubtedly decrease cost.

A Great Deal More Than Just an Economic Problem

R. B. MORLEY (Industrial Accident Prevention Associations, Toronto, Canada): First of all I want to thank Mr. Kalina for what he said. Second, I want to take you all back to the time when you were a boy and heard about Santa Claus. By and by we found out, like the little girl did, that Santa Claus was just your father.

Assuming we have found out there is no Santa Claus, don't we all love Santa Claus?

I agree with Mr. Van Brunt that we have to tie the two propositions together. You can't say to the foreman that it is only an economic problem. The foreman knows deep down in his heart that it does matter whether people are hurt or not. You have got to tie the two together. There are some people who get the dollars and cents idea quicker, so for heaven's sake, men, let's remember that it does matter. I lost part of a foot in a street car accident a few years ago. Does it matter? Of course it does.

A few days ago I talked to a man who had killed a child. If there was ever a man on earth who was miserable, it was that man. These things do matter, but we have to remember both sides of the question. Let's not stress either one too heavily because there is no necessity, and there is a Santa Claus all the time for all of us.

W. H. WINANS (Union Carbide & Carbon Corporation, New York City): May I suggest that we hear from some of the other foremen who are here? It seems to me we ought to hear from other foremen on this particular subject.

CHAIRMAN HODGE: That is a very good suggestion. Will some foreman volunteer.

EVERET PAGE (Haynes-Stellite Co., Kokomo, Ind.): I am another foreman and I can appreciate the position that Mr. Kalina has portrayed to us.

You know managers are very temperamental people and the workmen are also temperamental people, and we foremen are the go-between; we take the shock from both sides.

When my manager comes to me and says, "Now, Page, we are having too many accidents; we have got to take measures to stop these accidents"; I say, "All right. We will take measures right away to correct that. I will have everything looked after and I will get the safety engineer and have him look everything over, and get the committee to go through and inspect everything."

When the Manager is Likely to Forget About Safety

The next day he comes around with his hair all mussed up. "My God," he says, "did you notice what our cost was last month, and look at your production. Your production was only about 80 per cent of what it ought to have been." Then you immediately forget about your safety program and you begin to try to hustle up production. You go out and boost the men.

I just wonder what per cent of the managers in this country are really enthused about the subject of safety? It seems to me that it is the big problem of this congress to pay more attention to converting the managers than it is the man and the foreman. Practically all the foremen and the men already understand the importance of safe conditions in the plant and also in public places, but it is up to the management of the different institutions to make money.

As Mr. Morey said, the function of the management is to use money to make more money, and it is very easy for management to forget all the little details when they are trying to earn dividends for stockholders.

In the town where I come from until very recently there has not been very much done in a general way through the manufacturing plants to promote safety. They complied with the requirements of the insurance company and that's about all. But I want it to be understood that as far as I have been able to notice, the foremen and the men under the foremen are ready at all times to cooperate with the management when the management will show them that they are earnestly for safety.

E. R. HILL (U. S. Gypsum Co., Chicago): Our management believes in safety first; in fact, they have an operating motto, "Safety always, service, and then cost." When we show them we have saved \$200,000 on safety work, they can't wait for the monthly report to see how much we have saved. As a result of that, the management has issued notices that operators are not good operators unless they are safe operators. That amount of money was saved in one year.

M. H. HUNTER (U. S. Gypsum Co., Fort Dodge, Iowa): I am very

heartily in accord with some of the things that have been said here, and especially Mr. Morey's ideas on maintaining the interest of the foreman, because he brought out some ideas along that line.

I think it is foolish to tell a foreman how to conduct and teach his men safety. My idea has always been to help him. The safety man is the servant of the foreman and of the men in the plant. Quite often the foreman will say, "We will never get this job done if we don't take a chance."

I tell him, "Good for you, Bill; go ahead, take a chance; but for God's sake, don't take foolish chances. We have got to be in a hurry, but watch out; don't have accidents. It is all right to hurry, but of course the hazard increases. Get the work through without an accident and I am with you to help increase the production."

J. P. HUGSON (Phelps-Dodge Corporation, Morenci, Ariz.): I have listened with very much interest this morning to Mr. Morey's paper and later to this gentleman who addressed us as the foreman. I have a great deal of sympathy for any man in this man's position for the reason that I started out as a melter in the mines when I was a kid. I am at present manager of mines, mills and smelters in Arizona.

I think Mr. Morey struck the right key note when he stated that if we are going to succeed with safety, we must make it a part of our operating program, not a minor, but a major part.

The Foreman is Often a Buffer Between Two Forces

The Phelps-Dodge Corporation, with which I am connected and have been connected for the past 14 years, has always been interested in safety. We were interested in safety as long as 14 years ago, but we never got safety down to an operating basis until the last two years when we made it a part of our operating program.

Our safety department is headed by the vice president and general manager of the corporation, and every manager of every branch of the corporation is the head of the safety work of that branch. We have adopted the slogan of "No accidents."

It is true in mining, milling and smelting, that you have hazards. We expect to have them, but in the last two years we have cut our accidents more than half; that is since we adopted that program.

Having been a boss and having been a foreman, this gentleman has my sympathy. I know that the foreman is a buffer between the men and the company. You are looking for production, you are looking for costs and you are also looking for a low accident frequency or ratio, but I want to tell you, my friends, that I have had more than 40 years' experience in mining, milling and smelting, and if you are going to succeed, your success will come first by making your plant a safely operating plant and making safety one of your major, if not the major problem. Teach safety by education through the public schools and through your plants.

CHAIRMAN HODGE: Mr. Morey, have you any further remarks?

MR. MOREY: I think that has been a very helpful discussion. This is a forum for truthful discussion and we can be very grateful to Mr. Kalina for giving the foreman's viewpoint truthfully and splendidly.

Safety work has not been a mercenary thing. Joy is the consciousness of God's approval. I can't define just what joy is. Why is a flower beautiful? There is some indefinable thing of beauty and fragrance in the flower. There is something indefinable in the charm and beauty of character and nobility of our mothers. It is not a mercenary thing.

I know when we started safety, we thought that we would save money and we would have money to devote to fellowship activities.

I used to be a lawyer, and I think both sides of this motto, "Safety First," are right. Safety can be made first and it can save money. I want to bring you right back to the statement I made in my paper, that when a thing is right in principle, it doesn't conflict with any other right.

The Keynote of Discussion to Make Men Think

It is wrong to injure and kill men. Is there any argument on that? Is there anyone so base as to say that money shall come ahead of life and limb of the workmen in our shops? And yet we must make money to stay in business. We can't have our costs greater than our selling price. We have got to take a business-like attitude on this and see what truth is. Two truths never conflict. It is right to be safe and it is right to have our intelligence so spurred and our ingenuity so developed that we can meet any hazardous condition and improve it in such a way that it will not only protect life, but will improve production costs.

L. J. FARRISH (A. O. Smith Corporation, Milwaukee, Wis.): The key note of the several talks for the last two or three days has been to get men to think and that was the aim of Kalina's talk. The management behind Kalina thinks as much of safety as they do of production and have orders in the shop to every operating executive signed by the president of the company, not yesterday, but several years ago, and reiterated several other times to renew the thought, that every operating executive in our plant is to consider the job, the task that he has to do, on a fifty-fifty basis, if that is possible. In other words, safety should be given as much consideration as production in our organization.

Kalina is not a hard-boiled foreman. There isn't a man in this room or any other plant that has a heart as mellow, at least not any mellowier than Kalina's heart, but he is just throwing out a thought, gentlemen.

If you men could get to talk with certain foremen, you would find that many all over this country from one section to the other, have a thought that safety first is the bunk. Of course, it is not. Kalina doesn't believe it is the bunk, but how many times have we seen this situation arise in other places? Let us take the street for example. You know people like dramatic things. If an accident occurs in an unusual manner and it is dramatic, there are a lot of people there looking at the injured man, but if a man is struck by an automobile and just bumped, people pass by and never notice.

Too many managements feel just the way this foreman has described;

instead of constant impounding of safety, talking safety all the time, there is a lull between the periods of accidents.

To go a little further with our foremen, we have monthly meetings with the foremen and we discuss intimately with these foremen the cause of accidents, the cost of accidents and what we can do to prevent a recurrence of those accidents. All the foremen work together. We try to get our foremen to suggest something that can be done in other departments. We try not to be thin-skinned.

I think every manager must know that in business everywhere a large number of men lay great weight on production all the time and only a little weight on safety all the time. They are not in balance every day, and the whole theme of Matt Kalina's talk was simply a thought to get you people to think—"Certainly one way of reducing accident is by stressing cost. Maybe somewhere in my organization there is that sort of thing going on; maybe some general foreman is getting that idea of cost above everything else to a group of sub-foremen, which is not the management's idea at all." That was the idea back of Kalina's talk.

G. A. KUECHENMEISTER (Dominion Forge & Stamping Co., Ltd., Walkerville, Ont.): I was formerly connected with the A. O. Smith Corporation. I have been away from Wisconsin so long that I don't know whether to point to Matt with pride or view him with alarm, but I do want to get up in this truthful testimonial meeting this morning and say that I was on the first foreman's safety committee that was ever appointed in the A. O. Smith Corporation.

A Foreman Who Asked Help in Safety Work

I want to say that Matt Kalina was the only foreman in my recollection who came to the safety committee and said, "Will you come over to my department and help me?" And I want to say that Matt Kalina did not do it from the economic standpoint; he did it from the humanitarian standpoint.

CHAIRMAN HODGE: Having a plant in Milwaukee and knowing conditions, I want to state that the A. O. Smith Corporation is right and that they are doing the things that Mr. Parrish has pointed out. I know that.

We have talked around and about and to Mr. Kalina and I think it is only fair that we let him have one more word.

MR. KALINA: Gentlemen, there seems to be some misunderstanding about the few remarks I made. I did not get the impression from my employer. I consider my employer a model among employers. But I have visited many other plants from time to time and I get in among the foremen and I get to know them. I have questioned them along these lines, and what I spoke about was for foremen in general. Don't get the impression that I meant my employer.

CHAIRMAN HODGE: This discussion has been mighty fine, and it is certainly a source of satisfaction to the chairman to have such a fine discussion of the papers from the floor.

We will pass on to the concluding subject for the morning session,

"Who is Blocking Safety at Your Plant?" by Mr. Howard B. Benjamin, a grinding machine operator and a member of the safety committee of the Haynes Stellite Company, Kokomo, Ind.

WHO IS BLOCKING SAFETY AT YOUR PLANT?

Howard B. Benjamin, Member of Safety Committee, Haynes Stellite Company, Kokomo, Ind.

Before presenting my views, I wish to explain that the conditions I am about to mention are not taken from the plant where I work but from various plants in central Indiana. For years I made it a point to try to find who was blocking safety at the plant where I worked and until I met my present employers, I changed jobs many times.

As all of us know, there was, for many years, a misunderstanding between "capital" and "labor." Because of this condition the managements of some industries and the leaders of labor were each trying to get as much as possible from the other and giving as little as possible in return. As a result, many managers were backing away from the line of prosperity with a feeling of hatred and, on the other side, labor, led by false teaching, was backing away from the same line with the same attitude. They had reached the point where for either to back farther meant the destruction of both and something had to be done.

With these facts to face, studies were made and the personnel department and safety engineer entered industry. It was their responsibility to stand between the management and the working men, analyzing the conditions of both and making suggestions for the betterment of all. This was a difficult position because the attitude of both had to be changed.

I have found that most managers are seeking the truth and are willing to do anything within reason to gain the confidence of their men. No safety man need be afraid to stand for justice and to present the facts.

However, I have heard foremen say that the safety movement was a joke, that they could do the thinking in their departments and that all they asked of the men was to obey orders. Foremen of this type are fast passing from the picture. The management does not want them, because they block harmony, teamwork and cooperation. Managers are asking the safety man to help make those things a reality.

I believe that it is only through education and honest presentation of facts that industry can reach a high stage of efficiency in production or safety. The capitalists and the labor leaders must be willing to yield to reason. Both parties must realize that "capital" really means all resources which can be utilized and developed and that "labor" is the most important resource of all.

The management, to get results, must use and develop the mental resources; and labor, to get results, must use and develop mechanical

and material resources. We must all realize that "capital" and "labor" are parts of the same thing and neither can prosper long to the detriment of the other. And I believe the success of the safety man in the end depends upon his ability to create harmony by showing each group its true relation to the other.

The subject of getting the cooperation of the management and foremen has just been discussed by smarter men than I am, yet I can not resist naming a few selling points of safety that some safety men do not present to the management. I have never found a manager hard to convince when I could get an interview, but when a worker asks for an interview most managers are too busy with important matters to give a worker from the ranks time to discuss industry's highest item of expense.

Mr. Hoover says that the greatest waste in industry is the number of days lost through accidents. Records prove that this can be reduced by almost one-half through safety education.

Investigations by the National Industrial Conference Board show that in the metal working plants it costs about \$48 to replace each man who leaves the service, and to maintain a working force of 2,000 men the average cost is around \$168,000 per year. Records show that this has been reduced 42 per cent where safety work was properly applied.

Bradstreet's financial report shows that 42 per cent of all industrial failures are due to failure of the managements to properly consider the human element. According to Dun's Review there were 1,366 industrial failures in the United States during the second quarter of 1926, that is an average of 455 per month. Indiana had 37 of those failures and Michigan had 35.

Production Increased by a Chance Remark

I have figures to prove that in one departmental meeting at our plant, a chance remark resulted in an improvement of method reducing the cost of production more than the cost of the safety meetings for a year. Our Ever Ready plant at Cleveland put on a special safety campaign for one week and said nothing about production. Yet production increased 20 per cent that week. At our plant at Niagara Falls, Joe DeAngelo, a pipe fitter, eliminated one of the worst hazards in the plant and at the same time reduced the time on that job 66 per cent. I believe that such facts, properly presented, will convince any manager that safety is an investment and a necessary part of his program.

Labor is the highest item of expense in American industry today and yet as a rule it is the only item that has no one to look after it but foremen who are educated in production methods only.

I believe that the success or failure of any plant depends very largely upon the intelligence of the workers and how well they understand, and cooperate with, the management's plans. These workers are your mental guards as well as human machines. The foremen and management must remember that they are the only machines on the market

that can work to a blue print, adjust themselves to new conditions, and plan a better way while in motion. With proper handling, these machines should increase in value each year, while a mechanical machine decreases in value.

Back of every machine and back of every plan there must be brains. It is the duty of the foreman to develop these brains and to do so they must be willing to discuss safety, production, costs, or anything that brings the management and the men closer together in friendly relations. The foremen are getting paid, not for their mechanical skill, but for their ability to influence the actions of others in carrying out the plans and policies of the organization. When a foreman admits that he can not promote safety among his men, he admits his inefficiency on the job he holds. Safety is nothing but production efficiency and must be handled as such.

Mr. Safety Man, it is your duty to present these facts to your management and foremen along with a plan of action that will appeal to all. Have you done your duty? If not, who is blocking Safety at your plant?

Mr. Manager, it is your duty to give your Safety Man a hearing and if his plan sounds reasonable to give him authority to put it across without interference by any foremen who may be behind the times. Have you done your duty? If not, then, I ask you, who is blocking Safety at your plant?

Lay Out a Definite Plan for Safety Effort

I have been asked to suggest some plan of presenting safety to the workers in such a way that they will accept it. There has been more propaganda spread about how to get the cooperation of the worker than almost any other subject, and the fact is that deep down in the heart of every worker there is a desire to play fair. They are all willing to support any plan that is fair, providing it has been presented in a way that they understand.

There is no one plan that will work at every plant, as each plant has different conditions to overcome. But any plan will work if everyone in the organization is working for that plan. The best plan will fail, and often does fail, where only a few are working for that plan.

Therefore, I have always insisted on laying out a definite plan and then having safety meetings to make sure that everyone knows that plan. I never cared much what the plan was, if it was fair. I devote all my efforts to getting everyone to back the plan, and the best way I have heard of is, first of all, to have the men help lay out the plan. Get them to make suggestions on the plan they want and then follow their suggestions as far as practicable and so long as they do not conflict with the other plans or policies of your organization. In this way you are sure of cooperation, as no men or group of men are going to allow a plan to fail if they helped make that plan.

There is not a case on record, so far as I have found, where the facts

were properly presented, that the workers failed to cooperate and their judgment has proven good on some of the most difficult problems facing the management. As evidence, I refer you to the National Cash Register Company. Years ago a worker was asked why he did not make suggestions to show his foreman he was worth more money. His answer put the management to thinking and today they have one of the best organized plants in America. Three-fourths of their executives started making suggestions in safety meetings.

Years ago, Wm. Procter asked questions of two workers. Based on their answers, Procter and Gamble are leaders in efficiency. "Golden Rule" Nash made millions because he believed in the integrity and ability of his workers. The Standard Oil Company of Indiana and the International Harvester Company are others who are cashing in on the mental ability of their workers. And, pardon me when I say that our own general organization, the Union Carbide & Carbon Corporation, has learned that enthusiasm for safety can be aroused among the workers only after the foremen become enthused and go after it in real earnest. Our experience seems convincing. Four of our plants had no lost time accidents in 1925, and 12 have had none during the first half of 1926.

The First Step is to Gain Confidence of Workers

The first step in getting the workers' cooperation in Safety is to gain their confidence. To do this, there must be some one they can trust to protect them from the prejudice of jealous foremen. For that reason, if your plant is small your safety man should also be in charge of personnel. He should classify the jobs of each department, know their requirements and rate of pay and then *select* workers instead of *collect* them; instead of one foreman laying off a good man while another hires a new one, that man should be transferred. He should be in charge of considering all suggestions from employees and see that they get credit for their efforts and ideas. He should interview new employees for new ideas and interview men leaving the service to learn the causes. He should give the foremen credit for the development of their men but he should also charge the accidents and labor turnover to the departments where they occur. He should be willing to help the foremen but should not be under their command. He should provide a plan of promotion based on the square deal.

I do not think you need any red tape in safety. Just remember that to lead men you must be a man. Put yourself in the worker's shoes. Anything that would inspire you, will inspire others, if you are a man.

Safety in industry requires the development of the mental guards—the men themselves.

The only rule that always works is the Golden Rule.

Who is blocking safety at your plant? I don't know, but I do know that the worker is only the shadow of the man above him. If there is

a disloyal worker in your plant, there is an incompetent man above him. It is your duty to find that man and show him the path to take.

Through the influence of safety meetings, the workers can be made to feel the company's interest in them and they will become enthused. You can develop the right mental attitude toward their work, their fellow workmen and their responsibilities. You can teach them that reward and efficiency go hand in hand. You can teach them to consider all sides of a question without prejudice. You can teach them to pass their ideas along for the good of all. You can teach them the value of team work, harmony and cooperation. And you can teach them that every man will profit according to his own contribution to the welfare of all.

Of our 29 plants, four have had no lost time accidents during the plant year, nine no lost time accidents during the past nine months, and 17 no lost time accidents in the past six months.

Gentlemen, I hold here in my hand an American flag, the greatest emblem that ever waved over any nation. For every white stripe in this flag, 3,833 human souls were sent into eternity last year because of accidents. For every red stripe, 9,857 American children were made orphans last year. For every star in this flag, 11,979 American workmen lost 30 days or more last year through accidents.

Think this over, then go back home and try to learn who is blocking safety in your plant. I ask it in behalf of those millions of American workers who earn their daily bread by the sweat of their brow, and I myself am one of them.

Blame for Failure Sometimes Lies at Home

CHAIRMAN HODGE: Mr. Benjamin, I am sure that I express the sentiments of the session this morning when I say that your paper was an admirable one and an inspiration, I am sure, to everyone in the room.

Mr. Benjamin's paper is now open for discussion.

MR. FARRA: It occurred to me that if there are other workmen in the room, it might be illuminating to hear from them.

CHAIRMAN HODGE: I think that is a very good suggestion. Are there any workers present this morning who can contribute something toward this subject?

H. M. SHAW (Illinois Power & Light Co., Chicago, Ill.): I just want to contribute a thought in addition to what the speaker has just said by telling a story that occurred in a plant where I was employed.

At one time we had a very valuable man who was interested in safety work and he was about to leave the company's service. The manager called him in and said, "George, you are going to work for these other people. I would just like to know why?"

"Well," he said, "it isn't a very long story because when I get to that other manager and I tell him anything, he is always going to agree with me. Our manager wasn't so inclined."

The thought that I want to put over really is: do we, as safety engineers, often look for a cause to blame the manager or somebody else when it is the lack of our own resourcefulness. I believe many times we expect the other fellow to agree with us and we accept that as a fact and do not assume the responsibility that rests on us.

J. J. COKE (Henry Disston & Sons, Philadelphia, Pa.): In putting together the thought expressed by previous speakers, there has come up in my mind a conflict that possibly has come to the minds of other visitors.

In one of the talks on the subject of maintaining the interest of the foreman, it was said that the management in one plant had made the statement that with the increase in the safety movement, production had been reduced. Some of Mr. Benjamin's remarks have given me the impression that certain safety measures installed in his plant have increased production. I wonder if there are any figures that would lead us one way or the other. Do increased safety measures reduce or increase production? That point has come up many times in my relations with foremen, with superintendents and with the men themselves, and after having had 10 years of safety work in the Disston plant, I haven't been able to arrive definitely at any conclusion on this particular point.

Testimony on Production Gains Through Safety Work

CHAIRMAN HODGE: There is a committee which is making quite a concentrated study of that point. It is the American Engineering Council.

Has anyone anything to contribute to his question? Some of you men who have had considerable experience in punch press work: what do you say about slide feed dies and so forth, making the job 100 per cent safe and its effect on production?

H. W. SMITH (Pullman Car Manufacturing Co., Chicago, Ill.): I believe it is almost universally agreed that safety measures have increased production all the way through, with a very few exceptions where safety work has reduced production. We have found that always in our experience.

H. R. WHITNEY (General Industries, Elyria, Ohio): In 1924 we had nine major accidents in our press room and if I remember correctly, the cost of those accidents was \$22,000. In 1925 we commenced building safety into the tools and we had three major accidents to the extent of three failures. In 1926, ending October 1, we hadn't lost even the joint of a finger and we have cut the cost of some of our jobs nearly in half.

CHAIRMAN HODGE: What has been the effect on production?

MR. WHITNEY: It has increased production so we can cut the cost nearly half of those particular parts.

PAUL G. WOODWARD (Viscoise Co., Marcas Hook, Pa.): Some time ago we had an injury to a man resulting from a chemical splash and in an endeavor to prevent the recurrence of this, we hit upon a scheme that

didn't cost us very much which not only prevented the recurrence of that injury but is saving us money, although it is only \$5 or \$10 a week.

In an endeavor to prevent injury, we found a production loss.

CHAIRMAN HODGE: Gentlemen, I want to thank you very kindly for the splendid attention you have given this morning and I know you couldn't help give it because of the very fine papers and discussions that we have had.

ADJOURNMENT

FRIDAY AFTERNOON SESSION

October 29, 1926

The meeting was called to order at 2:10 o'clock by George Hodge, Chairman.

CHAIRMAN HODGE: I think we were mighty fortunate this morning in having such splendid papers presented, and I was particularly pleased with the very fine, free and frank discussion that we had from the floor, and I know that if we can just keep up the same pace we will have a very profitable afternoon.

In order not to encroach on the time of the speakers, I am going right into the introduction of the first speaker, Mr. Elliott P. Knight, Safety Engineer of the Employers' Liability Assurance Corporation of Boston, Massachusetts. Mr. Knight is leaving on an early train and Captain Fisher very kindly and courteously gave him the opportunity of speaking first. It gives me a great deal of pleasure to present Mr. Knight.

NO-ACCIDENT COMPETITIONS

Elliott B. Knight, Safety Engineer, Employers' Liability Assurance Corporation, Boston, Mass.

It has long been realized by those engaged in accident prevention that their work is successful only when it is possible to obtain widespread publicity. In no other line of endeavor is it so essential that all parties concerned be made fully aware of the nature and scope of what is intended, and that every effort be exerted to enlist the whole hearted cooperation of every member of an organization. Safety work without an incentive is practically useless, for interest among employees soon lags under a regular routine of plant inspections and committee meetings. That this is true is cause for regret to some leaders, but it is the natural outcome of a system that deals principally with personalities.

In searching for ways and means of making safety work more vital, it was natural that ideas of competition should receive first consideration. The desire to do just a bit better than the other fellow is deeply rooted in all of us. We like to be at the top of the heap looking down with some

complacency on those not quite so fortunate or so possessed with the desire to be out in front. This feeling is so evident in sport affairs that its value was too great to be denied. The application of the principle has proven its worth and as a result we find in industrial plants a wide variety of competitive schemes that are daily leading us on to outstanding successes in accident prevention.

It is highly important though, that the individual plant make an exhaustive study of its problems before attempting any campaign designed to compare men or groups of men. Each has its peculiar conditions, at such variance that it is not possible to treat any two in a like manner. The nature of the work is different, the types of workers change and the locations of the plants and their layouts introduce complications so that each contest must be designed that the detail approaches the need. In general, however, there are four principal factors to be considered: 1. what shall be the competing units; 2. what shall be the rules of the contest; 3. methods of deciding winners; and 4. determination of the reward if one is to be given.

Departmental and Foremen Contests Are Good

The choice of competing units is both interesting and important. The more common units selected are individual workers, departments, foremen and different plants belonging to the same company.

The use of individual workers is rather advantageous in a small plant, but in large plants it produces complications and often leads to some expense, especially if individual prizes are to be awarded. Complications arise in the allocation of accident causes and the methods used to record all data.

Inter-departmental contests are excellent in that they use the spirit of team work and departmental pride to a marked degree. It is possible to better the efforts of an individual who might hold his own record in disdain by the feeling of pride of his own co-workers. It does not take an inspired group very long to influence a wayward member to change his attitude or suffer the consequences.

Contests for foremen have also proved very successful. It has been accepted by most safety workers that the foremen are the "key men" in industry and should be held directly responsible for all accidents to men under their supervision. The offering of some incentive to these men will very often sweeten their attitude toward accepting their responsibilities. The principal drawback to this method is the limited distribution of the award. The larger the number of people affected by the award, the more will be interested in the contest. Very often employees will not put their whole heart into their efforts if they realize that the only one to benefit is the man who has supervision over them.

Inter-plant contests have all of the advantages and good points of inter-departmental contests, with the added advantage that a feeling of pride is fostered in the entire plant and is not limited to any one group of men in the plant. Furthermore, the question of record keeping is

much simplified and accident causes are easily chargeable. It is most important, however, that those in charge of the contest so arrange the details of their program that the interest of all employees is kept at a high pitch throughout the life of the contest. With a large number of people under one control it is possible that some individuals may feel that the loss of their efforts might not change the final result and that they may therefore try to "pass the buck."

The choice of contest rules should be thoroughly studied in order that all competing units shall be satisfied and fairly judged. Simple rules should be evolved defining what shall be called an accident, how lost time shall be calculated, giving an explanation of frequency and severity rates, and designating the source of information of exposure.

Chargeable accidents are those causing death, loss of use of any member, or loss of time beyond the day during which the accident occurred. Days lost should be the actual time lost by the man, counting the days between leaving and returning and excluding only Sundays. All such time lost is chargeable to the month in which the accident occurred irrespective of the month in which the man returns to work. Cases of death are chargeable with 6,000 days, as this is the figure agreed upon as a fair penalty for accidental death. Permanent injuries are charged with a certain proportion of the death penalty, depending upon the seriousness of the injury. A table has been prepared and distributed by the National Safety Council giving the time lost to be charged against the most common types of permanent injuries. Accident frequency rate has been defined as the number of lost time accidents per 1,000,000 hours worked and accident severity rate as the number of days lost per 1,000 hours worked. The exposure to accident is usually given in terms of actual hours worked, and this information should be taken from sources that are correct. In determining the exposure for an entire plant, the figures for supervisory, clerical and productive workers should be figured separately on their own correct bases and all combined to give the final result.

Methods of Determining Contest Winners

There are various methods of determining the contest winners which can be studied to find the one most applicable. The winner can be chosen on the basis of fewest lost time accidents or least lost time over a stated period, by percentage reduction in frequency or severity rates, or by combinations of these methods. Countless methods can be devised but the above are among the most common. Perhaps the best rule to follow in determining what shall be the method is to bear in mind the ideals of accident prevention work.

Fundamentally we are all after an actual reduction in accidents, even though such a reduction does not always mean a reduction in cost or lost time. It is possible that with the accident frequency remaining the same the severity will show a marked decrease and if such is the case the controlling factor has been principally good fortune. Consequently we

can not truthfully say that we have made any real progress in our preventive work, even though from a financial standpoint we have met with some success. Such success may be but temporary, for should our accident frequency remain the same during another period, we might be visited by a higher severity rate. Such reasoning leads us to feel that perhaps the best system is to judge our results on the basis of actual accident reduction. However, the problem is one for each plant to work out, as there is a wide variety of opinion on the subject.

The choice of awards for the winner or winners of a contest is dependent to some extent upon the nature of the competitors, whether individual worker, foreman, department or plant. Awards include sums of money, bonuses, certificates, medals, banquets, cups, banners, flags, etc.

It must be borne in mind that any contest is successful only to the degree that cooperation is obtained from every individual from the management down to the humblest worker. Whole hearted effort is required from all and unless obtained contests will prove futile. It is sometimes no easy matter to obtain and maintain this concerted effort, and widespread publicity before, during and after the contest is required. At times, stunts almost bordering on spectacular are required in order to keep interest at fever heat. It is vital that the start be made in an auspicious manner, that contestants be kept informed at all times as to their standing during the contest and that the ceremonies attending the award of prizes be such that a feeling of regret and desire to improve be inculcated in the minds of those that lost. Such publicity will form the nucleus for proper spirit during future contests and will illustrate what lines of attack new contests should follow.

Types of the Prizes Offered in Safety Contests

A few samples of prizes will illustrate some of the countless possibilities.

1. In a large textile finishing plant where contests are inter-departmental, the management gives a pair of theater tickets to each member of the department having the best accident frequency record for the month. This has aroused very keen interest among all employees. A bit of humor is injected each time a winning department attends the theater by having members of the cast of the show make some reference to the reason for the department's attendance.

2. A company operating six cotton mills staged a six months contest based on reduction in lost time, and conducted as a combination foremen's and inter-plant contest. A banner was designed and placed in charge of the department having the best record each month as the contest progressed. As but one banner was used, this meant that each department in each mill had an equal chance to win. At the conclusion of the six months period, the banner became the permanent possession of the department having the best total record. In addition to this, five prizes varying from a gold watch to articles of clothing were given to the foremen whose departments had the best records over the six months

periods. In further addition a banquet was given to all overseers of the one mill having the best combined record. In this way much interest was aroused and a fairly wide distribution of awards made.

3. A number of automobile assembly plants engaged in a nine months inter-plant contest based on reduction in lost time. By frequent meetings, visits of an engineer and much publicity, keen competition was obtained. The winning plant was presented with an engraved silver loving cup with appropriate ceremonies attending the award. The members of the winning plant were so pleased that they mounted the cup on an automobile and drove all around the town, explaining to all the story of their success.

4. A company making candy gives a pound box of chocolates to each employee who goes through a month without an accident of any kind.

5. A company engaged in meat packing and operating a large fleet of trucks offers enough material for one Sunday dinner to each driver who goes through a month without an accident.

6. A steel erection company offers a bonus of \$5 each month to the foreman whose crew has the lowest accident frequency and \$2.50 to each member of the crew.

When the Hazards in Departments are Quite Varied

CHAIRMAN HODGE: I am sure we are very grateful to Mr. Knight for bringing to us such a broad experience with no-accident competitions. There is time for a short discussion of this subject.

T. R. BICKFORD (Vitco Company, Rockford, N. J.): I would like to ask Mr. Knight in his running of departmental campaigns if he has come across a plant where the hazards of the various departments are quite varied; say he has one department which has been having an accident record of perhaps three accidents a day and perhaps another department which has never had an accident. In some plants like that, they may keep no record of the accidents, so that a campaign can not be based on past experience.

Mr. Knight, what would you do in a case like that in awarding prizes?

MR. KNIGHT: You have brought out one of the thoughts I intended to give you.

There are really two methods—one, practical, the other, theoretical. You have been given the practical one. If any plant comes up against that situation (when you are running a campaign, you very seldom have any two departments having the same chance for accidents), you might place those departments on exposure. You might tell just what has been the number of hours' work, but even that does not give you an exact figure to base what your results are going to be. Some plants which have kept records have gone back over previous years and taken each department in its turn, found out how many accidents there had been, how much lost time was caused by those accidents and then said to them: "In the past, this department has produced so many accidents." The department next to it has produced fewer, so it isn't fair to compare

them when they both employ the same number of men and have had the same number of hours. It is only fair to penalize them on the accidents occurring or the number of hours of lost time coming from the accidents. That is practical, using the past experience and past figures.

The theoretical method is one I learned from the National Safety Council and that is based upon insurance rates. Perhaps you gentlemen know that every single plant is classed as a certain type. Each type has its base rate. For instance, the base rate for foundry work is so much and cotton mills have another rate. In a cotton mill or foundry each department has a different rate, and the rate is determined by getting the total result from the individual ones.

The National Safety Council has brought out a method by which you can use insurance rates in comparing one department with another. For instance, in a foundry there is naturally more hazard out where they are pouring the iron than in the stock room.

Each department has its separate rate, and by using those rates according to rather a nice scheme worked out by the Council, you can get a pretty fair way to compare your groups under the conditions you mention. Does that answer your question?

MR. BICKFORD: Yes.

C. V. PATTERSON (Hercules Powder Co.): Among the prizes you mentioned, you didn't mention extra money prizes. I would like to hear if you have had any experience with money prizes and what luck they have had?

The Question of Money Prizes is Discussed

MR. KNIGHT: I have had experience with just one case and that is a structural steel company in New York City. Structural steel work is always taken, as a rule, as a separate part of your building operations. If they are putting up an office building, there is a certain amount of foundation work and a certain amount of erecting work. The erecting work is structural steel work, that is, picking up the steel members from the ground, taking them to the job and setting them up. The size of any steel job is governed by the number of derrick gangs. There are six or eight men in each derrick gang. That is the source of my information.

We had quite a campaign with the steel erection company. We had eight derrick gangs on the job. We matched derrick gangs against each other, each with the same number of men, the exact kind of work, and working the same number of hours; so it was simple to work out.

We gave to the foreman of the derrick gang who had the best accident record for the month a bonus of \$5, and to each member of his gang, or the other seven men, we gave \$2.50 each. That is my only experience with giving actual money prizes. I can't think of many other cases where I would like to give a prize of money. Too often you are perhaps going in the wrong direction. It is one thing to give a money prize and another to give a watch fob, but in this particular case we did get good results

and the money was far more interesting to the structural steel men than a watch fob or anything else.

E. R. COMPTON (Ford Motor Co. of Canada): Your foreman is a hard-boiled man, particularly in the automotive industries. When you go to that foreman and say, "Here, your department has had so many lost time accidents, totalling a certain number of days," does it convey to his mind the impression which one would wish to convey? We have found that because of its theoretical application in production work, it does not go across as well as the actual dollar and cents basis; and we have based any competitions of ours on that basis and have given the department rating not in days lost but in compensation costs in that department. We have found that to be a much better method because when you quote dollars and cents to the foreman, you are striking home at his overhead. He is naturally more interested.

I was wondering, Mr. Knight, if you have had experience in using that base?

A Safety Contest in a Light and Power Company

MR. KNIGHT: In a plant in New York state engaged in heavy work, such as the manufacture of air compressors, we didn't run any sort of a campaign except what you have outlined, and that is putting up to the foreman just what it meant in terms of actual money. That company opened a separate ledger account of accident costs and every single month each foreman was given an entire statement of just what his accidents had cost for the month, the medical cost, the compensation cost and all the incidental cost, and believe me, when any certain man's cost was high for the month, he was a worried man. That is about the same as what you outlined and we got good results from that.

I wish I had time to go into more detail concerning a great many campaigns. Perhaps I might preclude the possibility of some of these questions being asked because I have run into quite a few of the different types. Your thought is very good and I found it very good also.

G. M. GLIDDEN (Ohio Public Service Company, Mansfield, Ohio): I would like to ask Mr. Knight if he has had any experience in competition in a light and power company, either in plants or divisions of a company?

MR. KNIGHT: Again I can say, "yes." In this case it was a separate company, rather a large public utility company, engaged in the manufacture of gas and the generation of electricity.

We took the plant crew and outside crew separately. Of course, in the gas house you have really a fixed group of men doing fixed operations, and so in that particular case, we ran the contest on the basis of departments, matching one against the other.

In the case of the outside men such as those men engaged in trench work and erecting poles and repairing wires and so forth, they were divided into gangs. Of course, those gangs varied as to the type of work and amount of work, but we rated them on actual exposure. We gave

no prize. The only prize was that each month the winner of a certain campaign or the campaign for the month was given the privilege of being elected to replace the retiring member's place on the safety committee for the following period. It did work out. There is no reason why you can not work a competitive scheme in a public utility of that sort any more than any other place.

CHAIRMAN HODGE: I want to thank you, Mr. Knight, in behalf of the A B C Session, for your very fine talk on this subject, and we hope that you will be able to make your train.

The next subject, "High Spots in Industrial First Aid," and as the program carries the statement, "a racy talk with demonstrations," is by Captain G. R. C. Fisher. Captain Fisher will be assisted by Miss Capper, a graduate nurse of the Henry Ford Hospital.

It gives me a great deal of pleasure to present Captain Fisher at this time.

HIGH SPOTS OF INDUSTRIAL FIRST AID

Captain G. R. C. Fisher, Department of Educational Safety, Illinois Manufacturers' Mutual Casualty Association, Inc., Chicago, Illinois.

"Speaking of the relative value of "Safety" and "First Aid," a Canadian comrade has cleverly phrased it thus—"Safety first is first aid to the uninjured, and first aid is safety first to the injured!"

But it might be well to add that there are degrees even in first aid; and while I am compelled to acknowledge that there are good, better and best in this subject as in everything else, it is the two extremes which one must emphasize; namely First Aid or Worst Aid!

"Big Industry" has long recognized the importance of first aid as a vital part of safety, and as one prominent safety engineer put it: "A man who is well trained in first aid is by far the best safety man because he it is who realizes what accidents mean; and consequently he is ever on the lookout to prevent them; and best of all, if an accident occurs he's Johnnie on the spot: because he knows what to do, and does it!" L. A. DeBlois gives us these figures, which are startling; he tells us that "32 per cent of American industrial concerns employ 100 or less workers!" So then while 18 per cent (which practically represent what we term "Big Industry") are "up and comin'" on first aid, 82 per cent of industry know little or nothing about it.

It positively depresses me when I think of how much this large proportion of our industrial brothers have to risk in wresting a living for themselves and their loved ones. We speak of hazards, but to me the greatest hazard lies in the fact that not one in ten of our smaller shops and factories have anything like adequate provision against accidents: and if that is true of medical supplies its a thousand times worse when it comes to that question of such vital importance—someone who knows how to render first aid—that's where the "worst aid" comes in.

While a member of the British Army Medical Corps, I had an orderly who got hold of some whiskey, properly termed "fix'd bayonets," and possibly something like what we now call "Mule!" That night Charlie was on duty. Among his orders was one to give a patient beef tea and put his feet in mustard and water. Charlie got mixed, he put the man's feet in beef tea and gave him mustard and water to drink! That was a fine illustration of what I call "Worst Aid!"

But all joking apart, this shocking lack in industry today challenges the National Safety Council and the American Red Cross to do something of a constructive nature along this line; and I am not so sure but that the compensation insurance companies can accomplish wonders to this end by training their inspectors to give shop talks on "what to do in case of accidents!" The company which I represent has been doing this for over three years, and it has not alone helped in preventing accidents, but especially has accomplished wonders in lessening suffering, preventing complications, cutting down lost time and minimizing costs to both the worker, the boss and the insurance company.

Here as the program puts it, I shall give you some "High Spots of Industrial First Aid!" I can only select a few out of many, so then, first of all, a word or two on the triangular bandage and a few demonstrations of its use.

This bandage ought to be kept on hand in every industrial plant, it is the first aid bandage superlative.

Arm Slings and Care of Common Fractures

Permit me to show you 3 arm slings, "the lesser" for support in cases of fractured upper arm, a wound or a burn. (Cap't. Fisher applied it.) "The greater," is for support of a broken forearm or in case of wounds or burns, but never to be applied for fractured collar-bone or shoulder blade; because then it adds to the pain by pressing on the injured parts, (Cap't. Fisher applied it.) And here is the unnamed arm sling, to be used in case of broken collar-bone, shoulder blade or dislocation of the shoulder or severe bruising of same. (Cap't. Fisher applied it.)

Now for a few hints on the care of some common fractures, in which we find the greater triangular bandage peculiarly adaptable. By all odds, fractures of the hand, wrist and forearm are the most numerous. A newspaper folded as I now do it, is a splint which can't be beat and for three reasons—you can find them anywhere, they don't need to be padded, and they afford good support.

For the hand or wrist it is best to see that the entire limb is so treated (Cap't. Fisher applied the folded newspaper, using two small scarves to fasten it on) and over all the great arm sling. Another common fracture is that of the collar-bone, and here again the triangular comes in mighty handy. The signs of a break at this bone are easy to locate. There is always a droop of the shoulder on the injured side, pain and loss of power to use the corresponding arm. Treat in this way—place a soft pad in the armpit on injured side, such as a wad of waste newspaper or a folded

cap. gently press the arm into side, make a broad scarf and apply as I do, but be sure you pull tight enough and tie behind. Then catch part of the scarf and fold it in under palm of hand and this prevents the hand slipping down. The pad under the armpit is a fulcrum, and the arm by the side a lever, and this makes extension on the usually overlapped broken bone; so that when he reaches the doctor he is ready for the permanent application.

A fracture of the ribs is one of the most distressing experiences, and there is no mistaking what the trouble is for this is what you generally see (Cap't. Fisher showed how an injured man acts). The positive sign is that the poor chap can't breathe without showing the signal of distress. Take a broad triangular scarf, place the broad part right over the injured ribs, and be sure you place the lower edge above the hip bone, carry the ends to the opposite side and cross the ends, pulling gently and strongly, watching the victim's face as you do so, and when he can take a reasonably deep breath then secure by safety pins; don't tie a knot as that will hurt. And don't forget to place the arm on injured side in a lesser sling.

Arterial Bleeding and Its Ready Control

Now for what might reasonably be called the most vital thing in first aid. Controlling arterial bleeding! One of the great industrial medical authorities has said that seven out of ten deaths are due to loss of blood, one of which may possibly be from internal bleeding.

Nature has made it mighty easy for anyone who once sees this demonstration to catch on, and to be able anywhere to save a comrade from bleeding to death. Note these two remarkable facts which prove that I've just said that nature has made it easy.

1st. We need only know of five points on either side of the body to check the hemorrhage, and four out of five, though under the clothing, may be checked without removing the ordinary clothes. (There was a time when it was difficult to do this with women employees, but now they wear so little that we can easily handle them as we do the men.)

2nd. Nature has placed every artery against a bone, so that all we have to know is the general locality of these, and make pressure in against the bone and control is obtained.

For a gash on the front side of the neck towards the windpipe the blood coming out in spurts and bright red, is proof that the carotid artery is severed. Pressure must be made immediately below the wound and in against the spinal column. Remember, to control an artery, you always press between the wound and the heart.

Before I go further I must not fail to speak of a wound on the side of the neck, where you may find dark red blood welling out freely; that is proof that it is the *jugular vein* which is cut, and this has to be handled with as much thoroughness as that of the carotid artery. One can easily bleed to death in from ten to fifteen minutes with a severed jugular. In this case pressure is made immediately above the wound

because veins run toward the heart, and pressure is always made on the side of the wound away from the heart. (Cap't. Fisher showed the pressure points in both cases.)

And here let me stress a vital point—never allow an injured person to be laid down who is bleeding severely from the head, nose or neck; keep him in a semi-sitting position.

If the arm is cut up toward the armpit, or crushed in rolls or torn from the socket, make pressure at the sub-clavian artery, at back of the collar-bone and down into the first rib. (The Captain showed the point.)

Stopping the Blood Flow in Difficult Places

For a wound with arterial bleeding, from the hand up to the lower part of the upper arm, pressure must be made at the brachial artery. (The Captain showed the point.) This is not hard to find; it is located at about the upper middle of the limb and right below the biceps muscle and of course in against the bone. Here is the point for the application of the tourniquet, but we'll come back to that.

Now for the lower extremities, I am going to show you a pressure point not mentioned in first aid books, possibly for what is known as being too delicate to demonstrate. Well, I'm Scotch, and since I've known of precious lives lost because of this sort of modesty (?) I want to say to you that there's no time for such prudery when it comes to the question of saving a life!

So then, in case a victim of an accident suffers a severe wound high up on the inside of the thigh, pressure must be made at the iliac artery, which runs over the lip of the pelvis bone in the groin space, (the Captain showed the spot.) But if the wound is anywhere from the sole of the foot up toward the lower middle of the thigh; then pressure is made at the femoral artery! This artery is located at a point known in surgery as "Hunter's Canal," in the upper middle inside front of the limb where a cleft may be found; here pressure is made in against the thigh-bone; and this also is the point for the tourniquet on the lower limbs.

Now a word about tourniquets. Here are three kinds, "The U. S. Field," "the St. Johns Ambulance" and "the Barbrous," (The Captain showed all three.) I wish to say that it is best for the industrial first aid man not to depend on the manufactured kind, but always to improvise one, and the reason is plain; you may lose the former, but you can always find material to make the latter anywhere and at any time. Now see how easy it is to improvise one, with a handkerchief and a hard object—as for instance this small bunch of keys; fold the handkerchief crosswise, roll into it the keys, place the hard part over the artery, tie the ends loose on opposite side of limb, put something under knots to protect flesh, as for instance this small Westinghouse notebook, then a pencil to twist it and the trick is done! (All this the Captain did more rapidly than this can be read.)

Now a vital point to keep always in mind, if a tourniquet is applied in the case of a hand torn off, or a badly crushed limb, put it on as tight

as possible because it is a most merciful aid. Not only will it prevent the victim from bleeding to death, but in the case of the amputated limb it helps to lessen the awful twitching caused by the exposed nerves; and if it is a crushed limb, it helps to stop the frightful throbbing. But—and mark this well! If it is a deep incised wound with arterial bleeding, say on the inside of the forearm, and if the doctor is delayed over 25 minutes, raise the limb, have a helper compress the brachial artery, loosen the tourniquet and gently stroke the limb towards the body; and as soon as the redness disappears; retighten the tourniquet. This will prevent strangulation which usually means the loss of the limb. When placing a tourniquet on the brachial artery see that the hard object lies across the artery; but with the femoral artery, the hard object should be larger and run parallel with the artery because it has to sink into the cleft (Hunter's Canal.)

For wounds with arterial bleeding, from finger tips to the wrist, or from the toes to the ankle, use the Flexing Method. If the hand, merely roll up the shirt sleeve and crowd down into the bend of the elbow, a bit more on the inner side of arm; and tie forearm back on arm with scarf, (The Captain showed how.) But if the foot, grab the man's cap, roll it together and crowd into bend of knee and tie back the leg onto the thigh. (This also was demonstrated.)

Now for a few simple but effective methods of lifting and carrying the injured.

Practice in Carrying the Wounded Man

It is well worth while to know these for emergencies in which you have got to get your man up and off and out of danger; and for this reason I only demonstrate one-man methods. These I teach to railway hands, policemen and others to whom such necessity comes.

If it is an injury where it is possible to get a chap upon his feet and if he has a coat on, use this one which I call the "coat carry." Go behind him, grab the tail of the coat, give it a twist or two, turn round, stoop, get the coat over your shoulder and here he is! (This was rapidly demonstrated.) If he has no coat on, stand in front of him, throw your arm over his near shoulder, and get your hand under his opposite armpit, bend sideways, grasp his legs about the knees, bend over—and as you do so draw him onto the small of your back so. (This also was clearly and quickly demonstrated.)

But the carry most necessary, and one which every industrial worker should positively be able to do, is the "fireman's lift;" but not as the fireman does it, unless you have to bring a victim down a ladder; that is, don't put your arm between the legs. I'll prove my point to you in a jiffy. This lift, as you know, is for the injured or helplessly ill victim; or for the unconscious. First, roll him on his face; 2nd, grab under the armpits and lift him to his knees; 3rd, slip the hands around the waist, hug the body and raise to standing position, and as this is done place one of your knees against his to hold the limbs straight; 4th, grab his left

wrist with your right hand, draw him to you and drop your left hand to back of his knees; 5th, pull his body well onto your left shoulder, so that the bend of the body is over your shoulder and lift. Then transfer his gripped wrist to your left hand so that your right hand is free; and if his body is not well balanced on your shoulder give a hitch to bring it there. (The Captain demonstrated this so clearly that no one could miss the method.)

Now you can see that with this method, the entire weight is on the shoulder and can not get loose; in other words, you have much better control than when the arm is between the limbs, because then the bulk of the victim's body is not on your shoulder, but hanging over your back.

Artificial Resuscitation Often Saves a Life

And now I want to emphasize some practical points on "artificial respiration!" And how great is the need! It is a fact that more than one death a day resulted in the state of Illinois last year from asphyxiation alone—i. e. gases and fumes. Unfortunately, I can only touch the merest fringes of this matter, and I sincerely wish I could present every one of my hearers this afternoon with my own little "Manual of Artificial Respiration" but alas, I'm too poor to do that.

Permit me to say this emphatic word, however. What industry needs today along the lines of applied first aid is Standardized Methods! And especially in Methods of Resuscitation!

If this science was taught throughout industry, it is safe to say that seven out of ten deaths, who are victims of "the hot stuff," or gases, etc., could be prevented.

And it ought to be taught, especially in view of the fact that the motive power of industry is almost entirely electrical; to say nothing of the hazards from gases and fumes.

Another thing, we ought to get away from the mechanical methods. "The Encyclopedia Americana" justly and truly says, "they are more lethal than life giving!" While giving a demonstration some years ago at the South Dakota State Fair, in which I had voiced this fact, one of the inspectors of the U. S. Department of Mines came to me, and among other things said, "In my experience the use of the mechanical has been most fatal;" and then he added "out of 25 postmortems which I've attended, and all of these had been worked on with the mechanical apparatus, in every case the lungs were a mass of blood!" Do you get the point? If these hands which God has given us can't revive the "apparently dead," then the mechanical won't.

In the manual method we work *with Nature*, in the mechanical it is a case of mostly *forcing Nature*! The Commission appointed by the U. S. Government in 1914 to examine these so-called resuscitative apparatus, brought in among other vital matters in their report this, "The mechanical apparatus has a tendency to turn inspiration into expiration, through a catch in the bronchial tubes."

That explains why a post-mortem usually shows, as the U. S. Agent of the Department of Mines gave it to me, "the lungs were a mass of blood!"

The Harvard Medical School of Public Health has recently made some experiments which are of vital interest in this connection. Dr. C. K. Drinker says of these. "The heart is known to continue beating from five to eight minutes after asphyxia (breathing stoppage) and it is probable that nervous degeneration of irrevocable nature will not take place for almost an equal period of time following total cessation of the heart beat. While the heart which has ceased beating on account of asphyxia does not readily start again unless attacked very directly, there is always a possibility that well applied artificial respiration may have even this result, and consequently in early cases this measure should never be withheld even though there is no evidence of heart beat!"

What encouragement this is in taking a chance to resuscitate "the apparently dead!"

So then let us go at it and see how this life giving movement should be performed.

Practical Points in Saving the Life

First, (right on the spot where the accident occurred, if out of danger of further trouble), loosen tight clothing, especially at the waist line, for that's the point at which the diaphragm is attached.

Second. Turn the victim over on his chest, grip under the belt-line and jerk up; if a drowning case this will disgorge the water in the stomach; if gas, fumes or smoke, it will help clear the bronchial tubes.

Third. See that the tongue is forward, the mouth free of food, chewing gum, tobacco, loose false teeth, etc., and of all dirt or mucus.

Fourth. Stretch the hands straight out over the head, flex (preferably) the left forearm and lay the head on it with the face towards the right.

Position: the operator's knees should be just above victim's knees, arms rigid, thumbs close in against palm of hand. Place the hands on victim hard above hips, throw weight of body on arms and press down, pressing fingers in on floating ribs as the arms carry weight of the operator's body down. This is "Expiration," and it should only take two slow counts in this way—"one-and-two-and." As the second "and" is spoken the hands should be snapped off the victim. This gives much more reaction, as the suddenly released pressure causes the diaphragm to descend sharply and a consequent immense inrush of air, which is "Inspiration." While the hands are on the ground, the slow count is continued thus—"three-and-four-and-five;" at utterance of which the hands are immediately replaced on the victim and the movement continued.

While the operator is "carrying on," it will help if one kneels at the victim's head holding a cloth with some aromatic spirits of ammonia, which he thrusts close to the mouth and nostrils as the hands are snapped off. These are the steps to be followed in performing artificial respira-

tion, and if done correctly, with patience and perseverance and trust in the help and blessing of God, they will succeed. I know of no act which you or I can render to a fellow man which could mean more.

CHAIRMAN HODGE: I think we owe Captain Fisher a very fine vote of thanks for the splendid, instructive and interesting talk that he has given us.

H. D. LIVERS (Southwestern Bell Telephone Co., St. Louis, Mo.): I would suggest you ask how many in this room know about first aid?

About 100 men raised their hands.

W. RAY (Detroit City Gas Co., Detroit, Mich.): Captain Fisher, you did not mention how long the Schaefer method should be kept up, or is it necessary to open the jaws on carbon monoxide poisoning?

CAPTAIN FISHER: As a rule, if you don't open the jaw, you can't get the tongue forward. I didn't mention that because it is obvious, to bring back a victim, you would keep on until there is no hope; and usually we say when rigor mortis sets in, that is the stiffening of the muscles.

Don't Let Anyone Interfere with Life-Saving

Here is something to keep in mind. The American Red Cross has one record of a lumberjack who fell through a log jam in Northern Minnesota. It was nearly an hour before they got him out from under the water, and they worked four hours and brought him back. That is a record, I think.

PAUL HODSON (East St. Louis Light & Power Co., East St. Louis, Ill.): I would like to ask Captain Fisher the much argued question: what is your opinion when a man is asphyxiated, shocked, drowned, or whatever the case may be, and someone should call an ambulance; what would you do in that case if you were present?

CAPTAIN FISHER: We fought that in the Northwestern Bell Telephone Company. The boys in Des Moines and other towns had been interfered with either by a policeman or doctor who said there was no hope. They said, "What are we going to do about it?"

I said, "Don't swear at the doctor or policeman, because, if you do, that will undo what you are trying to do. Just be a little polite and say this, 'Doctor, can you do any more than I am doing?' and the doctor will say, 'Of course not.' Then say to him, 'As long as you can't do any more than I am doing, let me alone.'"

MR. HODSON: I brought that question to a physician, and he said, "We can do things at the hospital that you can't do," and he explained what he could do at the hospital that we can't do on the job.

CAPTAIN FISHER: A positive table of the cases taken to the hospital and those cases treated on the ground showed that the man who was put in the ambulance was buried in almost every case. If you have to surrender a body to the ambulance to be taken to the hospital, see that you accompany the body and keep the thing going.

Here is something: the Travelers two years ago in their little standard

told this story of a boy working on his father who had been drowned. The ambulance came and the doctor said there was no hope. He put the body in the ambulance and the little fellow with tears running down his face said, "Doctor, I want to go with him," and because it was his father the doctor let him go.

The moment the doors of the ambulance closed, the little fellow went at it and worked, and when they reached the hospital, his father was living.

MR. LIVERS: We have had that question come up numerous times, and early last year we had a man who was electrocuted and our men went to work on him. A neighborhood doctor came in and pronounced the man dead. Our man just wouldn't accept it that way. He went with that man toward the morgue. However, the man was dead; there wasn't any bringing him back, but he stayed with him for over two hours and a half until the body was perfectly stiff.

We instruct our men to stay with them regardless of what the police or anybody else say.

To Standardize the Prone Pressure Method

MR. HODSON: I would like to revert to what Captain Fisher said a moment ago about standardization of a method of resuscitation. The American Red Cross teaches one way, the U. S. Bureau of Mines teaches the same thing slightly changed. The National Electric Light Association teaches just a little differently. The American Gas Association teaches almost the same as the National Electric Light Association. What we need is a standardization. There are things that Captain Fisher does that I don't agree with. There are probably things I would do that he wouldn't agree with. What we should do is get together and agree on one method and have everybody do it in the same manner.

H. BAER (Railroad Mutual Company, Boston, Mass.): I think I can answer the gentleman's question to a certain extent. Dr. Shupper, of the General Electric Company, is a member of a committee which is trying to standardize the Schaefer method right now, and a preliminary report has been issued. I have seen a typewritten copy of it recently. There is a movement on foot now to standardize it.

While I am on my feet, I would like to ask Captain Fisher a question that has been put up to me several times. In the case of a man who is killed and thrown into the water, does any water get into his lungs? I understand that in the case of a man who drowns, there is very little water that gets into his lungs, possibly some gets into the stomach.

Medical examiners on pulling bodies out of the water, when the man has been killed and thrown into the water, make the statement that he was not drowned, he was dead before he entered the water because there was no water in his lungs. If there is no possibility of the water getting into the lungs, how does it get there?

CAPTAIN FISHER: I don't like to be dogmatic, but a man that is really dead before he drops into the water, inasmuch as breathing has ceased

and there is no air in the lung cells, naturally the water goes in; but where a man falls into the water gasping, that explains why it is in the stomach and not so much in the lungs.

J. F. GREEN (Western Cartage Company, East Alton, Ill.): About a year and a half ago I bought an H and H engine to be used for Schaefer resuscitation. Our family doctor is not sold on the fact. He even went so far as to criticize how it should be used.

What I would like to know from somebody who knows more about it than I is, should it be used?

CAPTAIN FISHER: The best thing for you to do is to go to the Bureau of Supplies because there they have it all and know all the facts.

MR. RAY: We have had inhalators in use for both employees and the public at large for the past three years, and I might tell you we have lost only one case in that three year period, not only through the H and H inhalator but also through the Schaefer method. The one case was lost through what they call a wet brain, where the carbon monoxide poisoning had reached the brain and destroyed the brain cells. They had been working on this man for about eight hours and the brain cells had been destroyed. It is quite a common occurrence to use an inhalator and stay on a case anywhere from six to eight hours before we let it go. In fact, we do not move it to the hospital right away. We give our patient a good chance right on the street or right on the job. At times we have worked five or six hours right on the street.

Hours of Effort Often Bring a Delayed Success

To clear up this question of the doctor's interfering, we never yet have had a case where a doctor has tried to butt in on any of our cases. We only had one case of the police department and that policeman was reprimanded for it. We are recognized as a rescue squad in the city and were the first in the city to put in H and H inhalators and the Schaefer method.

I might also state that last year we handled 268 cases of rescue work.

J. F. H. WYSE (Canadian National Safety League, Toronto, Canada): I want to tell you that it is a matter of astonishment to me that more large plants don't understand thoroughly first aid. We are issuing for 1927 a safety calendar and one of the illustrations shows a staff of the Bell Telephone Company of Canada administering first aid and that was inspired by an actual happening at our plant at Sault Ste. Marie on the Canadian side.

A Bell Telephone Company lineman was being shown through that plant by some of the local foremen, and as he was going through a section on the ground floor he noticed a man's body partly covered with a canvas and he said, "What's the matter with that fellow?" The foreman answered, "That fellow fell into a gas tank this morning. This tank had some heavy gas at the bottom and we pulled him out and he is dead."

The Bell Telephone lineman said, "How do you know he is dead?"

The foreman answered, "Well, we suppose he is dead. He seems to have stopped breathing and we just covered him."

The lineman said, "Let me get him and see if he is dead," and he took the canvas off the man, turned the victim on his face and started to work on him with a prone pressure method, and in 35 minutes he brought him to and he is living today.

We thought that was of so much importance that we got the photograph of the Bell Telephone Company lineman and this victim and broadcasted the story in the shape of a poster relative to not giving up.

I know of another instance where men were gassed early in the morning some years ago by being ordered into a tank to clean the tank out. There was some heavy gas in the bottom of the tank and one man collapsed as soon as he got down there, and several others sent to get him out collapsed, and they were all brought to within a few hours except one. The gentleman who is president of the Imperial Oil Company of Toronto was then in charge of this plant and he wouldn't give up the victim but followed him finally to his house.

In those days they didn't know much about the Schaefer method, or bringing those fellows to in any scientific way, but he wouldn't let him keep still, he kept the body moving, and after 12 hours he still wasn't satisfied to believe that that man was dead. They had him laid out on a bed in the guest room and he went after him and shook him and finally said, "Bob, it's time for you to wake up," and the fellow come to.

CHAIRMAN HODGE: Throughout the convention we have been considering the prevention of accidents. We all know that through the failure of the human element somewhere along the line, accidents do occur. I think it has been extremely interesting and instructive to close our convention with such a splendid address from Captain Fisher in calling to our attention some of the things that we can do after an accident occurs so as to give us at least another chance to save men from actual death.

Captain Fisher, I am sure everyone appreciates very much your contribution to the work of the congress this year.

ADJOURNMENT

A. S. S. E.-Engineering Section

New Officers of the Section

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CHAIRMAN: E. W. BECK.

U. S. Rubber Co., New York City.

VICE-CHAIRMAN: R. C. STRATTON.

The Travelers Insurance Co., Newark, N. J.

VICE-CHAIRMAN: R. A. McA. KEOWN.

Industrial Commission of Wisconsin, Madison, Wis.

SECRETARY: W. DEAN KEEFER

National Safety Council, Chicago.

ASST. SECY.: MRS. GENE S. WOOD

New York City.

EXECUTIVE COMMITTEE (The Officers and)

C. B. AUEL

Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.

J. I. BANASH

Consulting Engineer, Chicago, Ill.

C. R. BEARDSLEY

Brooklyn Edison Co., Inc., Brooklyn, N. Y.

E. F. BLANK

Jones & Laughlin Steel Corp., Pittsburgh, Pa.

J. E. CONGDON

U. S. Rubber Co., New Haven, Conn.

A. P. COSTIGANE

Ontario Pulp & Paper Makers' Safety Assn., Toronto, Canada

F. A. DAVIDSON

American Safety Device Co., New York City

J. R. DAVIS

U. S. Gypsum Co., Gypsum, Ohio

L. A. DEBLOIS

National Bureau of Casualty & Surety Underwriters, N. Y. C.

W. F. DITTMER

Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.

E. ROSS FARRA

U. S. Gypsum Co., New Brighton, S. I., N. Y.

R. DAWSON HALL

Coal Age, New York City

F. HARTENSTIEN

Lehigh Valley Railroad Co., Bethlehem, Pa.

ERNEST HARTFORD

American Society of Mechanical Engineers, New York City

W. H. HEINRICH

The Travelers Insurance Co., Hartford, Conn.

F. L. HURLBUTT

Patent Scaffolding Co., Chicago, Ill.

S. V. JAMES

Underwriters' Laboratories, Chicago, Ill.

S. R. JENSEN

Armour and Company, Chicago, Ill.

ALEXANDER LACKEY

Consolidated Expanded Metal Co., Boston, Mass.

M. G. LLOYD

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

H. W. MOWERY

American Abrasive Metals Co., New York City

G. A. ORTH

American Car & Foundry Co., New York City

A. D. RISTEEN

The Travelers Insurance Co., Hartford, Conn.

G. E. SANFORD

General Electric Co., Schenectady, N. Y.

E. J. SENNE

Vacuum Oil Co., New York City

F. C. SINGLETON

Standard Oil Co. (Indiana), Chicago, Ill.

CLINTON D. SMITH

Beaver Valley Traction Co., New Brighton, Pa.

THOMAS S. STROBHAR

Wagner-Taylor Co., Philadelphia, Pa.

R. F. THALNER

Buick Motor Company, Flint, Mich.

W. E. WELCH

The Travelers Insurance Co., New York City

S. E. WHITING

Liberty Mutual Insurance Co., Boston, Mass.

October 27, 1926

G. E. SANFORD, Chairman

General Electric Company, Schenectady, N. Y.

THE first session of the American Society of Safety Engineers—Engineering Section, Fifteenth Annual Safety Congress, National Safety Council, held at the Tuller Hotel, Detroit, Michigan, convened at 3:00 o'clock, Mr. G. E. Sanford presiding.

CHAIRMAN SANFORD: The meeting of the A.S.S.E. Section will kindly come to order.

The first item of business is to announce the personnel of the Nominating Committee, which includes Mr. H. W. Mowery, chairman, Mr. A. J. Van Brunt, Mr. L. A. DeBlois, and Mr. H. Walter Foster. This committee will present its report and officers will be elected toward the close of this meeting.

The next topic on the program is assigned to me under the heading of "Past, Present and Future of ASSE—Engineering Section."

I presume that was a polite way of asking your chairman to give a report of the Section's activities. As you probably all know, the engineering section of the National Safety Council was organized eight or nine years ago. The old American Society of Safety Engineers started up somewhere around 1914. These two organizations worked along parallel lines with considerable duplication of membership. Two years ago they got together and combined as the A.S.S.E.—Engineering Section.

As to the present condition, we are working slowly in some directions and more actively in others, particularly on a number of researches which have been approved by the Executive Committee of the National Safety Council. These researches include exhaust systems, electrical hazards, synthetic ammonia, mast hoists, static electricity, elimination of harmful noise, annealing chains, wire rope attachments and connections, steam engine breakdowns, and rotary stresses. In fact, almost every engineering problem that is put up to the National Safety Council is referred to this Section for solution.

The future of this Section depends largely or almost entirely on yourselves, on the interest you display in regional conferences and in the work of the research committees. We are sometimes at a loss for men to serve on our various committees and in several instances we have been forced to go outside our own membership to secure individuals who are willing to give of their time and effort for the safety cause.

Speed is another important factor in work of this kind. Each committee is organized in response to a more or less general demand for detailed information in a certain subject, so this data should become available at the earliest possible moment.

Rather than emphasize this further I will call on Mr. Stratton, our Vice Chairman in charge of Research, Standards and Codes to present the report of his committee.

REPORT OF R. C. STRATTON, CHAIRMAN, STEERING COMMITTEE ON RESEARCH, STANDARDS, AND CODES

The work of your Steering Committee on Research, Standards and Codes, during the past year has been along research lines similar to the work of previous years. This work included: (1) The giving of advice to the executive committee of the National Safety Council upon subjects proposed for codes or research; (2) Appointing of research committees; (3) A general check up of research, standards and code work, which was in process by members or representatives of the A.S.S.E.—Engineering Section.

Ten research committees have functioned during the past year. These committees are as follows:

1. Wire Rope Attachments and Connections—Charles C. Sunderland, Chairman.
2. Accident Hazards in Manufacturing Synthetic Ammonia—F. A. Ernst, Chairman.

3. Static Electricity—F. C. Singleton, Chairman.
4. Mast Hoists—W. C. Muehlstein, Chairman.
5. Electrical Hazards—S. E. Whiting, Chairman.
6. Exhaust Systems—W. J. Graves, Chairman.
7. Elimination of Harmful Noise—H. W. Mowery, Chairman.
8. Annealing Chains—R. F. Thalner, Chairman.
9. Steam Engine Breakdowns—Daniel L. Royer, Chairman.
10. Rotary Stresses—S. V. James, Chairman.

All of the committees should receive special mention for the work which they have done and the reports which will be presented during the sessions of the A.S.S.E.—Engineering Section will establish their effectiveness.

The A.S.S.E.—Engineering Section continues the sponsorship or joint sponsorship of certain major codes already accepted by or being developed under the direction of the American Engineering Standards Committee. Last year it was reported that 15 safety codes had been completed and received the approval of the American Engineering Standards Committee. During the past year three new codes have been accepted, thereby bringing the total to 18. These are Aeronautics, Gas Safety Code, Paper and Pulp Mills.

Sponsor for Fourteen Safety Codes

The A.S.S.E.—Engineering Section is now joint or sole sponsor for 14 safety codes. These are as follows:

1. POWER PRESSES. This code was completed and approved several years ago. During the past year it was revised, and five weeks ago it was turned over to the U. S. Bureau of Labor Statistics for publication as a government document.
2. LADDERS. This code was completed and approved several years ago. The committee is now considering a revision of the code.
3. FORGING. (A.D.F.I.) The code has been completed and submitted to the committee for final letter ballot. It is anticipated that this code will be adopted within a few weeks.
4. CONSTRUCTION. Further action on this code has been delayed pending the development of a comprehensive safety program undertaken by the Associated General Contractors of America.
5. COMPRESSED AIR MACHINERY. (A.S.M.E.) Work on this code has been unusually slow. It is hoped that the first draft will be completed within a few months.
6. IDENTIFICATION OF PIPING SYSTEMS. (A.S.M.E.) This code has been completed; it is now being edited by a special editing committee.
7. RUBBER MACHINERY. (I.A.I.A.B. & C.) This code has been completed and it will be approved at this Congress.
8. WALKWAY SURFACES. (A.I.A.) Satisfactory progress is being made in developing this code.
9. TEXTILE. Various sections of the Textile Code are being developed by sub-committees. The first drafts of two sections have been

completed; one on "Cotton Mills," and the other on "Bleaching, Mercerizing, Dyeing, Printing, and Finishing."

10. **COLORS FOR TRAFFIC SIGNALS.** (A.A.S.H.O.) Further action on this code has been delayed for short time.

11. **IDENTIFICATION OF GAS MASK CANISTERS.** The committee on this code is being organized.

12. **WINDOW WASHING.** The committee on this code is being organized.

13. **PAPER AND PULP MILLS.** This code has been completed and approved by the American Engineering Standards Committee.

14. **FLOOR AND WALL OPENINGS, HANDRAILS AND TOE-BOARDS.** This is a recent assignment and work has just started.

With one or two exceptions where unavoidable delays have occurred, the work of the code committees is progressing satisfactorily, and the representatives of the A.S.S.E.—Engineering Section on these committees are to be complimented for their efforts.

Representatives on Many Code Committees

The A.S.S.E.—Engineering Section is represented on many other code committees. Our representatives on such code committees are as follows: Abrasive Wheels, W. D. Keefer and G. E. Sanford; Aeronautics, G. E. Peterson and G. A. L. Beaundoin; Auto Brakes, J. H. Truett; Building Exits, S. J. Williams; Colors for Traffic Signals, W. S. Paine, D. Van Schaack and S. J. Williams; Compressed Air Machinery, Dr. A. D. Risteen, C. E. Pettibone and Guy Gregory; Construction Work, W. D. Keefer, Leo D. Woedtke, W. F. Austin, T. J. Whelan, E. W. Bush and F. L. Hurlbutt; Conveyors, R. F. Thalner; Electric Code (National Electric Fire Code) No Council representations; Electrical Power Control, M. C. Goodspeed and J. I. Banash; Electrical Safety Code, G. E. Sanford, S. E. Whiting and R. W. Moore; Elevators and Escalators, G. E. Crippen and W. D. Keefer; Floor and Wall Openings, A. W. Benz and E. B. Tolsted; Forging, J. L. Thompson, W. D. Keefer, C. E. Lehr, Thomas Irving and H. L. Johnson; Foundries, G. E. Sanford and S. E. Hassell; Gas Safety Code, G. O. Smith and E. J. Reeder; Head and Eye Protection, G. E. Sanford and S. J. Williams; Headlights for Motor Vehicles, No Council representation; Ladders, C. N. Young, W. E. Welch, W. Newell, H. B. Gaffers, M. C. Goodspeed, H. G. Wiberg and H. A. Schultz; Laundries, F. F. Beik; Lighting Factories, W. D. Keefer; Lighting School Buildings, William Darlington and G. H. Stickney; Lighting, J. R. Brownell and E. R. Scales; Logging and Sawmill Machinery, S. J. Williams and C. O. Hero; Machine Tools, H. L. Robinson; Mechanical Power Control, No Council representation; Paper and Pulp, Holger Jensen, R. M. Altman, G. E. Williamson, J. M. Sandel and A. P. Costigane; Piping Systems, W. J. Venning, H. P. Weaver and S. H. Kershaw; Plate and Sheet Metal, F. S. Beik and S. J. Williams; Power Presses, S. J. Williams, C. Van Horn, W. D. Keefer, C. B. Auel and A. L. Kaems; Power Transmission, H. E. Somes and H. A. Shultz; Refrigeration, J. I. Banash and H. S. Smith; Rubber Machinery, A. E. Hoener, J. E. Congdon, R. H.

Blanchard, H. A. Dodge and E. W. Beck; Sanitation, C. F. Horan and L. D. Burlingame; Tanneries, No Council representation; Textiles, Ignatius McNulty, Harvey Saul and W. D. Keefer; Ventilation, S. J. Williams and G. E. Sanford; Walkway Surfaces, A. S. Regula and W. F. Sterne; Woodworking, A. S. Regula.

There is in addition one recent appointment, namely, Dr. A. D. Risteen, who is to represent the A. S. S. E.—Engineering Section in service on a committee sponsored by the American Bureau of Welding and the American Society of Mechanical Engineers covering a research on Welded Pressure Vessels.

The Section also represents the Council on certain mining safety code committees through its members.

Work That Is Difficult and Exacting

It must be remembered that the work of a code committee is without exception difficult. Many times research committee members are widely scattered over the entire country and much of the committee work must be done by mail. Meetings of code committees in their entirety are as a result infrequent. However, the importance of the work is realized and the progress of the work under such difficult circumstances behooves us to extend our appreciation to our representatives on these committees. They deserve not only our appreciation but our utmost support. The completion of committee activities on any subject be it research, standards, or codes is a step forward in the prevention of accidents and the protection of human life.

The same thought applies today that was expressed one year ago, and that is that the completion of any code is only half of the necessary work, the remaining half is to secure the use and adoption of the codes by state departments, insurance companies, compensation bureaus, and industrial concerns who may be affected for safety by its use. It is at this point that the responsibility for the completion of this work can be assumed by each individual member of the A. S. S. E.—Engineering Section wherever he may be located and in whatever business he may be engaged.

It was generally agreed, sometime ago, in view of the strategic positions occupied by the International Association of Industrial Accident Boards and Commissions, and several other organizations, including the U. S. Department of Labor, that the National Safety Council would not attempt an active part in the initiation of the direct promotion through state officials for the adoption and use of safety codes. The work, however, in the promotion of or the securing of state adoption and use of codes can be continued by individual members as propaganda work or direct promotional work.

The first can be accomplished by each member, when informed that a code or committee report has been approved by his giving all possible publicity to the report and by bringing the code or report to the attention of the proper authorities in his state and also to the attention of interested associations or organizations. Each member can distribute

copies of the code or report to various trade organizations or periodicals which may represent the industrial activity to which the code applies and urge at the same time that extended publicity be given.

Each member should encourage the presentation and discussion of codes at conventions and conferences.

Each member should urge the manager of any local safety council with whom he may have contact to assist in the acceptance of the code and the promotion of the necessary publicity.

Direct promotional work can be instigated by any member by keeping in close contact with his state department and attend public hearings which may be held when such a state is considering the adoption of new codes or regulations or the revision of existing codes and regulations which apply on some phase of safety that is at present covered or to be given consideration by a safety code. Each member through the attendance at such public hearings or other meetings in his state should be able to assist in securing the adoption of specifications in harmony with the proper safety code.

This individual responsibility should be extended to the promotion of codes or their use by industrial concerns, insurance companies, and rating bureaus. Voluntary individual solicitation by every member in placing the codes before such organizations for adoption or use is to be appreciated and should be expected.

Members Should Influence Adoption of Safety Codes

If every member would assume personal interest in his own state for the promotion and acceptance of safety codes approved by the Engineering Standards Committee or the acceptance of reports of research committees for the betterment of safety conditions, then the burden of intensifying promotional work would be lightened in national council headquarters, and would be that much more effective owing to the personal contact which would be had. Members should welcome the opportunity to speak on safety codes and to attend state public hearings on codes or safety rulings and regulations. Every member should welcome the opportunity to serve on any committee that may be organized at any time and at any point, to consider the production of new safety standards or the adoption of existing safety standards.

In conclusion, your committee would urge every member of the A. S. S. E.—Engineering Section to interest himself in his state to secure the adoption of safety codes and to promote the use of the same. It should be ascertained if any of the completed codes are applicable in the industries in your vicinity. If so, the field is at present open for endeavor and no appointment is necessary.

Your committee would urge that every member volunteer for service on present or proposed committees considering research, standard, or code work. Out of the total membership of the A. S. S. E.—Engineering Section there should not be one member who would fail to give the small amount of his time necessary to produce such reports as will be heard

today or to assist in the promulgation of safety codes. Every member should give the time to influence his own company to adopt the codes and then to influence others to act in a similar manner. If this is done your committee has no fear for the future, in this work. In addition every member should suggest to the Steering Committee on Research, Standards, and Codes any subject which he thinks befitting. The field covered at present is small, the future should prove the reason for our existence.

R. C. STRATTON, Chairman.
DR. M. G. LLOYD,
S. V. JAMES,
W. S. PAINE.

CHAIRMAN SANFORD: Our next report will be presented by our old friend, Mr. Banash, chairman of the Membership Committee.

REPORT OF J. I. BANASH, CHAIRMAN, MEMBERSHIP COMMITTEE

1925 Annual Safety Congress—Members.....	450
Associate Members	191

Total members present.....	641
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Today there are 567 members and 320 associate members. Total, 896.

10 Cancellations during the past year.

245 New members during the past year.

19 Applications pending further investigation.

J. I. BANASH, Chairman,
M. C. GOODSPEED,
R. E. PROUTY,
W. F. YEAGER,
E. G. SHEIBLEY,
C. H. SMITH.

MR. BANASH: It might interest you to know that, due to the activity of E. G. Sheibley, we are adding considerably to our membership on the Pacific Coast. The question often arises as to how far we should go in securing new members. We could put on an extensive campaign if the members thought it advisable.

CHAIRMAN SANFORD: I think we ought to boost the Section as much as we can. At the present time quite a number of our members are working on various activities and certainly it is advisable for us to start new projects as rapidly as possible.

A. J. VAN BRUNT: I heartily agree with what the chairman has said relative to increasing the size of the Section, but I also feel that we should continue to maintain our present high standard before accepting

applications for membership. I personally am very proud of the engineering and safety titles which most of us carry and would not care to see the admission of men who, while personally good fellows, are not eligible according to the qualifications.

CHAIRMAN SANFORD: Our next report is on Regional Safety Conferences. Unfortunately, Mr. Walter G. King, chairman of that committee, has been called out this afternoon to attend another session, so this report will be presented by Mr. J. E. Walters.

REPORT OF WALTER G. KING, CHAIRMAN, STEERING COMMITTEE ON REGIONAL SAFETY CONFERENCES

Thanks to the cooperation of various local councils, industrial sections, council members, and outside organizations, your committee has the pleasant privilege of reporting that 22 successful regional safety conferences were organized and held during the past year. This is almost twice the even dozen that were held last year which up to that time was the high water mark.

The Mining Section shared honors with us for two conferences at Iron Wood, Mich., and Hibbing, Minn.; the Marine Section at the November conference in New York City; the Petroleum Section at Taft, Calif.; the Metropolitan Chapter and the four founder engineering societies at New York City; the Paper and Pulp Section and the Wisconsin Industrial Commission for two conferences, one at Green Bay and the other at Appleton, Wis.; the Chicago Safety Council at that mid-western metropolis; the Woodworking Section and the Southern Pine Association at New Orleans; the Western Pennsylvania Safety Council at Pittsburgh; the Erie Safety Council at Erie, Pa.; the Metropolitan Chapter and the safety councils of Newark, Paterson and Jersey City at Newark; the safety councils of Massachusetts, Springfield and Worcester at Boston; the Chemical Section at Niagara Falls; the two societies of Safety Engineers of California and Southern California at San Francisco; the Washington Department of Labor and Industries at Seattle; the Oregon Safety Council at Portland; the Cleveland Safety Council at Cleveland; the Toledo Safety Council and the Quarry Section at Toledo; the Plant Publication Section for two conferences, one at Pittsfield, Mass., and the other at Chicago; and the Cement Section at La Salle, Ill.

Those who attended these regional conferences emphasize the fact that they are thus enabled to give safety ideas and inspiration to their superintendents, foremen, and others more forcibly than in any other way. This is particularly true of the evening dinner meeting to which many companies send their entire supervisory staff.

Our committee has been encouraged to proceed with the tentative plans for other conferences to be held the coming year, and on behalf of your new committee on conferences, I bespeak your full assistance and support. If any of our members want regional conferences in their

communities, a note to your committee will bring an immediate response and an offer of complete cooperation.

W. G. KING, Chairman,
DAVID VAN SCHAAACK,
H. B. HARMER,
T. H. MCKENNEY,
A. J. VAN BRUNT,
G. F. PRUSSING,
M. E. ARKILLS,
J. I. BANASH,

J. E. WALTERS: I want to add a personal word vouching for the value of regional safety conferences. We take our superintendents, foremen and safety men to these meetings and we can not too strongly emphasize the fact that the results have been highly satisfactory.

Mr. ROSELAND (Newark Safety Council): May I say very briefly that in northern and northeastern New Jersey we are very appreciative of the opportunity of having annual conferences in Newark. We believe they are of very great value in every community and we hope that you will give us the pleasure of continuing our cooperation with you.

CHAIRMAN SANFORD: Our next report is on Chapter Activities. Mr. Ernest Hartford, chairman of that committee, found he was unable to be present and I have asked Mr. Van Brunt to read his report.

REPORT OF ERNEST HARTFORD, CHAIRMAN, COMMITTEE ON CHAPTER ORGANIZATION AND CHAPTER ACTIVITIES

So far there have been organized the Metropolitan (New York City), Boston, and Hartford Chapters and negotiations are pending with the three Societies of Safety Engineers of California, Southern California, and Pennsylvania, and with safety clubs in Kansas City, Portland, Oregon, and Newark, New Jersey.

ERNEST HARTFORD, Chairman,
A. D. RISTEEN,
J. E. WALTERS,
E. W. BECK,
E. W. BULLARD,
J. A. OARTEL,
JOHN BROWNELL.

CHAIRMAN SANFORD: The next article of business is to vote on two suggested amendments to the Constitution which, according to regulations, have been submitted to the secretary in writing, signed by five members and published in the *National Safety News*. I will ask the secretary, Mr. Keefer, to read and explain the suggested changes.

SECRETARY KEEFER: It has been suggested that we amend Sections 1 and 3 of Article 4 of our Constitution as follows:

Section 1. The officers of the society shall be a chairman, two or more vice-chairmen, and a secretary. There shall be an executive committee consisting of the officers, nine committeemen at large, all past-chairmen of the A.S.S.E.-Engineering Section, and one committeeman representing and appointed yearly by each of the industrial sections of the National Safety Council. All such officers and committeemen shall be chosen from the corporate membership.

Section 3. The Executive Committee may elect additional members of the committee or additional vice-chairmen (regional directors) from its own number or from the membership, and may assign any or all of the vice-chairmen to direct the work of the society in specified districts.

The suggested amendment provides for three changes. One will permit the election of two or more vice-chairmen instead of just two.

The second change specifies that all past chairmen of the A.S.S.E.-Engineering Section shall be made members of the executive committee of the Section in succeeding years. This follows in line with the present procedure of the National Safety Council.

The third change permits the executive committee to elect new executive committee members. The suggested amendments were published in the August, 1926, issue of the *News*.

(Upon motion, it was voted to amend the Constitution as specified above.)

CHAIRMAN SANFORD: Our next business is the election of officers for the coming year. I will ask Mr. Mowery, chairman, to read the report of the Nominating Committee.

REPORT OF H. W. MOWERY, CHAIRMAN, NOMINATING COMMITTEE

Your committee respectfully submits the following report:

We recommend the nomination of the following:

Chairman, Ernest W. Beck, United States Rubber Company.

Vice-Chairman, R. C. Stratton, Travelers' Insurance Company.

Vice-Chairman, R. McA. Keown, Industrial Commission of Wisconsin.

Directors for three years: Ernest Hartford, American Society of Mechanical Engineers; F. L. Hurlbutt, Patent Scaffolding Company; C. B. Auel, Westinghouse Electric & Manufacturing Co.

Secretary, W. Dean Keefer.

Assistant Secretary, G. S. Wood.

Signed:

H. W. MOWERY, Chairman,

H. W. FORSTER,

J. A. VAN BRUNT,

L. A. DE BLOIS.

(Upon motion it was voted to accept this report and elect the officers as nominated by the committee.)

CHAIRMAN SANFORD: I am very sorry I can not introduce Mr. Beck, our new chairman, at this time but he is attending another meeting of considerable importance. I am assured he will be with us during our session tomorrow afternoon.

Our next subject is the report of the Committee on Accident Prevention in Engineering Colleges, by Mr. Keown, chairman.

REPORT OF R. McA. KEOWN, CHAIRMAN, COMMITTEE ON ACCIDENT PREVENTION IN ENGINEERING COLLEGES

I have no formal report to present at this time. What I shall give is simply in the nature of a progress report.

In discussing this matter at our meeting last year it was suggested that we ought to make some contact with the student branches of engineering societies in the various engineering colleges and universities, so we secured authorization to expand our committee, under whose direction we are developing a series of illustrated addresses or talks on the following subjects.

1. Brief History of the Safety Movement.
2. Why Student Engineers Must Be Interested in Accident Prevention.
3. A Comprehensive Industrial Safety Program.
4. Safeguards and Engineering Revision.
5. Safety Education.
6. Accident Prevention in Woodworking Shops.
7. Mining Safety.
8. Accident Prevention in Building Construction.
9. Preventing Accidents on Power Presses.
10. Safety in Foundries.
11. Preventing Personal Injuries in Machine Shops.
12. Showing of Motion Picture Film, "Hindsight vs. Foresight."
13. Electrical Accident Hazards and their Elimination.
14. Eliminating Accident Hazards in Industrial Power Plants.
15. Chemical Accidents and Their Prevention.

Securing approval of this list, we included the following statements in letters sent to all members of the committee:

"Many of us realize that the student branches of the professional engineering societies often have difficulty in arranging sufficiently interesting programs to maintain the regular attendance of their members.

"If this suggested plan is approved by our committee, these lectures can be developed in either printed or mimeographed form and brought to the attention of, and made available to various student branch officers. At the same time, we might write to the engineering college Deans asking their cooperation and active support.

"It will, of course, be made clear that it will take from twenty to thirty minutes for the presentation of each lecture and that stereopticon slides will be provided free of charge."

It is taking longer to complete these lectures than we had anticipated, but by next fall we should be ready to push this work with the opening of college.

CHAIRMAN SANFORD: This is one of the committees which has been carrying on excellent work, and Mr. Keown and his colleagues deserve our sincere thanks and continued support.

MR. MULLINS (Toronto): I would like to ask if the committee plans to send these lectures to the student organizations for presentation by students, or whether the addresses will be presented by professors.

MR. KEOWN: The students and professors in each college will determine jointly just who will present each lecture.

MR. VAN BRUNT: I would like to ask Mr. Keown if the list of lecture subjects is complete.

MR. KEOWN: We shall be glad to have suggestions for additions.

MR. VAN BRUNT: There is one matter that has been brought to the attention of all safety men very often of late; that is the matter of resuscitation by the prone pressure method. The American Gas Association is making a motion picture depicting not only the prone pressure method of resuscitation correctly, but also showing the result of this action on the interior mechanism of the human body. I feel sure you can get the A. G. A. to cooperate if, in your wisdom, you decide it is best to add the showing of this film to your list.

SECRETARY KEEFER: We have asked Mr. Whiting, the chairman of our Committee on Electrical Hazards to prepare lecture No. 10 and I think it is contemplated that he will include in this lecture something on this important subject of resuscitation. Nevertheless, we are glad to have this information, Mr. Van Brunt, which I feel sure will be given careful consideration not only by Mr. Whiting, but also by Mr. Keown's committee.

CHAIRMAN SANFORD: The next subject on this afternoon's program is the report of our committee on "Suction Systems" by Mr. Graves, chairman.

REPORT OF W. J. GRAVES, CHAIRMAN, COMMITTEE ON SUCTION SYSTEMS

As your Committee on Suction Systems was organized but recently it will not be possible to make a formal report at this time.

Outlining briefly the objects of the committee's work and its proposed program of activities, we find that a real need exists for more effective installations, better designed hoods, and more extensive use of mechanical ventilation to the end that working conditions in many industries may be materially improved.

We find a willingness on the part of employers to do all that lies within their power to provide healthful working conditions, and that shortcomings in the efficiency of the majority of installations arise from a lack of knowledge of requirements, or from the employer's inability to discover the right source or the right kind of equipment, or to a short-sighted policy of economy, which, if not followed, would result in much more effective systems, giving satisfactory results under all conditions and with but slight additional increase in capital investment.

A real problem exists in thousands of factories located in smaller communities the country over, because competent contractors for blow pipe systems are located only in the large cities and as the problem of dust or fume removal is frequently of minor importance nothing is done about the matter. The committee hopes to promote the design and manufacture of portable unit suction systems, which can be purchased by the isolated factory and installed with the same amount of labor and material (and we hope not the profanity) that accompanies the setting up of a coal stove.

To Promote Extensive Use of Mechanical Ventilation

Your committee will endeavor to promote more extensive use of mechanical ventilation in industry where the conditions are such as to require the removal of noxious fumes or gases or harmful dusts, which would be of decided benefit from the health and labor turn-over standpoints. Many industries are relying upon natural draft, through roof or window ventilators, and where satisfactory results, at all times and under all conditions, can only be secured by substituting the more dependable mechanical method which removes contamination quickly at the source and at the same time provides the only practicable known method of positively controlling these conditions.

The pneumatic conveying of material is worthy of greater attention. It is not only an economical way of handling many kinds of raw material and manufactured product, but is the safest type of conveyor—bar none.

Any members of the Council having difficult problems in removal of fumes, dust, fog, heat, odors, etc., may submit them to this committee, who will gladly cooperate in an endeavor to find the best method and type of equipment needed.

W. J. GRAVES, Chairman.
H. M. NICHOLS,
S. M. TONNESEN,
LEONARD GREENBURG,
R. S. GILCREAST,
W. A. ROWE.

(Mr. Graves then exhibited and commented on a group of stereopticon slides showing new and novel suction systems.)

CHAIRMAN SANFORD: Gentlemen, we have one additional piece of business to bring before the Section at this time, and I will ask Mr. Goodspeed to read the report of the Resolutions Committee.

Resolution Upon Death of Claude Robert Alling

MR. GOODSPEED: "WHEREAS, The American Society of Safety Engineers—Engineering Section of the National Safety Council—has just learned of the death of its valued and greatly beloved member, Claude Robert Alling, vice-president of Underwriters' Laboratories; be it

"RESOLVED, That the deepest heartfelt sympathy of all our members collectively and individually is hereby extended to his family together with our great regret at not being able to be represented at his funeral today. Be it further

"RESOLVED, That our deepest sympathy is also extended to Underwriters' Laboratories, to whom we take this opportunity to express our appreciation of his many years of successful effort in the safety movement and particularly of his own contributions in our councils and deliberations, which, in addition to his genial and well-beloved personality, make him an outstanding figure to us."

(Upon motion this resolution was adopted and the secretary instructed to mail copies to Mrs. Alling and to the Underwriters' Laboratories.)

ADJOURNMENT

THURSDAY AFTERNOON SESSION

October 28, 1926

The Thursday afternoon meeting convened at 2:05 o'clock, Mr. G. E. Sanford, presiding.

CHAIRMAN SANFORD: The first part of this afternoon's session will be devoted to a discussion of low-voltage electrical hazards and I will ask Mr. S. E. Whiting of Liberty Mutual Insurance Co., Boston, and chairman of our Committee on Low-Voltage Electrical Hazards, to lead the discussion.

LOW VOLTAGE ELECTRICAL HAZARDS

A Discussion Led by S. E. Whiting, Liberty Mutual Insurance Company, Boston, Mass.

MR. WHITING: Surely every one of us is interested to know what hazards may develop in the use of low-voltage electricity, both in the industries with which we are connected and, more personally, in our homes, most of which now are utilizing this almost indispensable form of power. It is the hope of your Electrical Committee that the informal discussion we are now to have will both convince you that certain common practices in utilizing electricity are so hazardous as to cause fatalities and provide you with practical methods of prevention.

Let us ask ourselves a few questions regarding this hazard and then see whether or not we can agree on the answer, after considering certain records of cases.

Question A:

Does low-voltage electricity ever cause a fatal shock?

Discussion A:

By "low-voltage" we mean anything from, say, 750 volts down to 110 volts. Nearly all utilization of electricity (disregarding telephony and other forms of communication) comes within this range, the higher values for substantial amounts of power and the lower for small amounts of power and for interior lighting.

The average wireman and the average electrical engineer are firmly convinced that a low-voltage shock can not of itself prove fatal; but let me read you the following tabulation of 10 death cases reported as due to low-voltage shock. Some of this data is confessedly fragmentary and some of the cases may have been actually due to high-voltage leaks. To answer this objection right now, we shall have to state that our tabulations do not include all of the evidence available to your committee. You all know, with what care the liability situation

in any death case is examined by medical experts and claim investigators and there are practical reasons for distinguishing between high-voltage and low-voltage electric shocks. We can not include such details here since ours is an educational problem where brevity in our statistics at least is necessary for us to get even a hearing. Anyhow, what does it matter whether our statistical accuracy on this dispute between high-voltage and low-voltage is not 100 per cent, only 70 or 80 per cent? The practical point is that these accidents occurred—these persons were killed—while handling low-voltage equipment, every one of them. Obvious cases of a cross on high-voltage circuits have been thrown out.

- (1) Two employees in coal yard. Pushing a coal loader, individually driven through a 250-volt motor fed by portable cable. Shock received from frame of loader as wheel was pushed over the cable. Ground was damp.
- (2) Employee in acid-making room of paper mill, June 23, 1924. Shock while taping wire lead to 3-phase 550-volt acid pump motor. Fuses had blown in two phases only and main switch was left in during repair.
- (3) Mechanic setting up new machine, shocked by 550-volt wire where splice was not taped.
- (4) Electrician of power company testing out a 550-volt line to locate defects. Shock while connecting instrument from fuse box to ground on conduit.
- (5) Operator in wood-pulp mill. With hand on water pipe, threw in open-knife switch and made contact with one of the blades. Circuit was either 220 volts or 550 volts d.c.
- (6) Employee on construction job. Walking on ground that was wet, fell against open-knife switch on 440-volt circuit.
- (7) Near-sighted electrician, not wearing his glasses. Shock from factory motor knife switch in metal box on 440-volt circuit.
- (8) Repairman in combustion chamber of boiler. Removing portable electric light, received shock. Circuit was 220 volts.
- (9) Richard Camp, seaman on U. S. "Currituck," July 20, 1925, Norfolk, Va. Found dead with bare feet on metal bunk and neck against radiator. Loose wires (from junction box to lamp) lying on bunk, with bare spot in contact. Circuit was 122 volts from auto transformer with one side permanently grounded a. k.
- (10) Woman dish washer at Monroe Terrace Apartment, Richmond, Va. With wet hands, picked up telephone and turned on light by pull-chain socket. Lighting fixture found "dead grounded" on 115-volt a.c. circuit. Old installation with neutral not grounded but test showed no indication of high-voltage leakage. Reported by Inspector Bowry.

Operating Conditions Where Fatal Shocks Occur.

Answer A:

Under certain circumstances we say decidedly "Yes."

Question B:

Under what operating conditions does low-voltage electricity cause fatal shocks?

Answer B:

Where the person is well grounded at the time of shock.

Discussion B:

You will note in reviewing our tabulations, there is such a characteristic relation between severity of shock and grounding of the person (standing on a wet floor, working in a boiler, etc.) that we must train our electricians, engineers, and master mechanics to avoid all chances of shock under such conditions. There is nothing new about this idea

for the National Electrical Code has specified porcelain sockets in damp places for many years but we must develop it into an almost instinctive habit if we are to avoid these low-voltage fatalities.

Ten more items of our tabulation are given below and you will note how repeatedly this idea of the grounded person enters the situation.

(11) Boiler repairman at Richmond Refining Co., Richmond, Va. Inside of boiler with extension light having porcelain key socket and wire cage. Clothing wet from perspiration. Shock from strand of wire projecting between socket parts in contact with lamp cage. Several burns on body and on arm. Circuit 220 volts a. c. Reported by Inspector Bowry.

(12) W. Garnett boiler repairman, on steamer "St. Johns," Washington, D. C., July 31, 1925. Shock from extension lamp inside of boiler. Staggered out of boiler and fell dead. Voltage supposed to be 110 volts.

(13) R. Alleman, Washington, D. C., July 12, 1925. Garage employee holding metal socket of extension lamp, standing on wet concrete. Neutral of three-wire secondary circuit had two driven-pipe grounds. Inspector found 220 volts between outside wire and ground.

(14) M. H. Knott, Elmira, N. Y., Sept. 18, 1925. Demonstrating an electric washing machine at Fair Grounds. Received shock with one hand on washing machine and other hand reaching for connection.

(15) S. Cole, repair man at Embury Gypsum Plant, Wheatland, N. Y., March 7, 1925. Holding onto frame of plaster conveyor, received shock from brass socket on extension cord light. Socket showed omission of fibre lining and loose strands on one of the cord wires inside of the socket. Voltage not stated.

(16) H. Sprague, electric welder on U. S. Ship "S-47", July 22, 1925. Using electric welder in confined place on top of engine, suddenly died. Voltage of welder 110 volts. Autopsy showed no external or internal causes of death and was therefore reported as electrocution.

(17) Mrs. C. H. Kady, Providence, R. I., Sept. 21, 1925. At home, while washing up floor received shock from unused side of twin socket on extension cord to piano lamp on 250-volt circuit. Ground through water pail against steam radiator. Burns on arm and on thumb (found in socket).

(18) Machinist at Hathaway Machinery plant, New Bedford, Mass., August, 1924. Shock received from drill press individually motor driven from a 550-volt circuit.

(19) Electrician at Wickwire-Spencer Steel plant, Worcester, Mass. Shock followed by fall from ungrounded overhead outdoor conduit on side of building on 550-volt circuit.

(20) Twenty-seven low-voltage fatalities from brief records of Bureau of Standards. Occurred between 1912 and 1919 entirely on lighting circuits. Fourteen cases specify voltage from 110 to 120 volts. Circumstances of shock not given except for five cases in bath tubs and three cases on portable cords.

Shock Current Does Not Depend Solely Upon Voltage of Circuit

Question C:

Why is a low-voltage shock more dangerous in damp or otherwise grounded locations?

Answer C:

Because, for a given voltage, the flow of current through the body is greatly increased by the body being grounded.

Discussion C:

Perhaps it is altogether obvious but it is here worth emphasizing that this shock current does not depend solely upon the voltage of the circuit but every bit as much upon the body resistance, as well. If you stand on a dry, wood floor, and come into contact with 110 volts through one hand, you probably will not feel any shock at all, let alone being killed. If you stand on a wet floor and do the same thing, the resistance through your body to ground has been materially decreased—more current therefore flows through your body and the resulting shock is more severe.

Now this is an application to the particular case of the human body of what has been known for generations about electric circuits; that the current equals the voltage divided by the resistance—what is known as "Ohm's Law." We are justified in further stressing the point since many an electrician stops applying this law when he reaches the low-voltage fatality problem and seeks some mysterious high-voltage explanation or, what is still further beside the point, ascribes the death to a weak heart. It is not a theory but a fact that the resistance of the human body varies widely. The Bureau of Standards and other experimenters have measured the body resistance and have found that it varies from 100,000 ohms or more between dry finger tips down to 1,000 ohms and less between large, firm and wet contacts against the hands, feet or body. Here is a range in resistance over 100 to one. Therefore, those who believe that a man can be killed by even a poor contact on a 2,300-volt circuit (as we all do) must also agree that a man can be killed by a contact only 20 times as good on a 110-volt circuit—or else deny Ohm's Law.

Discussion of the Preventive Problem

We are now through with arguments and can take up the preventive problem. Before doing so you will be interested to read another group of our tabulations, 10 more obituary notices or rather 11, for in one of these accidents on low-voltage equipment two persons were killed simultaneously!

(21) Marguerite Prevot, at home, Green Bay, Wis., Mar. 26, 1926. Using a hair curling iron while sitting in bath tub. 120 volts.

(22) J. Ketch, laborer at Merrimac Chemical plant, Woburn, Mass., Nov. 3, 1918. Shock from defective lamp cord on drop light while replacing lamp. 110 volts.

(23) C. Riddley, laborer at Royster Guano Co., Norfolk, Va., April 5, 1919. Moving electric loader in yard, strain on cables broke wood bushing and charged machine.

(24) C. Hansen, helper at Waterhead Mills, Lowell, Mass., March 16, 1920. Starting elevator motor with compensator starter. Tests showed 550 volts charge on case of starter.

(25) R. Sawyer, millwright at Slater Mills, Webster, Mass., Aug. 21, 1919. Drilling hole in floor of elevator pent house, bit struck controller parts, ground for body through motor frame. Burns on hands and chest. 550 volts.

(26) N. Neilson, Salinas, Cal., 1921. Shock from open-knife switch on lighting circuit at home. Ground through gas stove.

(27) C. Ingraham, Lansing, Mich., 1922. Shock from electric light switch at home. Ground through water pipe.

(28) Beatrice Schwarzler, Bronx, New York, N. Y., 1921. In basement in dripping bathing suit. Shock from lamp socket while screwing bulb into it.

(29) Workman in auto body plant, Detroit, Mich., Oct. 1925. Shock from portable electric drill lying on auto body, not in motion. Ground through metal rod on floor. Burns on palms of both hand and sole of one foot. Test showed 118 volts.

(30) Two men in auto body plant, Philadelphia, Pa., June 5, 1925. Simultaneous shocks from auto body on wooden horses, charged by portable electric grinder having defective insulation. Ground through metal air hose on floor. Test showed 220 volts.

We are fortunate in having several prominent electrical experts at our meeting, some of whom are serving on your Electrical Committee,

and they will now speak on one or another of the practical ways in which these electric shock cases can be prevented. One of our members is Dr. M. G. Lloyd, of the Bureau of Standards at Washington, who is also chairman of the National Electrical Safety Code. He will speak on

Polarized Wiring

DR. LLOYD: Polarized wiring, which is now required by the electrical code, means that a definite polarity is maintained through each and every circuit of the system. This applies to two-wire and three-wire 110-volt systems used principally for lighting and such systems are also permanently grounded on one side. This means that at every outlet on the system only the "outside" or ungrounded wire is "hot" or has any difference of potential between it and ground and this hot wire will be connected to the side of the device that is least exposed. For instance, on an electric lamp socket, the hot wire will be attached to the center contact and the grounded wire to the socket shell contact. This plan has two advantages in avoiding shock. One is that if you get your finger inside the socket, the part you are most likely to touch will be the grounded side of the circuit. The other advantage is that no electric strain is put on the resistance of the little fibre sheet that is provided between the screw shell and the outer brass casing of the socket. Under abuse and exposure to moisture, etc., this fibre is likely to break down where subjected to the full line voltage and cause a charge on the outside of the socket that would be hazardous to life. Polarizing eliminates this hazard.

This polarizing practice is now required for new electrical installations and I think everyone can see that it is a very desirable thing. By having one side of the circuit systematically identified throughout, the hot wire only need be fused and the elimination of a fuse on the grounded side of the circuit insures that the ground connection will be maintained.

When it comes to portable devices, especially if they are connected by the ordinary bayonet plug and receptacle, it is not quite so easy to maintain polarity. Non-reversible plugs and receptacles and identifying colors or other marks on the wires of the extension cable itself will be necessary to maintain the polarized condition right up to the portable device. We should thereby secure a means of grounding the exposed metallic parts of any electric portable device such as the frame of an electric drill, thus guarding against another of the low-voltage hazards. While such polarized plugs and receptacles are already on the market and their use is strongly recommended, the great majority of existing equipment is of the reversible non-polarized type. We have here a large problem that has not yet been solved.

MR. WHITING: Just to remind you again that we are talking about a death hazard, we present another group of 10 fatalities occurring in the

use of low-voltage equipment. Two of these are of the brass-socket-in-a-boiler type where, as the body was taken out of the boiler, it was still holding on to the brass socket in a death grip.

(31) Workman in tank in Winslow Bros. Tannery, Norwood, Mass. Shock from brass extension lamp on 110 volts. Three-wire system with neutral grounded o. k.

(32) Millwright in Albermarle Paper Co., Richmond, Va., Jan. 1925. Shock through heavy wrench used on machine charged by extension cord that was jammed in gears. Standing on water pipe. On 110-220 volts three-wire circuit. Rescuer received shock.

(33) Workman in copper kettle at tobacco extract plant, Richmond, Va. Shock from brass socket on extension cord on 110 volts.

(34) Workman in Merrimac Chemical Plant, Woburn, Mass. Shock from ceiling outlet on open wiring on lighting circuit at 110 volts.

(35) Workman at Waterside Textile Plant, Lowell, Mass. Shock from charged casing of portable electric drill with defective armature insulation.

(36) W. Fisher, electrician, Gilboa, N. Y., Aug. 23, 1925. Dragging portable line over ground at construction job. Circuit 440 volts, ungrounded secondary. Lamps in series. Spliced bared by stretching. Man hung up on circuit 5 minutes or so. Three fingers burned off. Prolonged resuscitation unsuccessful.

(37) A. G. Hamilton, janitor, Cambridge, Mass., Feb. 10, 1925. Inside boiler of apartment house. Shock from brass socket extension lamp. Lamp cord found wet and light still burning. Man still gripping socket when pulled out of boiler dead.

(38) Workmen in tunnel under construction. Bound Brook, New Jersey, 1921. Shock from exposed splice on 220-volt portable lighting circuit.

(39) Employee in Griess Pfleger Tannery, Chicago, April 25, 1925. Shock from socket of extension cord on a wet floor on 110-volt circuit.

(40) Boiler man at Lawrence Gas Co., Lawrence, Mass. Shock from brass socket on extension cord in mud drum of boiler. Victim still gripping brass socket when pulled out of boiler.

One of the members of your committee represents the National Electric Light Association, the members of which generate electric power and distribute it to us for such innumerable and invaluable uses. These power companies distribute electricity at high voltages but on private structures, under ground and over head, to which the general public is not exposed, finally delivering the power to us at low voltage at our service switches. From that point on, the power company has no legal responsibility; for someone else, an electrical wiring contractor or an individual who does his own wiring, completes the connection from service switch to utilization device.

This N. E. L. A. representative is Mr. E. W. Gorry, Superintendent of Substations of the United Electric Light & Power Company of New York City, the power output of which is so vast they have to use 100,000 volts, not for transmission but merely to distribute it. Mr. Gorry will discuss this low-voltage problem from the

Viewpoint of the Electric Power Company

MR. GORRY: As far as the light and power companies are involved in this question, every possible precaution is taken to the best of our knowledge and belief. It almost goes without saying that we utilize every available method of avoiding any chance of our high-voltage current getting crossed onto, or leaking through transformers into, the low-voltage system on our customer's premises.

In the protection of our own employees, undoubtedly many of you are familiar with the method known as the "hold-off system" and with the devices used for the protection of employees. In New York City we go somewhat further on our distributing system, by placing a protective grounding connection also on the secondary side of transformers to guard against any possible feed back.

The Accident Prevention Committee of the N. E. L. A. has given considerable thought to the question of proper grounding of exposed parts and the safe design and construction of the vast amount of utilization of equipment found in industry and in the home. In my opinion, the adoption of polarization, as Dr. Lloyd has explained, will help a great deal to eliminate some of these hazards that we are here discussing. I suggest that some more of our statistics be entered now in the record.

Additional Cases Where Fatal Shocks Occurred

(41) L. J. James, steam-fitter on Baker Smith contracting job, Perryville, Md., Aug. 18, 1918. Fell against 440-volt open-knife switch on switchboard. Floor wet, wood platform out of place.

(42) A. Ellis, electrician at Sun Shipbuilding plant, Chester, Pa., April 8, 1919. Coming down from overhead work on high-voltage bus, got across 440-volt bus below it.

(43) P. J. Fahy, electric welder at Sun Shipbuilding plant, Chester, Pa., June 11, 1919. Using a.c. welder in tank of Hull No. 11, found dead with electrode in hand and body wet from sweating. Test: 60 volts on welder terminals under load and 110 volts on open circuit. Autopsy: burns on finger and body, aortic regurgitation.

(44) S. Niclewska, repairman at Electric Lamp plant, Danvers, Mass., June 26, 1918. Shock from open-knife switch, reaching for it with other hand on gas pipe.

(45) Man at home, Milwaukee, Wis., June 14, 1924. Shock touching electric washing machine in his basement, on 110-volt circuit. Motor insulation had broken down, charging frame of washing machine.

(46) Moulder in a Milwaukee foundry, Aug. 17, 1924. Shock received from electric sand vibrator on 110 volts a.c.

(47) Night watchman in Milwaukee foundry, Aug. 17, 1924. Shock from brass socket on extension cord taken out of doors in rain. Man found dead still clutching socket.

(48) Employee in Aetna Ball Bearing plant, Chicago, Aug. 10, 1925. Shock from brass socket of extension cord. Man fell into water tank set in floor. Was gripping socket when rescued. Another man shocked, touching him.

(49) Foundry crane operator, Buda Company, Harvey, Ill., March 14, 1925. Shock from 440-volt a.c. trolley wire of crane. Shock and fall. No burns but marked congestion of internal organs.

(50) Employee at DuPont plant, Nov. 28, 1922. Circuit was 550-volt a.c., chemical dirt on floor. Safety switch charged by insulation breakdown in conduit. Protective ground by driven pipes had too high resistance.

Both American Institute of Electrical Engineers and the American Society of Mechanical Engineers are cordially cooperating with us through the appointment of representatives on our Electrical Committee. Colonel John P. Jackson of the New York Edison Company, another very large power company has, for years, been a leader in the safety activities of these organizations. At the present time, due to the illness of one representative, Colonel Jackson is acting in dual capacity for both engineering societies. He will speak on the

Viewpoint of the Engineering Societies

COLONEL JACKSON: My own belief is that there is no problem today which should engage the safety engineer's attention more fully than the one which we are now discussing. In a talk I had yesterday here in Detroit with certain prominent engineers, we all agreed that electrical engineering has been developed probably with more intelligence, so far as the safe utilization of electricity is concerned, than any other branch of engineering. The electrical industry started only a generation ago but with a very high type of young men because it was only such men who could understand the principles of the industry.

Shortly after that the great manufacturing companies began to take large numbers of young and well-educated men into their plants and put them through special courses designed especially to fit them for intensive work in this field. The result today is that, with an amount of power generated enormously greater than is found in any other form for distribution to the general public and of such a nature that you can neither see nor smell it, there have been phenomenally few accidents. Nevertheless, accidents are increasing and why? Because the industry is growing so rapidly and new developments are complicating our problem to such an extent that we can hardly keep up with our own progress. Naturally the engineering profession is very much interested, both from the generating standpoint and from the utilization standpoint, in seeing that the problem of electrical hazards is fully and carefully handled and that the intelligent men of this generation give it more than ordinary attention.

This country is not the only one that has this problem of electrical utilization. Only the other day, Mr. Loeb, General Manager of the New York Edison Company, handed me a report by Mr. G. S. Ram, Electrical Inspector of Factories in England, a man of very high technical ability and long experience. This report discloses very much the same situation we have in this country. The legalized official rules in England require polarizing and grounding but, due to the fact that many existing installations have not been brought up to the new standards, serious accidents are continuing to occur in Great Britain. I am arranging to turn over the most vital part of this English report to your Electrical Committee.

MR. WHITING: Of course insurance companies are represented in this committee work for it is the poor insurance companies that have to pay out large sums for accidental death cases whatever the cause, provided they occur in industry. The cases in the homes, unfortunately, are not insured and the bereaved families do not have even the slight satisfaction of financial recompense. It is an open secret that insurance companies are not the "ultimate consumers" of these costs but anyhow we are indebted to them for many items in our tabulation. The Aetna Life Insurance Company has served on this committee for several years and one of their research engineers, Mr. W. A. Ferguson, will now speak on

Viewpoint of the Insurance Company

MR. FERGUSON: I can say that we are very much in accord with the views already expressed regarding this low-voltage electrical hazard. During the past 18 months four additional cases of this kind have been called to our attention. One of them was from a lamp socket and the other three occurred in connection with the use of portable electric tools or devices. These accidents were all death cases and we feel that the situation is such that it merits considerable study and investigation, particularly in connection with the portable tool problem. Personally I feel that this Engineering Section should dig into the problem to assist in every way in working out an answer to this serious toll of death cases.

MR. WHITING: Just to reinforce Mr. Ferguson's suggestion that every one of you should lend a hand in solving this problem by sending in your suggestions and reporting cases that you personally know about, we present you another group of 10 more low-voltage fatalities. This completes our formal tabulation, although we still have many other records in the rough.

(51) Operator in Erving Paper Mills, Erving, Mass. Shock from handle of starting compensator on 550-volt circuit. Protective ground wire clamp was loose and arcing.

(52) Engineer at Wyman Gordon Forging Plant, Worcester, Mass. Shock from handle of starting compensator on 440-volt circuit. Charged condition found by volt-meter test still existing on the next day. Due to leakage through metallic dust on top of slate terminal block of circuit breaker mounted on same ungrounded hangers that supported the compensator.

(53) Workman at Norton Grinding Wheel Plant, Worcester, Mass. Shock from charged compensator at 550 volts. Charge due to bent pigtail of contactor in switch.

(54) Repair man in boiler at Oswego Falls, N. Y. with extension lamp, 1926. Weatherproof socket broken, exposing live outer screw contact. Fed from 440-volt circuit having four lamps in series.

(55) Mrs. Joseph James, Anderson, Ind., 1926. Electrocuted while operating an electric carpet sweeper at her home. A short circuit caused the fatal shock.

(56) Mrs. Sidney Ragan, New Orleans, La., 1926. Shock from weatherproof lamp socket on a low-voltage grounded-neutral lighting circuit.

(57) Herbert Rought, Chicago, Ill., Mar. 27, 1926. Connecting armoured cable to 110-volt circuit. Shock between live end of wire and grounded cable. Line tested o. k. after accident.

(58) Leslie Woodson, laborer in Lynchburg Foundry, Va., Sept. 20, 1926. Shock from portable motor-driven sand screen charged by wheel cutting cable on wet sand. Circuit 220-volts, three-phase.

(59) John Gerger, Machine Operator at Pittsburg-Des Moines plant, Pittsburg, Pa., Aug. 6, 1926. Shock from 220-volt drop light through metal shade on weatherproof lamp socket.

(60) Cannery employee, Booth Packing Co., Baltimore. Shock from conveyor charged by accidental contact through metal bucket with low-voltage electric switch.

The largest electrical manufacturer in the world itself uses electric drives practically 100 per cent upon its vast quantities of machine tools, large and small, each with its own controlling devices. While the chairman of this session, Mr. Sanford, could tell us much from his own experience about such installations, I am going to call upon another man of similar experience with this company, Mr. J. B. Harnden, Super-

Intendent of Tests of the General Electric Company, Schenectady, New York, who will tell us about

Guarding Stationary Electrical Equipment

MR. HARNDEN: Speaking first of the low-voltage hazard in general, I feel a great amount of missionary work must be done before much will be accomplished in this field. I have had close association with large numbers of young college engineers that go through our training course and have been astonished to note repeatedly how generally these men feel that no danger is associated with the lower voltages. The proposal made elsewhere at this Congress to carry safety education into our schools and colleges is certainly a valuable one.

I have made a careful study of all accidents that have happened in our testing department, going back to 1900. We have to handle both high-voltage and low-voltage circuits in this work and, while we have had indeed very few low-voltage fatalities, we have had some and they have almost invariably resulted from the test man feeling that low-voltage shocks were harmless. Certainly voltages below 500 or 600 will not kill everybody, but they might kill anybody under certain circumstances and I attach great importance to this missionary work you are doing.

On the other hand, some cases of deaths in industry may be erroneously charged to electric shock. Thus, I recall over a period of 15 or 20 years three or four low-voltage electrocutions in our plant, but right alongside of these have been 20 or more cases of men dropping dead from heart failure. Because these men were not in proximity to any live electrical parts at the time, no question of electric shock was raised; but if they had been, a false conclusion might have been drawn as to the real cause of death. There is evidence enough that low-voltage will kill but certainly we must use caution in deciding such cases.

The guarding of stationary low-voltage electrical equipment against accidental shock is a simple matter but it is unquestionably important. It consists merely in the enclosure of live terminals, switch blades, fuse cutouts, etc. (unless they are isolated by elevation); the use of dependable insulation on wiring with enclosure in conduit where exposed to mechanical injury; and the permanent grounding of all metallic cases and frames to prevent charge on these dead-metal parts if the internal insulation should fail. It should be obvious, yet the fact is sometimes overlooked, that where you have a machine individually driven by a motor mounted directly thereon, any insulation failure in the motor windings will place a charge on the whole machine. It is our standard practice to permanently ground each and every motor-driven machine tool. In the usual case, the line wires are in conduits and the desired protection is obtained by a short jumper wire screwed to a clean, firm contact on the machine and fastened to the conduit with the usual ground clamp.

MR. WHITING: One organization represented on our Electrical Committee is the Electrical Manufacturers' Council. At this meeting, this organization is represented by Mr. M. C. Goodspeed, Safety Engineer of the Erie Works of the General Electric Company, who will talk to us about

Guarding Portable Electric Tools

MR. GOODSPEED: The portable electric tool or device presents much the same shock problem that the extension cord lamp presents. We recommend polarization of wires for both portable tools and extension lamps wherever possible. The grounded wire of the circuit is then connected to the frame of the tool as it is to the shell side of the socket. With this plan, if the tool insulation breaks down, you simply have an internal short circuit that will clear itself by blowing a fuse but the man is protected.

We must realize that frequently electric tools are used on scaffolds, etc., where even a mild shock to the operator may cause a dangerous fall. We had a case of this kind quite recently and, as a result of it, we decided to remove all of our old type plug attachments and install polarized plugs and receptacles throughout.

Another method of protecting the user of portable tools is to provide three-wire cables and three-pole attachment plugs and receptacles, the third wire being connected between the casing of the tool and a ground contact at the plug outlet. It is even possible on existing equipment to tape a third wire onto the cable of the tool, one end screwed into contact with the tool casing and the other having a spring battery clamp for grounding onto the outlet box or otherwise. The former method is better because it grounds automatically—and not every man will take the trouble to guard himself.

Where polarized wiring and a grounded side to the circuit are not available, this third-wire method is valuable but I distinctly prefer the two-wire polarized feed for portable tools. The third wire may become broken and its protection be lost without warning but with the two-wire feed, any break in either wire puts the tool out of commission and warns the user of the defect.

Referring to this low-voltage hazard in general, I feel that the physical condition of the subject has much to do with the result of the shock. Standing in water has been mentioned as dangerous but if a man is merely perspiring very freely, his resistance may be markedly reduced. The lowest fatal voltage mentioned at this meeting has been 110 volts but even lower voltages may be dangerous. I recall witnessing one man getting hold with both hands of two live metal surfaces and he could not pull himself loose. He was taken off the circuit by others before serious injury developed but if he had not been promptly relieved, we can not be sure the strain on him would not have proven fatal. Subsequent tests showed that this circuit had on it less than 35 volts.

MR. WHITING: The city of Detroit has established a reputation for official enforcement of protective measures against this portable electric tool hazard. We appreciate the attendance at this meeting of the Chief Electrical Inspector of Detroit, Mr. B. W. Clark who will tell us about this pioneer work he has been doing.

Portable Tool Requirements in Detroit

MR. CLARK: A few years ago we had a sort of epidemic of serious and fatal accidents in the use of portable electric tools and investigation showed that something must be done. So in 1921 we adopted a rule that cable used for portable motors must have an extra wire connecting the tool or machine directly to ground. For single-phase or direct-current motors this required three-wire cables and for three-phase motors, four-wire cables. This practice applied not only to the usual small electric drills but also to portable loaders for handling coal, gravel, etc. Concerns with such equipment now have their yards provided with several plugging stations each with a ground connection as well as power feed.

Since the enforcement of these requirements, there has been no general trouble of this sort. We have had only four low-voltage fatalities during these six years; two of which were from direct violation of instructions given the persons and the other two were in tunnel work where the wiring was absolutely hazardous and had been installed without our inspection or approval.

Regarding polarization, we have found it necessary in certain types of installation to require double-pole switches even on two-wire polarized and grounded systems. This is the out-door sign lighting equipment that is becoming so common. In spite of its normally hazardous location overhead, such equipment must be handled frequently for replacement of lamps, etc. We had what might have proven a serious accident when a man up on a ladder on one of these signs got hung up by a shock although he had opened the single-pole switch that had been provided together with polarized wiring. Luckily, his helper was there to free him and knew enough to quickly clear the line at the fuse cutout.

Investigation showed what had happened. A repair man from another concern had cleared up trouble on this same sign the night before. He had found a ground on the live side of it and to quickly restore service had merely transposed the line wires. We thereupon adopted a rule requiring double-pole switches for outdoor signs and building outline illumination. This rule and the one on grounding the frames of portables have, I believe, saved a number of lives.

MR. WHITING: A past president of National Safety Council is with us and he has had, in a former business connection, not only to struggle against the misbehavior of chemicals in the manufacture of dynamite, but against the same low-voltage tricks of electricity we have been discussing—which shows how widely this hazard spreads. Mr. L. A. DeBlois,

Director of Safety Engineering Division of the National Bureau of Casualty and Surety Underwriters will speak on

Dangers from Inadequate Grounding

MR. DEBLOIS: It is quite possible that, under certain conditions, the grounding of non-current-carrying parts of electrical equipment may merely be setting a trap for the unwary by creating a zone of potential difference or voltage in the ground itself. I can make this clear by citing an electric shock fatality in a plant that had its power brought in from outside and transformed down for distribution at 550 volts.

An accidental ground developed between one leg of the low-voltage system and a conduit that was in metallic contact with the switch box and the iron sheathing of a motor house—all these dead-metal parts being connected to a driven-pipe ground. The floor of the house was cement somewhat soiled with nitrate of soda that had been tracked in. A man reached over to throw the switch (without standing on the insulating platform provided) and dropped dead and attempts at resuscitation failed. Investigation disclosed the breakdown on one leg of the circuit to the conduit already mentioned and another similar breakdown to a conduit on another leg of the circuit but located over half a mile away. There was found a difference of potential in the space where the man stood sufficient to cause a fatal shock and, of course, his feet were wet with the chemicals.

In investigating the methods of making electrical grounds, the Bureau of Standards has found that from a driven-pipe ground you may have within a short radius as much as 70 to 80 per cent of the entire line voltage; that is the point. In my opinion there is only one thing to be done. Make your ground connection of such low resistance that when the insulation breakdown occurs enough current will flow to positively blow the fuses in the line or operate the circuit breaker.

The DuPont Company where this accident occurred has now abandoned the driven-pipe or buried-plate grounds that are so commonly used and does all of this protective grounding of equipment directly onto water pipes. In buildings not provided with water supply, a buried copper ground wire is run to the nearest point where there is a water pipe. We now feel that some of the formerly inexplicable shocks or fires that occurred were due to the inadequacy of anything less than a complete metallic ground such as water pipes afford.

MR. WHITING: Safety Council headquarters has for years been helping on this problem and I will ask Mr. W. Dean Keefer, Director of the Industrial Division of the Council to tell you about their special publications relating to electrical hazards; he wrote several of these pamphlets himself.

Pamphlet on Low-Voltage Electrical Equipment

MR. KEEFER: The National Safety Council has published a series of about 85 Safe Practices Pamphlets on special hazards, and the pamphlet relating to the low-voltage electrical hazard is No. 29, now in its second edition. It consists of 16 pages with numerous pictures of a very practical nature illustrating details of electrical equipment of all sorts. It is sold at an average of 10 cents per copy in quantity lots. We strongly recommend that all who are interested in this subject obtain copies not only for their personal use but also for distribution to master mechanics, plant engineers, and members of wiring departments. Thorough familiarity with this pamphlet should assist your plant men materially in correcting the dangerous practices that lead to regrettable electric shock fatalities. We also have Safe Practices Pamphlet No. P. S. 1, on Radio Hazards, and No. 76, on Portable Electric Tools, the latter discussing both the electrical and the mechanical hazards involved.

Safe Extension Lamps

MR. WHITING: In closing this discussion, I want to call your attention to the safe forms of extension lamps that are available for your use. There is the substantial wooden-handled lamp holder with cage to cover the lamp and protection of the cord against bending strains. There is some choice between these holders and those with porcelain or composition sockets are to be preferred: at least you should insist that the brass socket, if used, is thoroughly insulated from the cage with ample creepage clearance. There is the reliable rubber-sheathed cord that you should use in place of ordinary twisted lamp cord. And, if your men will persist in using twisted lamp cord and brass sockets for their extension lamps, there has recently come on the market the special rubber slip-on cover that will help you solve this problem. But don't wait for an accident to force this issue upon you. Make a clean-up of your electrical equipment now, even searching into the lockers of your repair crews—the men who are from Missouri on low-voltage shocks. Of course, you will check up in your own home.

CHAIRMAN SANFORD: This subject is one that might be continued for much of the afternoon, but we are obliged to jam as much as we can into each single session of our three half-days. Therefore we will have to stop this very interesting part of our program.

The next part of the session will be in the field of electrical testing in the factories and will be given by Mr. J. D. Harnden, superintendent of tests for the General Electric Company, Schenectady, N. Y.

SAFETY IN ELECTRICAL TESTING

J. D. Harnden, Superintendent of Testing Department, General Electric Company, Schenectady, N. Y.

It has been my good fortune to be connected with an industrial company which from its early beginning has been actively interested in all phases of "Safety First" activities. Paralleling the growth and development of its business has come extensions and improvements to the system of grappling with this important problem. As a result, we find diligently engaged in this work an organization consisting of a general committee, having local works committees whose representatives extend down through the entire line of organization, with large numbers of workmen on the floors, the whole forming an agency whose influence is felt in every department of the business and through which it appears great progress can be made.

The electrical industry, rapidly taking form as one of the major industries of the world, is made up of many phases, and an essential part of each is electrical testing in one form or another. Wherever manufacture of electrical apparatus or devices is carried on, testing is found usually paralleling and considered an important part of manufacturing and engineering operations. Much testing is necessary to determine that defects of design and manufacture have been eliminated, that guarantees of performance in contracts to customers have been met, and for the taking of sufficient data for the guidance of engineers in making future designs.

While much of this paper applies to all kinds of testing, it deals particularly with electrical testing in the largest manufacturing plant of the General Electric Company at Schenectady. This plant produces in great volume and variety large power apparatus, consisting of direct current motors and generators, synchronous converters, alternating current motors and generators, induction motors, frequency changers, steam turbine driven generator sets, transformers, regulators, rectifiers, with combinations of the above units forming motor generator sets, etc.; and all of the work is performed by engineering graduates—about four hundred are taken in each year from one hundred and thirty-five technical schools and colleges, the testing department being used as a laboratory for the training of young engineers after graduation.

In some places the opinion prevails that such work is naturally extra hazardous and that more accidents than usually occur in other kinds of work must be expected. The writer does not share this view, although as long as electricity is used there will always be a good deal of hazard associated with the physical handling of electrical apparatus and power circuits. But with a full realization of the conditions and an earnest and sincere desire to prevent accidents, operations of this kind can be performed with an accident record no higher than is usually present on other classes of work in shops considered as safe places to work. A low

accident rate, however, can be accomplished only by consistent efforts on the part of all supervisors of testing departments, who must be made to understand that the prevention of accidents is one of their first duties and fully as important as any work performed.

A fact many times overlooked is that electrical testing of rotating apparatus has associated with it all kinds of hazards—both electrical and mechanical. Mechanical hazards include such things as the bursting of rotors or flywheels, armatures, pulleys, belts, rotating exposed shaft projections, couplings and jack shafts. The bursting of rotors or flywheels with disastrous results must be guarded against by the use of speed limiting devices—tested once each week—and other regulating devices, and when testing for over-speed (usually 200 per cent speed), such as is done in case of the rotors of water-wheel driven generators, extra precaution should be taken by placing the rotors in underground pits, specially designed for this class of work.

Great care must be exercised in the selection of men for this kind of work and all must be physically capable. Those with defective vision, hearing, subject to fits or any other ailment which may be the cause of an accident should not be employed. Hence, the need of a physical examination before employment.

Before starting work, a person thoroughly competent with knowledge of all rules and regulations should spend considerable time with each group of new employees.

The Careless Human Factor Must Be Eliminated

Much attention must be given to ascertaining how careful a workman each tester is, and when a careless man is discovered, he should be discharged. There is no one thing which has a more far-reaching effect on other workmen than to follow the above practice. Accidents in electrical testing cannot be entirely eliminated by the usual practice of guarding dangerous places, although it should be used extensively. For the reason that men testing machines are in complete control, connecting, adjusting, taking electrical readings, changing connections, and performing various duties incident to the job, they largely create safe or unsafe conditions as each step of the work progresses, and no amount of general safety rules from headquarters will suffice, except in so far as they educate the men to use careful methods. So we must use guards wherever they will be of value but our main reliance will always be in educational programs and discipline.

Therefore, department heads will find it necessary to pursue a policy of continuous instruction in some form best adapted to meet the needs. The following plan has been found to be effective: Monthly meetings (or oftener if necessary) on the first Friday of each month at 7:30 a. m. of all supervisors on both the day and night shifts of all testing sections. A large part of each meeting is always devoted to safety and each accident is discussed and ways decided upon to prevent a

recurrence; and equally important is some plan that will insure all information and instructions being passed down to the workmen. It is a common fault with supervisors that they sometimes possess information sent out from headquarters but no one else knows about it. To overcome this, and as an agency in foremen's training, each foreman should call his men together for a few minutes whenever necessary to give them full and complete instruction.

Every man should be given a "Safety Manual" embodying all the rules of the department. The manual should be in three parts:

First: all general miscellaneous information bearing on the subject.

Second: a chapter of the most important safety rules, infraction of which justifies the action of discharge.

Third: a detachable sheet to be returned, after not more than one week of service, to the office, certifying that the rules have been read and are understood.

Experience indicates that much good results from this system. A very active suggestion system is in operation through which about 5,000 suggestions are received from the workmen each year, many of which relate to safety methods, and those possessing merit are put into use at once.

Much may be gained by offering prizes each month to the department with the lowest lost time accident record, as a means to arouse interest and keep the subject of "safety first" at all times in the minds of the men.

Summarizing Safety Effort Under Four Heads

The subject may be summarized in the following four statements:

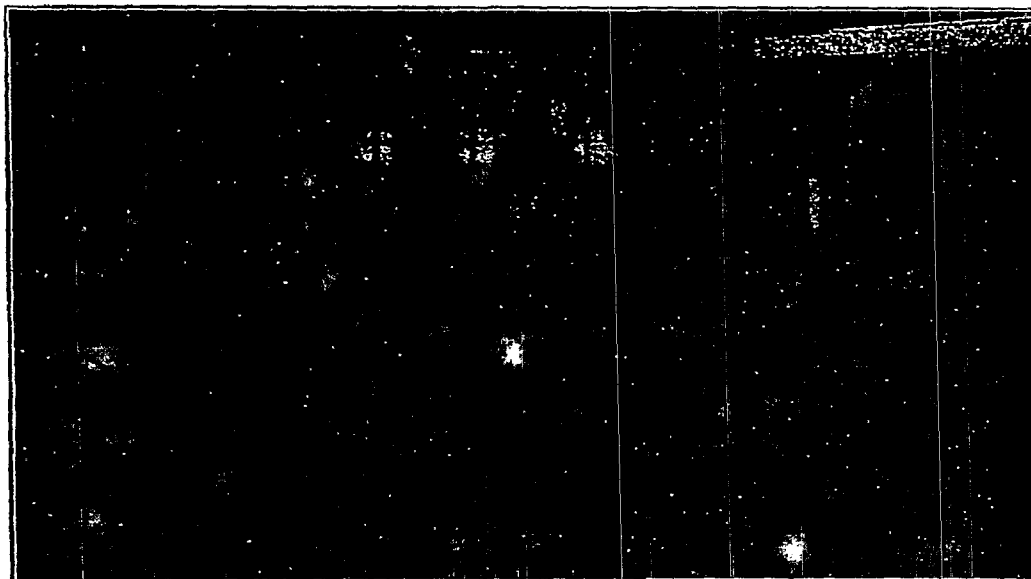
- (1) Supervisors to the last man must be trained to think and work safely.
- (2) Workmen must also be trained.
- (3) Methods of operating all equipment must be in accordance with safe practices.
- (4) Equipment must be safe and so maintained at all times for the service placed upon it.

Perhaps the most difficult accomplishment is the training of supervisors; they must be made to see that preventing accidents is largely one of education, supervision and discipline. Educational campaigns should never cease and should include everyone in the department. Supervisors must get the spirit of safety and pass it on to the men. Careless workers or supervisors should be discharged in cases of serious infractions of safety rules or regulations.

Adequate illumination is important. Undoubtedly many accident reports, specifying other reasons, should read, "Insufficient illumination."

The equipment, much of which is comparable with modern powerhouse installations, should be designed, installed and maintained with great care. The equipment naturally falls into two classes, permanent and temporary. Since the greatest hazard exists on that part of the

equipment that may be installed in a temporary manner, it follows that the maximum amount should be installed in permanent fashion. In most departments much more is temporary than need be, the excuse being that things are up today and down tomorrow. On small devices a large percentage can be installed in permanent shape, although on large power apparatus, fully 50 per cent of the equipment must be of a temporary nature. Many of the portable parts, such as test tables, circuit breakers, oil switches and other control devices can be designed and constructed in finished form.



Portable safety enclosure for testing mercury arc rectifiers.

There is a common belief that the only electrical hazard is one of shocks, but there is also always present the chance of electrical burns from short circuits and arcs of all kinds; and where a large quantity of power is involved the results may be quite as serious from burns on low voltage as from shocks on high voltage circuits. The great danger lies both in direct burns from the arc itself and also the secondary effect of burning clothing. Therefore, the greatest care must be exercised constantly to prevent accidental short circuits and power arcs with their destructive effects.

Numerous devices have been developed which play an important part in the prevention of accidents and are used extensively.

Testing tables for various purposes developed along modern lines of switchboard construction (completely enclosed with expanded metal) which contain the main circuits and potential and current transformers;

etc., are used, the front table part of which carries all instruments, isolated from the high voltage.

Rotating shop machines with frames thoroughly grounded are equipped with guard rails for the protection of men and operators when inspecting bearings or other parts.



22,000 volt potential transformer cage, Schenectady Works.

The frames of most machinery undergoing test are effectively grounded, as the massive iron floor upon which they are placed is thoroughly and permanently grounded.

Transformers are safeguarded by placing them within fireproof vaults or expanded metal enclosures.

Portable circuit breakers and oil switches are carried in substantially built and completely enclosed structures.

Insulated wooden mats are used in front of switchboards and test tables. Conspicuous signs in large numbers indicate to all the character of the job, and white tape, meaning "High Voltage" to every test man, is strung around the temporary circuits and other parts of a set-up.

The use of rubber gloves, metal lamp guards, metal armored air hose, the wearing of finger rings, wrist watches, metal pencils, long flowing neckties and loose clothing is prohibited.

Much attention is given to instructing the men in the "One Hand Method of Operating" and also that they must never risk their own safety to the insulation on cables or other parts, because in general it is always possible to disconnect the source of power before making changes or adjustments in test work.

The various kinds of general testing work in the factory buildings naturally falls into three classes and the equipment should be designed accordingly.

- 1st. Tests which can be made within an enclosure or room with gates interlocked with the source of power, thus excluding all persons including the testers. Wire and cable, transformers, insulators, etc., are tested in this way, and all operations performed from the outside of the enclosures.
- 2nd. Tests which can be made within an enclosure where all persons are excluded, except the testers.
- 3rd. Tests on large power machinery in the manufacturing shops where it is obviously impossible to construct rooms for each unit, require the greatest care and attention. On this class of work, we are faced with the most difficult problems.

Each unit must be erected in a thoroughly substantial manner on the test floor to avoid shifting or movement in case of accidental short-circuit. Substantial platforms equipped with step and guard rail are necessary around the larger units, also guard rails to prevent a tester from falling or otherwise accidentally coming in contact with high voltage or the rotating parts of a machine. The wiring, even though temporary and used only for a few hours or days, must be well done to prevent the cables from coming in contact with rotating parts, and movement due to magnetic forces, the melting off of terminals, or a number of other reasons, which cause open or short-circuits, grounds or arcs.

A frequent cause of accidents in testing work is the likelihood of misunderstanding between men working together. This can be avoided by training the men never to take the word of another person, but always to look and see for themselves that conditions are safe before proceeding with any work.

The following is a sample of the signed certificate mentioned previously and a part of the "Safety Manual":

This certificate is to be signed by employees of the testing department and must be delivered to the office not later than one week after engagement.

I hereby certify that I have received a copy of the book "Instructions for Testing Electrical Apparatus." I understand all the instructions in the chapter on "Safety First" and appreciate that all my work in the Testing Department must for the safety of myself and others be carried out with extreme caution and thoroughness. I understand that I should consider all circuits and current carrying parts of machines to be "alive" unless I know of *my own knowledge* after careful inspection "that they are dead." When circuits or current carrying parts of a machine are "alive," I shall consider it dangerous to touch or to approach any part of it, even if insulated, closer than the following distances:

750 to	2,500 Volts.....	1 foot
2,500 to	10,000 Volts.....	2 feet
10,000 to	50,000 Volts.....	3 feet
50,000 to	100,000 Volts.....	5 feet
100,000 to	250,000 Volts.....	10 feet
250,000 to	500,000 Volts.....	15 feet

I have had instruction in the "Prone Pressure Method of Resuscitation from Electric Shock" and feel capable of applying the method in case of need.

Signed _____
Date _____

We adopted that certificate at the request of the men themselves. In the second portion of the safety manual is a short list of "don'ts." Each statement has at different times been worded in a good many ways but

we finally agreed that you often get positive results from negative statements. This list has been compiled from experience. We know the major causes of all our accidents and it is a simple matter to specify the few things which if done by the men will lead to discharge. The men themselves helped to write them, and they were anxious to word each caution as a "don't."

An analysis of the few fatal accidents which have occurred since the year 1900 reveals some strange and interesting facts. Contrary to expectations, it is nearly always the older and more experienced men who meet with accidents, indicating that the old maxim "familiarity breeds contempt" still applies; new, inexperienced men instinctively are more careful. Also, a large percentage of accidents occur on the last half hour of the working shift, indicating that the mind is for a moment on other things—a ball game—clam bake—trip home, or outing of some kind, and at such times the work does not receive full concentrated attention. It would naturally be expected that more accidents occur on the night shift than on the day shift, but again it does not work out that way; on the same basis of man hours worked, the number is approximately the same on both shifts.

In spite of all that can be done, testers will at times receive electrical shocks, hence the necessity for every man in the department being thoroughly trained in the method of resuscitation by the Prone Pressure method, which has in late years proved the most effective. To accomplish this, we have adopted the practice of instructing and demonstrating the method to every man before he is permitted to start work, with a follow-up demonstration every month thereafter. This follow-up system is conducted by the foreman and each man is required actually to go through the motions of performing the method.

In conclusion, therefore, and evident to all, the problem resolves itself into one of creating the safety habit throughout the department. This must be done by every conceivable means, and done so effectively that it will find expression by every man in every act on every job.

(Mr. Harnden then exhibited a group of slides showing methods that have been used to safeguard the equipment in the G. E. Testing Department.)

CHAIRMAN SANFORD: We will now proceed to the subject of static electricity which will be discussed by Mr. Butler of the Standard Oil Company, of Indiana.

STATIC ELECTRICITY

T. W. Butler, Standard Oil Co., (Indiana.)

The Standard Oil Company (Indiana) is interested not only in protection against the hazards due to static electricity, but also against stray currents and lightning.

We protect all of the plants in the marketing division of our company against all of these three hazards. The hazards due to lightning

are taken care of by grounding all storage tanks with a permanent form of ground and the usual precautions of seeing to it that the ground leads are as heavy and strong as possible.

Stray electric currents cause hazards in unloading our tank cars. We have known of cases where relatively high voltages have been encountered. When I say high voltage I mean up as high as 40 or 50 volts of direct current between the rails of the siding and the unloading pipes of our storage systems. It is needless to say what would happen if a spark were drawn between an unloading pipe and the top of a tank car.

Various Precautions Taken Against Static

Briefly, where these hazards are known to exist, and they are usually found by voltmeter tests between the rails and the unloading pipes, we connect the pipe lines to the tracks by means of heavy cables. In doing this we are carrying out the recommendations of the American Railway Association. However, we do not feel that this is necessary in the case of the small station away from the centers of population or away from the known sources of stray electric current. Our friends, the electric railway companies, are usually the worst offenders in furnishing stray currents. Electricity leaks from their rails on to the rails of the steam roads and sets up this difference in potential between our pipe lines and the sidings. Where we find stray currents to exist, we request the railroad companies to install insulated rail joints at the points of the sidings. We spot the clearance point so that at no time do we permit any tank cars or car to be placed across these rail joints to form short circuits.

Static electricity is one of those elusive things about which we hear a lot and about which we know very little. We can understand that static electricity is present on tank trucks. It usually accumulates while the truck is in transit. There are a number of theories as to why that should occur. One of them is the swishing of the gasoline in the tank. Personally I do not subscribe to this one. A second theory is the friction of the tires on the roadway. A third is electrostatic induction from overhead clouds. A fourth, there might be charged particles of air blowing against the metallic body of the vehicle. I have known of cases where a radio aerial became disconnected and positively charged over night with sparks coming from the aerial connection at the time it was attached to the set. This could very readily occur in the case of a vehicle.

Still another theory: we know that a highly insulated plate put in the path of the exhaust of a motor vehicle will become highly charged. This of course leaves the charges of opposite sign still on the vehicle.

Those are just a few of the theories. There are others, which undoubtedly come to your minds.

The next question is what are we going to do to eliminate the static charge on the vehicle? One way is to drag a ground chain. A ground

chain, however, is not an absolutely positive device for it wears or breaks off and is not always replaced as soon as it should be. Something additional is necessary, so we have installed a metal ball on the top of each tank truck. At each platform where gasoline or refined oil is loaded, we have a handle known as a contact handle which hangs out directly over the truck when it is standing at the loading platform. On this handle is a sign, "Ground your trucks before loading." The men are required to attach this handle to the metal ball on the tank truck thus equalizing the potential between the fill pipe and the truck.

Mr. Singleton is the chairman of the Committee on Static Electricity. It is the plan of this committee to gather all available data and then to list all of the possible causes of static generation. We will then attempt to propose a report discussing the various methods that may be employed to stop the generation of static or to eliminate the hazard after it has been generated. Our committee requests every A.S.S.E. member to send us all available data on static; data about accidents or fires that have resulted from static or were thought to have resulted from static. Please address Mr. Singleton, chairman, through the National Safety Council office.

CHAIRMAN SANFORD: Gentlemen, I have an announcement to make. Yesterday, at the time of the election of officers, it was impossible for our newly elected chairman to be present, so I am going to call on him now and ask him to preside for the remainder of this session. Mr. Ernest W. Beck, of the U. S. Rubber Company.

Chairman E. W. Beck is Introduced

CHAIRMAN BECK: Gentlemen, I assure you it is with appreciation that I accept this responsibility. I realize it is a responsibility. As a member of both the old A.S.S.E. and the Engineering Section of the National Safety Council, I had the privilege of participating in the negotiations that led to their amalgamation, so I consider it an unusual honor to be your chairman and I trust that I will be able to do as much as your previous chairmen have done. I number among my best friends the chairmen of the old A.S.S.E. and the Engineering Section. I feel that the Engineering Section is the most important section of the Council with the possible exception of the Education Division. Having spent several years in educational work I consider both sections highly important.

I greatly regret my inability to attend yesterday afternoon's session. Unfortunately, it was necessary for me to meet with the Rubber Machinery Safety Code Committee of which I happen to be secretary. After about four years of hard work we at last have a code for mills and calendars that has been approved unanimously. We now expect to promulgate other sections of the code until we have covered all types of rubber machinery. I believe it is one of a very small number of the codes that have been assigned to sponsors to cover an entire industry.

We have two subjects left on the program to cover. The first is that of "Accident Hazards in Direct Synthetic Ammonia Process." Mr. Ernst, chairman, is absent this afternoon but in his place we will hear from Mr. E. B. Tolsted. It is a pleasure to introduce Mr. E. B. Tolsted of Fonda-Tolsted, Inc., of Chicago, at this time.

MR. TOLSTED: I think we are fortunate this year in having Mr. Ernst as chairman of this committee. Mr. Ernst, as you probably know, is in government service and in a position to know a great deal about this subject. I feel honored in being asked to read his report.

HAZARDS INVOLVED IN THE OPERATION OF THE DIRECT SYNTHETIC AMMONIA PROCESS.

F. A. Ernst, Chief, Engineering Division, Fixed Nitrogen Research Laboratory, U. S. Department of Agriculture, Washington, D. C.
(Preliminary Report of Special Committee of the
National Safety Council.*)

Your committee investigating the hazards involved in the operation of the direct synthetic ammonia process reports progress. By progress, the committee does not mean inactivity. This committee has been very active and has secured much material of value. It must be remembered, however, that this is an infant industry and that the committee's report can be but more or less of a preliminary report which might need considerable revision some years hence.

The direct synthetic ammonia process was operated for the first time on an industrial or commercial basis in 1913. This first plant was located at Oppau, Germany. It was not until 1921 that a plant outside of Germany came into operation. This was the plant of the Atmospheric Nitrogen Corporation at Syracuse, N. Y. It can be seen, therefore, that this industry is not yet old enough to afford complete details.

For the benefit of those not familiar with the operation of this process for the fixation of atmospheric nitrogen, there follows a brief description.

The object of the direct synthetic ammonia process is the production of synthetic ammonia directly from its elements, nitrogen and hydrogen. Hydrogen secured by any of the various known methods, is mixed with nitrogen, generally secured from the atmosphere, in the ratio of one part of nitrogen to three parts of hydrogen. This gas mixture is then compressed to what might be called high pressures. The pressures in commercial use at this time are within the range of from 100 atmospheres (1500 lbs.) to 900 atmospheres (13,500 lbs.). This compressed gas mixture is then passed over a material, known as a catalyst, at a relatively high temperature (450-600°C). In passing over this catalyst, a portion of this gas under these conditions is converted to ammonia. On passing out of the catalyst-containing vessel, or ammonia convertor,

*See list of members of this Special Committee appended to this Report.

the ammonia formed is removed from the gas mixture and the remaining gas returned either to the same catalyst bed where sufficient fresh gas has been added to make up for the ammonia removed, or to a subsequent catalyst bed.

What are the operations involved, then, in this industry? First, there is hydrogen production and handling; second, nitrogen production and handling; third, the treatment of these gases for their conversion to ammonia; and fourth, the handling of ammonia. Operations 1, 2, and 4 are not new, but have been carried out for a long time and have been made the subject of previous study, although not in this particular connection. It is, then, operation No. 3 which is practically new. There is a new feature to the operations 1, 2 and 4, however, and that is the production and handling of these materials in the manner and in the quantities necessary for this industry. For this reason, then, serious consideration is being given to all four operations.

Part I—Hydrogen.

Hydrogen production and use for industrial purposes is a development of the last two decades or so. Many methods of producing hydrogen have been proposed, and several have been developed and are now in use. Large quantities of hydrogen have been produced for the hydrogenation of oils and for aeronautical purposes as well as for use in the synthetic production of ammonia. Smaller quantities have also been produced as by-products in the electrolytic production of oxygen and caustic soda and have been used in the manufacture of electric lamps, cutting and welding of metals, calcium lights and similar purposes. It will be seen, then, that the production and handling of hydrogen is a technical process in which there has been considerable experience through which the hazards involved have come to be quite well understood.

It is true, however, that for use in the synthesis of ammonia from its elements hydrogen is needed in quantities and degree of purity not frequently required for other purposes, and for ammonia synthesis the economical production of the gas is of prime importance. For these reasons the production of hydrogen for ammonia synthesis has in many cases developed along somewhat different lines than those followed in producing it for the other purposes. So consideration of the hazards involved in producing hydrogen for this purpose naturally leads to some consideration of the production processes employed for this purpose.

Your committee is therefore briefly reviewing some of the more commonly employed methods of making hydrogen for use in the synthetic ammonia industry. There are many such processes and it seems unnecessary at this time to consider the newer processes which are being developed, such as the Bergius process in which iron and water are caused to react at a temperature of something like 300°C and the corresponding vapor pressure of the water (about 1300 pounds per square inch), or the Liljenroth process in which water and phosphorus

react under the influence of a catalyst. Indeed only the most general consideration will be given to some of the more common processes in this report, although the development of the work of your committee very probably later may necessitate much more extended consideration of hydrogen production processes.

At present the primary source of hydrogen is water. There are of course large quantities of combined hydrogen available in the form of hydrocarbons and it is probable that this source will be used to an appreciable extent in the future. In separating the hydrogen from water it is usual to use carbon in the form of coke as a reducing agent, but there are processes in use in which the hydrogen is separated by physical or physico-chemical means, as in the electrolysis of alkaline solutions. We will briefly outline the processes that are being considered in connection with this preliminary survey of production and utilization hazards. They may be designated as follows:

1. The steam-iron process.
2. The water gas catalytic process.
3. The water gas liquefaction process.
4. The electrolytic processes.

In the steam-iron process, steam is caused to react with iron, the iron being oxidized by the oxygen in the steam and substantially pure hydrogen being produced. The reaction is carried out at temperatures ranging between 550° and 800°C, is a reversible reaction and takes place in accordance with the following equation:



The magnetic oxide of iron produced in the hydrogen production cycle is then reduced by means of a suitable gas and for this purpose water gas is generally used. The reaction occurs in retorts either of a "multiple unit" type or of the "single unit" type and the reacting mass is a suitable form of iron ore. It is necessary that heat be supplied to maintain the temperature of the iron ore and to heat the incoming steam and water gas to the required temperature. Such heat is supplied either by having the retorts in a furnace or "bench" in which producer gas is burned or by burning, in the retort itself, a mixture of water gas and air.

Hydrogen Sulphide and Carbon Dioxide Removed

The water gas used for reducing the iron ore is produced in water gas generators of standard design. In these a mass of coke is alternately treated with air and steam. During the combustion or "blow" period, the coke is brought to a suitable reacting temperature and during the "steaming" period, blue water gas which may be considered a mixture of substantially equal parts of hydrogen and carbon monoxide is produced. Both the blue water gas used and the hydrogen produced by these processes contain hydrogen sulphide and carbon dioxide in small amounts and these are removed usually by iron oxide and lime

placed on trays in purifiers of the conventional type. Both water gas and hydrogen are also scrubbed with water in scrubbers of conventional type for the preliminary removal of impurities.

In this process of hydrogen manufacture, the hydrogen and water gas are generally stored in "relief" or "floater" holders after they pass from the generators through the "scrubbers." From the relief holder, the blue water gas is moved with a pump or "booster" through the purifiers and the hydrogen retorts. The hydrogen is pumped from the hydrogen relief holder through the purifiers to a storage holder. These parts of the system are mentioned here because they are factors which are important in considering process hazards. They are, however, elements which are exactly similar to those used daily in thousands of gas producing installations and so they present hazards no different in degree or kind from those which have been successfully controlled in a very large number of gas plants.

Intricate Details of the Process

In the water gas catalytic process the water gas used is passed from the "relief" holder through heat interchangers to a converter in which, under the influence of a catalyst, the gas is caused to react with steam at a temperature of about 450°C. The carbon monoxide in the water gas is oxidized to carbon dioxide, reducing the steam to hydrogen. The resulting gas is therefore principally hydrogen and carbon dioxide mixed with steam and containing small amounts of carbon monoxide, methane and nitrogen. The steam is removed by passing the gas mixture through a condenser, which may be of the scrubber or tubular type. The hydrogen-carbon dioxide mixture is then usually compressed to a pressure of the order of 450 pounds per square inch and scrubbed under that pressure with water in order to remove the major portion of the carbon dioxide. Water is then separated and the crude hydrogen stored in a suitable gas holder. The traces of carbon dioxide and sulphur dioxide in the crude hydrogen may be removed by scrubbing with alkalies or lime. The removal of the carbon monoxide in the hydrogen presents some difficulties and various methods of doing this are available. As illustrative of the procedure to be followed, mention may be made of the use of an ammoniacal cuprous salt solution as an absorbent for carbon monoxide, the hydrogen being treated with the absorbent under high pressure before it is introduced into the ammonia synthesis proper.

In the water gas liquefaction process the carbon monoxide in water gas is removed by liquefaction induced by compression and subsequent expansion through a suitable throttle valve or expansion engine or both, the system including suitable heat interchangers to bring about progressive cooling. The carbon monoxide may also be liquefied by means of an external refrigerating system in which liquid air or nitrogen may be used as the refrigerating medium. Previous to the liquefaction process, the hydrogen sulphide and carbon dioxide are

practically entirely removed by means similar to those which have been mentioned with the additional use of refrigeration. Whatever impurities remain are removed in the liquefaction process itself. Hydrogen produced in this way will contain two to four per cent carbon monoxide, which is removed by methods similar to those used in treating hydrogen produced by the water gas catalytic process. The carbon monoxide separated by liquefaction is used in gas engines for the production of power.

By the electrolysis of a solution of sodium or potassium hydroxide, water is decomposed into oxygen and hydrogen. The process has been used to a considerable extent for the production of oxygen. The hydrogen produced is very pure and may be used for ammonia synthesis.

Most of the caustic soda and chlorine marketed today are obtained by the electrolysis of a brine solution. In this process large quantities of hydrogen are produced as a by-product and this gas may easily be purified and utilized for synthetic ammonia production. Both these methods of hydrogen production are carried out in electrolytic cells of more or less standard designs fitted with suitable means of keeping the hydrogen from being contaminated with oxygen or chlorine as the case may be. The small amounts of oxygen or chlorine which may be found in the hydrogen as it leaves the cells can be readily removed, no additional purification being required.

There are many types of cells used for both the electrolysis of sodium hydroxide solutions and brine solutions. They all consist essentially of suitable metallic electrodes and means of keeping separate the products produced. In the case of the oxygen-hydrogen producing cell of modern design, a diaphragm is used in almost all cases for this purpose. In the case of the caustic soda—chlorine—hydrogen cells, a diaphragm is sometimes used and in other cases the desired end is attained by other features of cell design. The many types of cells in common use need not be described here.

Each Process Involves Certain Operating Hazards

In considering the hazards involved in these various processes, it will be seen that each of the processes involves certain operating hazards peculiar to the type of equipment used and certain general hazards which are common to several processes or perhaps all of them. The special hazards which must be guarded against in any particular type of plant need not be considered now. Perhaps the work of this committee will be so developed that such hazards will require consideration, in which case undoubtedly the practical experience of those who have operated the equipment in question will be made available for the use of the committee. It is believed that a thorough consideration of such special hazards must be based on actual practical operating experience. Some of the more general hazards may to advantage be given consideration in this first committee report.

It will be noted that in three of the processes reviewed, water gas is used. The presence of carbon monoxide in water gas makes it highly toxic. For this reason, as well as because the gas is combustible, care must be taken to prevent its escape from the gas system. Cases are on record of at least temporary asphyxiation of those employed in hydrogen producing plants where water gas is used. The dangers of carbon monoxide are recognized generally and adequate protective measures are available as well as adequate measures for treating those who may be overcome by the gas. The handling of the water gas to prevent the formation and ignition of explosive mixtures requires only such precautions as are being taken in thousands of gas plants today and these precautions can readily be codified to apply to hydrogen production plant operation.

The production of the hydrogen itself by either the steam-iron process or the water-gas catalytic process, presents no unusual hazards. Combustible gases are being handled in closed systems and the escape of the gases from the systems or the introduction of air into the systems must be guarded against, but the means of doing this are well known and can be readily prescribed. In some of the purification processes the crude hydrogen is treated with liquids at higher pressures than are usual in such purification processes, and perhaps in such cases some particular care must be bestowed upon the control of operating practices which might result in the introduction of air into the system. But the means of protection to be employed are the same in character as those employed in similar widely used methods operating at lower pressures.

Some Intricate Safety Problems Are Presented

In the water gas liquefaction process of hydrogen production rather unusual safety problems are presented. A combustible gas is compressed to comparatively high pressures and then passed through the liquefaction system. In parts of the system, quantities of liquefied gas, at extremely low temperatures, are collected and at such points there is a potential pressure hazard which must be guarded against. The carbon monoxide separated from the water gas is an extremely toxic gas and in part of the system at least is under pressure. Its escape at any point in the cycle must necessarily be prevented. While these hazards are somewhat unusual they are similar in character to those met in handling other industrial gases and it will become evident in this report that satisfactory methods of control can be developed and applied.

The hazards involved in the production of hydrogen by the electrolytic method result principally from the fact that under certain conditions the hydrogen may be sufficiently contaminated with air, chlorine, or oxygen to be explosive and that such a mixture may be ignited. If an explosion takes place after the gas has been compressed to a high pressure for use in ammonia synthesis, the results are likely to be extremely serious. However, there has been much experience gained in the operation of hydrogen producing cells. The possible causes of impure hydrogen pro-

duction are well known and guarded against. Either frequent tests of the hydrogen are made manually or automatic and practically continuous methods of testing are employed as a check on the safety of the hydrogen as well as for plant control purposes. In the case of the caustic soda cells producing hydrogen, the hazards of course also include those connected with the handling of the caustic liquor.

These particular hazards will not be considered now. It is sufficient to point out that the operation of both electrolytic oxygen-hydrogen plants and caustic soda-chlorine-hydrogen plants has become practically standardized and efficient expert operating management and the employment of intelligent and skilled labor together with the application of well-known protective measures will result in plant operation which is safer than that of many other industries.

In the production of synthetic ammonia, the hydrogen used is compressed to high pressures, higher in some cases than those in general industrial use. The handling of the hydrogen (regardless of the particular process used in its manufacture) is a subject which should be given careful consideration in connection with the work of the committee. In this procedure, however, we may again be guided by practices which have been established in the course of regular operation of hydrogen plants in which large quantities of gas have been compressed to pressures almost, if not quite, as high as those generally used for ammonia synthesis.

Accidents in Handling Hydrogen at High Pressures

Some accidents have occurred in the handling of hydrogen at comparatively high pressures, and they have resulted usually either from explosive mixtures of gases produced in the generating system and then compressed or from explosive mixtures produced in the compression system itself.

When hydrogen is being handled at high pressures, special precautions should undoubtedly be taken to prevent the introduction of air or oxygen into the gas.

In considering the hazards involved in the compression of hydrogen to high pressures, it might be well to mention first that experience has shown that hydrogen containing sufficient air or oxygen to be explosive may ordinarily be compressed to high pressures without ignition taking place. In good compressors of modern design the ignition point of such mixtures is ordinarily not reached. Cases are on record where extremely explosive mixtures of gases have been compressed, being subsequently ignited in the storage vessel with serious results. In order to prevent introduction of air into hydrogen flowing to compressors, precautions are to be taken at all times to keep a positive pressure in the compressor suction line. Usually the maintenance of such positive pressure is insured as nearly as possible by the design and operation of the suction line and its connections. In some cases pressure responsive attachments have been connected to this line and to the compressor motor or other power ele-

ment in such a way that the compressor driving mechanism is stopped in case too low a pressure occurs in the suction line.

In the operation of gas plants of various types, means have been developed for preventing the reduction from normal of the gas holder pressures. These pressures may be reduced either by continuing to draw gas from the holder after the gas holder bell has reached the landed position, or by drawing gas from the holder after the travel of the bell has been stopped through ice accumulations or mechanical conditions which are not normally present. In many plants a mechanism is provided which is actuated by the gas holder bell so that when the bell has reached a predetermined position near its lower limit of travel, the compressor driving mechanism is automatically stopped. Such mechanisms have many times proven their value and in many cases where they have not been used, accidents have occurred.

Control of Hydrogen Compressing Plant Operation Necessary

In the suction lines of hydrogen compressors there are frequently placed drains which are water sealed or manually operated. Operating practice has indicated the means of maintaining such drains at all times in proper operating condition with the thought in mind of preventing the entrance of air into the suction line. The same precautions are, of course, followed in connection with taps in the suction line for obtaining test samples or for purging or similar purposes. The hazards resulting from failure to properly control the parts of the suction system which have been mentioned are important ones but here again operating experience has resulted in recognition of these hazards and in the understanding of suitable means of preventing accidents.

Effective expert control of hydrogen compressing plant operation is, of course, necessary at all times. In the operation of such a plant used in connection with ammonia synthesis and operated by employees who, in all cases, have not had extensive experience in the handling of hydrogen, it would undoubtedly be highly desirable to carefully formulate operating rules covering these particular hazards. There is undoubtedly a tendency among those in charge of operation of hydrogen compressing plants, as well as of similar equipment, to lose sight of some of the hazards involved and authorize practices which have been proven by experience to be dangerous. Hydrogen compressors have sometimes been used intermittently for the compression of air.

There is on record a case in which this was done with disastrous results. The hydrogen compressor suction line was equipped with two globe valves of standard design and manufactured by a reputable manufacturer. These two valves in the suction line were both presumably tightly closed and communication to the atmosphere was then established at a point in the suction line near the compressor. It was found later that in spite of the fact that the two globe valves had been tightly turned down, both of them failed to seat properly, allowing the passage of a quantity of hydrogen. This hydrogen was mixed with the air drawn into the com-

pressor and the explosive mixture resulting was compressed to some 2,000 pounds per square inch and stored in a battery of high pressure containers. The explosive mixture was apparently ignited by friction or static spark which followed the opening of a drain in the storage system. The resulting explosion completely wrecked the storage system as well as other parts of the plant and resulted in loss of life.

Such accidents are, of course, no indication that there are inherent hazards in the handling of hydrogen at high pressure, but they do indicate that careful design and operating control are necessary. The synthetic ammonia industry may find the basis for such careful design and operating practice in the experience which has already been gained in other industries.

On the high pressure side of the compressor system there is little probability of introducing air into the gas and here the problem becomes largely one of preventing the escape of the hydrogen from the system. It may be noted here that hydrogen at high pressure, when escaping from a small orifice may be, and frequently has been, ignited either from friction or by static spark. In the hydrogen compressor plants, precautions are taken to prevent any serious results from hydrogen flames issuing from openings in the high pressure systems. In some cases where such precautions have not been taken, operators in the plants have been seriously burned. As a result of such experience, plants are being designed to eliminate such hazards, as far as possible. Vents (including safety valves) from the high pressure system, are piped outside of buildings, or, when practical, into the suction side of the compression system. In hydrogen compressing plants, leakage of the combustible gas into the room presents a general hazard similar to that met with in any plant where combustible gases are used. This hazard is perhaps a little greater in the hydrogen plant than in many other gas plants because of the fact that hydrogen is invisible and odorless and the pressures employed somewhat higher than usual. The use of vapor proof lighting and other electrical equipment is, therefore, rather common practice in hydrogen plants. Experience has indicated that such precautions, together with precautions against leakage, have given adequate protection against explosions of explosive mixtures formed by escaping hydrogen.

Purge Storage Vessels Before Hydrogen Is Introduced

While it is true that in most of the high pressure system there is little possibility of introducing air into the hydrogen, an exception may be found in the case of pressure storage vessels. Particular attention must be given to the purging of such storage vessels before hydrogen is introduced. In some cases there are also possibilities of introducing air or other gases into the high pressure hydrogen system by means of making improper connections from other systems. Such improper connections have actually been made in service and accidents have followed. As a result, the containers for storage of hydrogen under high pressure for use in industry are universally equipped with purging through. Left-

hand threads are, however, not generally used in the high pressure hydrogen system in the plants themselves. Connections to such systems, however, such as are used for obtaining test samples and similar purposes, are frequently equipped with left-hand threads and some precautionary measures should be taken to prevent the possibility of making wrong connections to such openings.

As an additional precaution against the utilization of hydrogen containing dangerous quantities of oxygen, it is general practice to regularly test the quality of the hydrogen as it leaves the high pressure system for delivery to the point of consumption. Here again, automatic testing equipment is available by means of which the gas may be analyzed almost continuously and if desired the results recorded automatically.

In this report many of the details of hazards which may be met with in the operating of hydrogen plants have been mentioned together with precautionary measures which are taken and should be taken to prevent accidents. It is believed that in this way it has been clearly indicated that while the production and handling of hydrogen does involve some hazards, these hazards have been recognized and suitable precautionary measures and means are available for use in any particular case where hydrogen is to be produced and handled in connection with the manufacture of synthetic ammonia.

Part 2—Nitrogen.

The nitrogen used in the direct synthetic ammonia process is naturally extracted from the atmosphere. Mention may be made of three methods of separation used: first, the liquefaction and distillation of air; second, the burning of a mixture of air and hydrogen, thus producing a nitrogen-hydrogen mixture and water; third, the production and mixture of producer gas and water gas and the subsequent treatment of the mixture in the same manner as water gas is treated in the water-gas catalytic process.

The securing of nitrogen from the atmosphere by the liquefaction and distillation process is a well-established industrial process. It involves of course, some hazards, but these have been carefully controlled by established industrial process. It involves, of course, some hazards, but these have been carefully controlled by established operating procedure. The liquefaction process is carried out at comparatively high pressures, but these no longer present any particular difficulty. In the liquefaction system itself, liquid gases at very low temperatures accumulate and the potential pressure hazards must be controlled. Some serious accidents have resulted in the operation of liquefaction equipment as a result of the accumulation of liquefied combustible gases taken in through the air compressor intake. In using this process for the manufacture of nitrogen for use in the direct synthetic ammonia process, particular attention might well be given to this hazard. If this is done and good engineering control is maintained, no difficulty should be expected from the operation of the air liquefaction system.

The production of a hydrogen-nitrogen mixture by burning hydrogen in air is a comparatively simple procedure and probably no analysis of the hazards involved need be made at this time.

The hazards incurred in producing a hydrogen-nitrogen mixture by the third process mentioned will be practically identical to those met with in the water-gas catalytic hydrogen production process and these have been reviewed in the preceding section.

It is believed that for the present, this brief review of the few hazards which present themselves in manufacturing nitrogen for use in the direct synthetic ammonia process will be sufficient for the purposes of the committee.

Part III—Ammonia Synthesis.

In 1913, on starting the plant at Oppau, Germany, for the production of synthetic ammonia, an attempt was made to keep the process very secret. The Germans were quite successful in doing this, but it became apparent that this alone was not enough to prevent other countries from entering into this industry. Further, at the conclusion of the war, this German plant was entered and the equipment and operation studied by several allied commissions. It then became apparent that some other tactics must be used by the Germans in their endeavor to hold this industry within their own country. A vigorous propaganda was started advising of the great dangers attendant with the operation of this process. This propaganda was so successful that even today a great majority of the people hold paramount the thought of these advertised dangers. To date the study made by this committee has found that with reasonable care and precaution, the dangers attendant with this process are no greater, and it might even be said are less, than those attendant with many of the so-called safe industries. It is true that the pressures of from 100 to 900 atmospheres are higher than those which are in general industrial use. It is also true that ordinary steel can not withstand subjection to these pressures at the higher temperatures mentioned. As in the case of any other industry, however, these conditions have been taken care of by working up special materials and special design of equipment.

A person seated or standing at a soda fountain normally feels quite safe, and yet probably directly beneath that person is a cylinder containing gas compressed to a pressure greater than the 100 atmospheres mentioned above. Again, a person will enter a steam electric power house, rest his hand on the casing of the steam turbine or perhaps even lean against it, and feel quite safe, and yet the stresses in this casing and the danger of fracture due to failure of the rotor revolving within this casing at a tremendous peripheral speed are much greater than anything which might be expected from any piece of apparatus in a direct synthetic ammonia plant as operated today.

The committee wishes to leave with you then by this preliminary report the thought that while there are hazards attendant with the operation of

this process, these hazards are not of such great magnitude or even appreciably different from the hazards which attend the operation of many processes of everyday and common knowledge and sight.

A brief review of some of the accidents which have occurred may be enlightening.

The one which perhaps comes to thought first is the great Oppau explosion on September 21, 1921. Even today, there is much publicity given to this explosion in an attempt to prove that the operation of the direct synthetic ammonia process is a hazardous operation. This Oppau explosion, however, indicates quite the reverse and shows the comparative safety of this operation.

Details of the Oppau Explosion in Germany

The committee first wishes it understood that this explosion did not occur in any of the operations of the direct synthetic ammonia process or even in any of the buildings housing the equipment for this process. The explosion did occur in a warehouse housing 4,500 tons of a mixed salt, ammonium sulphate-nitrate. In this explosion, 509 people lost their lives and 1,917 were more or less severely injured. Out of approximately 300 buildings, located within a radius of 1,600 feet, 96 or one-third were as good as completely destroyed; 12, located within 2,000 feet, were half destroyed, and 10, located at a distance of over 2,500 feet, were one-tenth destroyed. Yet the equipment and building housing the direct synthetic ammonia process and located within the 1,600 foot radius, suffered no more than a loosening of a pipe line connection, which permitted the leakage of hydrogen, which caught fire and burned a relatively small hole through the roof of the building. By simply closing a valve, this fire was extinguished and no further damage done. An aerial photograph, taken of this plant shortly after the accident by Underwood & Underwood, shows that boiler and power plants ordinarily considered quite safe and located at equal distances and even greater distances from the source of the explosion than was this synthetic ammonia plant, were completely destroyed. It also shows other chemical operations, ordinarily considered relatively safe operations, as having suffered the same fate as these steam plants.

There are in this country at this time six operating plants producing synthetic ammonia. Without naming the individual plants, we can recite briefly a record of accidents.

In drawing off the ammonia from the gases as they come from the ammonia converter, the gases may be chilled by refrigeration, thus liquifying the ammonia and leaving the uncombined gases still in the gaseous form. It is quite customary then to convey this ammonia, together with the remaining gases, to a container in which the liquid ammonia is tapped off and the remaining gases returned for further treatment. This liquid ammonia is then tapped off for further use, either to be loaded into shipping containers or to be conveyed into some ammonia utilization plant. Due to carelessness, a responsible operator in a small and rather experi-

mental, but at the same time industrial plant, attached a shipping cylinder designed for a working pressure of perhaps 300 pounds to this ammonia catch pot, in order to draw off the ammonia. As operation that night had been interrupted, there was not sufficient ammonia in the catch pot to fill the shipping cylinder, so that instead of closing the valve between this high pressure catch pot and the low pressure cylinder, this operator cracked the valve with the thought that as additional liquid ammonia was produced it would be forced over to the shipping cylinder. The operator did not correctly gauge the discharge of liquid ammonia from the high pressure cylinder, and it was not long before all this liquid ammonia had been forced over and the shipping cylinder then receiving the high pressure gas shattered. The operator was killed by this explosion.

Another small commercial plant which was also quite experimental was attended during starting up with an accident. In this case, a pipe joint sprung a leak, with the result that the leaking hydrogen caught fire and quite severely, but not seriously, burned one of the attendant operators.

Three Accidents in a Plant Recently Started

Still another plant which has lately been started into operation was attended with three accidents. The first one was the case of a laborer leaning against a box car eating his lunch. A switch engine came up to remove the box car, with the result that the laborer was quite severely injured. The second accident was the case of a pulley block falling from a crane and striking a man on the shoulder and injuring him quite severely but not seriously. The third was a case more directly connected with the synthetic ammonia plant. A change was to be made in a pipe line. The construction pipe fitters, coming to the job before the operator had arrived, decided to make the change without waiting for the operator. They found that the line was filled with a gas, mostly hydrogen, and decided to pump the gas out of the pipe line. During this pumping operation, air got into the pipe line and an explosion resulted. A piece of the pipe was blown out and struck a man in the leg, but not seriously injuring him.

At U. S. Nitrate Plant No. 1, a plant erected during the war and which was never an operating success and therefore never produced, a single accident resulted from the various starting up trials. In this plant, the gas mixture was preheated by a fuel fire under a pipe nest through which the gas was conveyed. In order to withstand the 100 atmosphere gas pressure at this temperature, the piping specified was to be of chrome-vanadium steel. A similar sized piping, for use in other parts of the plant where the high temperature was not attendant, was specified to be made of straight carbon steel. Through an error of the workmen, a length of this carbon steel pipe was built into the tube nest which was supposed to be of chrome-vanadium steel. The result was that on attempt at starting up, this carbon steel tube gave way, resulting in a hydrogen

fire, which did some small amount of damage to the building housing the equipment, but caused no personal injury.

Other plants which have started up and which are in operation in this country and also in foreign countries, have been entirely free of accident.

**American Society of Safety Engineers—Engineering Section, the
National Safety Council**

Committee "Synthetic Ammonia"

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New York City.

CHAIRMAN BECK: We have for our next subject that of "Mast Hoists," and Mr. A. C. Rasmussen, of the Insley Manufacturing Company, will discuss that subject at this time.

**PROGRESS REPORT OF COMMITTEE ON ACCIDENTS
AROUND MAST HOISTS**

The Committee on Mast Hoists has been organized but a short time, so that we have only a brief progress report to submit.

The committee proposes to make a study of accidents around mast hoists and prepare a report on their causes and remedy. That there is need for a study of this nature is evidenced by the character of the accidents which occur around mast hoists and the increased usage of this form of equipment.

By mast hoists in this report is meant the device wherein a single strut or mast is used only to support the pulley, cables, brackets, hoppers and booms used to carry building materials or equipment vertically from different levels. Elevators, hoists in shaftways and derricks are not within the scope of this investigation.

Without, at this time, giving the details of accidents and their causes, the following is a general survey of the proven or suspected causes of accidents around mast hoists:

1. Mast failures. Due to improper foundation, over-load, loads not applied in a manner anticipated in the design.

2. Guy-Cable Failures. Due to breaking of cable, because of: (a) overload, (b) use of deteriorated cable, such as worn elevator cables, (c) accidental (sometimes intentional) damage to cable from contact with cutting materials or tools, (d) excessive wear at connections, due to short bends without thimbles or improper anchorage connections, as brought about by using old cable for lashings on deadmen.

3. Suspension Cable Failures. Due to insufficient allowance of sag considering loads and cable strengths. Also due to lack of proper back anchorages for cables carrying loads in such a manner. This also refers to the improper use of a tightly stretched guy wire for carrying loads as a suspension cable, which usage properly requires more or less sag.

4. Failure of Anchorage. Due to: (a) choosing an insecure anchorage, such as an unsound or slender tree, (b) use of inadequate deadmen.

5. Breaking or losing off of parts of equipment, including buckets, platforms, chutes, booms, etc.

Oftentimes the guy lines or support cables are too vertical, so the stress in each cable may be multiplied by two and even as high as three. This decreases the factor of safety considerably and you can see what just a small overload may do. It often means the snapping of that cable or the pulling loose of the anchorage or some accident like that.

Use of Guys for Carrying Loads an Unsafe Practice

Another source of failure is that the guy lines that are used to support the mast are sometimes used to carry loads vertically. A guy that is pretty tightly stretched for guying purposes is not a fit member to hang any loads from because just as you probably remember when you were kids you used to hang from the old wash line, and if it was stretched pretty tight you could easily break it, whereas if it sagged down it carried you all right and you had a nice swing. So the use of guys for carrying chute loads or counter weights is quite an unsafe practice and the thing to do is to use a separate member, a separate cable for that—one that has enough sag so that the stresses in the cable are not piled up so high.

Then other failures are due to choosing insecure anchorage, such as wrapping it around an old dead tree or possibly a tree that is too small to carry the load.

Another thing is not making the dead men large enough to handle the pull of the guy.

Other accidents are caused by the breaking or losing of parts of the equipment—for instance, rollers on the hoist buckets and possibly a loose tube or something like that on the platform that shakes off as the hoist goes up.

6. Incompetence or carelessness in erection of equipment and in the making of connections.

7. Disarrangement of parts, as in the careless moving of chutes, buckets, causing slippage and sometimes failure at some points.

Because of the limited time since this committee has been organized, it has been difficult to secure accident statistics which can be specifically applied to mast hoists. All possible sources of information have not as yet been reached.

However, the majority of accidents which are known have been due to lack of guard rails on the platform elevators used on such masts, and it is therefore felt that immediate results can be obtained by making recommendations for the use of such appliances. This includes the recommendations that guard rails be used on the receiving hoppers on the masts.

It is the intention of the committee to compile available data relating to use and maintenance of mast hoists from the standpoint of safety and to prepare during the next year a comprehensive report covering this equipment.

W. C. MUEHLSTEIN, Chairman

M. E. ARKILLS

J. E. BUSHNELL

GEOFFREY A. CAFFAL

R. M. MCKINLEY

A. C. RASMUSSEN

A. T. SCANNELL

A. J. SMITH

ADJOURNMENT

FRIDAY AFTERNOON SESSION

October 29, 1926

The Friday afternoon meeting convened at 2:15 o'clock, Mr. G. E. Sanford, presiding.

CHAIRMAN SANFORD: Mr. T. W. Mowery, chairman, will present the report of the Committee on Elimination of Harmful Noise.

**REPORT OF H. W. MOWERY, CHAIRMAN, COMMITTEE ON
THE ELIMINATION OF HARMFUL NOISE**

Numerous requests from widely different sources asking for aid of the National Safety Council in reducing excess noises originally directed the interest of the Council to this problem. A committee was appointed to make investigations. Nothing was accomplished by the original committee and after two years it was reorganized.

A preliminary survey by the reorganized committee was formulated into a report presented at the annual meeting of the Congress in 1925 and appears in the Proceedings of the Congress of that year. It appeared that the scope of the subject was so large and assumed such importance that the committee was continued with instructions to make a more thorough study and report at the 1926 Congress.

In planning the work of the committee for the year it was determined that the original name of the committee was misleading. The Council was not interested in elimination of excess noises if such noises were not harmful. We were interested in the reduction of noises that were harmful, and therefore the name of the committee was changed to indicate more clearly its activities. It was further decided that an intensive study should be made to cover various phases of this general subject as related to different phases of human activities.

1. The efforts of civic bodies to reduce what might be termed external or public noises were considered. In New York City some years ago Mrs. Isaac L. Rice organized the Noiseless Society which was instrumental in securing the passage of a number of ordinances in New York resulting in considerable noise reduction, the establishment of noiseless areas around hospitals, etc. A concrete instance of some of Mrs. Rice's observations was the blowing of tugboat whistles in one night to the number of 2,635 screeches.

The experiences of the Joint Committee on Noise Nuisance of the Civic Club of Philadelphia are appended hereto as illustrative of how such an organization may function and what it may accomplish.

2. The noises emanating from the operation of electric surface, subway and elevated cars and suggestions for reduction constituted another

phase. Mr. H. S. Williams, chairman of the Noise Reduction Committee of the American Electric Railway Engineering Association has contributed a report which is appended.

3. Significance of noises in power transmission machinery and their reduction were handled jointly by Mr. W. M. Bertram of the Morse Chain Company and Mr. G. O. Small of the General Electric Company, and their report is appended. It is important to note here that noise in power transmission, except in very few instances, is not merely an objectionable sound, but it is the audible manifestation of incorrect or faulty transmission and indicates inefficient performance and excessive maintenance troubles.

4. The isolation of noise from vibrating machines, etc., or its absorption by the use of sound deadners for wall and floor surfaces and fillers and kindred methods of abating industrial noises have become established businesses with specialists in the various fields. Therefore, the technical features of such work are not considered in this report, but a number of interesting and important cases together with the legal aspects of the noise nuisance are included in appended reports by Mr. S. Rosenzweig and Mr. C. Rosenblatt, consulting engineers, respectively, of New York and Philadelphia. Silencing gas pulsations by repeated reflection or by subdivision is a distinct and important phase of industrial noise reduction and is covered by an appended report from Mr. R. B. Bourne of the Maxim Silencer Co.

Definite Information Upon Harmful Noise

5. The most important feature of this year's study was the growing realization of the paramount importance of obtaining definite information of what constitutes a harmful noise. Unless it could be shown that a noise is harmful to the human system it would be futile to pursue this investigation any further. Accordingly the cooperation of the Bell Telephone laboratories was sought and obtained with the result that Mr. H. Clyde Snook, staff engineer, has summarized in the appended report much of the literature pertaining to the physical and auditory aspects of noise. It is unfortunate that his illness for the past several months has prevented completion of his report. Further research to determine the psychological and physical effects of noise is proposed. The Scientific Departments in Columbia, Northwestern and several other prominent institutions have been interested through the combined efforts of Mr. Snook and Mr. E. E. Free, a prominent consulting engineer of New York City, and it is believed that results may be obtained in this direction that will have an important bearing on the final disposition of this whole question.

The foregoing are the important features of the work of the committee for the year but it would appear that this subject is becoming of increasing importance and interest. In 1889 Joseph A. Guthrie, M.D., Lt. Comdr., M. C., U. S. N., at a meeting of the American Medical Association in Denver presented a paper entitled, "Discordant Sounds a

Menace to Nerves." He made the observation that "Noises create a disturbance of the nervous elements to the degree that they are vouched a place in the category of causations of disease." But his theme was undeveloped and he presented largely his personal observations with a request that his paper be considered "merely as an advance guard for a subject worthy of better forces." Under date of April 15, 1926, he writes, "Noise is a shock to the nervous system. We may become used to it but the mind eventually becomes wasted (by noise) as shown in symptoms of irritability."

In a paper presented August 14, 1912, to the Ninth Otological Congress in Boston, Mr. Edward S. Morse, who has campaigned for many years in an effort to suppress noises, stated that there is no doubt whatever of the disastrous effects of noise on the human system and stated specifically that "The emphatic judgment of our most distinguished men in medical science, S. Weir Mitchell, Jacobi, LeConte, and many others, is that noise affects the nerve centers in a disastrous way; leading to neurosthenia and even to insanity, and often marks the beginning of the end of one balanced between death and recovery."

The perplexing part of this whole problem is that with all the general opinions of medical experts and others assuring us that noise is detrimental to the nervous system, there has been no research definitely to prove or disprove it. Therefore, the further work of the committee should be directed to the seeking of definite information along those lines. If such research can definitely show the destructive effects of noise and confirm medical and judicial opinions, definite recommendations for the suppression of those noises that are shown to be harmful then can be made and enforced.

H. W. MOWERY, Chairman
W. M. BERTRAM
E. W. GORRY
W. V. LOVELL
S. ROSENZWEIG
G. O. SMALL
H. CLYDE SNOOK
C. VAN HORN
E. E. FREE
MRS. IMOGEN B. OAKLEY
M. C. ROSENBLATT
H. S. WILLIAM
LEO D. WOEDTKE

We Do Not Know What Noises Are Harmful

In addition to this formal report, gentlemen, I want to make a few extemporaneous remarks. We are all more or less familiar with boiler shops and the type of men who are working in them, many of whom are suffering from affections of hearing. Many of them are partially

or almost totally deaf. But I couldn't say that working in a boiler shop is harmful because I don't know. No one knows whether those men have had their hearing harmed by working in a boiler shop or whether their hearing was defective before they entered that shop. We don't know whether those men have selected that form of employment because they can do it better and with less trouble than other men whose hearing is more acute.

We are absolutely at a loss to know what noises are harmful. You take the city dweller—when he goes out in the woods, accustomed as he is to the noises of the city, he almost goes wild when he hears the katydids and crickets. The poor farmer boy from the country is just like I was. When I first went to New York City I didn't get a wink of sleep for nearly a week on account of the city noises. Yet we become accustomed to various noises. The human body seems to have a certain reserve vitality or resistance which enables it to accommodate itself to these various noises. So what may be irritating and annoying for a day or two or three days, you become accustomed to. It becomes a habit. Is it harmful or not?

I hope the Executive Committee will consider ways and means of establishing a research fellowship in connection with the further promotion of this work.

The following articles, to which I have referred, were written by members of our committee, dealing with specific phases of the subject under consideration, and are therefore appended to our report.

SOME PHYSICAL AND AUDITORY ASPECTS OF NOISE

H. Clyde Snook

The main object of this report is to discuss briefly some of the results obtained by Bell Telephone laboratories in its studies upon the physics of sound and the science of audition. A brief discussion will be made of various reprints of technical articles by engineers of those laboratories.

Noise is considered by the physicist to be sound or a mixture of sounds to which no definite pitch can be assigned. In general, noise is understood to be sound that lacks agreeable musical quality. Since pitch is the quality whereby it can be designated as having a certain frequency of vibration, pitch is the assignment of the sound to a certain position in an accepted series of sounds constituting a musical scale. Their comparatively even flow, their regularity and repetition of wave form are the things that characterize musical sounds. Noises have an irregularity and an absence of repetition in their wave forms.

It is to be noted, however, that this line of demarcation between musical sound and noise can not be sharply drawn, since very few musical sounds are entirely free from attendant noises that, to some extent, modify their smoothness and regularity; and since also musical sounds can be perceived more or less plainly through some noises.

Those sound disturbances that we characterize as noise are propagated in air at a velocity of about 1,100 feet per second. In general, disturbing noises of modern life have little, if any, variation from this velocity. The velocities of noise in the wooden, masonry and steel structures of buildings are very much higher than the velocity of noise in air. It is well known that the velocity of sound in timber is approximately 13,000 feet per second and in ordinary steel about 17,200 feet per second. The velocities of sound in all building materials and all the materials of machinery construction in general are higher than that of sound in air.

This difference in velocity of sound in materials of construction as compared with air may be considered to have as its principal effect upon noise propagation the influence that it exerts in modifying the noise that is radiated. Mechanical structures put noises into the air in forms that are quite different from the wave energy received by them. The radiating surfaces are almost, without exception, themselves mechanical resonators which modify the original sounds received by them. They thus emphasize the frequencies at which they are capable of resonating.

"Automobile Noise Measurement"

In many instances the original mechanical disturbances may be below audition, as may be the case with an automobile engine or as in the case of street vibrations, or rotating machinery. The vibration energy may be transformed into audible energy by the resonating surface that couples with the atmospheric air merely by shifting the frequency spectrum of the noise to a more audible frequency than that of the original disturbance.

The frequency spectrum of a noise may be determined by analyzing it into its various frequency components and by measuring the amount of energy residing in each of them.

An account of noise detecting and analyzing apparatus is given in a paper entitled "Automobile Noise Measurement" presented before the Society of Automotive Engineers in June, 1925. (Bell Telephone Laboratories Reprint B-140-L.) This paper discusses the mechanism and functions of audition. Also it considers the general origin and detection of automobile noise, its reduction and elimination. On page 25 of this reprint, Figure 15, is an illustration of the frequency spectrum of room noise under certain conditions. This may be considered a somewhat typical frequency spectrum of noise. The paper is largely a resume of a series of papers by other authors whose work is reviewed in this report. The "sensation units" and their relation to audition, as developed by Fletcher, are fundamental to the entire series of technical articles that this report considers.

"The Physical Properties of Speech, Music and Noise," which was presented by Fletcher in a paper before a joint meeting of the New York Electric Society and the New York Telephone Society February, 1924, gives the relation of these things to transmission problems. (Bell Telephone Laboratories Reprint B-94-1.) This paper gives an idea of fre-

quency spectra and the wave forms of speech, music and noise. It also describes some relationships of the auditory function.

"The Loudness of a Sound and Its Physical Stimulus" was given by Steinberg before the American Physical Society in December, 1924. (Bell Telephone Laboratories Reprint B-158-L.) The relationship that the loudness of a sound has to its energy frequency spectrum and to its level above the threshold of hearing is developed in this paper, formulated in an algebraic equation. The weight and root factors W and r , respectively, are discussed as functions of the sensation level, which is synonymous with the term loudness as previously used. There is a discussion of the relations between intensities well within the area of audition, and those near the threshold, to the weight factors. It is shown that as the intensity is increased the weight factors give greater weight to the lower frequencies; hence, even though the amplitude of the sound wave be increased without distortion, the ear will perceive both an increase and distortion. This effect is due to the non-linearity of the ear. This paper shows that the observed values of masking are the resultants of two effects, the change in ear sensitivity and the true sensation masking, that is, the inability to distinguish between sensations that are essentially the same.

"Loudness of a Complex Sound"

"Loudness of a Complex Sound" by Fletcher and Steinberg presented before the American Physical Society in December, 1923, gives the results of the study of two complex sounds. (Bell Telephone Laboratories Reprint B-91-1.) One of the complex sounds had a continuous energy frequency spectrum corresponding to connected speech, the other was a test tone having discrete frequency components. By means of filters the energy was removed from all frequencies either above or below a certain frequency, and the resulting decrease in loudness was measured by attenuating the original sound without distortion until equal in loudness to the filtered sound. This decrease in loudness was found to depend upon the absolute values of the loudness. For a loudness of 22 units above the threshold of hearing, each frequency region contributes to loudness in proportion to the energy in that region weighted according to the threshold energy for that frequency.

For a loudness above 30 units, however, this is no longer true because of the non-linear character of the response. By making certain assumptions, values of the total loudness in agreement with observed values are obtained if proper values are taken for the fractional power, decreasing to one-third as the loudness increases to 100 units.

"Audiometric Measurements and Their Uses" by Fletcher is the title of a talk presented before the College of Physicians and Surgeons in Philadelphia, April, 1923. (Bell Telephone Laboratories Reprint B-79-L.) This paper covers the general subject of the measurement of audition by means of methods developed in the Bell Telephone Laboratories. A discussion is made of the auditory sensation area and its relation to the

threshold of audibility and to the threshold of feeling. The method whereby this area of measured audition has been utilized to make a practical form of audiogram available to otologists is quite fully explained.

"Auditory Masking and Dynamics of the Inner Ear" by Wegel and Lane was presented before the American Physical Society in April, 1923. (Bell Telephone Laboratories Reprint B-58-1.) The phenomena of masking and their relation to the dynamics of the inner ear are discussed in detail in this paper. A clear discussion is made of the vibration of the basilar membrane at different distances from the oval window whereby stimulation of different auditory nerves is produced. This stimulation of different portions of the basilar membrane and different nerves, results in a difference in response or sensation of sound of different tones. The masking effect is shown to depend upon this non-linear response of the ear. The excitation of more than one portion of the basilar membrane by a pure tone results in the production of tone sensation other than the exciting tone. The overlapping of the effects in response by the basilar membrane brings about the masking effect and is clearly shown by diagrams and data.

"The Binaural Location of Complex Sounds"

"The Binaural Location of Complex Sounds" by Hartley and Fry is a paper that was published in the Bell System Technical Journal for November, 1922. (Bell Telephone Laboratories Reprint B-31-1.) This paper endeavors to bring the discussion of complex sounds to a stage similar to that which has been reached by the publications of work on pure tones. The experimental studies carried out by Stewart and his students have related to pure tones and have been published in the physical Review and the *Physikalische Zeitschrift* during recent years. Hartley and Fry assumed that the location of complex sounds by the binaural effect involves three processes: first, the resolution of the sound into its component tones; second, the independent (generally subconscious) location of each separate component; and third, the formation of a conscious judgment of the position of the source, based on the locations of the individual images. They conclude that subconscious corrections for the coincidences of different images bring about a final result depending very considerably on the psychological processes and individual prejudices of the particular observer.

"Binaural Beats" by Lane presented before the American Physical Society in April, 1925, is a most interesting theoretical and experimental discussion of binaural beats. (Bell Telephone Laboratories Reprint B-155-1.) This paper calls attention to the interesting fact that the introduction of a tone of one frequency into one ear and another tone of a higher frequency into the opposite ear, where the frequency difference is less than 5 or 6 cycles, brings about two kinds of binaural beats. One kind is objective and the other is subjective. Provided there is a sufficient difference in amplitude between the two tones the objective binaural

beat may be heard for most frequency values within the audible range. These beats are heard because the louder tone is conducted through the head to the ear receiving the weaker tone and the two tones are there received with about equal loudness. Subjective binaural beats, on the other hand, are heard for frequencies below 800 or 1,000 cycles when the tones of the two ears have about the same amplitude, differing by not more than 25 TU.

The evidence indicates that these beats are not due to cross-conduction in the head between the ears but are of central origin and are the result of the sense of binaural localization of sound by phase. If the beats are slow (less than one per second) they are generally recognized as alternate left and right localizations, though some observers may report one or more intensity maxima during the beat cycle. Fast beats (more than one per second) are generally recognized as an intensity fluctuation. Even with a constant source of sound rotating around the head of a listener, these fast beats are recognized as fluctuations in intensity, apparently since the sound appears louder when the phase relations are such that it is normally best localized in the position toward which the attention is desired.

"An Electrical Frequency Analyzer"

The actual physical analysis of sounds into their components is accomplished in the Bell Telephone Laboratories by means of various forms of frequency analyzers. One form of these analyzers is described in a paper by Wegel and Moore that was presented before the American Institute of Electrical Engineers in February, 1924, under the title of "An Electrical Frequency Analyzer." (Bell Telephone Laboratories Reprint B-86-1.) This apparatus produces a permanent photographic record of the frequency components of an electric current wave. The device has two frequency ranges; 20 to 1,250, and 30 to 5,000 cycles. The amount of power required as sound input does not, in general, exceed 500 microwatts, and the time for making a record is about five minutes. The mechanism of the analyzer is designed so that, to take a record, after starting the amplifier and connecting the apparatus to a 110-volt power source, it is only necessary to attach the conductors from the sound source to be analyzed and to press the starting button. The completed record is then delivered automatically in about five minutes, after which the apparatus returns to its starting condition ready to repeat the operation.

A paper published in the Bell System Technical Journal during July, 1925, by Fletcher upon "Useful Numerical Constants of Speech and Hearing" gives collected in one paper a large amount of exceedingly useful data. (Bell Telephone Laboratories Reprint B-142-1.) The material given in this paper was prepared in a more condensed form and published in the International Critical Tables. The paper, itself, is not so condensed and in some respects is more useful in the study of speech and hearing.

A paper by Crandall in the Bell System Technical Journal for October, 1925, upon "The Sounds of Speech" gives a graphical study of the vowel sounds statistically and by harmonic analysis. (Bell Telephone Laboratories Reprint B-162-1.) It also gives studies of four semi-vowel sounds and 16 consonant sounds. It is believed that this set of faithful graphical records opens a new prospect in the field of speech investigations.

A paper by Crandall and Sacia "A Dynamical Study of the Vowel Sounds" was published in the Bell System Technical Journal for April, 1924. (Bell Telephone Laboratories Reprint B-68-1.) An analysis of spoken vowel sounds based on accurate oscillographic records obtained without appreciable distortion over the frequency range from 100 to 5,000 cycles, was obtained for 13 vowel sounds. The method of analysis was a photo-mechanical one. With it was obtained the results indicated in a series of graphs.

The amount of power that is found in speech sounds was investigated and described by Sacia in a paper published in the Bell System Technical Journal October, 1925, under the title "Speech Power and Energy." (Bell Telephone Laboratories B-163-1.) The engineer in communication must know not only the average power but the maximum power that is involved in speech sounds in order to provide against load distortion. This investigation deals with the magnitudes and forms of speech waves primarily in terms of power. It is interesting to note that this paper estimates the average power in normal speech to be 7.4 microwatts. It is equally interesting to note that this average power had been previously estimated by Crandall and MacKenzie as 12.5 microwatts. (See Bell System Technical Journal, Vol. 1, No. 1.)

"Physical Criterion for Determining Musical Pitch"

"Physical Criterion for Determining Musical Pitch" by Fletcher is the title of a paper presented before the American Physical Society in April, 1923. (Bell Telephone Laboratories Reprint B-61-1.) This paper gives the results of experiments and studies upon the pitch of musical sounds from the human voice, the piano, the violin, the clarinet and the organ. It was found that only the quality and not the pitch of such musical sounds changes when a group of either the low or high frequency components is eliminated. Even when the fundamental and the first seven overtones were eliminated from the vowel "ah" sung at an ordinary pitch for a baritone, the pitch remained the same. It was found that three consecutive component frequencies were sufficient to give a clear musical tone of definite pitch corresponding to 100 cycles per second, and that, in general, when the adjacent components had a constant frequency difference which was a common factor to all components, a single musical tone of pitch equal to this common frequency difference was obtained. These remarkable results are due to the non-linear response of the ear and the production of the so-called "Subjective Tones." The components that are eliminated from the externally impressed musical tone are again introduced as subjective tones.

Inasmuch as the physician's stethoscope is frequently used to study sounds of machinery, there is included here this reference to the electrical stethoscope. There are three papers relating to auscultation that have been published by engineers of the Bell Telephone Laboratories. They are "The Stetophone and Electrical Stethoscope" by Frederick and Dodge (Bell Telephone Laboratories Reprint B-105-1) and "The Stethophone" by Dodge (Bell Telephone Laboratories Reprint B-105-1), and "Frequency Characteristics of Heart and Lung Sounds" by Cabot and Dodge (Bell Telephone Laboratories Reprint B-133-1.) The electrical stethoscope is a development of the Bell Telephone laboratories through its cooperative research extending over a period of more than seven years with prominent physicians and diagnosticians. Among these are Dr. Richard C. Cabot of Harvard University who is co-author with Mr. H. F. Dodge, a Bell Telephone Laboratories engineer, of the paper on "Frequency Characteristics of Heart and Lung Sounds" that was published in the Journal of the American Medical Association for June 13, 1925.

The electrical stethoscope is particularly well-adapted to the detection of faint sounds and their graphical recording by the aid of some form of recording apparatus whether it be a galvanometer or a wax disc cutting apparatus for making phonograph records.

List of Publications Bearing Upon the Subject

The following is a list of Bell Telephone Laboratories publications that are out of print but that have some fundamental bearing upon the subject that is being considered.

Reprint No.	Title	Author
B-8-1	The Frequency-Sensitivity of Normal Ears. Phys. Rev. June, 1922, pp. 553-565.	H. Fletcher
B-11-1	The Nature of Speech and Its Interpretation. Franklin Inst., June, 1922, pp. 729-747.	R. L. Wegel Harvey Fletcher
B-12-1	Physical Examination of Hearing. Nat. Acad., July, 1922, pp. 155-160.	R. L. Wegel
B-14-1	Audiometric Methods and Their Applications. Trilog. Soc., 1922, pp. 98-131.	E. P. Fowler, M.D.
B-19-1	The Relative Sensitivity of the Ear. Phys. Rev., Oct., 1922, pp. 331-343.	R. L. Wegel Donald MacKenzie
B-30-1	Physical Characteristics of Audition. Bell System, Nov. 1922, pp. 56-68.	R. L. Wegel
B-43-1	The Nature of Language. El. Comm., July, 1923, pp. 32-45.	R. L. Jones

All of the matter included in this report thus far relates to work that has been done in the Bell Telephone laboratories. Much valuable work in this field has been done elsewhere, but the writer has made no attempt to include a discussion of it in this report.

There is, however, one notable contribution to the literature of noise

that has come to the writer's attention and upon which it might be well to make a brief comment. "The Overcoming of Distraction and Other Resistances" by John J. B. Morgan is the title of a pamphlet published by Columbia University as one of its contributions to Philosophy and Psychology, Volume XXIV, No. 4, as a part of "Archives of Psychology" by R. S. Woodworth No. 35, February, 1916. Professor Morgan undertook a considerable amount of work in the study of noise and its effect upon the human organism. The pamphlet contains 84 pages and is very interesting because of the relatively large number of people who were studied and because of the interesting ways in which Professor Morgan obtained the reaction of his subjects to noise. The reader is referred to the original pamphlet to obtain an account of the apparatus and methods employed in the experiments.

Professor Morgan's conclusions are briefly summarized by him as follows:

Conclusions After Morgan's Study of Noise

A. As to the Effect of Noises on Activity.

1. The initial effect of noise is to retard the speed of work.
2. After this initial retardation there is an increase in speed. In many cases the subject exceeds the speed he had attained before the introduction of the noises.
3. Extra effort is put forth to overcome the noises. This is shown by an increase in the pressure exerted upon the keys in reacting. This extra effort continues pretty uniformly throughout the noisy period.
4. Articulation is used as a means of overcoming the effect of the noises. This articulation is shown by changes in the breathing of the subject. In some cases this help is not used immediately after the introduction of the noises, showing that it is an adjustment that is more deliberate than the extra expenditure of energy.
5. It is by means of these helps that the subject is able to eliminate the influence of noises from his time score and the extent of the use of these is more a measure of the effect of the noises than is the time record.

B. As to Method.

1. Time measurements serve to indicate facts concerning the laws of mental operation, individual differences and class comparisons, but they do not serve to show whether one condition is better or worse than another.
2. In order to know whether a condition is efficient or not we must have evidence of either the constancy or change in effort. To take for granted that it is constant is to make an unwarranted assumption, and destroys the validity of any conclusions as to efficiency.
3. Tests taken without the knowledge of the subject, but directly connected with the work in hand, give the most promise of success as indexes of change in effort expended.

C. As to Time and Energy Relations.

1. In a test where numerical comparisons were possible it was found that energy changes are much more significant than time changes.
2. A person tends to change the amount of energy expended to meet changing situations, and to keep the time constant regardless of variations in conditions.
3. We offer as a statement of the situation that any real or imagined change in the resistance offered to the maintenance of a set causes a change in the output of energy.

THE CIVIC CLUB OF PHILADELPHIA.

Mrs. Isaac L. Rice

The Civic Club of Philadelphia organized a committee to prevent unnecessary noise in 1907, when a petition was received from a group of working women asking for assistance in their effort to stop the shouting and yelling of street vendors and pushcart men. These women complained that their husbands could not sleep on account of the disturbances on the streets. Chickens, geese and turkeys, also disturbers of rest, were removed from a poultry yard by a city inspector on request of the committee. The committee has continued its work and has been the recipient of complaints of all kinds.

In 1908 the ordinance forbidding unnecessary noise near hospitals was passed by Council and superintendents given power to post warning signs on all hospitals.

Work was begun in 1909 on ordinances to regulate the cries of street vendors and newsboys as well as the noises of animals and birds; to remove flat wheels from trolley cars, and stop whistles and bells in the early morning; as well as to license hand organs and street pianos.

In 1910 the Joint Committee on a Safe and Sane Fourth of July was organized in the hope of saving life, reducing accidents, and stopping the deafening racket of explosives, all of which were a part of the nation's birthday celebration. It was discovered that no new ordinances were needed as the Acts of Assembly, if enforced, would remove all these objectionable features. These laws were enforced by one of Philadelphia's mayors in 1881-1882-1883 with success. Philadelphia now has a quiet Fourth of July and an accident of any kind is unusual.

In 1913 an ordinance was passed extending the "Zones of Quiet" to the public schools. Principals were given authority like that of the superintendents of hospitals to post notices on their buildings. Under this ordinance the amount of quiet depends largely on each superintendent. The grinding of brakes and the bumping of trolley cars over crossings was discussed with the superintendent of the Rapid Transit Company.

In 1915 the report of the committee states that over 14,000 complaints were received by the police of unnecessary noises in hospital zones.

In the Annual Report of 1916-1917 there is a note that the Joint Committee on the Noise Nuisance, representing the leading organizations of the city including the Automobile Association, the Hotelkeepers' Association, the Bureau of Health, the Bureau of Police, and the Rapid Transit Company, was called together within the year to consider the advisability of an ordinance to restrict the noise of domestic animals because of the protests of citizens. Such an ordinance, however, was found to be unnecessary as a clause in the housing and sanitation law empowered the Bureau of Health to take action against the owners of unduly vocal roosters, dogs, and other animals.

"Soft Pedal Week," following the annual "Clean-Up Week," was inaugurated by this committee and endorsed by the Bureau of Health. At first there was no noticeable diminution of useless noises during that week but nearly 2,000 suffering persons took courage to send complaints to the Bureau of Health. The Civic Club also was the recipient of many complaints which it passed to the Bureau of Police. The newspapers had editorials on the noise nuisance. Daily items concerning useless noises appeared in many of them and papers throughout the country commented on Philadelphia's "Soft Pedal Week." The educational results of such a week were considered sufficient justification for making an effort to have it an annual event.

During the war the chairman of the committee reported significantly the following:

"War is noise and breeds noise, and during a war no attempt to restrict even the most useless noises of a city could have a hearing. Therefore, the Committee on the Noise Nuisance has no report to make.

"IMOGEN B. OAKLEY."

Annual Reports of the Civic Club

The annual report of the club for 1920-1921 calls attention to the protests that had been received regarding noise from motor trucks, etc. The Joint Committee on the Noise Nuisance was called together. The noises from motor trucks were condemned and it was suggested that such traffic be restricted to certain streets. The Bureau of Police had no authority to keep trucks from any streets without special permission of the legislature. The Chamber of Commerce prepared a bill to provide this necessary power and presented it to the State Legislature at Harrisburg. The committee advised action by all the associations to stop the shouting of street vendors, a nuisance which is forbidden throughout the state by Act of Legislature, which is only tolerated because of ignorance of the law.

In 1922 it is recorded that the committee had secured action by the Health and Police departments against many instances of unnecessary noise. Insistent bells were silenced and the director of the Department of Public Health jokingly complained that his inspectors had been kept so busy looking after the dogs and chickens reported by the Civic Club that they had scarcely any time for other cases. A petition to

Council containing many signatures requested the forbidding of heavy, noisy trucks on Spruce Street during the night. Spruce Street is a strictly residential street and it was felt that noisy night traffic should be diverted to a purely business street. The wholly unnecessary yelling of newsboys on the streets came in for consideration. It was agreed that it would be desirable if newsboys as a class were forbidden to shout their extras especially during the quiet peace of Sunday morning. Philadelphians will remember when bells were removed from street car horses on Sunday. An Act of Legislature forbidding all vendors to call their wares under penalty of revocation of licenses if the law was not obeyed was invoked and numbers of offensive vendors were silenced.

In 1924 the Joint Committee on the Noise Nuisance submitted to the Director of Public Safety, General Butler, a plan embracing six ways by which the committee believed the unnecessary noises of the city could be decreased without detriment to any one person and with a vast increase to the public comfort:

Points in the Plan for Reducing Harmful Noise

First: that heavy traffic shall be diverted from residential streets from 8:00 p. m. to 8:00 a. m., with especial consideration of Spruce and Pine streets, which being so near to Chestnut and Walnut streets are afflicted with their heavy traffic overflow.

Second: that one standardized horn shall be required on every motor vehicle, the siren and klaxon to be put under the ban of the law.

Third: that the law against the use of muffler cut-outs be strictly enforced.

Fourth: that drivers who sound their horns uselessly and continuously between intersection and in traffic jams be subject to arrest and fine.

Fifth: that the law forbidding street vendors to call their wares in any part of this commonwealth be strictly enforced. Hotelkeepers make especial complaint against the cries of newsboys which they report as excessively annoying to their guests.

Sixth: the Joint Committee on the Noise Nuisance believes that to add a gong to the proposed traffic control semaphore system would be a useless increase to the already large number of gongs which perplex and bewilder the pedestrian.

In 1926 the protests of the hospitals of the city against unnecessary honking of automobiles caught in jams, etc., together with open muffler cut-outs, etc., claiming that such noises prevented the rest and quiet so necessary in hospitals, and retarded convalescence, brought about action by the committee in the way of representations to Mr. Elliott, the Director of Public Safety, who reported that he had taken steps to reduce this nuisance.

The work of the Civic Club of Philadelphia in endeavoring to lessen the distracting noises in a great city has attracted nation-wide attention, and recently a letter was received from Berkeley, Calif., suggesting that the less noise week be made a national affair.

NOISE REDUCTION BY THE ELECTRIC RAILWAYS**H. S. Williams**

Reporting the progress of the noise reduction campaign of the electric railways, the American Electric Railway Engineering Association appointed two committees in 1925 to study and report on the reduction of noise incident to street car operation, one committee represented the rolling stock section while the other represented the tracks section. The reports of these committees will be found in the Proceedings of the A.E.R. Engineering Association, for 1925, on pages 64 and 320.

Briefly summarized the causes of noise were shown to be as follows:

1. Track noise, caused by wheel impact and influenced by:
 - (a) Degree of track maintenance.
 - (b) Type of track and pavement construction.
 - (c) Special work (switches, crossings, etc.)
 - (d) Imperfect rail joints.
 - (e) Broken rails.
 - (f) Corrugated rail.
 - (g) Sand and other foreign matter on rail.
 - (h) Rails loose on ties.
 - (i) Squealing of car wheels on curves.
2. Wheel noise, due to impact with rail and with the following factors influencing the sound:
 - (a) Size and weight of wheel.
 - (b) Material and design of wheel.
 - (c) Condition of wheel as regards maintenance.
 - (d) Flat wheels.
 - (e) Resonant quality.
3. Truck noise due to the following:
 - (a) Weight of truck.
 - (b) Design of truck.
 - (c) State of maintenance, chiefly worn and loose parts.
 - (d) Unsprung weight.
4. Brakes, noise produced because of:
 - (a) Design of brake rigging.
 - (b) Condition of maintenance.
 - (c) Air compressor.
 - (d) Condition of maintenance, loose and worn parts.
 - (e) Brake shoes (design and hardness).
5. Gearing, as influenced by:
 - (a) Design and type of teeth.
 - (b) Resonant quality of gear.
 - (c) State of maintenance, including condition of axle bearings.
 - (d) Lubrication.
 - (e) Muffling action of gear case.

6. Motor noise, caused by:

- (a) Brushes on commutator.
- (b) Motor weight.
- (c) Motor suspension.
- (d) Condition of maintenance.
- (e) Armature unbalance.
- (f) Unsprung weight.

7. Body and Miscellaneous Parts as caused by:

- (a) Weight.
- (b) Design as influencing sounding board effect, sound reflection and sound conduction.
- (c) Door operating mechanism.
- (d) State of repair.
- (e) Window rattle.
- (f) Trolley noise.

All of the above points were discussed in detail and remedies suggested which would tend to cure the trouble. The remedies can be grouped under five general headings as follows:

- 1. Adoption of higher standards of construction.
- 2. Adoption of higher standards of maintenance.
- 3. Improved design.
- 4. Cushioning.
- 5. Reduction of unsprung weight.

Two Major Problems in Noise Reduction on Railways

From this it will be seen that there are two problems, one concerning maintenance and the other dealing with design. Much can be accomplished in noise reduction by the enforcing of higher standards of maintenance. Also in the course of maintenance, chiefly at periods of heavy overhauling, minor construction changes may be effected. But the most important factors can be taken care of only when new equipment is being built as this embodies radical departures in design.

In 1926 the A.E.R.E.A. combined the work of the committees into a single unit. The work of this committee has just been completed for the year and its report was submitted to the annual meeting of the association in October, 1926. The work of the committee for this year has taken on the nature of a scientific measure of noise volume by means of radio amplification apparatus. The underlying thought being to test various elements of car and track structure to determine the best construction from a noise standpoint and thus be able to recommend to the industry definite items to improve the quietness of operation.

It is expected that this work will be continued for several years as the subject is a very live one with the electric railways and very great improvement can be expected in street car noises.

NOISE REDUCTION IN POWER TRANSMISSION**G. O. Small and W. M. Bertram**

The elimination of noise in power transmission has perhaps been developed further, although perhaps unconsciously, than in many other lines utilizing power.

In the very early days of the use of power in industry, the flow of water was utilized to produce this power; a wheel of some sort being turned by the force of the falling water, and from the shaft on this wheel a belt was used to transmit the power to the machine requiring its use.

The belt has taken many forms; various kinds of rope drive as well as round and flat leather, fabric and rubberized fabric having been used. All of these when run at moderate speed are very quiet in operation. It is only with the advent of greater power and high speeds which have developed in comparatively recent years that these means of transmission have become inadequate.

With the increasing problems in power transmission, due to the above causes, various expedients have been tried to cut down the noise due to high speed and heavy load. Of course the great outstanding advancement in the transmission of power has been in the employment of electricity and the consequent elimination of mechanical means of transmission. In many cases, however, it is still necessary, on account of installation cost or other potent factors, to maintain the mechanical transmission. The flexible belt of leather or fabric is still used successfully, even with its limitation, to transmit power quietly. The limitations of belting, however, are many, and when excessive speeds are encountered, there is the tendency to slip which is hard to overcome, and when great power is to be transmitted it necessitates excessive width or undue thickness, either of which results in serious faults tending to discount their use.

It has been necessary, therefore, in many cases to utilize some other means of mechanical transmission. The two most familiar are gearing and the silent metal chain. Where the distance from center to center of shafting is comparatively small, gearing has been used very extensively. Where the source of power to be applied to a machine must be at some distance and where this distance may vary from one machine to another, the use of the silent metal chain is a very common means of silent power transmission.

In the use of gearing for power transmission a tremendous growth has occurred tending to a greater efficiency and quieter operation. The first gears used for power transmission were simply pegs of metal or wood inserted in a wheel rim engaging similar projections on the wheel to be driven.

Even today in many of the water-wheel drives used for power we find bevel gearing transmitting power from the vertical water-wheel turbine

shaft to the horizontal shaft for the power transmission. This bevel gearing had, in the past, in many cases cast teeth. Such teeth are never accurate and while strong enough they can not be made to run quietly. As an improvement in the use of bevel gears with cast teeth, there has been made a combination consisting of a cast tooth gear on a driven shaft and a wooden insert tooth on the driving shaft. This combination runs with a fair measure of quietness considering the comparatively low speed at which it operates. Such devices, however, are entirely inadequate to take care of the large power units and the high speeds that are encountered today in transmitting power.

It has consequently become necessary to develop a type of gear that would present the strength required and would have a material in its construction that would either eliminate or greatly minimize the noise produced by the rapid meshing of the gear teeth. The first of these materials used successfully was rawhide and this is used today to a great extent; this use being not only in power transmission but in machines themselves where motion is to be transmitted from one part of the machine to another. This material is easily available and within its limitations is very successful. On account of these limitations, however, in many cases it has been necessary to utilize some other material. Consequently, material made from vegetable fibers, especially cotton, either in the form of a fabric or pressed direct from cotton batting has been used with great success. This gearing is used for transmission of power in quantities varying from a fraction of a horsepower to several hundred horsepower. With accurately cut teeth and proper meshing, some types of these non-metallic gears have run successfully at a pitch line velocity of 5,000 feet per minute and without any undue noise.

Vibration Is Often Cause for Much Annoyance

Although progress has been made in the elimination of noise in power transmission, there still remains much missionary work to be done along this line. The fact should be stressed that noise in power transmission, except in relatively few instances, is not merely objectionable sound, but is the audible manifestation of incorrect or faulty transmission.

It is most often due to vibration, the destructive effects of which are well known. There are few noisy transmissions that could not be made quiet, and the elimination or reduction of noise would be but a minor one of the benefits obtained. The various parts of the transmission would have longer life, less repairs would be needed, efficiency would be higher, and in many cases less power required.

This committee is considering the elimination of harmful noise, and it can be shown that most noise in transmission is harmful economically as well as psychologically. The physical results of noise and their cost in dollars and cents for maintenance and upkeep, etc., may have a more definite appeal than the value of the effect of noise elimination as shown by better working conditions and increased efficiency of workers.

Many instances might be given illustrating these points. A rough

cast gear, operating at low speeds may show the effects of its vibration not only in the machine, but all through a train of gearing, and cause trouble which will appear not where it originates in the rough gears, but at some other point which may not in itself be at fault. Too high speed in motors without properly designed gearing will often show up not only in rapid gear wear, but in the breakdown of motor insulation. The vibration of metallic gears may affect the work done where accuracy is important. The use of more flexible connections, such as silent chains or non-metallic gearing, would eliminate such difficulty. Instances may be shown of reversing drives with leather belts where change in size of pulleys and belt width and thickness has done away with squealing, and shown much longer belt life. As stated above, in all of such cases, the elimination of noise is but the minor benefit.

VIBRATING A COMMUNITY IS A NUISANCE ACCORDING TO IMPORTANT COURT DECISION

S. Rosenzweig

The operation of machinery invariably causes vibrations. Quite frequently they may not be felt in the immediate neighborhood of such machines but appear some distance away in an amplified intensity. When they cause disturbances of such a nature as to materially interfere with the operation of a neighboring plant or to become so annoying that they constitute a nuisance, an action to enjoin the use of the offending machinery may be started and, according to a recent court decision, carried through successfully.

Such a case is discussed by Leslie Childs in the *American Machinist* (New York) from which the following quotations are taken:

"As an example of judicial reasoning on this subject, a recent New Jersey case is well worth a brief review. The plaintiff was engaged in the manufacture of chlorin gas distributing machines, meters, gages, and other scientific devices. He also conducted an experimental laboratory in which delicately adjusted appliances were used, and a drafting room for the drawing of plans incident to his business.

"The plaintiff's plant was located in a factory district about 250 feet from the plant of the defendant. The latter, it appears, operated a high-speed uniflow engine and generator to generate electric power for his plant, which, owing to vibration, seriously interfered with the complainant's business. This vibration, the evidence showed, shook the walls of the plaintiff's mill in such a manner as to affect noticeably the entire building, and thus hampered the department heads and their assistants in their work. In this situation the plaintiff sought to enjoin the defendant from the operation of his generator.

"The defendant, among other things, took the position that the plaintiff had no right to attempt to carry on his business, in view of its character, in a factory district; and that if he attempted to operate in a factory district, he should assume all risk of disturbance."

When the decision was rendered, against the defendant, he appealed to a higher court which, in granting the injunction, also decided in favor of the plaintiff and after a review of the evidence, in part, said:

"The law guards jealously, for all alike, the enjoyment of all private property. The right of enjoyment is surrendered in a factory district only to the extent of the inconvenience incident to the character of the business carried on there, no more.

"The ceaseless pounding of the vibrations from the defendant's engine against the walls of the plaintiff's mill is not incident to the neighborhood. The same annoyance would happen, under the same conditions, if both factories were on a farm. It was not a neighborhood hazard to be anticipated, and is not one to be suffered. Community vibrations must be endured, but vibrating a community is a nuisance."

The lesson to be learned from this case is important and can not be too forcibly impressed upon those executives who are responsible for the installation of machinery. Wherever the health, efficiency and comfort of people may be impaired by the vibrations and noise resulting from the operation of high-powered machinery, satisfactory insurance against such an occurrence must be provided, particularly in buildings in which industrial and commercial enterprises are carried on.

Vibrations May Often Be Carried Long Distances

It is natural that more care has to be exercised when such machinery is operated in crowded and residential districts than in isolated plants. However, it is surprising to the uninitiated how far vibrations may be carried, due either to the construction of buildings in steel and concrete, or on account of the character of the soil upon which the foundations are built. This is especially true of machines of high rotative speeds, as steam turbines; of reciprocating action, as steam and internal combustion engines, or of heavily vibrating character as coal pulverizers, stamping presses and forging hammers.

The suitable isolation of machinery to prevent the transmission of disturbing noises and vibrations, is not a matter of experiments and hit-and-miss methods. We know how it can be accomplished and how satisfactory and far-reaching results can be obtained.

Thousands of successful installations justify this statement. The largest public utility corporations in this country and abroad have taken advantage of these modern methods for the isolation of steam turbines, motor generators, rotary converters, transformers, coal pulverizers, etc., while commercial enterprises and industrial concerns have applied them to all types of machinery such as printing presses, dough mixers, pumps, compressors, fans and many others.

The correct application and disposition of these methods to eliminate the transmission of vibrations is plainly the work of specialists and experts in this branch of engineering. In many cases a careful study and survey covering operating conditions of the machinery equipment and construction of building foundations are required. Sensitive and

accurate instruments are available which allow us to determine the character and intensity of vibrations.

The cost of such work and the application of the most suitable equipment is insignificant when compared with the complete cost of the machinery to be installed. If it serves no other purpose it may be considered the best and cheapest insurance against the possible damage caused by vibrations. How important such insurance is, is clearly exemplified by the court decision cited above.

SOME IMPORTANT CASES OF NOISE ELIMINATION WITH LEGAL ASPECTS

M. C. Rosenblatt

Certain instances of mitigation of disturbing noises encountered over a period of several years, some of which contained important legal consideration, are of interest. Considerable money was spent in these several cases to provide barriers against noises flowing to the ears of disturbed neighbors, and since we seem to be prone today to measure in the dollars and cents standard, it may be a useful idea to measure the amount of harm done by distracting and disturbing noises by means of the amount of money spent to ameliorate it.

Further, because in most of these instances were matters appearing in one judicial court or another, the increasing stress laid upon noise nuisance by the courts becomes important. Some years ago, lawyers to win against a claim needed only to set up the defense that the noise was a part of the very industrial processes and that the industry was a necessary part of the community and therefore the noise had to be tolerated as a necessary evil. Today, the lawyer knows that he can not get away with this sort of defense and he finds that the court will not listen but will insist that excess noise is a nuisance and if complaints are made, the noise must be abated.

Several years ago, a large transportation company was hailed into court by neighbors to one of its electric charging plants which operated through the night to prepare their electric trucks for the day's work. The court directed the company to remedy the nuisance, and although this company showed that it would cost over \$75,000 to remove the machines and place them elsewhere, the court ordered the company to abate the nuisance by a certain date or be prepared to be held in contempt. This order was in the face of expert testimony by sound and vibration experts that the disturbance was not of a great order. However, testimony by neighbors was taken by the court to refute the experts and the court directed as above.

Night and day work was rushed to isolate the machines before the day of answer to the court. A sound proof enclosure was constructed around the equipment properly prepared for ventilation and removal of machines if necessary, and when finished, no sound could be heard

10 feet away from the enclosure on any side. During the trial, testimony was given to the effect that a woman residing about 150 feet away from the plant was thrown out of bed with resulting injury to her spine due to the vibration. This testimony of course was positively ridiculous, but how could it be refuted. After the work was finished, arrangements were made so that the two judges of the court were present at a test made at 2:00 a. m. The transportation company then wrote as follows: "The sound proof enclosure recently installed has proven entirely satisfactory for the isolation of noise produced by the motor generator sets and I wish to thank you for the very efficient manner and dispatch with which this work was accomplished before the date specified by the court."

One of the largest ice cream manufacturers was accustomed to begin loading and icing their trucks at 3:00 a. m., in consequence of which neighbors for a distance of three city blocks complained that their sleep was greatly disturbed. These people went into court and got an injunction which ordered the manufacturer to desist from loading until 6:00 a. m., which brought a great hardship upon him. This condition was remedied by the special construction of sound proof enclosures around all of the noisy equipment, such as ice crushers, conveyors and chutes. The neighbors finally agreed that they were no longer disturbed. The cost of this installation, which was quite extensive, was \$4,600.

Examples of Harmful Noise Elimination

In another instance an ink manufacturer found that he could better afford to run his equipment continuously without shutting down than to clean the equipment so as to prevent the drying of the ink upon parts of the mechanism. By running during the night the neighbors were disturbed and so expensive were the means necessary to reduce the noise that the manufacturer decided to move his plant to an isolated part of the city rather than risk probable adverse court decision and, possibly, heavy damages.

A fabricator of structural steel was about to install one of the largest metal cutting saws ever built. It would run at high speed. His engineers warned him that the noise was terrific and was disturbing at a distance of over 1,000 feet. A sound suppression housing was built by specialists around this saw at the time it was erected to forestall any complaints from neighboring property owners, and was entirely successful.

Probably one of the most interesting installations was where employees in a factory refused to work in one part of the building, complaining that the noise of an elevator driving apparatus caused headaches, nervousness and other distress. The erection of a sound proof housing around this machinery was difficult because of restrictions by the elevator inspectors and the need for ventilation, which was accomplished in a novel engineering manner. The installation, costing \$440, was successful and the machinery absolutely sound proofed.

CHAIRMAN SANFORD: I have an acquaintance who has been in the drop forge business for upwards of 40 years. He is now the superintendent of that department. He is deaf in the ordinary sense of the word. If he were here today he would have to sit in the front row and probably cup both hands back of his ears to get what the speaker was saying. He will get that same distance from a man in a drop forge shop and carry on a conversation in an ordinary tone of voice. He seems to need the continual din of those machines to so tune his ear drums that he can hear properly.

If there are no other remarks we will pass on to the next subject which is the report of the Committee on Annealing Chains by Mr. R. F. Thalner.

REPORT OF COMMITTEE ON ANNEALING CHAINS

MR. THALNER: There was an announcement made in one of the sections that at this time the subject of annealing chains would be thoroughly discussed; unfortunately that announcement was made in error because this is merely a progress report of a committee which has been appointed to go into the question of whether or not some research should be conducted to determine the best methods of annealing hoisting chains. We all know that there are many methods now in use. One man will heat his chains into a certain temperature and have a certain method of cooling. Another man will heat his chains to a different temperature and have a still different method of cooling, with the result that none is sure he is annealing chains in the best possible manner.

This committee has been in conference with two universities and it has been discovered that we can have the necessary laboratory work done at very little cost. We have tentatively engaged a man to do the work. He is now preparing a suggested plan of action, and after it has been approved by your committee, we will ask various members of the council to contribute to a fund which will be used to defray the nominal expense.

Several chain manufacturers have signified their willingness to co-operate with us to the extent of supplying the chains that will be needed, so it should not be long before we start active work. At present this undertaking is under the direction of a small steering committee including Messrs. E. F. Blank, W. Dean Keefer, and myself. This committee is being enlarged to include more of our own members as well as representatives from other organizations.

CHAIRMAN SANFORD: At this time, I would like to ask Mr. R. C. Stratton, vice chairman of the Section, to take the chair. Before retiring, however, I wish to thank the Section and the officers for the very strong support that they have given me during the past year and I trust that you will continue to support the incoming officers as well as you have those of the past.

CHAIRMAN STRATTON: The next paper is the report of the committee on Steam Engine Break Downs, which will be presented by Mr. Daniel L. Royer, chairman.

REPORT OF DANIEL L. ROYER, CHAIRMAN, COMMITTEE ON METHODS OF PREVENTING STEAM ENGINE BREAKDOWNS

The causes of steam engine breakdowns have been classified from several viewpoints. The statistical system developed by Insurance Companies lists engine breakdowns by recording the initial broken part and the cause of failure under the headings which follow:

Initial Broken Part

1. Cylinder and piston (including steam chest, combustion chamber of internal combustion engine, piston rings, etc.).
2. Mechanism by which power is transmitted from piston to shaft (including piston-rod, cross-head, connecting rod, crank, bearings, other than main bearings, and other related parts).
3. Shaft.
4. Main bearings.
5. Valve gear, including eccentric rod and all other parts of valve mechanism.
6. Governor parts.
7. Bedplate and frame, including outboard-bearing pedestal.
8. Wheels, pulleys, etc., mounted on main shaft.
9. Undetermined.
10. Miscellaneous, N. O. C.

Cause of Failure

1. Defective material, workmanship or design.
2. Deterioration.
3. External violence.
4. Foreign objects in cylinders.
5. Loosening of nuts or other fastenings.
6. Lubrication, failure of
7. Misalignment.
8. Overheating.
9. Overspeed.
10. Sudden overload or sudden stoppage or sudden loss of load.
11. Pre-Ignition.
12. Settlement of engine or its foundation.
13. Water or other liquid in steam or power cylinder.
14. Undetermined.
15. Miscellaneous, N. O. C.

From the standpoint of the engine builder rather than the insurance statistician, engine failures have been classified as follows:

1. Water in the cylinders.
2. Fatigue of material.
3. Defective material.
4. Failure of safety device. (The above classifications were given by Mr. I. H. Reynolds, manager of the Engine Department of the Allis Chalmers Manufacturing Company to which has been added—)
5. Loose or deranged parts.
6. External violence.
7. Improper care and management, including failure to provide lubrication.

The following analysis of these causes is of interest:

WATER IN CYLINDERS—Preventing water from entering cylinders involves the original plant layout, boiler operation, and engine operation. If the plant is properly designed and operated, no trouble will develop from water in cylinders.

FATIGUE OF MATERIAL—The prevention of this form of deterioration involves original design which will minimize the possibility of fatigue and care and management in maintaining proper alignment.

DEFECTIVE MATERIAL—To minimize the hazard inherent in defective material, inspection and rejection of defective materials at the plant of the manufacturer and subsequent inspection during the life of the unit are necessary.

FAILURE OF SAFETY DEVICE—This accident cause might be assigned to improper care and management, providing the safety device was correctly designed originally.

LOOSE OR DERANGED PARTS—This might be treated under the heading of improper care and management because parts are not permitted to become loose in a properly maintained engine.

EXTERNAL VIOLENCE—This is still another cause of accidents which might be listed under improper care and management.

Safe Practices Pamphlets on Engine Breakdowns

It is evident that the fly wheel of an engine is a part of the engine. Furthermore, fly wheel failures cause many serious engine breakdowns involving loss of life and extensive property damage. However, this committee has not considered fly wheel failures because it is understood that the Council has assigned this investigation to the Committee on Rotary Stresses.

The committee feels that the subject of preventing engine breakdowns has already received careful and satisfactory treatment in the following:

1. Safe Practices Pamphlet No. 9, entitled, "Engine Guarding and Engine Stops" issued by the National Safety Council.
2. The Operating Code Manual formulated by the Prime Movers Committee of the National Electric Light Association.
3. The many papers covering the field of engine and wheel design prepared by members of the American Society of Mechanical Engineers and published by that organization.

4. The report of the Committee on Rotary Stresses which, it is presumed, will cover the safe speed of the various types of wheels and operating features involving wheel safety.

For the information of those who are not familiar with the Operating Code Manual of the Prime Movers Committee of the National Electric Light Association, we quote the following rules covering the starting and stopping of reciprocating engines.

Corliss Engines

STARTING

1. Notify switchboard operator that machine is ready to be warmed up.
 2. After receiving affirmative reply, see that all drains from the cylinder are open.
 3. See that the drain and trap above the throttle valve are open.
 4. See that the main exhaust valve is open.
 5. If a compound engine, see that the receiver is drained.
 6. See that the wrist plate is unlatched from the eccentric rod hook.
 7. See that oil is running to the bearings of the engine.
 8. See that the crank and cross head pit drains are open and free.
 9. See that the cranks, cross heads, and other movable parts are not obstructed by any foreign material.
 10. See that the wrist pins, crankpins, eccentric straps and wrist plate pins are tight.
 11. See that the valve gear nuts, etc., are tight.
 12. See that the crank is in such a position that the engine will start readily.
 13. See that the governor belt, when used, is in good condition and free from oil.
 14. Examine all gauges.
 15. Oil the governor spindle and see that the dash pot has the necessary amount of oil.
 16. Start the circulating, air and hotwell pumps, and get partial vacuum in the condenser.
- Note: Regulate hotwell pump so that proper water level is maintained above pump suction.
17. See that the governor is hooked up on a safety pin.
 18. Place the bar in the wrist plate of the engine.
 19. Open the by-pass valve, or crack the throttle, admitting steam alternately to each end of the cylinder, warming it up and getting all the water out of the valve chest and cylinder.
- Note: Shifting of valve gear to permit steam to enter alternate ends of cylinder shall be done with throttle or by-pass valve closed, due to the wear and tear on the crank pins and boxes when this operation is performed under steam pressure.
20. Open the throttle valve further until the engine revolves slowly, then engage the wrist plate with the eccentric rod hook.
 21. See that the lubricator and oiling system are in operation.

22. Notify the switchboard operator that the machine is ready for operating speed.

23. After receiving affirmative reply, open throttle slowly and close the by-pass valve, noting that the engine comes up to proper speed.

24. See that the safety pin of the governor is in a correct position to operate, should the governor belt break.

25. Close the drains.

26. Signal "Load" to the switchboard operator.

27. As the load comes on, bring the vacuum up to normal.

SHUTTING DOWN

1. After receiving the signal "Stand By" from the switchboard operator, answer it.

2. After receiving and answering the signal "Stop" from the switchboard operator, close the throttle slowly until the engine comes almost, but not quite, to a stop.

3. Reverse the safety pin of the governor so that the governor will not drop to the lowest point.

4. Place the bar in the wrist plate.

5. Disconnect the wrist plate from the eccentric rod.

6. Operate the wrist plate by hand with the bar so that the engine will stop with the crank in starting position.

7. Move the wrist plate to a central position so that the exhaust valves are closed.

8. If the engine has a double eccentric, trip the steam valves by hand when the wrist plate is in a central position so that the steam valves may be closed and lapped.

Note: A test should be made periodically by leaving the governor safety pin in the running position when shutting the throttle valve, to see that the safety device is in working order.

9. Shut down the circulating, air and hotwell pumps.

Note: If jet condenser is used close off injection water just before closing throttle valve and allow air or wet vacuum pump to run until engine stops, thus obviating, to some extent, the possibility of water being forced by atmospheric pressure through air or wet vacuum pump into low pressure cylinder in the event of displaced or defective valves in the pump.

10. Shut off the oiling system.

11. Open the drains.

The Human Element Is Usually Responsible

It has been the experience of manufacturers engaged in building high class engines and of the Companies insuring engines against their breakdown that the standard engines on the market are properly designed, and when installed in an approved manner and operated under loads for which they are designed will become obsolete before they wear out or break down.

The human element, not the engine, is the big accident maker.

The subject of the practical operation of steam engines has been covered by many qualified authorities whose works have been produced throughout the history of engine manufacture. The opinions of these authorities are well known to all qualified stationary engineers—and under the licensing provisions enforced in many of our states and cities, it is practically impossible for an incompetent person to obtain the authority to operate a steam engine. It would appear, therefore, that the selection of the men to operate steam engines is of prime importance in preventing engine accidents. This, of course, is a matter for each individual plant manager to consider.

The committee believes that the danger of employing incompetent men in the engine room should be stressed if engine accidents are to be reduced.

It is also thought that it may be desirable for the Committee on the Prevention of Engine Accidents and the Committee on Rotary Stresses to make the revisions to the Safe Practices Pamphlet No. 9 necessary to bring this work up to date.

DANIEL L. ROYER, CHAIRMAN
A. E. BULLEN
G. H. BARTHOLOMEW
MAX RUESS
I. H. REYNOLDS
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H. J. VANDER EB
B. H. ROMALY

CHAIRMAN STRATTON: We will now proceed then to the fourth and last paper on this afternoon's program, "Rotary Stresses." I would like to introduce Mr. S. V. James of the Underwriters' Laboratories who is chairman of this committee.

MR. JAMES: The Committee on Rotary Stresses has prepared a brief report, the main purpose of which is to summarize the situation to date. It does not include any mathematical or engineering discussion of details but attempts to classify the various types of machine parts in which the rotary stresses are of great importance and likely to lead to accident if not properly considered. It points out briefly typical references to sources of information already available in the engineering literature in which the specific problems of these various classes of parts have been very fully dealt with.

REPORT OF SYDNEY V. JAMES, CHAIRMAN, COMMITTEE ON ROTARY STRESSES

The Committee on Rotary Stresses of the A.S.S.E.—Engineering Section considers its immediate problem to be a review of the status of the design of machinery having rotating parts, such as flywheels, pulleys, turbine discs, rotating members of electrical machines, etc., to determine whether or not there exists an adequate basis for the safe design of such parts.

This scope is an extension of that which guided the former committee, the work of which resulted in a report entitled "Flywheel Explosions and Their Prevention," presented to the Engineering Section at the eleventh Safety Congress by Elmer B. Tolsted. Mr. Tolsted's report outlined very clearly the important items in flywheel design and discussed the various types of flywheel construction commonly employed. It included formulae for computation of these wheels and concluded with a consideration of the causes of flywheel accidents with their remedies. The present committee, therefore, has extended its consideration of the problem to include other equipment which must be designed safely to withstand stresses resulting from rotation.

Machine Parts That Require Particular Care

Certain machine parts require particular care in design and construction on account of rotary stresses. Practically all such parts come within the following classes:

- (a) Flywheels, rotating parts for electrical machinery, and pulleys.
- (b) Turbine discs.
- (c) Centrifugal pumps.
- (d) Centrifugal extractors.
- (e) Shafting.

Flywheels and pulleys have been very frequently discussed in the technical press. Reference has already been made to the report of the previous Committee on Rotary Stresses by Mr. Tolsted. In an article by William H. Boehm, entitled "Flywheel Explosions," which appeared in the June, 1905, number of *Insurance Engineering*, a very complete account of flywheel accidents and their causes was given and various types of flywheel construction critically compared. A pamphlet published as Machinery Reference Series No. 40—"Flywheels," covers this subject thoroughly. Mention should also be made of Safe Practices Pamphlet No. 9 of the National Safety Council, entitled "Engine Guarding and Engine Stops," in which flywheel design and the causes and remedies of dangerous conditions are adequately reviewed. The National Safety Council library includes a bibliography of flywheels and pulleys which covers not only reference books, but also periodicals.

Reference should be made to Kent's Mechanical Engineer's Handbook, 10th edition, pages 1678 to 1688, on Flywheels. In an article entitled "The Strength and Proportion of Wheels, Wheel Centers, and Hubs," by R. Eksbergian, A.S.M.E. Transactions, Vol. 46 (1924), pages 929 to 980, is a complete review of the present-day design methods employed for proportioning flywheels, locomotive drive wheels, rotating field members for electrical machinery, and other machine parts closely allied to the foregoing.

It is believed that the references given will indicate that there is already available a suitable basis for the design and construction of flywheels, rotating members of electrical machines, and pulleys and that causes of accidents and their remedies have been thoroughly recorded.

The second class, turbine discs, involves a more difficult problem which has, nevertheless, been made a matter of record insofar as design and construction are concerned. Reference is made to Kent's *Mechanical Engineer's Handbook*, 10th edition, pages 1110 and following, in which a detailed review is given of the methods of computing turbine discs. In Kent's discussion, reference is also made to many other sources of information, and it will be seen that reliable information on this subject is now on record available for designers. Closely allied to this matter is the question of stresses in turbine discs due to vibration. A very illuminating article, entitled "The Protection of Steam Turbine Disc Wheels from Axial Vibration," by Wilfred Campbell, appeared in *A.S.M.E. Transactions*, Vol. 46 (1924), and described at length the elaborate experiments made by the General Electric Company in the determination of the causes, effects, and control of turbine disc vibration. A satisfactory solution of this difficult problem was obtained.

Closely allied to the subject of turbine discs is the design of centrifugal pump impellers and the revolving members of centrifugal extractors. A very complete reference on this subject is the book entitled "Centrifugal Pumps" by Loewenstein and Crissey. Pages 167 and following give a detailed study of impellers including stress computations, and pages 191 and following give a discussion of critical speeds.

The Design of Shafting Presents Many Problems

The design of shafting presents a number of problems which also have been quite well covered by previous investigation and study. An adequate basis of the design for line shafting including the loads and stresses imposed by the weight and belt pull of pulleys is a matter of record and may be found in any standard information handbook, such as Kent's *Mechanical Engineer's Handbook* and others. The question of critical speed of shafting is also a matter of record in such handbooks and also in the publication above mentioned, "Centrifugal Pumps" by Loewenstein and Crissey, pages 171 and following, in which are given a detailed study of the critical speed of shafts and the design of typical shaft construction to resist the stresses involved. This subject is also critically reviewed in an article entitled "The Calculations of Critical Speed" by K. Baumann in the *Proceedings of the Institution of Electrical Engineers* (London) 1912. In this publication, a detailed comparison of various rules for calculation of shafting is given and a convenient method of design recommended. Other references might be included but the foregoing are typical and indicate that the subject is covered adequately.

A classification not included in the foregoing covers the stresses due to gyroscopic forces which come in play when the plane of rotation of a flywheel or other rotating body is changed. These stresses are of considerable importance in aeroplane designing and also in the designing of marine machinery. Any standard reference or handbook will be found to embody a very adequate discussion outlining the methods by which such stresses may be determined.

A review of accidents due to rotating machinery indicates that most accidents are caused by defects in material either unknown at the time the machinery was assembled or which developed subsequent to the use of the machinery, or else are due to such uncontrollable conditions of service as overloading, sudden unloading, failure of governor, sudden blocking or jamming of the machinery, and changes in governor setting to allow higher speeds than the parts were designed to withstand. Such causes of accidents may be more generally classified as ignorance either of materials or of proper use of the machines and do not in any way reflect upon the intelligence of the designer nor do they prove that there is not already an adequate basis for design and construction of such equipment.

Manufacturers of large machinery and producers of large forgings and castings fully recognize the danger of using imperfect materials in rotating members. In recent years considerable progress has been made in exploring forgings and castings and in testing materials. From important castings or forgings, which are to be highly stressed, several test samples are taken from a point as near the actual location of the zone of maximum stress as possible, rather than following the older and less drastic practice of testing a specimen made from the same heat but not forming a part of the piece itself.

Considerable testing has been carried on in recent years by several leading manufacturers and laboratories to obtain the "endurance limit" for various materials; also to ascertain the strength of various materials while stressed under temperatures somewhat higher than the ones the materials encounter in actual operating condition.

Highly stressed shafts and rotors often have an axial hole drilled through the full length of the piece to make possible a more thorough examination of the forging for possible flaws or other dangerous imperfections.

Careful Designers Use as Large Radii as Possible

A considerable amount of analytical investigation and testing is also being done to determine to what extent sharp corners in revolving parts weaken the part due to stress concentration. Careful designers use as large radii as possible wherever a change in cross-section of a rotating member occurs. Where only a small radius or no radius is allowable, proper allowance is made in the assumed factor of safety.

It is the sense of this committee that insofar as design and construction of machine parts subject to rotary stresses are concerned, there is already in evidence a fairly comprehensive basis of design and an appreciation of the effects of departures, intentional or unintentional, from this established basis. This opinion is substantiated by data obtained from large manufacturers producing machinery of all classes involving adequate design against failure on account of rotary stresses. The experience of these large manufacturers is typical of the situation throughout

the country and leads your committee to conclude that there is now available sufficient information and experience from which to compute and construct safe rotating equipment.

The committee has not considered its scope to include recommendations with regard to devices or mechanisms intended to prevent dangerous overspeeding or in other ways controlling the speed of rotation of machinery. This field, which would include engine stops, governors, etc., may perhaps be a fit subject for further investigation.

S. V. JAMES, Chairman

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E. B. TOLSTED

CLARENCE C. PERRY

CHAIRMAN STRATTON: During the past year I had the honor of serving as chairman of your Steering Committee on Standards, Research, and Codes.

Section Has a Membership of About Nine Hundred

We have a membership of approximately 900—by far the largest of any of the Sections—but unfortunately a small percentage of our members are serving on active committees. It is impossible for our small Steering Committee to select single handed all of the subjects that should be studied during the coming year. Some are asking every single member of the A.S.S.E. to suggest subjects that should be given research consideration, and at the same time to suggest the names of one or more persons qualified to serve on the research committees if organized.

We must consider the research problems of all industries and of all Sections of the Council. Approximately \$5,000 has been spent on the benzol research; considerably more on the spray painting work, and the N.S.C. Executive Committee is now looking to us to recommend the next important subject that should be given serious consideration and upon which it can spend the money it is empowered to spend. Is it to be one of the subjects upon which we have heard papers during the last three sessions? You can and should help us to decide. Simply write either to the chairman, Mr. E. W. Beck, of the United States Rubber Company, to myself as vice-chairman, or to our secretary, Mr. Keefer, at National Safety Council headquarters.

SECRETARY KEEFER: Before we adjourn I would like to ask several questions of the members who are present. At next year's Congress shall we hold three afternoon sessions of the A.S.S.E.—Engineering Section, or shall we hold only one session and then plan to finish the remainder of our work at midyear meetings? We realize that most of our members attend sectional meetings in the mornings, and we wonder if you want

A.S.S.E. meetings in the afternoons or whether you prefer to leave them open so you can attend other sessions. We need your advice.

J. F. CONNER (U. G. I. Contracting Company): I believe the Engineering Section should function at the time of the Congress. Many of us could not afford the time to attend mid-year sessions. The National Safety Council is not the only organization that has conventions which we in the industries have to attend and we find it very inconvenient arranging our daily programs to attend all of the meetings that are scheduled. I think that another reason for having our sessions at the time of the other Sectional meetings is that sometimes a question arises in the Sectional meetings that we could well bring to the attention of the Engineering Section.

Furthermore, I would not object if the Engineering Section were to schedule one or two evening sessions at the Congress.

CHAIRMAN STRATTON: We certainly appreciate your point of view. Mr. Sanford, Mr. Keefer, and other members of the Executive Committee gave considerable thought to the matter of a three-session program particularly with reference to the Congress in Cleveland where everything was crowded into a luncheon and one afternoon meeting. I personally think that a comparison of our experience in these two years shows the desirability of following this year's plan.

Evening Meetings of Section Not Favored

DR. A. D. RISTEEN (Travelers' Insurance Co.): I think we should not be too hasty about having mid-year meetings because while that might be conducive to fuller and freer discussion of our special problems, yet some of us perhaps have a little difficulty in persuading our employers to let us come to the National Safety Council meeting once a year. Perhaps the task of persuading them to let us come to another meeting might be one from which the boldest would shrink. I think we should continue this year's plan.

SECRETARY KEEFER: Mr. Conner raised an interesting point that brings out this question: do our meetings conflict with other meetings you would like to attend? This afternoon there is the A. B. C. session at the Book-Cadillac and I am wondering how many of our members wanted to go to both meetings? Would the evening session solve that problem?

MR. ROYER: The company which I represent frequently brings in as many as 25 men to attend the Congress. Some of us who have attended these meetings for 10, 11 or even 12 years, owe a lot to the National Safety Council. The Congress has been more or less of a developing ground for us where we met men who gave us ideas and who would listen to our side of the story. With that in mind we must try to continue our present policy. The Congress should not be a meeting of eminent experts but a meeting of all those who are interested in safety so that a beginner can hear the more experienced men give their opinions, and so those of us who have been in the game for a little longer can see the problems of the fellows who are coming along. I

think on that common ground we can get together. Speaking for the men who represent my company, I know every time we see a particularly interesting item on the program, we make it a point to attend that session, be it morning, noon, or night.

(A vote indicated preference for day-time sessions.)

SECRETARY KEEFER: The final question is this: shall we continue to have presented at our A.S.S.E. meetings just the reports of technical committees or do you prefer speakers on the more popular phases of general safety?

MR. TOLSTED: I have been trying for several years to get the National Safety Council to take up a certain activity that we have not yet gotten across and that is to have some man attending each Section come to some general session at the end of the Congress and report to that general session the activities of that particular Section. In other words, I would like to see Mr. Conner come from the Public Utilities Section and report to a general session what the Public Utilities high spots were, and have someone else come from the Marine Section and report the high spots of that Section, etc. Then in one afternoon we could get the high spots of the whole Congress. If the A.S.S.E.—Engineering Section would undertake that activity its members would benefit greatly thereby.

CHAIRMAN STRATTON: I think Mr. Tolsted's suggestion is one which Mr. Keefer can carry back to Chicago for future consideration.

(A vote indicated preference for speakers and discussions on more popular phases of general safety.)

A Luncheon Meeting Brought Favorable Comment

MR. CONNER: I have another suggestion—one that came to me very forcibly at this Congress—and that is in reference to the noon-day luncheons. I attended the joint luncheon of the Railway and Public Utilities Sections. True, we had some interesting talks there but in contradistinction to that I also attended the dinner of the Construction Section at the Detroit Athletic Club. That dinner developed into a regular business session before it was completed. We continued until after 11:00 o'clock, discussing various problems. We did far more work at that dinner meeting than was done at any of the sessions held during the day. I always have felt that when you get around the festive board it is comparatively easy to start interesting and valuable discussions. Certainly this experience demonstrated the value of a dinner meeting. From what I have seen I think that the evening dinner meeting is probably the best because then we are not hampered with the thought that we have to get through and get back to an afternoon session.

MR. LAW (Oneida Company): I think we can piece together several of these ideas; hold an evening dinner, present your reports from various Sections, provide a little entertainment and we will all have a good time.

CHAIRMAN STRATTON: That sounds reasonable and no doubt outlines the idea Mr. Keefer will take back to Chicago.

SECRETARY KEEFER: The question is often asked, "Can't we secure

every safety man in the country as a member of the A.S.S.E.—Engineering Section?" The answer is, "We can if every member will boost." Our Membership Committee can not do it all, but with the help of every active member we can easily make our membership list a complete census for our profession.

CHAIRMAN STRATTON: Thank you, Mr. Keefer. The Membership Committee reported during the last year an increase of approximately 250 members. I think that was a good start. With the individual help of everyone in the Section we certainly can make even better progress during the coming year.

In conclusion, I want to extend the thanks of the Section as a whole and particularly of the Executive Committee to the chairmen and committee members who worked on the reports presented at this Congress. I know that they have our heartfelt appreciation of their efforts and also our good wishes for the continuation of their researches in the coming year. We want to do more next year—a lot more than we have done this year and with everybody's help I know we can.

ADJOURNMENT

THE WEDNESDAY LUNCHEON SESSION.

October 27, 1926

**THE WORLD'S SUPPLY OF BUNK—WILL IT NEVER
BE EXHAUSTED?**

**James E. Bennett, President, Babcock Printing Press Manufacturing
Company, New York City**

The topic is—"The World's Supply of Bunk."

The question is—Will it never be exhausted?

The answer is—Not as long as human beings are human.

This is a topic that I always use when I speak and in this I probably am not much different from all other people who make public talks, only I come right out in the open and admit it. For a number of years I went about having a different topic for every talk that I made, but I found that in order to have a talk appreciated it must be on some topic with which the audience is perfectly familiar and which appeals to them strongly. A little experimenting proved beyond a shadow of a doubt that of all the topics there was only one which seemed to be common to every audience and that is the one which I have chosen.

It may not be wise or pertinent to make such an announcement before an audience of engineers but I am sure that a little research will disclose that even in an august and well-trained assemblage like this we shall find plenty of evidences of the ravages of bunk. In fact, if it was not for bunk there would be no need of safety engineers, so it may be truthfully said that your entire organization is erected upon a foundation of bunk.

If every man knew when he was safe and did not think he was safe when he wasn't, we would not need you engineers to explain safety, to prepare bulletins, to write letters, to make speeches, and to devise all manner of means to prevent and forestall accidents.

In analyzing the subject as applied to safety, I find that the trouble is with the process that men call, "thinking." For instance, a man has a gun which he thinks is not loaded; he pulls the trigger and kills his wife. A boy playing with a knife thinks that the blade is dull and cuts his finger. A man with a bottle thinks it contains whiskey, but it turns out to be wood alcohol and he dies. The great cause of trouble in families and among nations is that they think a thing is so, and they come to find out there is no foundation of truth.

The other day I was riding in a taxicab. We were on a cross street. When we came to an avenue there was another taxicab crossing our street at right angles. Each driver thought he had the right of way. Each man thought the other was going to slow up, with the result that

neither man slowed up and we formed a perfect right angle, which is termed a side collision.

A few days ago an engineer with many years of experience was driving a Pullman train at Bethlehem, Penn., and another experienced engineer was driving another Pullman train. The tracks crossed. Both trains were going slowly and were under control. Each engineer thought the other was going to stop before reaching the crossing; neither man did, with the result that several were killed and many injured.

In all of these things it was a question of thinking instead of knowing or acting. Loose thinking is the basis of most of the alibis, but in many cases it merely is a name and is not actual thought. One time a farmer was asked what he did to spend the long evenings and his answer was, "I go out on the porch and set and think, and sometimes I just set."

Many a man has lost a finger or hand because he thought the buzz saw was not moving. Many another has been injured in making a coupling on a railroad train because he thought there was room between the cars for his body. Many another has been injured by thinking that the speed of the train was less than it really was when he jumped from the step or tried to board the train.

To Be Safe One Must Know All the Facts

Perhaps the hardest thing in the factory in relation to safety is to get the workmen to understand that there is a vast difference in being safe and thinking you are safe. The Holy Bible informs us that by taking thought we can not add a cubit to our stature, and it seems to be true that thinking does not change any fact.

It is also true that most of our theories are probably wrong and the process of time usually proves that theories in relation to philosophical, educational or religious topics are usually wrong. Thinking is only safe when it is based on actual knowledge, but thinking based upon theories is like little Eva crossing the river on loose cakes of ice. It is possible but highly improbable that you will reach the other shore. You are more likely, however, to resemble a man leaping from bog to bog in an impassable and boundless swamp.

To be safe it is necessary for any man, whether he is a workman, a student, a professor or a professional man, first to know the facts before coming to any conclusion or making any move.

As engineers your business is to try to make things safe for the physical bodies of men who are employed in various plants. There is also the larger question of the safety of the intellect, and the still larger safety of the spirit or soul. In these two fields the damage done by bunk is beyond calculation.

It would be interesting to know just how minds of the present generation are being developed. Usually an element grows according to the food that is given it. When I was a boy if I wanted to read a so-called "dime novel" glorifying Nick Carter and other desperadoes it was neces-

sary to sneak behind the barn to do it. Today a boy is openly escorted by his mother and father to a movie palace where he sees stories pictured which, in comparison, reduce Nick Carter and the old-fashioned dime novels to the class of Sunday school stories; and the average boy goes to the movies twice or three times weekly to be thus fed and enlightened. He also has the picture sections and comic sections of the newspapers and then, as great as anything else perhaps, he has the tabloid newspaper, which can hardly be classified higher than mental and moral garbage.

Just how a generation can be protected from things like these is beyond my comprehension, but I believe the problem is much more important than how to protect a man's eyes from steel chips or even his neck from being broken by a chain dangling from an overhead crane.

On this mental side we also have the question generally called education, which is closely related to that of politics, and then we find we are deeper in the bunk than ever. In fact, education has progressed so far that it is practically impossible for anyone to give a concise and clear definition of what education is.

Idiosyncrasies of the Human Mind

A professor of literature considers all men educated who can intelligently discuss literature with him. An engineer thinks a man is educated when that man can discuss engineering problems intelligently; and so on through all the ramifications of learning. A highly educated and specialized engineer would have a miserable time with a highly educated and specialized veterinary surgeon if they were alone on a desert island, each one interested only in talking on his special topic.

From the viewpoint of loose thinking, politics is closely related to education but it is doubtful if there is anything in existence which contains as much bunk to the square inch as politics. This present gathering is a Safety Congress and in the use of the adjective it differs widely from the one which meets in Washington.

I have just been reading of a man who spent a good deal of money to be nominated and elected a Senator because his daughter was in school in Washington and his wife liked the city. This was what he privately told his friends. In his campaign speeches and writings during the campaign he never mentioned these real reasons but spoke very grandly of his desire to serve the public. It is not necessary to explain the bunk in politics because, even while we are sitting in an audience listening to a political oration and lapping it up like a kitten taking cream, we know we are being filled with bunk and we seem to enjoy it.

Just now the most widely discussed question is prohibition. There are many people who think this is a brand new question and forget that it is impossible to make any law which carries a penalty which is not in effect a prohibitive law.

Perhaps the various laws in relation to the automobile and automobile

traffic are the best known prohibition laws in existence. They come in contact with practically everybody and are violated by almost everybody. In fact, I believe that the automobile laws are violated more than any other existing laws and they are being made stricter and stricter all the time in order to stress their importance upon the people. The liquor traffic, however, has a peculiar hold upon the people in general because alcohol is a habit-forming element and a vast number of people would throw aside everything pertaining to safety in order to indulge a personal habit.

Most Dangerous Bunk Relates to Religion

The most dangerous bunk is in relation to religion. Here multitudes of people throw aside and rush through life unheeding any and every warning, because, out of their own minute intellects, they have convinced themselves there is no hereafter and no future; and if there is such a hereafter or future life they think they will be all right and they will be safe because they are—themselves.

Religion is the relationship of God to man, and its terms are fixed by God. There is one true God, and, therefore, one true religion. There are innumerable false gods and innumerable false religions. There can be safety only through the relationship with the true God and the multitude of people who have no proper relationship with one true God are, therefore, in danger of eternal separation from the true God, which separation men call eternal death.

The topic of religion is one which men seldom discuss between themselves and a man who does discuss it is generally put down as a crank or a fanatic or a little soft in his upper story. When the Son of God Himself was on earth He urged men to seek first the Kingdom of God, which would put them in the true relationship; and He advised them that the items of bunk which would keep them out of this Kingdom and relationship to God were, (1) the pleasure of this world, (2) the deceitfulness of riches, and (3) the lust of the flesh. If we turn this over in our minds we find that this is absolutely true; nevertheless the vast majority of the inhabitants of the world are paying no attention to such instructions as to safety. They are taking a chance on the deceitfulness of riches, they are getting all of the pleasures that they can possibly gather, and they are letting the desires of the flesh have almost unbridled rein.

These three things are the greatest dangers facing the world today and constitute a volume of bunk which is beyond calculation.

We are a race of kidders. Recently I read in editorial columns about a "magnificent sporting event" recently held in Philadelphia; and in the same newspaper in the report of the fight it told about the gruesome scene, with the blood spurting and one man pounding another until he could get him into such a weakened physical condition that he hoped to be able to give him one hard sock which would knock him unconscious; and the reports said that one man got \$700,000 and the other

\$200,000. There were no elements of sport in it but they had to kid themselves and the public.

The great trouble in this question of safety and also the question of bunk is that most all men and women feel quite sufficient in themselves. In other words, they feel independent. They feel they are entitled to greater freedom and they should not be interfered with in their personal habits, desires and efforts.

This feeling, I believe, is one that you have to contend with most in order to get your safety programs over—the right of independence (so-called) of the individual. In fact, it is the continual standing up for one's rights which is such a big hunk of bunk.

As a matter of fact you and I have no real rights, but on the other hand we have great responsibilities. Our business is to live up to our responsibilities. If we do this we will not have to worry about our rights. We will get them when we deserve them, and anyway we will be so busy living up to our responsibilities that we will have no time to think of our rights.

Any machine is an evidence of this. Every part of the machine does its own job without worrying about its neighbor. It lives up to its own responsibilities. It claims no rights except the right to carry out its responsibility. Any ordinary machine is an excellent example for a human being, and any machine is usually far superior in producing results than the ordinary human being, because it and all of its parts mind strictly their own business.

It is not necessary for me to finish this talk because you can all finish it for yourselves, if you will just be honest with yourselves. To achieve safety in anything, the first requisite is a thorough process of *debunkation*. Prove all things, hold fast that which is good.

ADJOURNMENT

Automotive Section

New Officers of the Section

CHAIRMAN: A. F. DUNNEBACKE
General Motors Corporation, Detroit, Mich.
VICE-CHAIRMAN: A. M. WILLIAMS
Chrysler Corporation, Detroit, Mich.
SECRETARY: E. H. COTCHER
Murray Body Corporation, Detroit, Mich.

Committees

POSTER: J. B. GIBSON, Chairman
Western Electric Co., New York City.
MEMBERSHIP: G. H. CHAPMAN, Chairman
Briggs Manufacturing Co., Detroit, Mich.
STATISTICAL: G. S. THOMPSON, Chairman
Detroit Insurance Agency, Detroit, Mich.
ENGINEERING REPRESENTATIVE: R. F. THALNER
Buick Motor Company, Flint, Mich.
EXECUTIVE COMMITTEE (The Officers and)
G. A. KUECHENMEISTER
Dominion Forge & Stamping Co., Ltd., Walkerville, Ont., Canada.
L. E. AVERILL
Packard Motor Car Co., Detroit, Mich.
R. A. SHAW
Detroit, Mich.
L. L. JUDGES
Ford Motor Co. of Canada, Ltd., Ford, Ont., Canada.
D. C. HUNTER
National Cash Register Co., Dayton, O.

October 26, 1926

G. A. KUECHENMEISTER, Chairman
Personnel Manager, Dominion Forge and Stamping Co.
Walkerville, Ontario, Canada

THE first session of the Automotive Section of the Fifteenth Annual Safety Congress, National Safety Council, held in the Ball Room of the Tuller Hotel, Detroit, Michigan, convened at 9:50 o'clock, Mr. G. A. Kuechenmeister, presiding.

CHAIRMAN KUECHENMEISTER: For the past two years we have condensed all of the reports of the officers into one. In opening the meeting I will ask our secretary to read the report of the officers.

SECRETARY WILLIAMS: Mr. Chairman and Gentlemen: We are getting a rather late start. The activities of your officers for this past year and all of the trials and tribulations they have met with and the conditions they have bumped up against have all gone over the dam and we won't rehearse them. But you will find the results on pages 22 and 23 of the program, and I believe when this program is completed you will agree that we have been very fortunate in securing a splendid staff of speakers.

CHAIRMAN KUECHENMEISTER: That report was decidedly shorter than I thought it would be.

Next will be the appointment of a Nominating Committee. We have appointed Mr. R. F. Thalner, Mr. E. O. Austin and Mr. D. C. Hunter. These gentlemen will make up a slate of officers for the coming year and we will take it up tomorrow morning.

I am glad I don't have to make a report as chairman of the Section for the past year. My year's activities as chairman were just about minus. However, that puts me in an advantageous position this morning because I can boast about the program that has been arranged—I had absolutely nothing to do with it. I want to say it is the best program that has ever been arranged for this Section. It is a well thought out and well developed program. It is supposed to take this matter of safety from the beginning right through to the end.

Inspirational Start of the Sessions

We start with the inspiration, and none of you have ever done any safety work in your plant without inspiration. Then we take the material as it comes into the plant, dispose of it safely and move it to the machine departments and process it. Then we take up plant maintenance and go on to the assembly hazards and finally the education of the workmen.

I think your committee has done splendid work and if you follow all of the sessions of this Section this week you will get the complete picture of what safety in a plant really means.

Last Saturday morning the chairman of the Program Committee called me on the telephone and said that owing to the death of Mr. H. H. Bassett of the Buick Motor Company, Mr. Kettering would be unable to be with us this morning, and the chairman was quite worried. It didn't bother me at all. I simply told him to get busy and wire New York and if a certain man from New York was going to be here today he would talk.

Most of us, if we were given a 48-hour assignment to address any meeting, would become worried. The man we have in Mr. Kettering's place doesn't need 48 hours' notice. I remember he told me a few years ago about an instance which occurred in Toronto. One night he went to a lecture and I think he actually paid his way into the hall, although I am not sure of that. While he was sitting there one of the men in charge

of the lecture saw him and rushed up and said, "Our lecturer is going to be about 45 minutes late and we would like to have you come up on the platform and keep the crowd interested until our lecturer gets here."

The speaker we have this morning filled that assignment and the one thing that stands out in what he told me about it was the fact that he wasn't worried about getting up and talking but he was worried for fear he hadn't had his shoes shined that day.

It is a great privilege to me to introduce, and I know it will be a pleasure to you to hear, Dr. R. M. Little, Chief of the Bureau of Rehabilitation of the State of New York.

THE SPIRIT THAT MOVES IN PROGRESS

Dr. R. M. Little, Chief of the Bureau of Rehabilitation of the State of New York

Gentlemen, I am glad to greet you. I did not pay to get in and I did not want to speak nor have I had much more than time to have my shoes shined. I was on the golf grounds last Saturday afternoon when a peremptory message came to my wife to telephone me quickly that Will Cameron wanted to reach me and I knew that some point in the program of the National Safety Congress had gone wrong and that he was calling on me to be a pinch hitter, which I have to be from time to time.

My good friend, the chairman of your Section, has put me before you in a rather embarrassing position by saying that I can talk on any subject without any notice. I know enough about safety work to talk about it but you know enough about it to practice it. There is a great difference in knowing enough about a subject to talk about it and knowing enough about it to put it across. Therefore, I rise with a feeling somewhat of embarrassment because you men are practicing safety in the automotive industry in the plants throughout our country. It would have been exceedingly fitting if Mr. Kettering could have been here—a leading manufacturer in your industry—to give you the proper start, the inspiration and encouragement which we all need in the comradeship for safety. But as he is not here I recognize my fellowship with you and I am very much pleased to bring you a word of greeting and also, if I may, a word of encouragement in the development of safety in your industry and out in the country.

It has been my opportunity from time to time to visit a number of the automobile plants here in Detroit and Cleveland and Buffalo, etc., and I presume there is no other industry putting forth a more consistent and intelligent and effective effort year by year than your industry to make the plants safe and healthful and attractive for both the management and the men and not only to prevent accidents but to build up morale. You have a high-grade industry and therefore a fine opportunity to continue this crusade for the saving of life and limb.

I am quite sure also that your intelligence and sympathy follows your

industry out into its use in the public life of your country and that there is not one of you but was distressed by the intelligence that in the month of September 2,100 people in our country were killed by automobiles and trucks, and, of course, for every one killed perhaps there were from 25 to 40 who were injured. Therefore, the product of your plants, one of the most useful articles man has ever developed, one of the most enjoyable, one that has brought a great deal of happiness and delight into life, has also brought with it a great hazard and it is exacting that toll day by day. As men who love our fellow men, who are concerned for the well being and economic development of our country as touched by the poignancy of human suffering, quite naturally we wish that the public life of our country might also be saved and accomplished at a great reduction in the public accidents which are occurring from day to day.

All of us Americans perhaps do not realize the tremendous strides which we are making in this country industrially and in some other respects, but particularly as an industrial nation we are the wonder of the world at the present time. Many of you younger men do not realize the conditions in our country 25 or 30 years ago. You were born and grew up and commenced your work in life in the midst of an urge for organization and efficiency in industry, the like of which no nation has ever known. While we in the midst of it do not recognize the tremendous things which are happening, we are attracting the attention of all keen thinkers of the other nations of the world.

To Learn the Secrets of American Success

You will remember quite well the English engineers who visited Detroit, Cleveland and all of the other great industrial centers to study your industry along with other industries to find out the secrets of the marvelous industrial success which is characterizing our life at the present time. Then you will remember that delegation of skilled workmen which the *Daily Mail* sent to America and that spent three or four months here last year and visited the plants, talked with the workers, watched the processes and felt the atmosphere of an industrial life where goods are being made plentiful and men are being made dear, where wages are high and goods are multiplied and the market increased by the well-being of the life of all the people, with the recognition of the fact that these two principles can go together. They are not only practicable, they are just and they are fine and we in America have brought that to pass practically in the last 20 years.

I remember during the war hearing Mr. John Calder, whom many of you have listened to, talk about workmanship and training and he said that we wished, in our industry, to make men dear and goods plentiful. His thought was high wages and goods multiplied by large units of production and fine distribution at low cost in order that all people might have the manufactured product for the use and pleasure of life. He was aiming at it and talking about it and the people were working

to bring it to pass, and it has been brought to pass in a very remarkable degree in our country. That was held out to us 30 years ago as an ideal. We are moving today into something of its accomplishment.

I do not know, Mr. Chairman, whether or not the delegation of industrial students from Australia has reached the states, but they have been appointed and they likewise are coming to study our industrial life and to discover, if they may, the secrets of our wonderful success. Naturally those keen-eyed brownies from the far east have been here and have come and gone in their silent way to discover why and how America can do this wonderful thing.

We Want to Recognize Workers as Fellowmen

But I come to you this morning as gentlemen who are not only interested in making goods plentiful, in mass production and in splendid organization of industry that accumulates wealth, but also as a group of men who represent practical efficiency in the plants and who also have the human touch; who recognize that with all of the development of our industrial life in making goods plentiful and paying high wages, it profits little at last if we maim and bruise and kill a large number of those who are engaged in the industry; who hold that the great aim of life after all and the ideal of our lives should not be merely the multiplication of things perhaps to the impoverishment of the mind and the spirit, but that in the development of our industrial life as well as in our home or civic life, our political, educational and religious life, in these great economic units where we serve day by day, we want something of the touch of kinship with those with whom we work.

We want to recognize them as our fellow men and we want to recognize that they have like spirits with our own, like ambitions and desires, and that they are entitled to all of the justice and liberty and aspirations and development of life that any of the rest of us enjoy. That brings into the work-a-day life the spirit of comradeship and of good will and lets us find ourselves down deep in the things that you can neither touch, taste, nor handle, but which belong distinctly to the spiritual nature of man, which Dr. Wishart so splendidly dwelt upon yesterday morning in the general session.

So as I speak to you this morning I would not attempt at all to mention anything of the practical organization and operation of your safety work, although I am somewhat familiar with it. I have been through the plant out here with Mr. Shaw. I have asked him to point out to me things which Mr. Wallace was thinking of yesterday afternoon, the relationship of safety to production. I have been endeavoring for years to gather up points and suggestions upon that very interesting phase of the subject. But not upon that do I wish to speak at all but rather this: as a comrade with you and as one who looks upon the whole movement in perspective. What is it about, this safety movement after all that brings to us so much pleasure, joy and satisfaction?

I have been running along with the movement nearly since its incep-

tion in one form or another. I have observed the Council grow from a handful of young men with ideals and visions into these great Congresses, and I have watched the coming and going of the delegates to the different conferences as they have been held—national and also state and city conferences across our country for a number of years. There is actually nothing which has happened in my lifetime in America that has been quite so intriguing to my imagination, so pleasing to my spirit and so encouraging to my hope as this industrial safety movement of our country.

I am interested in many things and get pleasure out of many things, but in some way or another this organized industrial safety movement that has gone through and established itself in the better industries of our land has in it a spirit, a feeling, a comradeship, a practicality with ideals that I can't just find any place else in life. It rests upon this underlying assumption that you can't have a sound economic system that is not grounded in morality. Philosophers and economists have been crying that out for ages.

Sound Economics and Morality Lie Side By Side

There are a large number of people who believe you can have sound economics without bothering about morality. It is the fatal heresy of the economic determinism of Marx upon which the Russian nation is trying to operate and can't. You simply can not confine human life merely to economic interests and you can't develop a sound and enduring economic system apart from morality. Why? Because, after all, our economic systems are the creations and service of man and man is more than a beast. He has something in him that is immortal and that cries out to the eternal, that searches for truth and wants to feel reality and know the power of the urge that runs through the whole universe of which he is a part.

Therefore to me this safety movement has much of its power, its practicality, its urge, its fine fellowship and its onward sweep because it has rooted itself in the things which are deep and true along with the things which are practical and daily urgent to be accomplished—the coupling together of the ideal and the practical with a method wrought out from the anvil of experience. You have tested it out in your plants your shops and your groups and you have found out that when you have really reduced your accident frequency and brought about that finer workmanship within your plants, you have blended together a great many things which you could see with a great many other powers that you didn't see.

You have worked with faith and hope and love. You have accomplished things by the power of perseverance and cooperation and you brought them to pass because there was working in your mind, your conscience, your will, a great inner power, that is the creative power of the whole universe of which we are a part.

That may be a little high-flown but it is absolutely true. Let me say this to you: when we approach new people on the subject of safety, public

or industrial, and go and talk to the employers who do not get sold on the idea, as we say, they think of safety as something to be wished upon them, added to from the outside, magically accomplished. That is what they wish it might be but they don't think it can be done. Is that not the view that the ordinary, uninitiated employer has upon this subject of organized safety and its practicality? I have met with it in scores of places across our country.

But go to the same man five or 10 years after. He has moved from the periphery of the subject into the center of it, from the outer obvious into the inner and further removed from the center, and see him working through it practically with his mind and his method and his power to accomplish it. Then we discover a man who has awakened to the fact that here are great hidden secret possibilities which may be touched and brought into play; and that it has not only brought about the reduction of accident frequency and a saving in loss of workers' time and sometimes the loss of workers' lives and the wastage of material, but it has made a contribution to that which every plant manager or owner wants above everything else—a spirit of morale that stimulated the whole plant and the entire works.

This great industrial advance which we are making in America today has a hundred and one causes and reasons but my own honest feeling about it is this: that among all of the various thoughts, movements and activities that are bringing America up to one of her unparalleled positions in industrial accomplishments, the organized safety movement is one of the finest, most stimulating and influential.

I know big industries of our country that I used to visit 30 years ago. I have watched them entirely transformed. I have sat with men who have been in those industries for those years and many more, who knew the old days and who know the present days, and while they can't demonstrate it, it is also their judgment that it is the safety movement that transformed the industry.

Leading Automobile Companies All Represented

CHAIRMAN KUECHENMEISTER: If there was any doubt in the minds of any of you about the ability of Dr. Little to pinch hit and give us an inspirational talk, I know it has been dissipated. Judging from the applause I take it that you will agree with me that we extend to Dr. Little a unanimous vote of thanks for not only pinch hitting but for giving us the wonderful talk he has.

This year we tried out a new idea in regard to our sectional meetings and addressed letters to the presidents of all of the member companies in the Section, and I am pleased to say that the presidents of all of the automobile companies, large and small, thought well enough of it to reply, most of them in person, to these letters. All but one assured us that although he himself couldn't be here he would have at least one representative.

To any of you who get an inspiration to begin to do safety work in your plant or to continue to do safety work after you have the inspiration, if you want to know what to do and how to do it, I would advise you to do what I did about 10 years ago—go out to the Ford Motor Company and see Bob Shaw. We can't all go out this morning to see and talk to him, so we asked Mr. Shaw to come down here and tell us what they do in regard to the hazards of receiving and storing and transferring.

HAZARDS OF RECEIVING, STORING AND TRANSFERRING MATERIALS

R. A. Shaw, Ford Motor Company, Detroit, Mich.

I have no intention this morning of entering upon a long discourse about my subject, no matter how important and interesting this subject undoubtedly is. I want to be brief, both because I do not like to write formal papers, and because I would much rather just talk these things over with you in a friendly way. A kind of Round Table discussion would, I think, bring out the many points in which we are all interested much better and more completely than if I were to attempt to write about them.

So that is what, for the most part, I mean to do, get you to talking with me, instead of me trying to talk to you. However, I have sketched out in some detail, under the various heads of Receiving, Storing and Transferring, the high spots which appeal to me in the handling of materials. Safety in these matters depends upon a correct attitude toward innumerable details, a proper understanding that little things always count, and an effort upon the part of management cooperating with the men in seeing that all the details of safe practice are carefully observed.

(1) Under the head of Receiving Materials, I have noted the following:

Have whistle men on all end cars.

See that cars are up to bumpers.

Have brakemen wear white caps at night.

Be sure that all material and objects along track have a clearance of six feet minimum.

Have crane chains regularly inspected, annealed and butt welded.

Employ whistle men to precede cranes. Use horns on cranes serving more than one floor.

Have "hookers" or whistle men step into clear before lift begins, and allow no one under load.

Fit slings to the stock to be moved.

Protect the corners of sheet metal stock with wooden guards, and have men piling stock wear gloves.

Specify open cars for bar stock.

Unload next to forging department.

Cut bar stock as it enters the shop.

Pile bundles of bar stock from four to five feet high, with layers of timber between.

(2) Storing Materials:

Have stock delivered only as needed, allowing a small emergency supply.

Send small parts over conveyors to operations.

Store small parts in metal boxes, four by four feet by 12 inches. Pile one upon another, and handle with trucks and cranes.

Allow only a limited amount of stock to be stored at machines, keeping the vicinity of machines free of barrels and boxes.

Arrange that operators secure stock sufficient to their needs direct from the conveyor, taking small supply at fairly frequent intervals.

(3) Transferring Materials:

Install guards under overhead conveyors.

Use light wire guards on ordinary small parts of overhead conveyors; use solid guards under conveyors carrying large parts; in some instances it may be found necessary to make a guard strong enough to hold up the conveyor.

Equip conveyors with pull cords by means of which conveyors may be instantly stopped.

Place steps across floor conveyors, or cover them so that they may be crossed without hazard.

Gravity transfer chutes involve the use of head and hand pads.

Inclose all gears, belts and sprockets, and provide protected foot walks wherever necessary.

A Rapid Fire of Round Table Discussion

CHAIRMAN KUECHENMEISTER: Five or six years ago we had a safety school and we had Mr. Shaw come over and give us a talk. I will never forget that night. About 50 men walked in and took seats in the front of the hall and we wondered what they were up to. They came in in a formal sort of way, all single file, and they sat there. After Mr. Shaw got through we found out what they came for. Those 50 fellows just started to ask questions and they razed Bob and they bawled him out and it took the combined efforts of all of us to save Bob's head, but I wish you would do that same thing this morning. I would like to have you go right after Shaw and ask him all the questions you want.

MR. THOMPSON (Detroit Insurance Agency): May I ask Mr. Shaw how he handles sheet material eliminating the truck?

MR. SHAW: You have to have the cooperation of the steel company. Our company has requested that the steel company load their sheet metal with wooden strips of possibly four inches between sections and to have a little truck put under there. After they reach their destination we have these special little trucks put under there. We lift that up and pull the sheet steel out on the dock with special little trucks and all the steel company has to do is to leave a sufficient space by putting those timbers in while loading. We are making up little roller bearing trucks at the

Ford plants. If any one would be interested in this he could write to the General Stock Superintendent of the Ford Motor Company. We have gotten at least eight or 10 of the steel companies to load steel with that method. That eliminates the old way of taking the truck in.

R. F. THALNER (Buick Motor Company): I was rather interested in Bob's statement about putting white caps on his brakemen. I think standard railroad practice calls for the brakemen to use a lantern at night. Don't you consider that is 100 per cent safety, that that will designate where the man is? Do you think that the white cap on the brakeman will make him stand out in the darkness as well as a lantern, or does he carry both?

MR. SHAW: He has both. Absolutely he must carry a lantern, Mr. Thalner. I might say that with blue flags they must have a lantern also. That is the railroad requirement after sundown. But these caps designate those fellows as railroad men and in a little while the men in your plant are more inclined to listen to them if they ask them to move something away, and it breeds better cooperation. I believe it is an additional safety factor to wear a white cap at night.

The Method Used in Annealing Chains

M. J. MCCARTHY (Fisher Body Corp., Detroit): May I ask Mr. Shaw to explain the method he uses in inspection of chains?

MR. SHAW: When we first began to anneal chains we put them in the oven and heated them up to possibly 1,000 degrees and covered them with this fish scale, but after a few years we found that we weren't inspecting those chains thoroughly. So now they are sent to the heat treating department to a sort of acid tank, a caustic soda tank, and that chain is thoroughly cleaned and then inspected and you would be surprised to see the broken spots in the chains which are discovered by washing and looking over them first. Then they are sent to the big furnace and put in there and heated to 1,000 degrees. You can generally let them cool overnight in that furnace. That is better than throwing them out in the air where they might crystallize.

I would say with chains after two years it is good to bring back the life of the steel, to heat it up to 1,400, 1,500, 1,600 or 1,700 degrees and let it cool and then anneal it again.

MR. MCCARTHY: The point I want to make is, do you inspect the chains at different intervals while they are in use at your plant?

MR. SHAW: Twice a year we have a chain inspection and every one is marked.

MR. MCCARTHY: How do you mark them?

MR. SHAW: There is an O. K. We might say, for instance 2/6. We divide the year in two and then the 6 is for 1926. You can stamp that on the big hook.

MR. THALNER: Mr. Shaw brought up a very interesting point. He said he heated the chain to 1,000 degrees or thereabouts. We have been conducting a little research in the annealing of chains and from all we can

learn you take a chain and heat it to 950 degrees, I think it is, that is a chain which has been stressed almost to the elastic limit, and a certain theory enters in known as Stead's Brittleness. If that chain is then heated, after it has been stressed, to 950 degrees through an annealing process and is taken out on the job, there is a liability that that chain will rupture or break, due to the brittleness factor which enters in on account of heating it to this particular degree.

It is a very touchy subject and I wonder how many of us are heating our chains to 1,000 degrees or around that particular point where Stead's brittleness factor enters into it? We anneal our chains to 1,700 degrees or 1,650 and air cool them, and I didn't discover this until we got into the proposition of annealing chains and talked with our metallurgical engineer.

MR. SHAW: Our good friend Thalner is highly educated and you have to give him credit. I am sure he has looked into this thing thoroughly. I agree with Mr. Thalner that if your chain is stretched, that is why you have your inspection first before you anneal it, you will cut out the sections of the chain. It is not all of the links generally but some of the links with a great overload. But if it is only a few links then that is the time to cut your links and butt weld new links and go ahead with your annealing. Also, every weld that you put in there in a chain should be annealed afterwards, but I would leave that for your future study.

As I said before, the steel men do not agree on annealing chain, but I am absolutely convinced that we have a very good method. After you have made this investigation next year, I am thinking maybe Mr. Thalner will come and change this a little and I am willing to find out if there is anything better. It certainly is serious and important.

Testing the Chains After Annealing

E. C. JACOBS (American Mutual, New York): After those chains have been inspected and annealed, if they are tested how do you test them?

Then another question with respect to handling materials as they come into your shop. I am wondering how you go about the prevention of the cuts and scratches that certainly do arise when we handle so much metal?

Another thing: what do you do with respect to the piling of material? What is the height, for instance? Do you have a shop rule there? How do you select your men that handle these materials? Do you have the cooperation of the employment department? Who selects them?

Further, what methods do you employ in your plant to teach men how to lift and handle material?

MR. SHAW: If you talk to our employment manager, I imagine he will tell you he is hiring the best men in the country. Before I answer your questions, I think I ought to eliminate the discussion on chains. I hadn't noticed that Mr. Thalner, of the Buick Company, is leading the discussion on chains.

Answering the first question about testing of chains. Years ago we

were going to put a testing machine out. I have been to Buffalo and places where they weld chains and I have watched them. They will break a certain section of a chain just for a breaking test, but they only do that in one place out of so many thousands of feet of chain. They do give all of the chains a certain test, but the safety factor is very small. We discontinued that proposition and we eliminated the testing of chain by any kind of test. I don't know whether you will hear more about testing chains this afternoon. We do not pull chain. We eliminate that.

The next question was as to how to handle the steel without scratches? There is greater discussion on that. The steel companies load the sheet steel so that it moves and if it is scratched too much our men pick this steel out and naturally have to reject it. The inspectors are at our cars where the material is unloaded.

MR. JACOBS: That wasn't my question—I meant the cutting and scratching of hands while handling this steel.

Handling and Piling Sheet Steel

MR. SHAW: I beg your pardon. The question is as to how to protect the hands. Our salvage department has made pads which the men use. Some of the men wear gloves in addition to these pads.

MR. JACOBS: Is that a shop rule?

MR. SHAW: They are in the tool crib. You know how the men are. One will have a calloused hand and another will wear gloves. It seems funny to see a blacksmith wear gloves, but occasionally they do. Some of the steel men wear pads and some of them do not. That is left to the man's own discretion.

MR. JACOBS: The next question was on the piling of materials—the height.

MR. SHAW: I am sorry to say that our sheet steel plant is not quite regulated. We have quite a pile of sheet steel and that is piled about from six to seven feet high. If it is very narrow, it is not piled as high as that.

MR. JACOBS: Do you have a shop rule that that material must not go above a certain height?

MR. SHAW: No, we do not.

MR. JACOBS: That is left to the men's own judgment?

MR. SHAW: We have an understanding that the height is to be seven feet on sheet metal. The safety men patrol the plant and naturally pass the word along. I don't know whether that is written up in the rules or not. It is the same way with hauling trailers through the shop. If there are over six lined up, they will take one off.

MR. JACOBS: The other question was as to the selection of the man who handles the material.

MR. SHAW: That is left to the foreman. If he gets a man who is not satisfactory he will send him back and they will send him another man. He will do that until he gets a man he is satisfied with.

J. E. WALTERS (General Electric, West Lynn): Might I ask a question

on the piling of sheet metal? Are you talking of handling polished metal or do you handle sheet metal in the rough? You say you only pile it seven feet high?

MR. SHAW: The sheet metal must be two and one-half to three feet and the length must be six or seven feet.

MR. WALTERS: Do you pile it on skids or simply with boards between?

MR. SHAW: In some cases you have to tie timber between at each end. Possibly they do that on certain piles of three or four feet. I believe that is to keep it from going over. Some piles have no timbers. If you are going through the pressed steel room, for instance, and you see a pile that looks dangerous, it is removed. You may have a system of piling that is absolutely safe.

MR. WALTERS: I don't think it is. That is what I am trying to find out.

What is the material you use in your pads? That is one big trouble I guess we all have—cuts in the handling of material. We have tried about everything.

MR. SHAW: The salvage department has used old leather cut off of leggings and cleaned and cut up and also the leather material that we put on the side of the car. Then in some cases they used steel grip leather.

MR. WALTERS: Have you had any definite results from any of this material or is it simply left to the individual choice of the men?

MR. SHAW: No, it is left to the individual's choice, but if we have a few cuts or an infection the safety man will find out why they aren't wearing this stuff. For instance, in the glass foundry we had a man who lost an arm and now they have to have their arms protected all of the way up, but we haven't gone that far with the steel yet.

Thirty Per Cent of Lost Time Accidents Were Infections

MR. WALTERS: Last year we were running on a basis of 1.6 for lost time accidents for 100 employees, and of that possibly 30 per cent were infections; 1.6 doesn't look very large, but it bothered me and one of my troubles has been infection.

MR. SHAW: Do you have a strict rule that no man can bind up his own wound?

MR. WALTERS: Yes. We have a first aid station in every room and the dispensary, at the farthest point, is not over 2,000 feet.

MR. SHAW: I know that at one time we had our bacteriologist analyze the grease that is put on the steel, but I don't remember what was done.

MR. WALTERS: We don't have anything like that. We don't have polished material.

MR. SHAW: I don't know what rust would do. I really couldn't answer your question.

J. N. BROWN (Durant Motor Company, Elizabeth, N. J.): There is in the east a cream called "Boon." After the hands are thoroughly washed that cream is applied and rubbed in and it leaves the hands dry and doesn't make any hazard for slipping and it is a strong antiseptic. I know that in the east it has eliminated and reduced infection.

CHAIRMAN KUECHENMEISTER: I want to say that the American Rolling Mill, in Middletown, Ohio, has done a wonderful work in eliminating accidents from the handling of sheet steel and I am sure that if any of you care to write to Mr. R. Adair at that plant he will be glad to tell you what they have done.

W. S. BASORE (American Radiator Company, Buffalo): In separating steel after it is taken from the car, how do you eliminate the scratches? What becomes of the material? Do you find that the leather pad you use for unloading is better than any other?

MR. SHAW: Answering your first question, you mean the metal that is scratched?

MR. BASORE: Yes.

MR. SHAW: As I said, the inspectors reject any metal and that is sent back.

MR. BASORE: In unloading steel you spoke of putting 4 x 4's under the piles. Has the Ford Motor Company ever tried using conveyors for sheet steel in the cars?

MR. SHAW: No, we have never used them for that.

Problem of the Grease Used on Sheet Steel

MR. BASORE: In answering this gentleman's question in regard to the height of the pile, the American Radiator Company has limited the pile to six feet. The material, as it comes from the rolling mills, is covered with a sort of grease to protect the sheet. We have found through analysis that this grease becomes rancid. It may be a good idea to treat the hands with something before unloading the steel. We find that the greatest quantity of small cuts comes from unloading material and through that infection sets in. Our greatest percentage of accidents, while they are not lost time accidents, are cuts and scratches from unloading of material due to the corners and sharp edges.

I wanted to ask you a question. How big are the piles in the cars when you receive them in order for you to get the truck, and what is the weight of the car?

MR. SHAW: I believe I will refer you to our stock superintendent. This is under way now. I don't know whether it is piled three feet or not. That makes a carload. You have the capacity weight for your car and that sheet steel is very heavy.

MR. BASORE: A small car would consist of not less than 20 tons, which could be piled in four five-ton cars—I mean by that two in each end of the car properly braced and protected. Do you think it is good practice for a truck with one five-ton load to be taken out on the platform on these electric trucks or whatever you use?

MR. SHAW: We use these trucks to handle it now.

MR. BASORE: We use a small electric truck that will lift 6,000 pounds six inches from the ground. What I mean by that is that the platform is six inches from the ground. We use no hand trucks and cars.

In piling your material at the Ford plant, I heard you say you don't

limit it to any height. As you pile it, do you put spacers between it so that your crane comes along and takes off a certain amount—for instance, one ton or two tons?

MR. SHAW: I think we do.

MR. BASORE: How do you know how many there are in between, for instance, if you are using 2 x 4 pieces, 32 inches wide and 72 inches long?

MR. SHAW: I can answer that question. No man will lift over the capacity of any crane. There is a strict rule on that and we do not bother with 100 or 1,000 pounds in those bundles. All we are figuring on is the capacity of our crane which in most cases is five or 10 tons and no superintendent will lift anything over the capacity of the crane. That has to be O. K'd by the general superintendent and many times we hold up production due to that. If those bundles are not within the capacity of the crane that is where the safety man would step on him or if the piles are dangerously high. But as to the detail of the stock, how many piles, and so on, I will say we don't bother with it unless there are accidents involved.

E. R. COMPLIN (Ford Motor Company, Canada): We have been investigating this from our own standpoint apart from the American plant and I would refer the gentleman to our foreman, Mr. Carey, who is in charge of the loading.

Unloading Materials From the Cars

J. E. WALTERS (General Electric): Has anybody developed a skid for piling sheet metal?

MR. BASORE: I will say yes and no to the question. We use a standard skid made by the Steuben Company of Cincinnati. It is a skid stop made out of hard wood and the bottom is made out of iron which fits our standard electric trucks. We limit the load of skids to 6,000 pounds. We have many of those skids around our plant and rush orders are left on those skids until the time when they are to be used.

MR. WALTERS: I am talking about the plant unloading of two or three cars.

MR. BASORE: Our stuff is piled inside in piles limited to six feet in height. It is separated and counted and comes down from the cars on a roller conveyor. It takes four men to unload the car. Our fastest time on 21 tons has been two hours and 20 minutes. Those sheets are counted and inspected as they go on the pile individually and separately. Those that are bad are laid aside and they are put into what we call a 50-bundle lot. There is a steel tag with 50 marked on it that is set in between the steel. We also pile it, as I said before, with 2 x 4's in between so that our crane comes along and delivers it to the sheet department.

J. MURPHY (Hudson): I would like to ask Mr. Shaw if they have ever used spark-proof trousers?

MR. SHAW: You mean for pouring metal? The only thing we have tried is the apron. We have never bothered with trousers although they may be very good.

MR. DUNNEBACKE: Two years ago a man unloaded a couple of carloads of some finished product that was covered with some sort of a compound to protect the material. Then he did some work on an emery wheel and the sparks flew on his clothes which were saturated with this solution and he was burned to death. I think we ought to analyze the substances that are used to protect our materials to see that they are not inflammable and may not result in accident.

MR. SHAW: My answer is that we do not have spark-proof trousers, but I would rather have an apron that could be removed quickly if it caught fire rather than a pair of trousers.

MR. DUNNEBACKE: In this case the man had a burlap apron on. When he went to work on the emery wheel a spark struck the apron and it burst into flames and he died.

G. A. SCHENKLE (Heintz Mfg. Co., Philadelphia): I happen to know of two metal companies who send out body parts that are protected with an oil that contains some acid. It contains an acid which remains in there with sulphuric acid and is used for treating oil and also is very dirty. I don't believe the average oil we will get for protection purposes will be highly inflammable. It may be, but it will be very infectious and it is something you might well look into.

How Small Trimmings Are Handled

I would like to get Mr. Shaw's answer to a question on the handling of small trimmings. We have two kinds of trimmings—those which can be handled and those which can't be handled with a shovel because they are about like French friend potatoes on a spoon and we can't use a magnet very well. Do you have any such condition and how would you handle small trimmings?

MR. SHAW: If you have an individual press you have a problem there and you have to collect that any way you can and transfer it, but in the regular department your conveyor is back of your machine and takes it down to a large conveyor and from there into a large boiler. They have started that in the pressed steel department.

In regard to some of those trimmings, the salvage department has found that in many cases the trimmings on the heavier work can be used on the smaller jobs and instead of transferring it to the other departments it is brought direct to the job.

MR. SCHENKLE: In this particular case we have boxes where they are supposed to throw these small ends, but about 30 per cent of them don't get them in the boxes because they are working on a piece work basis and speed is necessary. Somebody has to clean that up. We try to get the man to wear gloves on that work because he can get very badly cut doing it. Have you developed anything to eliminate those lacerations and cuts from handling those trimmings?

MR. SHAW: I think a man handling any kind of metal is running a risk where there are sharp edges. I think all of that should be done with an additional tool—a wooden or metal puller or something like that. A

man has to take a metal puller or he will certainly cut his hands when he tries to pull that stuff out. We try to make a rule that a man will never pull any kind of scrap with his hand.

R. H. LUCKENBACH (E. G. Budd Mfg. Co., Philadelphia): I would like to return again for a moment to the matter of the burlap bag used for an apron. We have been very unfortunate in four years to have two men burned to death on account of the use of burlap bags for aprons. I don't believe it is on account of the oil or the inflammability of the solution covering the material or the oil used for preventing rust, but I believe it can be blamed more on the fuzzy material in the burlap bags. It seems to me it is very similar to a lamp wick.

I think we ought to eliminate the burlap bag entirely for an apron, substituting canvas or some other material. We have tested a material of this texture and have been unable to ignite it.

The Hazard of Overhead Hooks Used on Conveyors

M. A. KROGER (Muskegon, Mich.): I would like to ask Mr. Shaw the methods they use for eliminating the hazard of overhead hooks used on conveyors?

MR. SHAW: I consider that a very important subject and I doubt whether anything has been considered on it before. We had one instance where one of these hooks came along and picked a man up and carried him through an open spot into another building. He didn't die, but he was very badly crushed. Since that, wherever our conveyors come down we are putting a rail around that place.

MR. KROGER: For instance, on rotary conveyors in transporting crank shafts and such things from one department to another, in using the hooks what do you do to keep the stock from dropping?

MR. SHAW: That hook has to be designed to retain it. We are constantly changing hooks, special heat-treated hooks. I believe you will find that one of the causes of droppage is that a man will weld a piece there instead of forging the hook and those things drop off. We can make those hooks to retain the parts.

MR. KROGER: I had an opportunity to run into that situation while I was in the employ of the Continental Motors in Muskegon. Our method of eliminating that hazard was to use acetylene welding wire over the drop pin. In other words, it was the drop pin that caused the trouble. That passed up and down allowing your material to come out and go in. We put an acetylene wire right across the mouth of the hook, thereby eliminating the possibility of our pin coming in and out.

MR. SHAW: Was that used on a certain job?

MR. KROGER: It is used in one building extensively. I believe I figured there were 27 hooks, to be exact, and every hook was prepared by millwrights in acetylene welding wire to protect the drop pin from leaving the hook and allowing the material to drop on heads.

MR. SHAW: You don't put a guard on that?

MR. KROGER: We had to drop the guard approximately one to three feet which meant a basket guard and additional expense whereas by simply using a piece of wire plus the workman's labor of perhaps a quarter of an hour, each one of those hooks was put out, which meant an additional saving and an elimination of the hazard.

MR. SHAW: That seems like a good idea. I don't know whether I would want that without a guard. I know that if a hook should ever break or this thing should drop or your conveyor chain should break and slide back, a guard would be a mighty good thing.

MR. KROGER: We have never found an instance of a hook's breaking.

MR. SHAW: I think a lip on the hook to retain the parts is well worth while.

E. C. JACOBS: During the course of your paper you mentioned the question of hernias. Just what do you do in your plant? I assume you examine your employees. What do you do in your plant if some men get in that are inclined to hernias? Do you take some of them in or do you reject all of them.

Discussion on the Question of Contracted Hernia

MR. SHAW: When the man is being hired he is not turned down because he has a hernia. He is hired if we need men and he looks strong enough to do the work. That is put on the record card. If anything develops in the future due to that hernia of course that is on the record card and goes against him naturally in a way. But if he is inclined to want an operation, our company is trying to get them taken care of as much as possible. I don't know whether they pay half or what. I think the Buick plant is trying to take care of all its men with hernia. Is that right, Mr. Thalner?

MR. THALNER: If a man develops a hernia, we try to take care of him and we have taken care of a great many of them during the year, our surgeon performing the operation at no cost to the man. We merely ask the man to stand the expense of his hospital bill.

MR. SHAW: Answering your other question, if a foreman thought he had a man on a job, like handling steel, that was too heavy for him and the man claimed he had a hernia, he would be transferred if possible to lighter work. While a foreman can turn down a man he can't lay a man off.

MR. JACOBS: Would the foreman in that department know anything about the physical examination of that man?

MR. SHAW: I don't think he would, not unless he was interested to the extent of calling up the medical department. If he did, he could easily find out.

MR. JACOBS: You wouldn't know that man was susceptible to hernia until after he was ruptured. This foreman would take him even though he showed a slight inclination to hernia when hired. There is no checkup on that system.

MR. SHAW: There is a possibility of that man's getting on that job but it is a slight possibility. If you could go out there and talk to the employment manager, he could show you the system he has of placing men on various jobs. There is a slight possibility of a man's getting on a job handling steel with a slight hernia. If you were to turn down all the physical misfits you wouldn't be able to run any of your plants.

MR. JACOBS: You said that was put on the record card and that might go against the man if anything should happen.

MR. SHAW: If a man wants a job and he has a hernia and our company should tell him that we didn't hire men with hernias, that would be an injustice to mankind. We will give that man a job and do our best. No man is turned down unless he is so terribly sick he can't walk. That doesn't mean we are taking all men physically ill into the plants but we are taking in thousands of them.

MR. JACOBS: I don't think you get my question. Supposing the examination revealed that the rings were enlarged and that man is handling material or doing some other job and he is ruptured. You say that those findings would go against the man. What would you do in that case?

MR. SHAW: I think that would be our responsibility. If we have a man on the job and he had adhesions or probably a weakness and we put him on that job and he has a rupture, of course we would be entirely responsible for that.

Liability in the Event of a Developed Hernia

MR. KROGER: In referring to the employment in your plant of a man with enlargement of the rings on either the right or left side, what he means is that in the event you employ such a man with enlargement of the rings, (which does not necessarily mean that the man is at present ruptured but when the rings are such he is apt to be ruptured), would you be made liable by accepting that man and putting him in your employment?

MR. SHAW: Sure we would. I answered that.

MR. JACOBS: That isn't my question. We are talking about preventing accidents.

A. M. WILLIAMS (Chrysler Corporation, Detroit): Might I attempt to answer that question?

We have dealt with this in hundreds of cases. It so happens that during the past year at the Chrysler Corporation we have been making physical examinations for the first time. We have found hundreds of cases of hernia, potential hernia, weakened and enlarged rings, and we realize that over five per cent of our workmen in the country have this weakness. We realize the fact that a man with an existing hernia and with a potential hernia is not 100 per cent efficient. He is handicapped and the corporation loses and the man loses.

I believe that this job of rehabilitating this five per cent of our men in industry is one we should all get behind and I admire the spirit of the Ford Motor Company in accepting these men and putting them on. We

are accepting them and putting them on but in every case they are accepted only after we have had a very close heart-to-heart talk with them. There are a great many of them we don't accept but we will take a case of potential hernia or an existing hernia and go over the matter with the man in detail, not in the employment office but in the safety department. Whether or not he goes to work depends upon his attitude and the thing is put to him in this way:

"Look here, Bill, you are handicapped. We are interested in rehabilitation. We are interested in taking care of the handicapped man. We have an allotment here and we can accept a few men with hernia. To have this thing taken care of means that you have to have maybe \$125 or \$150. Have you the money? Can you have this taken care of?"

"No, I haven't the money."

"Then you can't have it done, can you?"

"No."

"That means that you are barred from a job with the Chrysler Corporation. You have to have this money. Will the job help you get it?"

"Heavens, yes. I have got to have a job before I can get this money."

"Well, then, if we give you the job, will you have it taken care of and will you have it taken care of as soon as you are in a position financially to have it done?"

"Sure I will."

"All right. How long do you think it will take you?"

"It will be three or four months before I can get it done."

"All right, just as a matter of good faith on your part—I might not be here then—will you give us that in the form of a letter?"

A Letter from the Employee Clears Responsibility

And the fellow gives it to us in the form of a letter. We may get hooked on some of these cases but if we lay our cards on the table before the Industrial Commission of Michigan or any other state and show them we are actually getting behind our employees and trying to get them to take care of these defects and to rehabilitate themselves, I don't think we are going to get hooked on many of them. We are not taking a waiver. You all know what that would mean or wouldn't mean. But we are putting forth an honest effort to get these fellows to do the thing for themselves that they should.

In addition to that, we are trying to make the cost as light as we can and out of a good-cheer fund we have we are loaning the money if the case is too bad to wait to have it taken care of.

MR. JACOBS: I want to congratulate our good brother there on that system. However, there is one thing still unanswered. That is the real question we should discuss: what do you do with that man? Are you going to give him the job—which is a fine thing? We don't want to put men out of work but we are misplacing so many of them. Somebody somewhere should know that man has that trouble and he should be placed in a position for which he is fitted. If you are going to do humani-

tarian work, and certainly this work is that, why not see that that man is placed in the job he can do without producing a hernia even though his examination shows that he is probably a candidate for such a thing after a while?

I assume that represented here this morning are many large corporations. You can not forget the little fellow, that was the reason this question was brought up, and it is going to be brought out some more in the meetings that are to follow. We don't have physical examinations and it is quite difficult to place men as well perhaps as you might be able to place them. Certainly we know that the question of hernia has given every safety man something to think about. It has perhaps built up plant accident records more than any other one specific accident today if we include the strain cases and other injuries that come because of handling materials. We are not going to put a man out of a job but we want to place him right. How are we going to place that man in the position where he isn't going to get hurt?

If we accept a man in our plant and the medical examination shows that he has a potential hernia case, and if we place a man on the job where he is going to handle heavy material, we are going to have an accident chalked up against that case, and that is what we are trying to eliminate. We are trying to stop these accidents.

The Man With a Potential Hernia

CHAIRMAN KUECHENMEISTER: I am going to give Mr. Williams about a minute to answer that question and then I am going to ask you gentlemen to confine your discussion to the Hazards of Receiving, Storing and Transferring Materials from Receipt to the Shop Machine. Then if we have time we can discuss hernia and other things.

MR. WILLIAMS: To go back to the man with potential hernia. You will find that sooner or later that man is going to develop that condition and the sooner he has the operation and has it taken care of the better.

Twelve years ago I had my first experience in the safety end in dealing with physical examinations on men who had been turned down because of physical examinations. That was in one of the largest corporations in the country with a record of about 150,000 employees—that is the Bell System—and during all of our experience there we found it utterly impossible to fit a man vocationally for that hernia and we gave it up. We drew the line sharply and kept the man out at first. Now I don't believe we can do it in a small plant, I don't believe we can do it in a big plant, I don't believe we can do it in any plant. As soon as this fellow gets inside of his plant he is going to chum with some foreman who is going to put him on a job for which he is not fitted or maybe when he goes to sit down at his bench he will find a crate of material there and he will start to move it and a hernia will develop. It is going to come on him sooner or later. But if you will take that man in and have an understanding with him, maybe he will hook you—maybe five per cent out of 100 per cent will hook you.

MR. THALNER: I would like to have a minute and I think I can answer that. We do that very thing in our plant. We have the slip made out in the employment department when a man is hired telling him any irregularities such as varicose veins, bad eyesight or hernia must be corrected. That slip is sent to us and a copy of it is sent to the foreman. The foreman knows the condition of the man and the safety inspector takes it out and checks up on it.

We hire men with poor vision. We hire men with vision probably 20-30 in one eye and 20-70 in the other eye on the condition that man will go out and fit himself with a pair of glasses, and the man is checked up on the job to see that he does it. We also hire men with varicose veins on the condition that they will wear a rubber stocking. It is just a matter of checking up through the employment and safety divisions and we are doing that very thing at the present time.

CHAIRMAN KUECHENMEISTER: Gentlemen, I don't want to appear arbitrary and if you want to discuss this question it is all right as far as I am concerned but if you want to get back to the subject of the morning let us have some more questions on hazards of receiving and transferring materials.

We will take a vote on this. All those who want to talk on the question of hernia will raise their hands.

(No hands were raised.)

CHAIRMAN KUECHENMEISTER: We will stop that discussion right here. Are there any other questions on the hazards of receiving, storing and transferring materials?

MR. REAMER (Cadillac, Detroit): I am glad to say that we have Mr. Weber, our superintendent of receiving, here and he might be able to give you some good ideas on receiving material in carload lots.

A Study of Material Received in Car Load Lots

MR. WEBER (Cadillac, Detroit): I have been making a special study on material received in carload lots. In our receiving room we have nails and band iron and excelsior and everything laying around and it has caused many accidents and in the last year we have given considerable study to the matter. When the materials come in in casks and barrels and different things, up to about a year ago they were all covered and each had from 75 to 100 nails. We have asked that many of these be shipped in carloads without covers. Many objected to that but we have succeeded in getting about 75 per cent of them to do it. All of the bearings and castings and forgings and different articles are coming in open boxes, which I find is wonderfully effective in preventing accidents.

Then we find that many concerns use band iron. After they have 100 nails in the box they deliberately put an iron band around the bottom, and the first thing a receiving room men has to do is take a pair of pliers and cut the band and nine time out of 10 that band will come back and hit him in the face.

In sending castings and forgings many shippers put them in old barrels, greased barrels, and barrels with nails put in around the head. You know that the men will go down in those barrels to get something and many times they will get a large rip in their arms. That has also been a special study.

I have been interested in listening to the discussion on sheet steel. We have a lifter that is far superior to a chain. We lift about four or five tons and it is very effective and successful. We just put it on in piles and it works on a brake lever. We are very much interested in this truck you are speaking of. We are anxious to see that demonstrated. I think in the Cadillac Motor Company we have been doing our share along that line in the past year.

G. S. MITCHELL (Chrysler): I would like to know how you handle the frames of the cars, how you get the chassis out of box cars?

Getting the Chassis Out of the Car

MR. WEBER: Our chassis frames are all bought here in the city. We have a rack. The Midland Steel sends them over on the truck and we just take our crane and let them down on the floor in the racks. We don't have carloads of frames.

CHAIRMAN KUECHENMEISTER: Has anybody here got an answer to that question of handling frames and getting them out of the car?

MR. THALNER: We handle them through hand labor and, of course, that brings in your supervision on the job. If you have a foreman in charge of half a dozen men and if he doesn't govern the accidents of those five or six men he is not a foreman.

MR. MITCHELL: What was the lift you were talking about?

MR. WEBER: We use the large sheet steel lifter and we have our men get four or five tons of sheet metal out of cars on to the truck. It is the full length of the sheet steel and they work a lever. Then your crane lifts it to any pile you want. We have only had that in the last year or so. We have had the same chain system that Mr. Shaw speaks of. I have seen many of them break. From my experience in the factory I don't believe any chain could withstand these lifts. This is a wonderful lift.

MR. REAMER: That lift works on the same principle as a clam shell. When you get your tension on your cable it closes on the bottom.

MR. JACOBS: In many cases in receiving materials, either barrels, boxes, kegs or other containers are used and they are received sometimes at what might be termed a distributing station, especially in large organizations. Frequently they are opened for inspection and in some cases some of the materials are removed. In the case of opening kegs, the head is usually driven in and the nails are allowed to protrude. Some of the materials are taken out or they are examined and the keg is sent out with the nails in it. That same thing is true with respect to boxes, barrels or other containers and it represents a hazard to the man who must remove those materials. It is a good rule to have those nails removed by the men who open the container.

We have found many cases like that and that barrel is sent from place to place and those nails are still left in. I think we can stop a lot of the small cuts and scratches that come from causes like that if we have a definite rule that everybody must either push over the nails or draw them out so they won't present a hazard to those men who must use them afterwards.

MR. SHAW: That is one thing I really had forgotten in receiving. Eliminating tops on boxes is a new idea. I had never thought of that.

No box goes through our receiving department unless all of the nails are removed; no kegs goes through unless every nail is taken out. If any of you gentlemen go through our plant and find nails in the boxes I will give you a dollar for each one.

V. P. SINNOTT (American Radiator, Buffalo): I would like to ask Mr. Shaw how he controls the weights on chain falls?

MR. SHAW: When I was speaking of chains I should have excluded chain falls. As you know, the chain fall is a heat treated chain. What we are speaking of mostly is the logging chain. With the chain fall it is impossible to do anything, and if you write to the manufacturers they will advise you to lift three-quarters of its capacity.

A New Type of Metal Head for Barrel Shipments

MR. SINNOTT: What do you do when your foreman and superintendent are caught lifting a six ton load on a three ton chain?

MR. SHAW: They are subject to discipline. That is a violation of our rules.

MR. BASORE: In talking about those barrels and nails in the kegs, I would suggest that you go through our plant and go to the receiving department and see the new type of sprung heads in the barrels. We are trying to get that type of barrels for our use now. What I mean by sprung heads is a metal head sprung in a groove eliminating all of the nails. It can be put back in at any time. It eliminates all of the nails in the boxes. While it is a mighty fine idea not to have tops on boxes and that might be all right for short hauls on trucks or something like that, it is not good for long runs. There are boxes used now by a great many shippers with cleats on them. When you lift the cleat which is nailed at the top of the box the top comes off and it not only saves time but there are no nails there.

MR. WEBER: I would like to say a few words about the kegs. I suppose you are referring to barb-bolts and rivets coming in kegs in large quantities. I noticed many of those. They have the ridges in there and you say the heads are pressed in by machinery. But if you will notice, every vendor still puts in 25 or 30 nails into that small keg.

MR. BASORE: Not in the new type of barrel. The new type of barrel is sprung with two hooks close to the top protecting this inverted ridge.

MR. WEBER: How long have they been on the market?

MR. BASORE: I guess about a year particularly in the United States Nail Outfit.

These can be used for other things when they are emptied. I think

Mr. Shaw's idea of using metal boxes is very good. They are good not only from the safety standpoint but because of their long life.

MR. WEBER: What I am concerned about is that the management puts down orders for the receiving clerk to live up to those rules and you go around and you say to John or Jim not to leave those nails in the boxes, and you send them out in the shop, and the minute your back is turned John and Jim are doing just the opposite to what you told them to do. It is quite a problem in the receiving room.

We receive about 40 or 50 carloads every day and about half of those are of material that has to be shipped in boxes. A lot of firms object to shipping bearings in open boxes. They claim the dust might get in them. The bearings are put in wax paper in individual cartons and packed in nice wooden boxes. I can't see the necessity of putting 100 nails in that particular small box but they all do it.

I know that a nail puller is a hazard. I have been through the mill and I know the accidents that occur through the use of nail pullers. We ought to be able to show the vendor that he would save by not using so many nails and we certainly would save.

MR. MURPHY: Mr. Shaw brought up something that I believe we have found the solution of in our plant. He spoke about a man running into a conveyor chain and hook. We have that same condition in our plant. In one place in particular we have a way of lifting a Hudson motor off of the block test and carrying it across an aisle past a blind corner and on to another conveyor. Because most of our material handling from one department to another is handled on electric trucks the drivers of these trucks stand at a height of 12 or 14 inches above the floor, which would make them seem like very tall men walking around.

Methods of Safeguarding the Overhead Conveyor

In this particular place the first thing we put in was an overhead wooden beam with some ropes dangling down so that the man would lift those in the same way a man riding on the top of a train will before coming to a bridge. In addition to that we had a gong on the train but that didn't seem to answer. So I decided I was going to put something quite elaborate on there. So we got a bell which is hooked up with the circuit of this portable electric hoist. At the time the power is on and the load is moving from one side to the other this bell rings continuously. We still had some fellows who pay no attention to that and so in order to make it more fool-proof we have a bank of red electric lights on each side and these red lights flash on and off at the time the load is moving. In other words, when the load is moving we have the bell and the lights and a rope, and so far nobody has gotten hit.

R. W. BAKER (American Mutual Liability Insurance Company, Indianapolis): This discussion has recalled to me an accident that might possibly be of interest. In this particular case the oil was forced under

air pressure to a reservoir and there fed by gravity for the purpose of annealing. No safety device of any kind was on the line. A commercial drum having been used there was a blowout and the man was killed. The manufacturers during the investigation stated that such a process was recommended by the Standard Oil Company. We made an investigation and found it was not true.

I am calling your attention to the incident to see whether or not this system might be in use elsewhere.

G. A. SHENKLE (Heintz, Philadelphia): That process of unloading drums by compressed air is not permitted in the Heintz Company plants. We had an accident possibly eight months ago at Philadelphia. We bought several drums of oil and in applying pressure blew up one of the drums. Fortunately for us, or unfortunately for us, the tug captain knocked off the running lights and broke off the flag staff and the oil went out into the middle of the river. That is what a drum will do. I would say it is wise not to apply air pressure to any drum. Some are good and some are bad and there is no way of telling about them.

CHAIRMAN KUECHENMEISTER: What would you recommend?

Mr. SHENKLE: That is all according to the condition. Usually it is possible to unload by gravity or by transfer. Usually you can, by gravity, raise the drum to the point where you want to in order to store it. Usually in the case of these tugs they are trying to save all the money they can because the captain is out for food or something else and he is using the quickest and cheapest way regardless of safety.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The Wednesday morning meeting convened at 9:20 o'clock, Chairman Kuechenmeister presiding.

CHAIRMAN KUECHENMEISTER: Before continuing with our discussion of industrial safety, we want to take a few minutes this morning to elect the officers for the coming year.

MR. THALNER: Your Nominating Committee met yesterday and in accordance with past procedure have advanced the regular officers in line. There have been just one or two minor changes, but the following is submitted for the approval of this body:

Chairman of the Section for the ensuing year, Arthur F. Dunnebacke, representing the General Motors Corporation; Vice-Chairman, Arthur M. Williams of the Chrysler Corporation.

You all remember. I think it was two years ago, that one of the hard-working members of the Automotive Section left us and went down to Chattanooga, Tennessee. At that time I believe he was the vice-chairman of the Automotive Section. Due to his hard work and earnest efforts the Nominating Committee asked him if he would consider taking up the secretaryship of the Automotive Section this year, because we thought we should have a man familiar with the work and Mr. E. H. Cotcher, of the Murray Body Company, has kindly consented to have his name presented as a nominee for Secretary of the Automotive Section.

Your Nominating Committee has offered, by way of suggestion, a little new procedure this year. We want to have elected at this meeting, if it is your pleasure, two men, one of whom, at the end of next year's work, may be put in as a nominee for the secretaryship of this Section. Any of you men who have had anything to do with work of this kind know that a new man coming into an organization is somewhat at a loss as to what his duties are. We feel that by having two men at large, by their contact with the Executive Committee during the year they can learn the processes, and then, if their work has been up to standard during the year, they can be considered as nominees for the office of secretary. Those two men, who will be purely on the Executive Committee at large this year, are Mr. Judges, of the Ford Motor Company of Canada, and Mr. Hunter, of the National Cash Register Company, of Dayton, Ohio.

In addition to that, we also feel that all past chairmen should be elected to office to serve on the Executive Committee of the Automotive Section, and we therefore submit the following slate:

A. F. Dunnebacke, Chairman; A. M. Williams, Vice-Chairman; E. H. Cotcher, Secretary, and your Executive Committee, consisting of those

officers and your retiring Chairman, Mr. Kuechenmeister, myself, Mr. L. E. Averill, Mr. R. A. Shaw, Mr. L. L. Judges and Mr. D. C. Hunter.

E. F. CLARKE (Ternsted Manufacturing Co., Detroit): I will make a motion that the report of the Nominating Committee be accepted.

(The motion was seconded and carried.)

CHAIRMAN KUECHENMEISTER: I declare these officers elected.

Gentlemen, I think you have been very wise in the selection of your officers for the ensuing year. Mr. Dunnebacke has had charge of the work for the past year. I will be frank to say that I didn't do a thing. He will be able to carry on the work far better this coming year.

Mr. Williams has not only been the secretary of the Section but he has been a member of the Executive Committee of the National Council. He is well qualified to carry on the work.

Mr. Cotcher has had much experience in industrial safety work and in the local Safety Council. He has been an officer of the Section. He will make an ideal secretary.

Those three officers, backed up by such men as Thalner, Averill and Shaw, give you a set of officers that are A No. 1, and you can all look forward to a very successful year.

I am going to turn this meeting over to your new chairman and let him carry on the work from this morning on.

It gives me great pleasure, gentlemen, to call on Mr. Dunnebacke to preside at these meetings.

Chairman Dunnebacke Assumes the Section Reins

CHAIRMAN DUNNEBACKE: Let us all laugh to ourselves in public. This is as good a joke as I have had in years. I opened up the paper and there I saw that I was elected Chairman of the Section before we had election. It is unusual. But I appreciate the honor you have shown me and I am especially grateful and I am very fortunate in the other men who have been elected officers. I think they are a very capable set of men. As I look forward to next year it is with no degree of hesitancy because I feel we are going to have a successful year.

The Automotive Section has always been one of the largest and most important sections and I am sure I not only speak for myself but for others here when I say that next year we will try to make it still larger and more important.

There is just a word I want to say in explanation. You may not know that Mr. Kuechenmeister has not been quite himself physically and that he has only recently completely convalesced from illness; under advice of his physician he could not do much active work. So last year when the Executive Committee met he tendered his resignation as chairman of the Section. We all know what Mr. Kuechenmeister has meant to the Automotive Section and the many years of hard work he has given to Safety Council work, and so your Executive Committee and officers decided we would not accept his resignation. We told him we wanted

him to continue through the year as chairman; in fact, we insisted on that.

I appreciate the opportunity of conducting this meeting and tomorrow morning I am going to give you a chance to see your vice-chairman and will have Mr. Williams conduct the meeting. I think it is wise for us to become acquainted with the fellows who are to be our officers for the next year.

I am going to reverse the order you find on your program. Your program has the hazards of plant maintenance first but I am going to take up the hazards of transforming material first because it follows in line with our picture of the program. To handle that paper dealing with the hazards of material in process we have a gentleman with us who, more than any man I know, has had a long, intimate experience with shop management, shop materials and shop processes.

I knew him 20 years ago when he was running a great big planer, machining up a flywheel, and through all of these years I know he has had intimate connection with men and processes. He knows every form of manufacturing process. He has his heart and soul in the safety work in his plant. It gives me pleasure to call on Mr. A. A. Lauzun, the general factory superintendent of the Reo Motor Company of Lansing, Michigan.

TRANSFORMATION OF MATERIAL—MACHINE PROCESSES

A. A. Lauzun, General Superintendent, Reo Motor Car Co., Lansing, Mich.

In order to get an idea of the size and importance of our job let us review a few statistics. During the World War, the U. S. casualties, including deaths from all causes, were 126,949 killed and 234,300 wounded; and during the same period there were, approximately, 126,000 men, women and children killed by accident in this country, representing a cost of \$1,600,000.

Think of it! Almost as many killed while peacefully engaged in the daily pursuits of life as were killed in the most sanguinary war of all time.

And then, that \$1,600,000 cost of these accidents; who pays that? You and I pay indirectly for every accident that occurs in the land. If a manufacturer is required, through compensation laws, to carry insurance to cover his employees, he adds it to the price of the article he produces and we pay for the insurance. In other words, if Bill loses a finger, you and I pay for that finger in the price of bread and butter.

So you see, that from a purely selfish view-point, we should go after this safety program for our own financial gain. But I am pleased to state that it would be hard to find a company or an individual who considers primarily the financial end. We are all looking after the welfare of the employee, for, after all, what is money as compared to the head of a family killed or totally disabled, with the wife and kiddies thrown on the world?

The reduction of accidents and the conservation of human life is our problem, and, judging from that enormous toll of 126,000 taken through accidents during the war, we have some job on our hands.

Now, how are we going to meet this problem? By a continued educational safety program, in the home, on the street, in the car, and in the factory.

In the NATIONAL SAFETY NEWS of August, 1926, we read: "Safety work in the U. S. has resulted in a saving of more than 100,000 lives during the period from 1913 to 1924 inclusive. * * * If the deaths from automobile accidents were not considered * * * a saving of 221,000 lives would be shown as a result of safety work in industries, homes and public places." This is proof to me, gentlemen, that you represent an organization that is Uncle Sam's greatest asset, and statistics show that you are doing your work well.

Guarding the Factory Hazards Is Not Enough

It is not enough to guard the factory so as to make it "fool-proof." Because the fool will seek some way around the guard. Let us eliminate the fool. Let us so educate him that he will be brought to think "Safety" at all times. If you cannot sell the idea of "Safety" to the men, all your efforts to guard the employee will go for naught.

There are some men who continually take chances and seem to get by. They are bad examples to the rest. There are some who are safeguarded against what they consider a great hazard and yet lose their lives by a most natural accident. For example: Bobby Leach, famous thrill seeker, and death defier, who startled the world in 1911 by going over Niagara Falls in a specially constructed barrel, lost his life 15 years later as a result of a broken leg caused by slipping on an orange peel. The great hazards seem to get more consideration than the small ones. We should be continually on our guard against infection from the small sliver in the finger, an abrasion of the skin, the foreign particle in the eye, the scratch of the nail, or any of the numerous other slight injuries that happen to men in their daily work. Go to the first-aid station for everything; it pays.

We hear some of the old heads say that this modern safety idea is all bunk, that years ago they did not hear of as many accidents as they do now. Gentlemen, previous to 1913 there were no means of getting accident data. Now we have free access to the wonderful data gotten out by the National Safety Council.

The slightest injury should be taken care of by the proper persons assigned to that duty. One might know his own physical condition but he does not know how some of the things he comes in contact with are contaminated.

Our modern Coolant systems, whether individual or centrally located, supplying a single machine or a group, bear constant watching. If one of the operators has a skin disease he will infect the entire system. Think of the danger to other employees if one should be suffering with

a venereal disease. It does not take long to contaminate a system with syphilis germs.

I will be asked, "How can we eliminate venereal disease from the factory?" It might seem a difficult problem, but you can educate your men in the dangers to themselves and their families of working alongside of a man so diseased, and they will soon single out those affected and report them to the proper factory authorities, who having once spotted such a person, should never rehire him until he shows a clean bill of health from the factory physician.

One of the curses of our factory life is "goosing." We have all witnessed the comedy of some nervous fellow being "goosed" from behind by a fellow workman. But think of the seriousness of this thing and stamp it out. "Horse-play" of any kind is dangerous and should be severely dealt with, even to the discharge of the guilty ones. You might consider these matters as rather delicate to handle through the medium of posters placed in the factory. Let us lay aside this false modesty and hit "straight from the shoulder." Posters appeal to the workmen, and the seriousness of the theme will strike home and give a lasting impression on the mind.

The Great Danger Lurking in the Air Hose

Did you ever think seriously of the great danger that lurks in the air hose? Yet, this cannot be guarded mechanically. In the use of air to blow out dirt from jigs and fixtures, men are not careful enough in protecting fellow workmen. They blow toward their co-workers, getting dirt into their eyes and causing injuries that are likely to be serious. They blow the dust off their own clothes with 80 lbs. pressure, little realizing that the air might enter the body and cause serious injury or death. Even though it does not enter the body, the sudden cooling of the body might result fatally. There should be more poster propaganda through the factories as to the danger of compressed air. We read of three workmen in one of our factories, holding a young lad and applying the nozzle of the air-hose to his body in such manner as to burst his intestines. The boy died. The men got jail sentences. Would this have happened if these men had been impressed with the danger of compressed air? We might guard every dangerous part of a machine tool, we might take every mechanical means towards safety, but we have lost all effort if we fail to impress the mind.

We, as safety men, are unfair at times to the operator. Under pressure of the modern piece-work system, the workman is after every possible piece that can be gotten in the day's run. If a guard interferes with production, he is liable to remove it when no one is looking. Of course if he is found out, he should be severely reprimanded, but we should find out why the guard was removed. Our guards should be such as not to hamper production. In short, we do not do enough careful engineering on our safety devices. We must not only consider the safety of the operator but also endeavor to get out as many pieces as possible with safety.

I am going to quote from a pamphlet entitled "Industrial Anxiety," by Glen Gardiner, relative to accident anxiety: "Every worker who works at a hazardous job sets up certain fortifications to guard against injury. It is when these fortifications sink too far into the sub-conscious that accidents occur. The fear that he may be injured constitutes a man's accident anxiety. The ever present realization that a slip may result in a serious injury keeps the workman keyed up to a nervous tension. The more responsibility for safety that can be taken off the shoulders of the man by the installation of mechanical safeguards and fool-proof equipment, the less accident anxiety he will feel.

"Safety is a habit, or at least by a great deal of educational work we try to make safe practices habitual. By getting a man habitually to work safely, we reduce the load of accident anxiety which he must carry.

The Accident Anxiety of Workers a Real Handicap

"Knowledge that the company has taken preventive measures to insure his safety is a source of great relief to the worker. It takes the pressure from his mind. It relieves that portion of his mind which he has to set aside for constant precautionary ideas, so that he can put his whole mind to constructive work. Instead of having part of his mind constantly saying to his hands, 'Be careful! Don't do it that way. Wait; not yet,' he can throw his whole mind into the doing of his job.

"There can be no question but that the accident anxiety which goes along with the hazardous job is a tremendous drain upon the worker's productive ability. This one fact alone is justification enough for the expenditure of money that is made to promote safe working conditions in a plant."

There is another phase of factory life that you perhaps will feel does not come under the jurisdiction of a safety inspector. That is, the attitude of the foreman and even the superintendent toward the men. Men can not work safely under a supervisor who is unfair. A boss who is a habitual grouch is a hindrance to safety and production. A supervisor who does not deal on the square with his men should be removed as soon as found out. Men like to see "all the cards on the table," and they will work better and safer under the boss who in all his dealings is just. We should feel it our duty to analyze the attitude of the boss toward his men and take a personal part in the correction of all unfairness, even though it means recommending the removal of some, because worry caused by the attitude of a misfit boss spells accident.

If you doubt the psychology of safety, look over the records of one of your "Safety Weeks." You will notice a substantial decrease in accidents, due to the "mass mind" working toward one ideal. Or recall how the different departments vie with each other for a position on the honor roll. Or notice the satisfaction of the foreman whose department has had a month without a lost time accident.

If we can create such a mind during "Safety Week," why not carry on toward a "Safety Year?" Or better still, why not all strive harder toward the consummation of the ideal of "Safety Always?"

CHAIRMAN DUNNEBACKE: Gentlemen, I am sure Mr. Lauzun has covered the field of shop safety in a pretty good way and I know you all join me in extending to him a vote of thanks from the Section.

The big value of these papers, of course, lies in the discussion and I am sure that Mr. Lauzun will consent now, in so far as he is able, to answer any question that you wish to bring up. I want to throw this paper open for discussion.

I want every man in the room to feel at liberty to ask questions on any subject, except accidents on punch presses, because they will be handled Friday morning in the punch press meeting.

MR. SANE (Delco Light): Mr. Lauzun spoke of the hazard of using the air hose. I would like to ask what remedy he offers for that condition, whether he has any arrangement made whereby he can cut down the air pressure where it is not needed to a lower pressure and still have the same line for high pressure.

MR. LAUZUN: Of course in the factories you will have to maintain an air pressure that works through the different tools using that air. Eighty pounds is about an average pressure, I should think, that would carry on air chuck work, riveting work and things of that nature, but as I stated, the air hose, the air nozzle, can not be mechanically guarded, as I see it. It is merely a matter of education. There are some things that you can not really guard and those are the things which you must go after in another way. You have to educate the man who is in danger. A poster, for instance, showing a man with his eye inflamed, caused by a careless workman blowing dirt toward this man; a poster showing the alimentary canal, for instance, and stating the pounds of pressure that the intestine will stand, and along the side of that an air hose showing the pressure that that will stand; would show the men so forcefully that I don't think there would be a repetition of any accidents along that line.

Eliminating Eye Accidents From the Air Hose

MR. BOYD (Paige Motor Car Company): I might add something to that. About two years ago in the Paige machine shop we had a good deal of the same trouble with regard to air hose. We had air all through the shop with 80 pounds pressure for the riveting work, as mentioned, and we were having a large number of eye cases in our first-aid room. We made up our minds that we would put a stop to that if we could, and we have eliminated, in about nine months' time, a great many of the eye cases caused by this practice of blowing the chips into the air.

We did it in this way: we first of all tried to educate the men not to use the air too liberally. We tried to educate them to be careful in the way they used it. But probably the thing which helped us most was going around and applying to each machine a chip pan on the table of the machine or under the table or close by where the chips could be put. We then furnished the man with a brush so he could brush the chips into that pan.

These pans, in addition to being located where they are handy, are

provided with a spout and are put over at one side of the machine. The sweeper comes along with a receptacle on wheels, locates it under the spout, and with his own brush or the brush on the machine shoves the chips through the spout into the receptacle and wheels it out of doors. That accomplishes three things. It keeps the machines clean, it keeps the chips off of the floor and it does away with a large part of the chip blowing.

J. E. WALTERS (General Electric, West Lynn): On the question of discipline, under the compensation laws of the state of Massachusetts contributory negligence is a limiting factor—that is deliberate negligence. The use of air hose enters into this problem. We had an accident of a similar nature and the question shot back at us was, what discipline did you use? The man had been warned but there was nothing doing on that.

"Did you fire him?"

"We did not."

"Then he had not been disciplined."

I wonder how many of us have run up against that problem. Had you fired anybody in a similar case before when you had this trouble or were you simply satisfied to say, "If this happens again, out you go"? The Board in Massachusetts has ruled that the only discipline is the actual discharge. That is pretty tough but I wonder how many more of us are up against that?

Eighty Pounds of Air Not Necessary in Hose

CHAIRMAN DUNNEBACKE: The general trend of court decisions is that way. Regardless of the number of posters you have around and regardless of the amount of instruction and definite absolute commands you give a man not to do a thing, the courts have held, and are more and more holding this way, that unless you can actually show the court you were making a determined effort to prevent the things you are trying to prevent through your signs, they will not relieve you from your responsibility. In other words, although you have all kinds of signs saying "don't do that," unless you can show the court that through repeated suspensions and firing you are making a determined effort to stop the practice you wouldn't get anywhere.

Before we leave the compressed air question, I want to offer one suggestion. In the majority of cases where you have air, I doubt if you need more than from eight to 12 pounds, yet these lines are carrying 80 or more. If you have reducing valves it would be very costly and the possibilities are that the minute your back is turned the man is going to get up and turn the valve, regardless of how you have it set.

In one company they got very good results in this way: just below each valve they put in a three-eighths union and between the two parts of that union they put a disc of 16 gauge metal and bored a sixteenth inch hole in it. What was the result? The workman shoots his air nozzle and he gets a blast of air sufficient to do the work he wants it to do to clean a certain jig or fixture, but that air pressure quickly dies down to eight pounds. He thinks he can fix that and he turns the air valve

but still he can't get more than eight or 10 pounds pressure, which is all that is necessary to do that work.

This has got to be done at night or on Sunday or some time when the men don't know it, because if the men know it the first thing you know, they are going to put larger holes in there. Then if it comes down to that it is a question of discipline.

MR. JONES (Motor Wheel Company): On this air proposition, it seems to me that eight or 10 pounds would not do the work required. We find that we need 80 pounds for every job. We tried to reduce the amount of pressure but we found it wouldn't give us the air required.

CHAIRMAN DUNNEBACKE: It may not on your chucks and other operations but on a good many of the cleaning operations I feel that from eight to 12 pounds would be just as effective.

Is There a Substitute for Air in Cleaning Off Dust?

MR. JONES: That leads me to ask another question. What is a substitute for air when you want to clean off dust from wheels or something of that sort when the air doesn't remove the dirt from the product? Is there some good substitute that can be used similar to rubbing it with a cloth which I know is pretty expensive?

MR. LAUZUN: There is a place for air and there are conditions under which air must be used if you want to accomplish certain results. In removing dust from wheels, you have either got to wipe it off with a cloth, which is an expensive proposition, or you have to blow it off with air of sufficient pressure. It would seem as though if you had a row of wheels in operation and the men were working on a certain detail of this wheel, in that particular line you could put a reducing valve on the entire line so as to give the nozzle of the hose where each operator is at work the proper pressure to carry on that particular operation. But air is the most effective way of cleaning things. It is very quick and when you come right down to analyze the cost it is about the cheapest way you can get at the proposition.

There are ways of taking care of the situation by putting deflectors on the pipe. For instance, if you are cleaning out cap holes, if you have a long slender pipe, you take about three-sixteenths inch brass pipe and solder that to the end of the air nozzle and then just above the depth of the hole you have a deflector. Now when you turn on the air the air goes into the hole the chips come up and pass on to the top of the work and they can be very easily wiped off.

Then, again, on your machines, if a man has to blow off his chips toward a workman you would blow a deflector that would catch it.

This little idea Mr. Dunnebacke advances in regard to the little disc, I don't think he means to suggest for anything other than the cleaning of fixtures and it appeals to me as a very good thing if it is put far enough away from the air nozzle so as to get a chamber between this disc and the air nozzle. By so doing you have slowed up the 80 pounds of pressure in this nozzle and you will get a good force and then it will be gone and

you will have to close the nozzle again; otherwise, he will get the pressure going through the small hole and it will dissipate its pressure in the large pipe.

E. C. JACOBS (American Mutual, New York City): I was in a plant recently where they have a number of air lines that are used in the engineering plant where they had taken a connection similar to that used on the drop lights and fastened those to the end of the hose. I think that serves to keep that air from entering the body in the event of horse play and it also serves to keep that nozzle away from the parts we are going to blow and allows a better spread of air. As a matter of fact, the best thing to do of course is to have a definite shop rule. In some plants the hose is used for cleaning clothing and to stop that practice I have seen some concerns provide whisk brooms in the departments where the hose is located.

I really think the connection we use on the electric light sockets today, especially the drop lights, will serve to stop a good many of the accidents that come from horse play because it is rather difficult for the air to enter the body unless that nozzle is brought close to the body; I think we might try that.

A Suction System Devised to Clean Away Dust

MR. THALNER: We had a job where we were drilling wrist pin holes in pistons and we couldn't use the air to blow the dust off of the jig continuously because in addition to causing a very dusty and unhealthy condition in the shop the machine bearings were constantly wearing out, so a suction system was devised whereby a pipe was brought down and run into each side of the piston. This was a multiple drilling job with three pistons laid one ahead of the other, and by putting in the suction system and making the aperture real small that job has been kept clean ever since because there is never any circulation to draw out any dust and chips which might accumulate and in addition you localize or confine your dust to a cyclone instead of blowing it through the entire department.

CHAIRMAN DUNNEBACKE: In order to carry on our machine processes, our shop processes, we must have a factory and we must have equipment; we must have heat and light and power and air. The installation, the maintenance and the upkeep of these various portions of industrial plants usually come under the plant engineer or the maintenance engineer. The maintenance engineer really has some job. Many times that work is emergency work.

Shops go through a process of reconditioning. Many whole plants are moved between Saturday and Monday. Then the plant engineer comes in and works night and day and overtime and Sunday to get the work done and there are many problems in connection with plant maintenance and plant engineering that are serious to us safety engineers. So many problems have arisen that we deemed it serious enough to bring it before the Section in the form of a paper. We have with us the Maintenance Engi-

neer of the Fairbanks Morse Company of Beloit, Wisconsin, Mr. L. H. Pease, who is going to talk to us on the hazards of plant maintenance.

HAZARDS OF PLANT MAINTENANCE—MECHANICAL JOBS

L. A. Pease, General Maintenance Engineer, Fairbanks, Morse & Company, Manufacturing Division, Beloit, Wis.

While we have been very much concerned in past years with reducing hazards in all of the other departments of an industrial organization, we have given little thought to the hazards of maintenance work and how they could be overcome.

It is the purpose of this paper to treat in a preliminary way of the many hazards ordinarily encountered in the work of the maintenance department in a large typical manufacturing industry, and to show what has been done by the company with which I am connected to reduce these hazards to a minimum.

The scope of work of this department is as varied as there are types of plants, and the hazards vary accordingly. The fact that this department operates in every other department of the plant, and usually with the hazard of unusual working conditions, will show that the hazards encountered are especially prevalent.

Our chief products are oil engines, both of the Diesel and spark ignition type varying in size from the two horsepower kerosene engine to 720 horsepower Diesel oil engine; electrical generators and motors up to 600 kilowatts; pumps of all types, including centrifugal pumps up to 60 million gallons per day; domestic water plants, windmills and light plants, and railway equipment of many types. So you can see that our products are not only varied but cover quite completely in their production most of the maintenance problems encountered in a large manufacturing plant. Practically all of the production work is done progressively, involving a considerable number of conveyor systems.

Our buildings and equipment vary in age from 40 year old buildings to our new modern six acre foundry. The type of equipment used varies from full line shaft, a little of which remains, to purely automatic direct motor driven equipment and conveyors. Besides machine, erection and test shops, we have large forge shops, pattern shops, tin shops, iron foundries, brass foundries and many other departments, employing in all between 5,000 and 6,000 men.

It is within the scope of the maintenance department to install all productive machinery such as lathes, milling machines, boring mills, boring bars, hammer presses, shears, etc.; as well as to install and maintain the non-productive equipment such as conveyor systems, cranes, hoists, oil, air, water, steam and gas distribution systems, line shafts, motors, furnaces, test and power plant equipment. This department also has charge of the maintenance of buildings, railroad tracks, power house, transportation and yards.

The maintenance department operates through the following seven crews: (1) The electricians who install and maintain all electric equipment and distribution systems. (2) The millwrights who care for the setting and repairing of machines, conveyors, shafting, etc. (3) The crane crew who operate and repair all cranes and hoisting equipment including bridge cranes, gantry cranes, hoists, elevators and locomotive cranes. (4) The carpenters and painters who maintain and change all buildings and structures. (5) The pipe fitters who attend to all piping for the distribution systems. (6) The plant operating crew who operate power plants and equipment. (7) The safety crew who inspect for hazards, and design, install and maintain all guards and other safety equipment.

The department functions in a manner similar to that of a normal staff organization, each foreman having equal authority and responsibility for his crew. It is usually necessary for several of the foremen to work together as well as with the superintendent of the shops.

Foremen Held Personally Responsible for Men's Safety

All foremen are held personally responsible for the safety of their men. Safety educational activities have from the first stressed this responsibility until at the present time every foreman realizes and feels it his duty to exercise every precaution toward the prevention of accidents. The foreman, his superintendent and the safety inspector are the safety committee of the maintenance department. There are no regular scheduled meetings of this committee. The discussion of general hazards encountered in the department are made in meetings held from time to time as necessity requires.

Where projects are of more extensive nature requiring the cooperation of several of the crews, a meeting of the committee is usually held in the office of the shop superintendent. At this meeting a program is laid out, hazards discussed, and responsibility assigned to each of the foremen. This allows a program to be arranged with no interference between the various crews and permits every precaution to be exercised against accident.

On projects requiring but a small amount of work on the part of several of the crews, the work is carried on in the same manner as normal maintenance. In this case, it is only necessary for the foremen to cooperate closely to prevent interference of other important work. Where the work is chiefly concerned with one crew, the foreman of that crew is responsible for the completed job, and men from other crews work under the supervision of the foreman in charge.

A copy of all non-productive shop orders is sent to the safety department where they are checked to see whether all state law requirements as well as our own standards of safety are being met. These non-productive orders cover all work other than the actual schedule of product manufactured for sale, and I believe that our safety engineer will bear me out when I state that the consideration of safety has been such an important factor in our shop that it is very seldom necessary for design

or layout to be changed to conform with the most modern safety practice.

In cooperation with the maintenance department and the safety department is the medical department through which many messages upon safety are brought forcefully to the employees. The slogan of the medical department is, "A healthy crew working full time," indicating that to work safely and efficiently a man must be healthy. Our point of view is that a man doesn't need to be injured and he doesn't have to be sick. It is the men to whom this idea has been sold, who are the back bone of our shops today. Do not think for one moment that we are referring wholly to the class in overalls. It is of vital importance that the foreman, the superintendent, the manager and owners get this point of view. That our managers and men do have this idea, is proved by the fact that our organization has two departments, "Safety" and "Medical," to fight the two factors which oppose our goal.

This also is proved by citing the accomplishments of these two departments in the reduction of time lost. The figures of the manufacturing division show that accidents are causing a time loss of less than one-half day per man per year, and sickness is causing a time loss of three days per man per year. The Medical department prevents accidents by reducing sickness which is itself a known cause of accident.

Departments Considered Especially Hazardous

Of the seven divisions in the maintenance department, the electrical, millwright and crane repair are considered the most hazardous. Many of the hazards referred to later as being especially applicable to the millwright division also apply to the electrician. The work of the electrician carries him throughout the plant, in every one of the shops both above and below the normal level.

In addition, there are many more hazards which require special vigilance on the part of the electrician in order that no injury results. The work on electric cables, transformers and switching equipment in underground vaults and tunnels requires special precaution. Here the switches controlling the circuits upon which men are working are locked with the workman's personal lock. Boots and rubber gloves are worn for insulation, pliers and screw drivers are insulated against shock. All iron boxes, lead sheaths on cables, etc., are grounded to make sure that no employee receives injury. Men on this work are required to work in groups, two being the minimum number allowed on any underground circuit. All circuits underground are worked on only when dead and with switches locked open, the men doing the work seeing personally that the switches are opened and locked, and unlocked and closed when work is completed.

On our overhead 4,000 volt lines, no one is allowed to work with the circuits alive. All switches controlling the circuits upon which men are working are opened, together with the hand operated disconnecting switches, and the circuit is grounded. These switches are opened and closed only by the electrical foreman who is always present when work is to be done upon the overhead lines.

When working on circuits in the shop the electrician locks open the switch controlling the circuit upon which he is working so it can not be closed until his lock is removed. If other mechanics are also working on equipment driven by motors on the same circuits, they also lock the switch open with their own locks and the switch can not be closed until all locks are removed. All switchboards and motor platforms throughout the entire shop have adequate hand railings around them to prevent the men from accidentally falling off.

All new wiring throughout the shop is done in accordance with the state code. All control equipment on new work is of the remote control type with safety stops located at convenient places. On conveyor systems extending over wide areas, there is only one start button for each conveyor or other conveyors which might be operating synchronously with it, and there are several stop buttons located at various points along the line for convenience of shutting down instantly if necessary.

Specially Authorized Persons Handle Electrical Work

All work on electric circuits throughout the plant is performed by electricians of the maintenance department only. No unauthorized person is permitted to work upon or to tamper with any electrical equipment.

In places such as test floors, laboratories, etc., where considerable electrical equipment is installed and operated, one of the maintenance electricians is always in attendance to perform all the operating and maintenance work necessary.

For convenience and safety throughout the various shops there is in each large shop an electrician from the maintenance department who cares for all of the electrical work thus making it unnecessary for any unauthorized employee to come in contact with any electrical equipment other than a switch controlling the motor driving the machine that he might be working upon.

The millwright has included in his kit a pair of goggles to use while chipping concrete, pouring babbitt, lead, etc., and although a great deal of moving machinery is operating at all times, we have never had an eye injury from this cause in our maintenance department.

Each millwright and electrician is required to carry a padlock, the key of which always remains in his possession. As there is more or less danger in having men of several crews working together and that the work of one crew might endanger the life of men of another crew, switches, valves, etc., are arranged so that each workman can lock them with his own lock and same can not be disturbed by anyone until all of the locks have been removed by their respective owners.

Where portable ladders are necessary, we have found it of considerable advantage that each division within the maintenance department have and maintain its own portable ladders, and in some cases certain individual employees have their own individual ladders. Special care is exercised to see that the ladders are used only for such purpose as intended, and by only such employees as are designated to use them. Ladders are

purchased on strict specifications and must stand rigid inspection and test upon receipt at the plant. Before placing in service, each portable ladder is equipped with a mild steel shoe having a hardened steel point. Rigid periodical inspection of ladders is maintained and the observance of any defect whatsoever is sufficient cause for condemnation, putting ladders out of use until repaired or replaced. It is our general practice and policy to use rigid ladders and stairways whenever possible reducing to a minimum the necessity of using portable ladders.

All hand tools used by the maintenance department except carpenter tools are furnished and maintained by the company. A special tool crib for all hand tools, ropes, chains, ladders, jacks, shovels, wrenches and other maintenance tools and equipment is situated in this department, easily accessible to all employees. All tools are issued on check to the individual workman. The trained mechanic keeps his tools for such time as it may be necessary to perform certain work while the unskilled workman turns in his tools at the crib each night. Condition of all hand tools is carefully noticed. Whenever a tool is found with mushroomed or burred head, a loose or broken handle, or broken head, etc., the tool is repaired or dressed as the case may be before being returned to stock or reissued.

To guard against the common dangers, we require every workman to wear close fitting clothes to prevent being caught in moving objects. Each new employee is instructed to discard all rings and floating neckties. He is urged to wear stout soled shoes with hard toe caps. Rubber coats, boots and hats are provided for men working in damp places.

Methods of Handling Removal of Machinery

Where heavy machinery is to be moved, the millwright must exercise his judgment to prevent injury not only to himself but to others and to equipment. The moving of heavy machinery may call into play the use of several overhead cranes or it may require large outlay of equipment and rollers, tractors, etc.; special care is taken so that injury will not result from the moving of this heavy equipment. It is often necessary to put up guards or construct rails, indicating signs, lights, etc., especially on work below or above the normal level.

The hazards in maintaining the crane and hoist equipments are fully as serious and numerous as in the millwright and electrical departments and probably more important to the rest of the plant, due to the fact that approximately 65 per cent of our men are working under crane-ways. The crane maintenance department is responsible for the maintenance and repair of equipment and the instruction of all crane operators. The equipment consists mainly of bridge type cranes, both alternating and direct current up to 35 tons capacity. There are also several of the gantry type in the material yards and several locomotive cranes for handling coal and miscellaneous yard work. This department also has under its jurisdiction maintenance and repair of the elevator equipment throughout the plants.

As proper inspection and maintenance makes for minimum hazard, special care is given to this phase of the work. Each crane is inspected periodically depending upon the service, for electrical and mechanical conditions. Whenever an inspection reveals any defect, it is repaired at once and in this way many serious breakdowns and accidents are prevented. A weekly report made out by the crane operator showing the condition of his crane is sent to the crane division and a copy is sent to the safety engineer. This report is acted upon immediately by the crane division.

Making Repairs to Cranes and Craneways

When a repair man, who is always on duty, is called to repair a crane, he immediately takes charge and no movement of the crane is made except under his direction. Main switches are arranged so they may be locked open. This applies not only to crane switches but to the crane trolley control switches as well. Repairs of craneways are made only when the cranes are shut down and the trolley control switches locked open. A very important feature controlling proper and safe crane operation is lubrication. This work is done by the crane operator but under the supervision of the crane division. In this manner the proper oils and greases are used and it is seen that proper application of them is made on the various crane equipments.

The crane operator, while not under the direct supervision of the maintenance department, is instructed by the crane division in the manner of operating and caring for the equipment. In employing a crane operator, he must meet certain requirements such as perfect eyesight and good hearing, and these conditions are checked by the medical department every three months. He must be a man above the average, speak and understand English and have a high order of intelligence, as upon him depends the lives of hundreds of workmen below. Too often the crane man is not carefully selected and this results in improper handling of equipment and needless endangering of the lives of fellow workers.

The operators are instructed by the crane division in the details of caring for the mechanism. Special attention is called to the manner of lifting and to the means of connecting the load. He is instructed that he need not lift any load if he believes the slings are inadequate, or that the load is not properly connected, or that any accident might result from the lift under consideration. He is also instructed not to make side pulls and to be careful and not get the cables over against the trolley wires. One of the greatest factors in lessening hazards in this department is the fact that most of the crane operators are all old experienced men. They are more careful in their work, take better care of the equipment, more readily check minor defects and difficulties and consequently keep the equipment in better and safer condition.

Our carpenter and painter crews include many who are often called millwrights in some shops, and they are the men who not only do the wood work about the plant but also do the necessary maintenance steel work, painting, etc. This group consists of such men as are necessary

to do practically all of the building repair and maintenance excepting the pipe work and electrical work.

All hand tools, ladders and miscellaneous equipment used by this division are cared for in the manner already described.

In addition to the items mentioned, this division uses a great deal of scaffolding for its many duties. As in other departments the foreman is held personally responsible for the safety and ruggedness of this construction. He in all cases inspects it before putting it into use. In most cases our own safety standards are set higher than required by the state. The machines used by the division located in the maintenance department are equipped with the necessary safety guard, and the foreman of the department is held responsible for keeping this machinery and equipment in first-class and safe condition.

On all excavation work shoring is ruggedly constructed to reduce to a minimum accidents from cave-ins. Excavations are filled or covered as soon as possible after being opened. Rails and safety lights and signs are hung as becomes necessary in order to prevent the probability of anyone receiving injury due to the excavation.

No Accidents Happen to the Pipe Fitting Crew

Our pipe fitting crew consists of a group of men who have been with us a great many years and perform their work so well that our safety records for many years back do not show a single serious accident in this division. Their work covers all construction, maintenance and repair of the high pressure steam lines, air lines, water lines, gas, oil, fuel, and sewers and drains throughout the extensive plant. Their tools are controlled by the maintenance tool crib as previously mentioned; cribbing, etc., is done by the carpenter division. On all high pressure work and underground tunnel work where high pressure is on the line, the foreman always precedes his men and is present during important changes, repairs or alterations. All main line repairs are done with the utilities cut off and the valves locked. No one except the fitter crew is allowed to open or close a valve on a utility main, and all heat, radiators, blower systems, oil pumps, and equipment using high pressure steam or high pressure air are also under the control of this department. Great care is used in keeping the utility mains in good repair, it being realized that the slightest defect may quickly develop into a dangerous condition.

The plant operating crews of the various works are responsible for the operation and maintenance of the various power plants throughout the works. These plants contain high pressure steam boilers, steam engines, steam turbines. Diesel engines, hydraulic turbines, air compressure, and miscellaneous equipment, sufficient to care for all the utilities for shops employing approximately 6,000 men. Safety in operating the equipment rests directly on the shoulders of the engineers in charge.

Coal is delivered in hopper bottom cars and dumped directly where possible into the plant bunkers. Coal going into storage is unloaded with

oil engine locomotive cranes and rehandled to the plant bunkers with the same machines. Special care is exercised in this work, a safety car wrench being used for dumping the car bottoms. Great care is exercised when filling hoppers to prevent coal slides. Our practice of purchasing nut coal has assisted materially in lessening the hazards since we do not have the large frozen lumps to contend with as when burning screenings in winter. Coal is conveyed into the hoppers and fed by gravity to the stokers. Ashes are handled with a steam conveyor system, discharging them into a concrete hopper overhead and fed by gravity to steel cars and removed by locomotive.

Fuel oil is stored in underground tanks and pumped by electrically driven piston pumps through the circulating system which is buried underground, thus maintaining a constant pressure on all the burners throughout the plant and all of the auxiliary tanks at all times.

Boilers are operated by experienced men who are cautioned regarding the many hazards prevalent with this type of equipment. Boilers are all equipped with safety valves, safety plugs, stop valves, non-return valves, and drains in the main headers between the valves, to prevent steam or water injuring men who might be working in the boilers. Steam valves are operated only by the men who work on boiler equipment. Furnace work and stoking are carried on by this crew and the carpenter gang. Great care is exercised in erecting scaffolds and in tearing down and rebuilding the arches and sidewalls of furnaces.

Steel Runways, Railings and Toe Boards in Boiler Plant

Steel runways with railings and toe boards are located at convenient places throughout the boiler plant so the valves can be operated from them. Ladders leading to the top of the boilers and to the platforms are of permanent steel. Boilers are fully equipped with gauges and meters so that fire conditions, steam pressures, load requirements, water conditions, etc., are at all times known by the fireman so that the operation can be kept within safe limits.

The safety division is responsible for the safety appliances and the general safety of the entire works, both mechanical and educational. They make and apply most of the safety appliances. They have a small well-equipped shop with sufficient machines for building and repairing all of the guards used throughout the works. They test periodically all slings, both rope and chain, and no new lifting equipment can be put into use until after passing a series of rigid tests. Inspectors are at all times circulating throughout the plant, carefully checking not only for mechanical defects but for unsafe practices. All recommendations of the safety division are given first consideration and safety inspectors have the absolute power of stopping any machine or equipment found to be defective or in a dangerous condition until proper repairs are made.

Educational activities, such as the bulletin board, instruction of new men, compiling of statistics and records, issuing safety information to foremen and superintendents, investigation of accidents, etc., are carried out by this department, as well as the competition contests between the dif-

ferent factories, the departments of each factory and the foremen of each division.

The fact that the activities of this division are so broad and that they have the undisputed authority to compel safe equipment and practices, is a powerful factor in reducing accidents. Each workman throughout the plant seems to feel that to call any defect or unsafe practice to the attention of the safety division means that the hazard will be eliminated and a safe method substituted.

Our records for many years show that the maintenance department, one of the most hazardous divisions of the factory, has had one of the lowest severity and frequency rates of the entire organization. We believe that this is due to three factors: organization; placing of responsibility; and the type of personnel employed.

This is well, for the maintenance department must, of necessity, work in all departments of the factory and a safety and cooperative spirit shown by such a department can have only beneficial effect upon the organization as a whole.

Accident Rates in the Maintenance Department

CHAIRMAN DUNNEBACKE: Mr. Pease, you have certainly given us a very complete paper and I am sure that the Section gives you its full thanks. If you can run a maintenance department and keep your frequency under one-tenth as an average, over four years, you have accomplished something worth knowing about, especially when the average for the automotive industry is 1.06. You are to be congratulated.

If any of you have any problems on maintenance now is your chance. If he can keep his record down he must have some real dope.

MEMBER: I wish to ask whether your safety committee consists entirely of the safety department?

MR. PEASE: The safety engineer of the safety department and he or his representative, together with the various people concerned in safety work.

MR. THALNER: I listened to Mr. Pease's paper with a great deal of interest and he certainly has things sewed up there tight, and I think it would be interesting to know what percentage of the total people employed at his plant are millwrights and how their accident experience compares with the total experience of the plant. Have you those figures?

MR. PEASE: I don't have all of the data here. I do have the frequency rate, however, of our department compared with the total plant.

For 1922 the frequency rate of the maintenance department was 19.8 against 42 for the plant. In 1923 it was 18.5 for the maintenance department against 24 for the plant. In 1924 the maintenance department was 9.7 against 14.8 for the plant. In 1924 it was 12.8 against 20.8 for the plant. And in 1926 to date the maintenance department was 6.8 against 17.7 for the plant.

CHAIRMAN DUNNEBACKE: That shows that running through the years the maintenance department has been one of the safest in the whole

plant. It is far below the average in the plant, which I think is contrary to general experience. It has been my experience that the plant engineering department has a high severity and a high frequency rate.

Are there any other questions?

F. L. SMITH (National Carpet Company, Cleveland): I would like to ask what precautions they take in the care of ladders—that is, in the purchase and also in the maintenance. How do you arrange it? How do you check it and know what the inspection has brought forth?

MR. PEASE: The ladders are all purchased in accordance with standard specifications set by the safety department and when they are received they must pass through the safety department first. They can not be painted. The wood must be clear so that any defect would show and the ladders are usually placed with the two ends on supports and two men weighing about 200 pounds apiece stand on the middle of the ladder and jounce on it. That holds for all ladders that are received.

MR. SMITH: Also, how often do you inspect those ladders while they are in use?

Inspectors Are Circulating Through Plant Continually

MR. PEASE: The inspectors inspect them continually. They are circulating through the shop at all times and it is their habit to inspect every ladder as they walk past. They also go to the maintenance crib from time to time and inspect that.

CHAIRMAN DUNNEBACKE: When you see a defective ladder that you know needs repairing, do you put a tag on it or tell somebody to take it away?

MR. PEASE: The tag is put on and it is immediately removed to the salvage department for reconstruction.

MR. SMITH: You brought up the matter about points on ladders. Do you consider that a point is a good proposition on a concrete floor?

MR. PEASE: We have tried almost everything advocated and we believe a point is the best thing known yet.

MR. MILLER (Chevrolet): There is a question that wasn't touched on by Mr. Pease that is causing me quite a little bit of trial and tribulation and that is the trucks that are used within the plant as to whether they are considered as a part of the maintenance department and just the way they are handled as to care and operators.

MR. PEASE: The trucks are operated by men belonging to the individual departments. The maintenance of the equipment, however, is within the maintenance department.

MR. MILLER: Do you carry them as a part of your work?

MR. PEASE: That belongs to the shop department.

MR. MILLER: Is the employee considered as a part of your department?

MR. PEASE: He is under the supervision of the individual shop in which the truck operates.

W. A. BASON (American Radiator, Buffalo): I would like to ask Mr. Pease how they test the chain and chain locks?

MR. PEASE: They are tested twice yearly.

L. W. THOMPSON (Wagner Electric Company, St. Louis): It may be a little out of order but I would like to know if anyone has had any particular experience in controlling electric truck drivers throughout the plant?

MR. PEASE: Those men are entirely within the jurisdiction of the superintendent in the department in which they are working.

CHAIRMAN DUNNEBACKE: Has anybody else an answer to that question?

MR. THALNER: We are licensing every truck operator and every elevator and train operator in our plant. The man is sent from the employment department to the foreman to be tried as to capabilities for operating a truck. If he is O. K. he is asked to read the safety rules which are on a card. After he has read the safety rules and the foreman is assured that he understands them, the man signs the card acknowledging that he has read the rules and the foreman signs it and sends him back to the employment department. He is then hired and is sent to the safety division where he is given, after an examination on those rules, a regular operator's license similar to a state license which is issued by our secretary of state for driving cars. He is impressed at that time very thoroughly with the importance of operating his truck in a safe manner. In addition to that he is given a badge designating whether he is an electric truck operator or an elevator operator or a train operator. We hope that through the information we can give this man and with the supervision of the foreman we can eliminate the reckless truck driver, elevator operator and train operator.

Accidents Resulting from Truck Driving

CHAIRMAN DUNNEBACKE: This truck driving proposition should have your attention and serious thought. I am reviewing the accident experience of perhaps 60,000 men every month and I know there are an increasing number of accidents resulting from truck driving and that is something I would advise you to examine and study. Just last month one life was lost in our corporation when a man was driving a truck, turning his head half way around to see where he was going. He backed right through an elevator gate and went down one floor and was killed. If he had had his load ahead of him and was facing in the way he was going he could have seen the situation and he could have stepped off on the floor into safety.

Reckless truck driving is causing a great many accidents. Our efforts in the General Motors are to always drive with the load ahead and face the way you are going. That is the big rule in our company.

MR. SINNOTT: I would like to ask Mr. Pease who controls and how you do control the fusing of your plant, such as the fusing of motors?

MR. PEASE: The fusing of all motors is under the jurisdiction of the maintenance department and we have tried to set certain size motors for line shafting and certain size motors for other things, reducing the different types and sizes of motors to a minimum. The fuse blocks for each type motor are standardized as closely as possible and we try in every

case where it is possible to have a maintenance electrician to place the fuses. It is difficult to do that and sometimes others will do it and fuse too heavily but I don't know any other precautions we could take.

MR. SINNOTT: I mean when it comes to renewing fuses.

MR. PEASE: That is done through the maintenance department.

W. S. BASORE (American Radiator, Buffalo): Is it the practice in your plant for the electrician to be present and remove the fuses from the cutout box at all times and what does he do with those fuses?

MR. PEASE: Whenever any electrical work is done to remove the fuses we lock the box so they can not be replaced and he either lays them up or puts them in a bag or case.

MR. BASORE: Is he the only one who has the key?

MR. PEASE: He has his own personal lock.

J. MACKINNON (Ford Motor, Canada): I would like to know how he gets the workmen to use life belts on overhead work and if so how he gets them to wear them or makes sure they do wear them?

Overhead Work Is Done Only in Presence of Foreman

MR. PEASE: All overhead work is done only when the foreman is present. He is a man who has been in our employ for a good many years and he requires them to wear them. That is, we do not have crews go out promiscuously and take care of overhead work. It is only done when a well-trained foreman is present.

F. G. DEWEY (Remy Electric Company, Anderson, Indiana): I would like to ask Mr. Pease how he takes care of the flywheels on different presses when they are being repaired. Do you set them down alongside of the presses or do you dispose of them in some other way?

MR. PEASE: The machine itself is not to be used. If there is room they are taken out and laid down. If not, they are taken out entirely.

MR. DEWEY: What I have reference to is, when you are doing work on a shaft and it is necessary to remove the flywheel. Do you set it down alongside of the press and tie it with a chain or something of that sort or have you something to keep it from slipping or falling over?

MR. PEASE: It is not our practice to tie it. It is just laid down out of the way. It is laid down flat so it will not fall over.

MR. SINNOTT: I would like to ask what control you have over rope blocks and rope falls? Also what kind of sling you use when you throw over a truss hook and block or chain fall over it?

MR. PEASE: Most of the slings are rope. We have some steel wire and some chain. It depends upon the job.

MR. SINNOTT: Do you think it is a good practice to use a rope sling over a truss?

MR. PEASE: No, a steel wire is better or a chain.

MR. SINNOTT: What control do you have over the block and falls, I mean the testing rope and the testing block?

MR. PEASE: Those are done by the safety department. We do not do that in the maintenance department.

MR. SINNOTT: I ran into a double block and falls. The thing was only three days old and it had only lifted 1,250 pounds. The thing went bad on about a 10 horse power motor. On the inside, where the pin goes through, the shive was all torn to pieces. What caused it I don't know. I do know that block, to my knowledge, hadn't lifted any more than 1,250 pounds in a three-quarter lineup.

I say those things should be looked after and tested more rigidly than they are. Every Tom, Dick and Harry wants to borrow it and takes it out in the yard and you don't know what becomes of it. You don't know whether he strained the rope or bent the pin that goes through or not.

CHAIRMAN DUNNEBACKE: Are there any other questions concerning this paper? If not, we have some time left and I am going to turn it over for general discussion. There isn't a man here who hasn't come here with some particular question in mind or some particular point he wants straightened out. Likewise, there is no man in this room who, during the course of his work, did not develop some particular kink or some particular stunt which is outstanding in his safety work during the year or who has not done something better than he did before which has been a big help in his accident prevention work.

During the balance of the time this morning I want you fellows to ask questions, whether they are on the subjects which have been presented this morning or not, and if you have developed something you feel would be of interest to the rest of the fellows, get up and tell us about it. That is all these meetings are; they are the clearing houses of safety experience.

Protecting the Plant from the Careless Truck Driver

C. S. WINGERTER (Reo Motor Car Co., Lansing, Michigan): I would like to find out about the setting of machines. Is there no state law on that? I would like to find out how you handle that. Just what is the clearance and the distance?

CHAIRMAN DUNNEBACKE: Has anybody made a standardized rule on that?

What type of machines?

MR. WINGERTER: Mostly screw machines and automatic machines.

MR. BASORE: We allow two feet on lathes, presses, automatic screw cutting machines, etc. That is our practice.

H. L. JOHNSON (Baldwin Chain & Manufacturing Co., Worcester, Mass.): There is one point I would like to hand out as a method of protecting yourself in a measure against employing careless truck drivers for the plant and for motor trucks on the streets by cooperation with your local council. We have found that it works out very well in Worcester to inform the council of the record—that is the safety record of the truck driver. If a truck driver gets through, you report that to the Safety Council, if he was discharged for being an unsafe operator. The truck

drivers know that is being done and it has a very good influence on them. It is very beneficial, I think, in getting safe operators on trucks.

CHAIRMAN DUNNEBACKE: I might mention a certain accident which happened in our corporation because possibly some of you are not aware of this hazard. We had a case where we had a 10,000 gallon gasoline tank underground. We raised it up and emptied it and moved it over 500 feet by rolling it over the ground. There were four openings in that and the holes were about two and one-half inches. It laid on top of the ground six weeks and then it was filled to overflowing with water. There was a leak noticed on the outside of that and so the water was pumped out and an air hose was put in there for two hours. Then the welding crew came on the job and four minutes after that oxy-acetylene flame was put on the outside, the tank let go and killed two men and pretty nearly killed a third.

There is a great hazard in using these tanks if any kind of explosive mixture or liquid has been in them. You can't be too careful in handling or repairing them.

MEMBER: Was there any pressure there?

CHAIRMAN DUNNEBACKE: There was no pressure. The welding was being done from the outside.

MR. ADERBURG: I would like to know what the men here are using for marking aisles that lasts longer than paint?

A. W. DAHLSTROM (Metallic Door): For a number of years we have used the painted lines to designate the aisles in a plant. We are now considering using the metal washer or tag to replace a white line.

CHAIRMAN DUNNEBACKE: Mr. Reamer, what do you use for outlining floor lines?

S. H. REAMER (Cadillac): We don't do the painting altogether. We are using a large headed tack. On all wooden floors that is working out in the best way I know today. We tried metal strips and the result of that is that we have to remake them quite often but with the large head tack we have never noticed one where it is pulled up. We are very well satisfied and well sold on them.

MR. DOHERTY (Franklin): How far apart do you place the tacks?

MR. REAMER: About two inches. We made a double row so it shows up in good shape. We did experiment with a copper tack and we thought that could be polished more but just a common tack is all you need.

ADJOURNMENT

THURSDAY MORNING SESSION

October 28, 1926

A. F. DUNNEBACKE, Chairman
General Motors Corporation, Detroit, Mich.

The Thursday morning meeting convened at 9:45 o'clock, Mr. A. F. Dunnebacke, presiding.

CHAIRMAN DUNNEBACKE: As I told you yesterday, I think it is a good thing for us to get acquainted with the new officers, who are to run the Section for the coming year. I am therefore going to turn the session over to Mr. Arthur M. Williams of the Chrysler Motor Corporation. Mr. Williams was promoted from the secretaryship to the vice-chairmanship.

(Mr. A. M. Williams took the chair amid applause.)

CHAIRMAN WILLIAMS: Gentlemen, after the banquet last night naturally it is a wee bit late when we are getting started and to get through promptly we will have to cut out a lot of underbrush and commence to saw wood.

We are fortunate in having for our speaker on assembly hazards this morning a man who has gone as far in it as any other man in the country and he is well qualified to cover the subject. I am gratified to know that he is not only going to give it to us verbally but he is also going to show us some slides.

It is with pleasure that I introduce our friend Dutch Thalner of the Buick.

THE HAZARDS OF ASSEMBLY

R. F. Thalner, Safety Director, Buick Motor Company, Detroit, Mich.

The subject assigned to me will be treated in this paper from the time the stock is completely machined until it arrives at and passes through the assembly plant. Before going into any part of the subject it will probably be well to review statistics showing causes of accidents in assembly plants. It is necessary for me in giving this information to make a personal reference since my work is for the Buick Motor Company. I hope that you will pardon this personal reference and feel that although it shows the experience of only one plant it nevertheless gives a cross section of assembly plants in general.

Going back over our experience for the past nine months, during the time the present assembly plant has been in operation, statistics show that although the assembly plant employed 9 7/10 per cent of the men in the entire factory, it had only six per cent of the total lost time accidents and only two per cent of the total days lost as a result of accidents, these days being figured according to the standard table of equivalents.

On the face of it, this shows that the hazard in the assembly plant is not as great as it is in other units, such as sheet metal, foundry, wood-working, drop forge, etc., and I believe that this information is substantiated by the rates given in the Insurance Manual.

Analyzing the accidents which have happened in the assembly plant over this same period, we find that the biggest toll comes under the classification of hand labor, while second place goes to vehicles and third place to falling objects. Out of a total of 903 days lost for the nine months, 351, or a little better than one-third, were caused by hand labor, 276 by vehicles and 108 by falling objects. The other causes of accidents can be included under the remaining classifications, such as grinding and polishing, hoisting apparatus, hot substances and flames, hand tools, stepping on objects, falls of persons, and power presses.

Among some of the more common accident causes in an assembly plant are such things as being caught between chassis and cars, dropping material, slipping on floors, feet run over with truck wheels, closing car doors on fingers and many other minor lacerations and bruises, developed in the course of using wrenches, hammers and tools.

With this insight into causes of accidents we can pass to the specific hazards which may be looked for in an assembly plant, and to properly present them the following procedure, taking the product from the machine through its various processes, will be followed:

A. Transportation from Machine Shop to Assembly Plant.

1. Hand trucks.
2. Gasoline trucks.
3. Electric trucks.
4. Gas or electric tow motor trains.
5. Conveyor propelled trucks.
6. Conveyors.
7. Railroads.

B. Storage at Assembly Plant.

1. Order of assembly.
2. Proper storing space.
3. Housekeeping.

C. Sub-Assembly.

1. Adjacent buildings.
 - (a) Stock distribution by hand trucks, conveyors or gravity feeds.
2. Balconies—in main building.
 - (a) Stock distribution by gravity chute feeds and conveyors.
 - (b) Properly railed sides and openings.
3. Within assembly building—main floor.
 - (a) Frames—rivetting, ventilation, furnaces, and hammers.

D. Assembly Proper.

1. Conveyor line.

- (a) Chain.
- (b) Motive power.
- (c) Stop buttons.
- 2. Appurtenances to conveyor line.
 - (a) Frames—rivetting, ventilation, furnaces, and hammers.
 - (b) Cables and their inspection.
 - (c) Lighting.
 - (d) Stock bins for small parts.
 - (e) Belt and gear guards.
 - (f) Steaming room.
 - (g) Painting and drying.
 - (h) Sub-conveyors.
 - (i) Hoists.
 - (j) Pit work.
 - (k) Punches, drifts and chisels.
- E. Inspecting, Driving and Storing.
 - 1. Clearance between cars.
 - 2. Good drivers.
 - 3. Draining radiators.
- F. Loading and Shipping.
 - 1. Inside premises.
 - 2. Outside premises.
 - 3. Driveaways.

Under the heading of "transportation" we must consider the various methods of moving the stock from one plant to another. The one in which hand trucks are used brings into play the human factor more than any of the other methods because more men must be employed to carry out the trucking and consequently there is the possibility of having a greater number of accidents due to hand labor.

Devices on hand trucks can be used to eliminate certain accidents. For instance, when a hand truck is being used barrels and boxes are liable to slip out from under the load and cause injury to a man. That has been eliminated by the use of a brake on the axle. A man simply steps on a pedal under the truck and the brake is slammed on the wheels so they are pivoted fast to the floor while the load is being transferred from the load to the hand truck.

With the use of gasoline trucks more material can be transported under the direct supervision of one man, thereby eliminating a good deal of the hazard caused in handling individual trucks, but a hazard is introduced in the loading and unloading of the stock on the various large trucks. This, of course, can be curbed by use of the proper appliances such as individual electric motor or gas driven trucks.

You can use hand labor methods if necessary to get your stock off of the truck. You can roll it out on large trucks, on individual trucks, and you can use power methods, cranes and hoists. You can use electric trucks or gas motor driven trucks. Each, of course, has its individual hazards which will be treated later, but with regard to hand trucks the

gasoline truck eliminates the larger percentage of accidents which occur as a result of hand labor.

Another hazard entering into this type of transportation is that caused by congesting your plant highway with large trucks. If these trucks must use public highways there is the added hazard of meeting with public highway traffic condition and the hazards incident to that operation.

The use of electric trucks for transporting stock is somewhat similar to the hand truck proposition because a man must be employed on every truck to handle it although he is able to handle larger loads much more easily. He must necessarily be a very careful driver because serious injury always results in electric truck accidents.

The system of using gas or electric tow motor trains eliminates any of the undesirable features of the hand trucks, the gasoline trucks and individually driven electric trucks. The stock is loaded into trucks and trailers at the place it is finished, and these trailers couple together to form one long train. The entire train is then hauled to destination in the assembly plant where the stock can be fed to the line with very little handling. This undoubtedly has proven to be as satisfactory a method as any yet employed, but there are hazards entering into this particular type of transportation which must be guarded against.

Conveyor Propelled Trucks Can Be Used Advantageously

The method of holding the stock in its proper place while being transported and also the proper safety locking devices for the couplings between trailers should be given serious consideration. In making the trip from the plant where product is manufactured to the assembly plant there undoubtedly are curves and inclines as well as level pavement which must be negotiated; and it is for the double purpose of protecting the stock as well as life and limb that every precaution should be taken to keep this train intact until it arrives at its destination. It is just as important that this train have couplings that are safe going up or down hill and around curves as it is for a string of box cars to be properly hooked together.

Conveyor propelled trucks can be used advantageously where short hauls are required from one plant to another. The stock can be loaded on a truck and set over the conveyor and forgotten until the conveyor has drawn it to the other end where it can be placed in storage. This type of transportation can be used on the level or on inclines.

It is especially adapted for using trucks; for instance, in taking stock from the enamel plant to the assembly line your fenders must be put on racks and kept apart from each other so there is no scratching or damaging. Where you have a number of pieces and the load is light the men can handle the truck at each end, you don't need any power device, and it just resolves into taking the truck which is loaded with fenders, running it over to the conveyor and as the dog comes along it catches underneath the truck and takes it to its destination.

Probably the most efficient and safest method, providing the equipment is properly installed, in transporting stock is the conveyor which merely requires attention at the loading and unloading ends. The use of a conveyor eliminates to the highest degree possible the human factor because in the entire process of transportation the only help required is that which must feed the conveyor and that which must remove the stock when it has reached the assembly line. There is some additional help which must be employed to maintain the equipment but this is usually of a higher caliber than ordinary labor and consequently can be relied upon to protect itself. Proper mechanical safeguards over gears, chains and belts, as well as a number of stop stations along the conveyor, will make this equipment almost fool proof.

Although the conveyor does minimize frequency rate or number of accidents it does bring with its installation the possibility of what we may term higher severity rate. For instance, where 10 or 15 men are handling hand trucks and may have a number of scratches and bruises of minor nature, one accident on a conveyor being more severe usually results in a broken arm, leg or possibly death, and consequently with the installation of it should go every safety appliance which is deemed necessary for efficient and safe operation.

These buttons should be arranged so that when the conveyor is shut off at a certain point it can not be started except at that point.

Problems in Storing of Materials

The use of railroads for short inter-building hauls brings into play all the hazards common to railroad work and in addition those which are always present with hand labor methods, because a certain amount of the latter must be used in loading and unloading the cars.

In storing material at the assembly plant particular attention should be paid to the order of assembly, amount of storage space and housekeeping. Keeping the stock routed in orderly fashion of course eliminates confusion and resulting accidents. Keeping the proper amount of working space makes it possible for those who must handle material by hand trucks to eliminate conditions which cause accidents. Housekeeping, or the work of keeping storage rooms in neat and orderly fashion at all times, plays a very important part in the elimination of accidents, as you all know. A well arranged shop does not present tripping hazards or the other possibilities which go with the shop which is kept in a disorderly fashion, and consequently the housekeeping part of storage room work eliminates many unnecessary accidents.

Storage, therefore, is not and should not be a big problem as far as being hazardous is concerned if the proper attention is given to the three items just mentioned.

In every assembly plant there is a good deal of sub-assembly work which is done before the parts reach the final assembly line, and this in turn has been divided under three buildings. The hazards coincident with sub-assembly are similar to those of final assembly and consequently will

be treated under the heading. The method of distributing the stock differs with each type of assembly. For adjacent buildings stock can be distributed by hand trucks, conveyors, or gravity chute feeds. The hazards of hand trucks and conveyors have been discussed. Gravity chute feeds must be carefully constructed to be sure that men who are taking the stock from them will not be injured while doing so. This can be accomplished by lining the chutes with material which will decelerate the speed of the moving stock or by putting in long planks to act as a brake on the material as it comes down the chute so that by the time it reaches the bottom its speed and danger have been minimized.

Using Balconies for Sub-Assembly

I don't know whether I have drawn the picture clearly there with regard to those chutes but in assembling from a balcony going across your plant over the line you can feed your stock through these chutes just due to the force of gravity. You can make them curve this way or you can make them go straight. The thing to watch there is to be sure that the stock in coming down the chute doesn't interfere with the man who reaches in to get it.

The plank I have reference to is nothing more than a plank 12 feet long which is pivoted about half way up the chute and as the stock comes down the chute strikes the plank and the weight of the plank on the stock reduces the speed of the stock so that it barely falls out as it comes through and the danger of speed is gone.

In using balconies for sub-assembly the same methods apply as formerly referred to. In addition the balconies must be properly protected with railings, screening and toe boards so that no stock can be kicked or pushed on the workmen below. Openings in the floors of these balconies should all be protected in a similar manner.

Sub-assembly within the assembly building and on the main floor is probably only done at the first end of the line, as for example the rivetting of the various brackets and hangers on the frame. The process of rivetting calls for the use of furnaces to heat rivets and the individual furnaces should be equipped with the proper ventilation stacks to carry off fumes produced as a result of the heating process. Trucks used to carry the frames while the work is being done should be so constructed that there is no possibility of the frame slipping off, and also so that it can be handled speedily after it has left the rivetting gang. Rivet sets and hammers should be kept in first class condition and safety collars provided on hammers.

The assembly proper has a number of hazards connected with it. First of all let us treat the conveyor line alone. The frame work supporting the chain should be covered the entire length on both sides so that men who work on the line can not get their feet caught in the chain; an accident of this nature always involves the loss of toes or feet or possibly part of a leg. The motive power for the entire conveyor should be completely inclosed not only from a safety standpoint but also from a pro-

duction standpoint. You realize what it means to hold up a conveyor line in an automobile factory for 30 minutes or even less, and with this end in view you can realize the importance of eliminating any possibility of damage to the motive power. A nut, bolt or any foreign body which might fall into the open gears of the conveyor would of course immediately disrupt the operation of the entire working force and cause an immediate shut down. A shut down of the assembly conveyor in turn checks the use of the stock, seriously handicapping every operation. Men getting caught in the conveyor at this point are always seriously injured. It is therefore the best thing from both safety and production standpoints to entirely inclose the mechanism which operates the conveyor.

Stop buttons should be placed along the line at various intervals and also one at each end to enable the conveyor to be shut down at a moment's notice if it becomes necessary. If a man is caught in it or if something goes wrong mechanically there should be enough stations so that too much time is not lost in trying to shut it down and the switches should be so arranged that it can only be started again from the point at which it was shut down. This can be accomplished by means of a board with lights in which each light shows up the point at which the conveyor was closed down. This will enable those who shut it down to start it again when they are ready and will eliminate the possibility of having anyone injured by having it started from some other button.

Hazards of Appurtenances to a Conveyor Line

The appurtenances to a conveyor line all have hazards to some degree. The installation of air or electric motors to do the various operations in connection with assembly work must all have counterweights so that they can be temporarily raised out of working position when not in use. These counterweights should either have safety chains attached to them or should operate in a specially constructed guard so that they can not strike men working on or about the line when they are lowered. One good method is to house a number of counterweights in one central place and then have access to the compartment by means of a door when it is necessary to change cables.

Steel cables should be used between the counterweight and the device they are holding instead of ropes because rope will not stand up under the severe usage which it is put to. The cables used for this work should be frequently inspected for wear and replaced whenever it becomes necessary.

Good lighting is a prime requisite for any assembly line and is the means of preventing accidents which occur to men on account of being unable to see their work. The arrangement of stock bins for small parts such as bolts, washers and nuts not only expedites the operation but also promotes good housekeeping and eliminates the accident maker which is always present in untidy shops. Belts and gears should be covered on any special machinery which is used such as paint pumps, motors operating blowers, grinding wheels, and so forth.

The steaming room probably has one bad hazard, that being the danger

of pieces which are blown off of the chassis flying and striking the steamer in the eye. Inasmuch as this man is working in a very warm room the ordinary glass goggle can not be used because it fogs up and in its stead a screen goggle has been very satisfactorily put into use.

The steaming room is a room where the chassis passes through and at that point there is a man who cleans the chassis thoroughly before it goes into the paint room. We call them rooms but they are nothing but compartments built over the line. The hazard there is the flying-particle hazard.

The hazard of painting brings with it the possibility of lead poisoning if the fumes are not properly controlled and directed. A first class ventilation system, preferably under the line, suffices to take off excessive fumes and any paint which goes past the chassis. Respirators may be worn if necessary but probably would not have to be used with a first class ventilation system.

The use of sub-conveyors feeding the main conveyor brings in, of course, the same hazards which have been mentioned heretofore and the same methods of correction can be applied.

Inspection of Hoist Cables Should Be Made Frequently

The use of hoists in bringing stock to the assembly line usually brings with it hazards which often result in very serious accidents. The cables used on such hoists should be frequently inspected and replaced whenever there are any signs of wear, and the hooks or chains must also be given very careful examinations. Men must not be permitted to stand under the loads, such as motors, because a failure of any part of the hoist mechanism would result in a very severe accident.

The use of pits brings in a hazard which can easily be rectified by placing guide rails along the sides of the pit to guide the car as it rolls along. If the guide rail was not installed there would be the possibility of having one of the wheels drop into the open pit and severely injure men who are working there.

Punches, drifts and chisels as well as other hand tools must be inspected constantly to see that they are not being used with mushroomed heads and men who use grinders to dress them down should be required to wear goggles while doing this work.

Inspecting, driving and storing the cars does not bring into play many hazards. Attention should be given to see that the proper clearance is maintained between car lines so that men passing to and fro will not be caught between them and a good deal of attention should be given to drivers and their driving methods. Fooling and stunt driving on the part of these men have caused serious trouble in the past and of course can only be eliminated through strict supervision. Exhaust gases from the cars can be deflected or taken out of the room with suction systems so that the unpleasantness caused by the gas in the room is removed.

In storing the cars before shipping one hazard manifests itself probably above any others and that is the one due to draining the automobile

radiators. If not properly constructed a leak might not appear in condition can arise, especially in the winter months when an ice flow will cause broken arms and even more serious injury. This condition can be rectified by localizing that particular operation and one of the points supplying the proper apparatus for carrying away the water so that it is confined to a definite path of travel. It is even possible to run the car on a conveyor and have it drained while it is being conveyed over a certain area.

The problem of loading and shipping has been divided into three parts—that inside of the plant, that outside and that of drive-away cars. Within the plant we have only local conditions to contend with such as driving out of the store room onto the dock where the car is loaded, but in using a dock which is removed from your premises the car is usually driven to this dock over public highways. You then meet with the possibility of highway accidents such as will either damage the car, cause property damage or personal damage outside of your own plant. These conditions of course always give rise to damage suits if your driver is at fault, and consequently the entire situation rests with the proper supervision over these men to see that while they are handling your property on the street they do so in as careful a manner as possible, never exceeding their rights and always being sure that even if they have the right of way they should be sure they do not figure in any accident as a result of trying to assert that right.

Hazards About Railway Cars in the Yards

With regard to loading these cars the same conditions exist at both places. Cleaning of railroad cars used for transporting automobiles carries with it the hazard of removing nails and steel straps from the floor. The use of goggles or specially constructed tools for pulling nails will eliminate the eye hazard which is very serious. The material removed from the cars should be piled in a certain place along the track and picked up by the salvage department as soon as possible, so that men walking between the tracks will not step on any protruding nails or stumble over piles of lumber. Special care should be taken to see that these cars are not molested by freight engines bumping into them while men are working in them, and this can be accomplished either by means of derails or warning signal bells the length of the dock.

There is also the hazard of a man being squeezed between the automobiles and the car. The use of individual tracks under each wheel greatly facilitates the operation of putting an automobile into a box car and should be employed whenever possible because the easy handling of the object is the thing that eventually will eliminate any accidents from that source. After the automobile is in the car another hazard arises—that of nailing the blocks or straps which keep the automobile in place. This involves an eye hazard and can be corrected through either of two methods. One is the use of goggles and the other is use of specially constructed hammers known as the "Bullseye" hammer, which eliminates the possibility of nails which have been struck a glancing blow, from

flying. The use of this special hammer has proved that the principle upon which it is constructed is correct because no injuries have been reported with it on the job.

Another hazard which enters into the nailing work and possibly is sometimes overlooked until it causes nails to fly is that of having the wooden blocks, if such are used, stand out during the winter and become frozen. On account of being frozen, a nail presumably fast only penetrates the wood a very little, so that when struck a hard glancing blow it will always free itself and fly into the air, in many cases finding for its objective the eyeball of an employee. Blocks should therefore be installed in a place warm enough to eliminate this freezing condition.

Experience With the Bull's Eye Hammer

MR. MILLER (Chevrolet): I would like to ask Mr. Thalner what kind of a brake it was that he spoke about?

MR. THALNER: I am not thoroughly familiar with the operation of that brake but as I understand it from our maintenance department the brake will operate directly on the chain. For instance, we will just presume this is the chain coming along on the rails. The brake operates against the shoe and it is operated through a lever automatically from the pulling end of the conveyor so that the minute any speeding up occurs in the motor or the bull gear the governor balls fly out and apply this brake through an automatic mechanism. That just clamps against your chain and holds your load.

E. R. COMPLIN (Ford Motor Co., Canada): When you were speaking about the blocking in freight cars you said there were two safety devices, the bull's eye hammer or goggles. We have had a case where a nail has glanced off a bull's eye hammer and struck the goggles of a man and smashed those goggles. Undoubtedly the goggles saved his eye. He was using a mushroomed hammer.

We have had other cases where the nails have not actually struck the man but they have glanced from the tip of the hammer. Therefore, I would say the men should use the bull's eye hammer and goggles.

There was another point in speaking about safety stops on conveyors. It occurs to me that if you have that button stop on a long conveyor you have to have quite a number of them. If anything happens a man is going to be in a hurry to reach those buttons and he is going to make a dive for that button and possibly might slip and fall, or two of them are going to dive for the button at the same time and they will collide. Would it not be better to have a safety cord running the full length of the conveyor, handy to every man, with a locking device on the motor switch so that the motor can not be started again unless from the motor?

MR. THALNER: No, we haven't. I hadn't thought of this safety cord proposition. That runs 3,600 feet and it would be quite a lengthy arrangement. We have those stop buttons all along the side wall of this conveyor and the conveyor is floored the complete length of it so a man can get to it quickly. But the point you raise might be well taken.

With regard to the bull's eye hammer, I am glad to learn of the incident you have had and I wonder if anybody else using a bull's eye hammer has ever had any trouble with it?

MR. DUNNEBACKE: We had an accident resulting from a nail flying when a bull's eye hammer was being used but we still feel that it saves so many nails from flying that we advocate its use.

MR. HARNESS (Reo Motor): About a year ago we inaugurated the use of that hammer. It has reduced our accidents 75 per cent. We haven't had a lost time accident since we inaugurated that hammer.

MR. KNOWLTON (Chrysler): We inaugurated that hammer and have been using it for the past two years. There are two types of hammer—one with the bell face and the other with straight face. We found that those with the bell face chip off.

MR. THALNER: We had that same trouble. If you do go into that hammer proposition you want to be exceedingly careful that you get a hammer in which the sides are at right angles to the face. On the first hammer we had the side was beveled in so that by the time you got within a quarter of an inch back on this surface a direct line on the outside groove would chip at that point. You see you had no support farther than a quarter of an inch.

You also want to be careful that the outside groove is not too close to the outside because you can easily see that if you haven't the support to hold the nail the hammer will chip anyhow.

A System to Avoid the Hazard of Flying Nails

J. MACKINNON (Ford Motor, Ontario): Mr. Thalner spoke about the blocks used for getting nails out. To eliminate that we have made a practice of having all the nails started before they go into the cars. We have a little assembly room where those blocks are cut to size and standardized and we have men handle them and they are all ready for driving the nails in the blocks.

MR. THALNER: That is very good. The reason I raised that point is that we have a machine which enters (I think) three or four nails at the same time. The block is merely placed in a machine and by tipping the treadle three nails are entered into the block and then the block is sent out to the plant. That works all right and the machine is O. K. if the blocks aren't frozen and if the wood is soft; but when the blocks are frozen the machine doesn't function as well, and that is where we had trouble.

MR. LYONS (Studebaker): Just to satisfy myself, I want to know how many of the automotive people are using the bull's eye hammer. Is there any way we can get an expression on that?

CHAIRMAN WILLIAMS: Will those who are using it raise their hands?
(Twelve hands were raised.)

CHAIRMAN WILLIAMS: Now those who are not.
(Fifteen hands were raised.)

CHAIRMAN WILLIAMS: Might I add something? During the last six months we have had one eye case where the man was using one of these hammers. Possibly we have been a little bit quick at Chrysler's to criticize this particular tool and I appreciate the suggestion that Dutch has given us. I think we will go into that further before we finally say that they are no good.

MR. BARRY (U. S. Company): I know the rope just mentioned would operate 1,800 and 2,000 feet because I have seen it operate on very heavy calendar rolls where the hazards are just the same.

CHAIRMAN WILLIAMS: On rope trip lines over conveyors?

MR. BARRY: Over a small pulley.

CHAIRMAN WILLIAMS: There is only one thought there. It seems on the face to be very good. On a rope trip line where the conveyer line is 1,600 feet long, if some one down that line stops the conveyer in an emergency, who starts it?

MR. BARRY: He starts it.

CHAIRMAN WILLIAMS: Does every man on that job understand that it can only be started by the man who stopped it?

No One But the Foreman Can Start the Conveyor Line

MR. BARRY: The foreman is the man who carries the key and the foreman must actually start it.

CHAIRMAN WILLIAMS: Must he cover that line to find out why it was stopped? Must he go over the 1,600 feet to find that out?

MR. BARRY: He did in the rubber mill I was connected with.

CHAIRMAN WILLIAMS: And found out the condition that caused the stoppage and had it corrected and then everyone was in the clear ready to start it?

MR. BARRY: That was done.

A. J. DUDGEON (Ford Motor, Canada): Why can't that be put in sections?

MR. BIDDENCAMP (Metropolitan Casualty and Insurance Co., Chicago): The advantage of having those cords in sections would be that in the event of accident a man wouldn't waste any time in getting to that button. That is the advantage of the long rope, but by putting it in sections you would be immediately able to locate where the damage was and you wouldn't have to go over the whole line.

CHAIRMAN WILLIAMS: You would have that red light and the foreman of that particular sub-assembly or part of the main assembly would be able to start it.

MR. BIDDENCAMP: It is a great factor to have available when an emergency arises and the quicker you can get to the thing the better. There are 10 buttons, I believe, according to this paper, and there is a distance of 360 feet between the buttons. That is too much in an emergency.

MR. THALNER: With the use of a rope between the buttons, would

that encourage the fellows to fool with it? Has anybody had any experience along that line?

MR. MITCHELL (Chrysler): I have had that experience with rope between buttons. We had that in the Dodge Company while I was connected with it. We used a rope running to the button. Evidently any little particle might catch on that conveyor and someone could come along with a handle and catch that rope and the conveyor would be stopped. That is the trouble you run up against.

CHAIRMAN WILLIAMS: Where did you have the rope—where you had to get up on something to use it or was it down low?

MR. MITCHELL: It was down below in the channel.

CHAIRMAN WILLIAMS: Wouldn't it be well to have that so the man would have to step up to get it, say, up about eight feet?

MR. MITCHELL: You might take care of it that way if you had the room but we couldn't do it at that time.

MR. GRAVES (Michigan Mutual): Mr. Thalner has given us a very fine paper and covered the ground very thoroughly. There is one point he spoke of that I think needs a little emphasis. He spoke of closing the driving mechanism of the motor driven car conveyors. That is most always done when the driving mechanism is located down on the floor near where a man is passing, but the plants quite often take the view that that closure is not needed if the motor is up in some place out of the way. We have paid a good many claims in cases that have occurred on the isolated driving mechanism.

The Problem of Monoxide Gas from Plant Trucks

F. G. DEWEY (Remy Electric, Anderson, Indiana): I would like to ask Mr. Thalner if he has any trouble with the monoxide gas when using gasoline trucks, that is, complaints from the drivers in the factory during the winter months on small gasoline trucks as substitute for electric trucks?

MR. THALNER: We don't have many of them. The only place we used them is where I showed you for conveying motors and the ventilation condition there is in rather good shape because the doors are open and you have access to the outside air, but we use the electric truck mostly. Of course on our tow motor trains traveling from one factory to another the motor is not constantly in the shop. It is just in with its load and out and there is enough ventilation in the shop to take care of that. There are openings in the assembly line building, which is a very large building and well ventilated, to take care of all of the objectionable fumes.

CHAIRMAN WILLIAMS: Are there any others who have had trouble with monoxide gas?

There is a little picture I always carry in my mind of just how we fellows in the industrial safety work came into our jobs, how industrial safety had its beginning. About 15 years ago when it was started the insurance companies and others naturally thought, here is a problem

that is a good deal like fire prevention. The companies carrying fire insurance naturally entered this field, and in creating a new department to cover it selected a man possibly with fire insurance experience or rather insurance company experience. They had found through experience that a practical fire man was able to go through a plant and indicate certain fire hazards that could be cleaned up and eradicated and the risk improved; logically therefore they decided they could take an industry, clean it up from the mechanical standpoint and do the same thing in preventing industrial accidents that we have done in preventing fires.

I think we have accomplished a lot and we fellows have been working to quite an extent in this direction. We have gone far enough with it I believe so that now most of us realize that we can prevent at best only about 15 or 20 per cent of the accidents we are meeting with by still greater efforts along the mechanical lines.

The Big Job Is in Controlling the Human Equation

The big job, the big leak in this ship we are dealing with, is in the human equation, it is on the human side of it. We are just realizing that we are bringing men together in large masses for the production of economic goods, supplying our economic wants, bringing them together in a new environment with which they are not familiar. They have never worked under these conditions before in past generations. They haven't a thing that they have inherited in their makeup that teaches them that punch presses are as vicious as rattlesnakes. But there is something they have inherited that tells them that in a rattlesnake there is danger. Even the child who has never seen one before naturally keeps himself in the clear but the same child will walk up to a punch press and start to operate it and lose his fingers. He will do the same thing in the wood mill or in the thousand and one corners of our plants.

What nature has failed to do by giving this man a natural warning of danger in his new congested environment, we must supply in an educational way and it is up to each one of us, as we find ourselves trying to analyze, trying to clean up this job of safety, to gradually, as we can, broaden from the mere mechanical side of it over to the educational angles of it, to adjust ourselves, to adapt ourselves to the new wants in the safety field.

Therefore we have given this matter a place on this program today. It is not much in the point of time allotted, but I think the time will come when we will give it perhaps more than half of our program; that is something we will have to grow to as we can.

We have brought to you to cover this one section of the program one of the men skilled and trained in the best methods of getting information across to people. It is with pleasure that I introduce Professor Allen B. Forsberg of our State College.

SAFETY EDUCATION OF THE NEW EMPLOYEE

Prof. Allen B. Forsberg, Michigan State College, East Lansing, Mich.

It is a great privilege to discuss this subject with you—I say particularly to discuss it with you because of the importance that I attribute to this body. In my way of thinking there is no group in this country, there is no single group other than the labor managers in this capitalist civilization of ours, that can do more to destroy, that can do more to tear down those things that this capitalist civilization has given us the opportunity to take advantage of. On the other hand, there is no single group that can do more good in upbuilding and solidifying and coordinating various forces and conditions we have.

This organization, as has been stated by your chairman, is now 15 years old. Starting immediately after and in some cases a little before the enactment of certain accident compensation laws, it has reached wonderful proportions, but the labor managers in this industry, moved by this economic motive, have accomplished a great deal in changing certain trends that were undermining this civilization.

It was very easy work for the organizer or the agitator a few years ago to look over just a few industries in any locality and he could pick on his fingers at least 10 illustrations where the widow and the orphan had not gotten a square deal because of the hurry, because of the neglect of the human element, in that industry or establishment and great suffering resulted. We were supplying the agitator with all of the material that he needed to make a most vivid and destructive story. Today it is different. Wonderful changes have been accomplished. The best talent in the country has been concentrated upon accident prevention.

Unlike the European method of attacking a problem, concentrating attention upon relief, in America we have been concentrating attention on prevention. I believe that with the other hazards in industry outside of just accidents that cost the average worker something like three days of wages, we will probably be attacking other big risks to which the worker is exposed in industry that cost him in excess of 60 days' wages.

I have been asked to talk to you upon the new worker, the new employee. As I see it, it seems to be primarily a problem of adjusting a new man. He has been unemployed. He comes to you for a job. Picture, if you will, the state of mind of the new employee coming into the organization. He has a job now. The dominant appeal, it seems, that can be made would be one that would be tied up closely to that thought of insecurity because he has been unemployed. He has a job. It seems that safety directors have been very clever in capitalizing on that situation by tying up any of their appeals to security.

Census has been taken in industries to find out what are the appeals that move men most. It is the security of the job that has the biggest appeal. So in your bulletins, in your plant propaganda and educational program and disciplinary problems, security is the appeal that seems to

take most. As for the size of this problem of inducting a worker into the new atmosphere—selling him, you might say, the company and the company's labor policy in all its ramifications—of course, that is the bigger problem in industrial concerns where the turnover is high.

The ideal situation would be to stop on the exits instead of concentrating on the entrance, to try and have fewer men come into the organization by cutting down the number of men who leave the organization. That is about the best way; but of course with the multitude of changes in the technology of industry it is impossible to stabilize industry because of the tremendous over-development of the nation's industrial capacity to produce.

So there are those periods when there must be reductions in a payroll and naturally every time you are rebuilding your working force you are again adding a number of new men, men you don't know very much about. You hope to know more about them. You don't know why they left the last job, you don't know their mind. They don't know the company policy, they have heard something about it—and most companies are not any too free to make definite what is the labor policy, what they really expect of the men. Some concerns have done wonderful work blazing a trail as a sort of standard for many of us to pattern after.

Some Folks Think They Know a Good Man By Sight

I have enumerated some things that might be considered. I might tell you of one of the old ways of tackling or approaching the problem. I have a friend of mine who feels that he can look over a man and by observing the points of his head and the bumps on the forehead and the peaks on the nose and the shape of the jaw he can tell the job that will fit the man; the mind, of course, is of no consequence.

That is a rather amateur approach but it is an approach. It is a sincere attempt but it really seems to have accomplished very little. Personnel men and labor men dig deeper than that. There are certain truths we can use to accomplish good work.

First of all, in inducting the employee into work you are considering hiring him. One of the organizations that I have in mind that has done a pretty good job requires the employee to go through a very extended series of questions and answer them in a positive or negative way. At least once in that employee's lifetime he has been asked to face definitely some problems and he is asked to attach his signature; he is asked to commit himself definitely to certain principles that you consider basic in your safety program. That is an approach.

I am teaching management work in Michigan State College and I spend a good deal of time acquainting myself with the different safety programs. Since I am new, I haven't been able to avail myself of all the opportunities there are for making a study. There is a surprisingly big range but Michigan certainly in comparison with other states is doing wonderful work in the direction of human relations in industry.

After an employee is in the organization he is probably temporarily considered. He is introduced to his foreman. In most concerns he is sent up to the foreman without a guide and told very little about what the company has to offer, what the opportunities are in that concern. The company has made very little attempt to make that man feel that that is a fine outfit to work for, that it is a mighty good place to stay. He knows what his obligations are. He knows his wage scale. Is that all the man is interested in? Can you appeal to something bigger than that? It seems that our progressive programs do make a bigger and wider appeal, a more fundamental appeal than merely those that I have mentioned.

Some of our concerns are requiring the employee to set aside one hour during the first week, in which he is given a series of short talks by different members of the organization; and of course a very important part of that one hour or half hour in some concerns is devoted to the safety program. There is not a list of requirements but the program is sold to him in terms of the things that he is primarily and dominantly interested in—in terms of security, in terms of his family.

I always remember that picture that went through the poster service of the National Safety Council. You have probably seen reproductions of it. It was the picture of a smiling baby—the biggest safety argument there is. It is convincing. That has the selling value if you want to talk in terms of safety.

What of that little manual that is given the employee? You are hired and you are handed a manual and told to read it. You stick it into the vest pocket of your overalls and never look at it.

Eleven Little Pamphlets to Each New Employee

A number of my students last summer hired out in various concerns and of course they made very regular and very detailed reports on what they saw. One concern handed the employee 11 little pamphlets. One concern was good enough to bind them all in one heavy piece of paper. The student conducted a little study in that concern and found that that material wasn't read. The average employee coming into the concern doesn't care very much about a bundle of by-laws that have been created; they aren't intelligible. How much better it would be if somebody bothered to work out an intelligible analysis answering very definite questions that are of concern to the average worker? What does he want and what is it that the concern has to offer to the safety program that meets these fundamental wants?

Of course this lecture idea of putting aside one hour or one-half hour has been very effective in the concerns I have covered where it has been used and they speak very highly of it. There may be a number of people who can suggest some things that are far better and they can probably show that they haven't been very successful with that method.

Bulletins have their place, valuable as they are, but too often we are

satisfied with just a syndicate service, a service that is prepared by a national organization. It naturally follows that if a bulletin is to have an appeal to workmen in almost every type of industry it must be very general, and since it must be very general it loses the local touch. How much better it would be if you could supplement those national bulletins with a number of local touches—a local situation that has developed! Photographs like these would be far more attractive to our own employees (while if they were sent through the country they would be less attractive naturally). The person that the writer would mention, of course, would be known by the members of that department and probably other departments. Pictures of buildings and machines would recall something to them that they know, hence the association would be more effective.

Suggestion Campaigns Good—But Not Too Many

Suggestion campaigns have been very effective in many concerns, but the explanation most people give is that suggestion campaigns work all right if two or three campaigns are conducted probably three months apart and then are dropped. Various explanations are given but the thing isn't kept up as religiously as it might be. It probably goes on that way for a year and then they start again. Still some of the concerns that have had the best reports on the use of suggestion campaigns are those that keep at it everlastingly, that put on a campaign probably every three months and keep it up; even though the suggestions coming in each time are small in number the total would be greater than if the suggestion campaigns were farther apart, every year or so.

The plant publication in the home carries safety messages along with it. I think the plant organ is probably the most effective means of selling and keeping safety sold. There, too, of course you have your national services that are very valuable. They are the gist of the experiences of numerous concerns and various industries and they are valuable, but just as the plant organ often degenerates into a front office, white collar gossip publication, so it is with the national safety service. Too often it is merely loaded with national propaganda rather than taking advantage of local situations and pictures of vivid experiences in the plants concerned. The plant propaganda by means of the plant organ would be far more effective.

So much for various devices that may be used by an industrial concern to mold the individual to his job in a safe way. I think one thing we must concentrate on more in the future, as it is becoming more important with the ever-increasing productivity of machinery and of industry in general, is the problem of bringing down and reducing the irregularities in industry. If we can reduce the irregularities in production we automatically reduce the irregularities of employment, hence the problem of inducing new individuals, strange individuals, into the concern becomes of less importance.

I really came down here to raise some questions and to get acquainted with you and to tell you something of what my observations have been in visiting a number of concerns of the state. We are only in the experimental stage, you might say, in promoting the industrial program. So if I have made some criticisms that strike home, please take them in the spirit in which they are meant.

CHAIRMAN WILLIAMS: In Detroit there is one thing definite that we have in mind in educational work for this winter. You all know how difficult it is to get the average shop man to give a continental whether he gets hurt and to get him to think seriously of what it might mean to him if he does meet with an accident. The average man thinks of an accident as something that always happens to the other fellow, not to himself. Possibly that is due to the fact that we are all more or less conceited. We can't take a text and preach to the fellow in the shop. He resents any effort at teaching if it is clothed that way.

We have found that we can build up in that man's mind a desire to avoid accidents, a fear of being physically handicapped, of losing a leg, arm or hand. We can show it in a picture but it only goes in through his eyes. We are all eye-trained.

Instructing the Employee in Practical First Aid

We have Dr. Shields here with us today from Washington, from the American Red Cross. He has had a world of experience in the one specific thing we can do to get safety across to the man and that is in first aid. Don't understand me to mean that we are going to put in first aid to compete with our own first aid rooms in our plants or that we are going to run our plant surgeon out of business. The specific thing we want to do in that, the thing of primary importance, is to sell the man safety, build up in that man's mind a desire to avoid being hurt, to avoid losing some of his members. It doesn't cost him anything to carry the information around. He may need it out on the bathing beach or in an automobile accident, far away from medical assistance. It has a very good sales value. When we put this in our plants this winter in Detroit I want to tell you something of what we may expect, and if you do the same thing, what you may expect from it.

The Bell Telephone companies, with something like 200,000 employees—one of the largest employers in the world—so far as their male help is concerned have covered about as hazardous work as we have to deal with in the world. In 1921 in Michigan we were running one accident a day, 300 accidents a year. Competitions and everything else didn't seem to get us any place. We taught first aid, starting in January, and in the month of February we went through the month with increased production and increased hazards with only two lost time accidents. Why? We hadn't told those fellows to be careful. When we lashed Bill Jones to a board in a practical demonstration of what was to be done to him if his back was broken—and every one of those men was lashed to a

board in the demonstration—it went under his skin. We were educating him and he knew what it would mean to him to lie in that position for months; it went in in a way that it wouldn't go in under any other circumstances.

We boiled this down to just practical problems. It wasn't a lecture method. It was the job method and partially the conference method with it. These fellows are eye-trained. You are going to get the information into their heads, ears, eyes and sense of feeling, and in that way you make a pretty deep groove in the record, a groove that lasts. If you look at a picture it makes a groove and a deep one but it doesn't last, but if you can get the fellow to work at the thing with his own hands or to feel the thing at the same time, it lasts.

Before we put that on we were running 18 accidents in Michigan for a given period and a given number of men. The Bell of Pennsylvania had put on first aid training and that was about the only thing they were doing in addition to what we were doing in Michigan and they were down around 4 while we were about 18 or 20. That was in 1920 or 1922. I talked with one of their superintendents and he told me that today for the same number of employees and the same exposure they were down under one, with increased production. The unit of production had gone up per individual. They had done things in preventing accidents and they had done them chiefly through first aid.

Opposition to First Aid Is Likely To Be Met

To the Detroit boys I want to say that we want to get started this coming week. You are going to meet opposition from your doctor or your surgeon because he doesn't know what it is all about. All you have to do is get across to him the simple fact that his business in the first aid room will increase rather than decrease after you put it on. Why? Because in your first aid class you get across to the man the importance of taking the minor scratches and cuts and bruises to the first aid room to get them treated. You are going to cut down your lost time accidents due to infections. They are not going out into the shops and compete with your first aid rooms. They will know the danger of removing something from the other fellow's eye and will send him to the nurse. Why? Because they know their own hands are all grease and dirt. They know why they shouldn't undertake to do anything of that sort until they wash their hands thoroughly and they haven't time for that.

You are going to meet some opposition from the management. They will say, "We are paying our nurses and plant surgeon for that." Get the facts across to the management, that this course will more than pay for every dollar that is put into it month by month as you go through with it. It will pay for itself, pay the biggest dividends of anything they can put their money in.

You are going to meet some opposition from your foreman. He will

say, "Why do I want to go down there and spend 16 hours at eight meetings to learn that bunk? We have a first aid department down there."

Is your plant competition down to the point where your foreman is asking you, "For goodness sake, what can I do to cut down the carelessness in my department? I am here at the foot of the sheet. How am I going to get out of this hole, out of this jam?" Here is something you can use. You can say to these fellows, "We will get behind you with a good snappy program, with stereoptican slides during the lunch hour. We are going to give you a lot of material that you are going to hand to your men. We are going to give you a card for every man with his name printed on it. There is a place for him to sign that enrollment card at the bottom and you are to deliver these cards to your men."

After this sales talk goes across explain to them that this card must be returned signed or unsigned because you, in turn, have to send it up to the big boss. Some of the men will sign the thing but they won't go. Then they will be followed up with an absentee card.

A Clever Plan for Enlisting Interest in First Aid

The thing to do is to get them to sign up and when they get in the first class, inside of five minutes after that class is called to order they are interested in a complicated bandage and it beats any bow knot tie they ever saw. That is used to break down their opposition. They become interested in that intricate knot and from then on your course is just nothing but one practical problem after another and each one of the problems is worked out on a definite, common accident that you meet with every day in your plants.

Your success in this will depend on just how wisely you select these accidents for the problems to be used in putting it across.

We are getting the material ready and by the fore part of the week it will be all set. Our management is already sold and also our first aid room doctors and nurses. So far as the Chrysler is concerned, we are down now to the foremen. We are not going to say a word to the men until we are ready to strike, and when we strike it will be a good, live, snappy campaign for two days and it will wind up with a card for the man to sign or refuse to sign.

I would like to take advantage for just a moment of Dr. Shields' presence. He is here and it is an opportunity for all of us. He always has a message on this thing because teaching the work of safety through first aid is a job that has been a big one, especially in the mines and in the more hazardous lines of work, and I think Dr. Shields is the outstanding figure in that line of work.

DR. SHIELDS: Mr. Williams explained the safety value of first aid and he has been very active in getting up what we call this first aid institute for lay instructors that we are to start next week. I might say this: that these men who take this course are supposed to put in at least 24 hours of class work, two hours a day, and at the end of that time we are going to give them two examinations, one for the standard course and

the other for the advanced, as we call it. To all of those who pass the practical examination the Red Cross will give cards which will entitle them to act as lay instructors—that is, to teach first aid classes, as Mr. Williams explained, in the plants and to hold examinations, etc.

The standard course, as we call it, for students that these lay instructors give will be a minimum of 15 hours. That can be divided into periods of one hour if it is thought best, or it can be put into periods of an hour and a half, which would make ten lessons including the examination of an hour and a half. These lessons, as Mr. Williams explained, will consist of about 45 minutes, or an hour and a half of demonstration of the instructor and talk. The other half of the lecture will consist of actual demonstrations by the men themselves.

We usually divide them up into teams of five and give them a specific problem about an accident to work out. Then we criticize their work and they criticize each other and so on. Doing something with their hands makes a profound physical impression on them. They also get the visual picture with the eye and the actual manual impression with the hands.

I might close by asking you to ask me any questions. I can answer questions pretty well but I can't talk in a consecutive way very well.

E. C. JACOBS (American Mutual): I would like to ask if the purpose of this course is to teach these men to apply first aid to themselves and their fellow workers while engaged in their occupation in the plant?

DR. SHIELDS: Yes, in a way it is. Of course, as Mr. Williams explained you have your up-to-date emergency station and dispensary but they really would use more first aid outside than they would in the plant.

Just What Does Practice of First Aid Mean?

MR. JACOBS: If that is so, where would the line of demarcation be drawn? At this late day after all of these years of telling the men for every cut and scratch they should go to the first aid room, we are not going to tell them to take care of the little cut and scratch and to go down to the dispensary for the big ones. When does he know what the big one is?

DR. SHIELDS: A little cut or scratch is really worse than a big one. The majority of cases of blood poisoning occur from the little insignificant things that have been neglected and what first aid does is to teach the man to apply to a doctor quicker than he would before, and in this first aid course we teach him just as much what not to do as what to do.

MR. JACOBS: If it is true that the small cuts and scratches are more dangerous than the large ones, isn't there a tendency, because of this course, that the man will treat those small ones and probably cause some trouble?

DR. SHIELDS: You might imagine so, but it is the opposite that happens. When I started first aid in the mines I had the doctors come to

me and say, "Are you going to teach miners how to be surgeons and railroad men quacks?"

I said, "I don't think so. I think we are not going to interfere with your bread and butter at all."

They were frank enough two years after to come to me and apologize, saying that they were mistaken. They said the men came to them with more little injuries and more little cuts than they did before they were taught first aid. You know, knowledge doesn't do a man any harm and so I don't believe you need to be afraid you are going to have self-treatment at all.

MR. JACOBS: The thing I have in mind is the small amount of time that is given to this man for the purpose of teaching him first aid. Certainly he can't acquire a working knowledge of that matter in the time allotted to it.

Another thing I understand from the way this question has been put this morning is, that if this is for the purpose of educating the worker we are going about it in a roundabout way. I wonder just what your experience has been—what you think of a definite and rigid shop rule with respect to cuts and scratches? When I say that I mean all that I say. I say a worker shall be discharged if he does not go to the first aid department—not on the first offense. In our plant we are going to establish a shop rule that is to be enforced just the same as we would with respect to production. What effect would such a rule have as compared with the system which you are discussing? Which do you think would be the best?

Three High Spots in First Aid Instruction

DR. SHIELDS: Both. That is exactly what we are doing. The first aid that is taught this man makes it easier to enforce your shop rule because he knows why you have the rule. I thought I made that clear when I explained selling the doctor.

MR. THALNER: Is there any tuition in connection with this course or is it all gratis?

CHAIRMAN WILLIAMS: The textbook we will use in Detroit will be the standard Red Cross textbook that is sold on a basis of practically cost of publication—60 cents. Our corporation will absorb that for each student. Possibly some others didn't get that one fact. This gentleman's question brings it up and I want to emphasize this: that we graduated out of a total of 1,800 men over 1,600 in first aid in 1922 (I believe it was) or the spring of 1923; and since that time I don't know of a single solitary case of infection that developed; for two years after that we kept a record on every case of infection and we went back to see whether that fellow had ever been taught first aid. We hadn't had a case of lost time accident due to infection because that fellow got enough in his class work.

There are three high spots in first aid that we work on. We get a

very good picture of what infection means and the reason for getting to the first aid room to get relief. They don't wait on the job for one, two or three hours. They know it should be treated and they go there and get it attended to. They know they can't attend to it themselves because their hands are greasy and dirty. They know that because they were taught that in the first aid class. Those are the things they actually get in this class.

MR. COTCHER (Murray Body Company): I think that Mr. Jacobs is unduly alarmed. I think that Dr. Shields knows enough about first aid to know what the definition of it is. First aid is that action necessary first to save life and prevent suffering, and second sufficient treatment to get the man where a doctor can take care of him. That is all first aid is. It isn't medical treatment at all. I don't think Dr. Shields' course is gotten up with any idea that a first aid man is competent to treat on his own responsibility any wounds or any other conditions.

First Aid Is a Bridge to the Doctor and Nurse

I have never had this Red Cross course but I had a lot of instructing to do in first aid in the army. That is one of the things we had to do with our companies. Those of you who have been in the service know what it is to line them up and put them through the first aid demonstration and discussion. That is one of the things we impressed on the men—that first aid is only that action which is necessary to stop a condition which might cost a man's life, stop the bleeding or whatever it may be, place him in a comfortable position to be transported to a medical infirmary or place where he can be given proper treatment. Of course, you know that nobody except a licensed doctor is competent to take the full responsibility for treatment—not even a registered nurse can do that. A registered nurse can only act under the direction of a doctor.

I don't think you will have any trouble with first aid of that kind.

CHAIRMAN WILLIAMS: We have had a lot of trouble in getting the men to go to the first aid room to have minor scratches and bruises taken care of. This is a systematic way, an orderly way, a way we have tried out by experience and a way we know that works in getting across to the men the importance of going to the first aid and then they do it.

There are three high spots, treatment for shock, artificial respiration and the control of arterial bleeding. The control of arterial bleeding is something you have to teach and we do that in class in a very few minutes. It is boiled down to the point. We have had one case this year where a life would have been saved if someone on that job had had first aid training. First aid is a bridge, as I have heard the doctor explain, that merely carries the man from the injury and places him in the hands of the nurse and the doctor with less shock, less loss of blood and in a better condition and with a better chance for recovery—a patient reinforced for them to work on and deal with if the accident is severe.

In our shops in the handling of men and getting them to the first aid

room, many a simple fracture has been made compound because the men did not know how to get the patient to the surgeon as he should be gotten there. Instead of in any way entering into competition with the regular established medical procedure of our plants it keys in with it, supplements it and rounds it out where it can do a hundred per cent job.

DR. SHIELDS: I might say for Mr. Jacobs' information that in some of the largest corporations, like the Bethlehem Steel Corporation, which has the most up-to-date surgical department under Dr. L. M. Showdy, they train from 600 to 800, sometimes 1,000 men in first aid, and they have emergency stations in all of their plants. Also, the United States Steel Corporation has practically the same thing. They train people in first aid and they wouldn't do it if it was going to compete with their medical and surgical men.

MR. JACOBS: I am not saying anything against first aid education. As a matter of fact, I believe in it. I have taken two or three courses in first aid and I would take some more if I could get them.

The thing I would question, and I do not advocate this, is that a man or woman would apply any first aid treatment to themselves while engaged in this work. If this plan is for the purpose of teaching the man the importance of going to the first aid room, I wish it well and I would advocate it very much, but I do not advocate the men's taking care of injuries they receive while at work.

CHAIRMAN WILLIAMS: The question in your mind was well taken but it is outside of the problem entirely because, as the Major has explained and as I have tried to explain, that is one of the essential parts of the course, to get the fellow into the first aid room where the case can be properly dealt with. But the big point, don't forget, is this: we are selling that man safety in a way that will get under his skin as no other way would. That is what justifies the expenditure of money by your corporations. We can't get that man to visualize the pain he is going to suffer from an accident in any other way we have discovered. We are only 15 years old in safety. We may eventually find ways of getting facts inside of men's heads and we may find a better way than first aid but we haven't found a way up to date. Inasmuch as we haven't anything better, we are going to use it and we are going to make a practical application of the best we have.

ADJOURNMENT.

FRIDAY MORNING SESSION

October 29, 1926

J. W. HENNING, Acting Chairman
Automatic Electric Company, Chicago, Ill.

The Friday morning meeting convened at 9:30 o'clock, Mr. A. F. Dunnebacke presiding.

CHAIRMAN DUNNEBACK: It is very gratifying to see that so many of you stayed over for this final meeting of the Automotive Section.

Due to the importance of safety in punch press work and due to the large number of accidents that we have every year from punch press work, we have set aside an entire session to be devoted to punch press hazards.

Mr. Henning will handle this part of the program.

(Mr. J. W. Henning took the chair.)

CHAIRMAN HENNING: I believe the first thing on the program is a talk by Mr. Kaems. We have got to go through this pretty quickly.

WHY A POWER PRESS SECTION?

A. L. Kaems, Safety Engineer, Simmons Company, Kenosha, Wis.

I don't know why I am always picked on to give a talk. I imagine that by this time most of you have heard me so often that you are tired of listening to me.

I am not going to talk on punch presses but I have been given the subject, "Why a Power Press Section?" It may be interesting to you to know how this started.

In 1919 in Cleveland I gave my first talk on punch presses. Mr. Williams, who had been with the Industrial Commission of Wisconsin, had gone with the National Safety Council. Knowing, as he did, the large number of serious accidents which occur on punch presses, he conceived the idea that a talk should be given on that at the National Safety Congress in Cleveland. He asked me to give that talk and I consented.

At that time I was working for the Wisconsin Industrial Commission. The state has a law whereby only two members of any one of the different departments in the state can go to any convention or on any trip and be paid by the state. As this came at a late date and other arrangements had been made for men of our department to go, I paid my own expenses to this convention. I want to tell you gentlemen today that nothing ever gave me greater pleasure than to be called upon to go there, and I have never paid out money with a better feeling than I did that money.

I remember distinctly that there were just a few of us. I was given 20 minutes to talk. I went to that convention with just two wooden models to show what could be done in this work, and it has grown tremendously since that time.

I might say this first: they did not know of a place to put this talk and they came to the conclusion that the Automotive Section would be a good place for it. Some of the people there were using punch presses but they were not interested in anything pertaining to the automobile industry. For that reason they began to write into the Council and ask, why not have a Punch Press Section? The committee at that time could not see its way clear to do that and it has tried from time to time to find some way in which this would fit in.

A Question That Has Grown Tremendously

At every congress this question has come up. After Cleveland the next congress was in Milwaukee. It was taken up there. The next congress was in Boston and that same thing came up. Then a decided step was taken when it was held here in Detroit four years ago to see if some way couldn't be found by which it would be possible to make some change in the naming of the Automotive Section so it would fit in with punch press users. Of course, that has fallen through each time.

But this question has grown so tremendously, due to the fact that there are so many small concerns throughout the country using a few presses with hazards just the same as for those who are using many.

For that reason the committee has decided to set aside a Section for punch presses. If you will think back to the time of my Cleveland experience with just two wooden models and look over this splendid exhibit we have here today, you can just see how this has grown by leaps and bounds, and that has only been done in these last few years. Many of the exhibits at this congress have come a long distance—for instance, the Westinghouse Electric Company from Pittsburgh, the National Stamping Company from Milwaukee, the Ternstedt people from your city, the Studebaker people from here; and the Automatic Electric Company from Chicago has shown a card which will convince anyone who uses punch presses how safe this work can be done. There is no doubt in my mind, and I know that there are at least a dozen men in this audience today who will stand up and tell us that punch press accidents in a few years from now will be as scarce as hen's teeth. That is due to the intensive work that has been put in by these people.

So the thought is with us that if we have a separate section in which we can not only have a display as big as we have today but one five times as big, we can put it into a room in which we will have someone stationed all of the time and that will give each and every punch press user in the country who comes to this convention some place where he can go and talk matters over and tell his troubles and someone will be there to help him overcome his difficulty.

There is no need of my telling you that it is important that the users of punch presses should all know the hazards of this work. Yet if we set ourselves to it with real thought, it has gone beyond the time of speaking of reading papers—the time has come when this question must be dealt with in a different way. It has come to the point where it is an engineering proposition, if I may give it that high-toned name. Yet men who have been successful in making real progress in this work know that it just requires horse sense and each and every one of you can do it if you once set your mind to it.

For that reason the Executive Board of the National Safety Council has, in its wisdom and its deliberations, found that it would be necessary to allow those who have asked for it time and again that a separate Section be devoted to the punch press.

CHAIRMAN HENNING: The next will be a short paper by Mr. Whiting to take the place of Mr. Beyer. Mr. Beyer couldn't be here and Mr. Whiting is to take his place on that paper.

MR. KAEMS: As long as this is going to be brought up, to facilitate the work I would ask the chairman to appoint a committee to nominate officers for that Section so that if it goes through we won't have any delays later on. If there is no objection, I would like to ask that that be done now.

CHAIRMAN HENNING: On that committee I appoint Mr. Schwab, of the Aluminum Goods Company, Mr. Gerding, of the Western Electric Company and Mr. Kaems, of the Simmons Company. You can get to work and get your slate up so we will have it at the end of the meeting.

MR. WHITING: Mr. Kaems says he doesn't know why everyone picks on him when they want to get the practical solution of the punch press hazard. We know the reason he doesn't know why he is picked upon—because he is too modest. He is a pioneer in this field, as we all know. You will notice in the film that has been prepared that he has been picked on again as a movie star on this punch press hazard.

Pardon me for reading this paper because it was not written by me but Mr. Beyer of the Liberty Mutual who was unable to come to the congress at this time.

BUILDING SAFETY INTO POWER PRESS TOOLS

David S. Beyer, Vice-President and Chief Engineer, Liberty Mutual Insurance Company, Boston, Mass.

The power press is right up in the front rank as an accident producer, and is second only to the circular saw as a remover of fingers.

The use of punch presses in industries such as those considered in our Insurance Manual under the classification "Metal Goods" has made it necessary to charge rates two to three times those of an average industry, such as "Machine Shop" in order to secure sufficient premium to pay the losses.

The chief hazard of the press is at the point of operation, where the

stock is inserted and worked upon. Aside from that it has merely the ordinary drive hazards which are common in all mechanical industries but which cause comparatively few accidents.

It is obvious that where the plunger can be enclosed so that a finger can not pass underneath it while the press is in operation, the punch press hazard has been pretty well eliminated. This is possible in many cases where sheets of metal, fibre, paper, etc., in comparatively thin sections, are worked upon. There are many industries, however, where odd sizes and shapes are used, where it is impracticable to enclose the plunger in this manner and in such cases some special arrangement must be resorted to, if the accident hazard of the machine is to be controlled. Many devices have been developed in an effort to overcome this condition, by means of safety appliances to be placed on the presses themselves or a special tool for manipulating the stock in such manner as to avoid the necessity of placing hands under the plunger.

Nearly All Devices Subject to Limitations

These devices have more or less value and some plants have made very good records through their use with constant care and follow-up. Nearly all such devices, however, are subject to one or more of the following limitations or objections:

1. It is difficult to get the operators to use them.
2. They slow up production.
3. They are so expensive as to be impracticable for small orders.
4. They have a complicated mechanical mechanism which is liable to fail at a critical time.

It accordingly follows that a device which can be firmly attached to the machine, which simplifies the operation, which keeps the fingers out of the danger zone, and has the additional merit of increasing production, would furnish the ideal solution for the press hazard.

Such a device is the slide or gravity feed, which is demonstrated in a new film which will be shown before this session of our Congress.

The slide or gravity feed is not a new thing to many of us. It has been advocated by our old friend Gus Kaems for a long time. He has blazed such a clear trail in pointing out the way to beat the punch press hazard, that all I can do is to add some personal testimony and additional evidence on the value of the methods he has outlined.

The builders of punch presses, for years, have furnished special slides or gravity feeds on request for certain kinds of work to which they thought they were particularly adapted. In most cases, however, these feeds were expensive and in some instances they cost about as much as the machine itself, so they were not practical for the ordinary shop which changes its product frequently and has many short runs.

I believe Mr. Kaems was the first man to realize and apply the possibilities of the slide or gravity feed to a miscellaneous run of work, through the expedients of simple specialized chutes or feeding devices which could be made up quickly, at slight expense, by anyone with a little ingenuity and familiarity with this kind of work. He also broadcast the

fact that such a device would usually pay for its cost many times over in increased production.

We are all familiar with the "sales resistance" that is commonly encountered in trying to get most mechanical safeguards adopted. When you can show a plant manager, however, a device such as that illustrated in our picture, which "took two hours to make, cost sixty-five cents for material and increased production 150 per cent," he is going to say "lead me to it!"

If anyone has any doubt as to the practicability of this method of guarding I believe this picture will go a long way towards convincing him, containing as it does, the testimony of representative concerns such as the General Electric Company. The Bosch Magneto Corporation, the Simmons Company, etc., illustrating a number of the many machines where slide feeds have been installed, resulting in increases of from 30 per cent up to several hundred per cent in the production output of the machine.

The Main Thing to Interest the Superintendents

After getting the backing of the management on this form of guarding, the main thing is to interest the superintendent or foreman of the department and the diemaker, by a few practical applications of the principle, so they get the idea and can apply it themselves.

The Liberty Mutual safety engineer was himself a practical diemaker for 27 years. He was one of the hard-boiled "show me" type, who started to listen rather cynically to a talk by Mr. Kaems a year or more ago, in which Kaems spoke of the results that had been secured from the application of slide feeds. However, before the talk was over he began to enthuse, and when they went into the shop together he began to say, "I can make a slide feed for this job—and this—and this," and it was only a short time before he had a number of the most hazardous presses, several of which had been responsible for one or more accidents, working on slide feeds.

Since then he has become an enthusiastic advocate for this method of controlling the punch press hazard, and he makes the statement that he has never seen a job yet for which he could not devise a slide or gravity feed.

This combination of imagination and practical knowledge of shop conditions has brought about very successful and interesting results.

He called at one plant about nine o'clock in the morning and the superintendent, after a little persuasion said, "I will give you just five minutes to tell your story." Three hours later the superintendent was still holding onto the engineer, getting suggestions and working out applications of the idea, and a number of presses were promptly equipped with these devices.

In another plant the manager pointed out 10 presses, each of which had caused an amputation, and said, "Go ahead and see if you can apply feeds to them at a total cost not exceeding \$100."

Three days later, when the engineer left the plant, every one of the presses had been equipped with a satisfactory device and the cost was within the figure mentioned.

I don't want to imply that there is no other method of getting results in safe operation of a punch press except through the slide or gravity feed. Many other devices which are effective, or partially so, have been developed. However, where they depend on the intelligent cooperation of the operator for success they are almost certain to fail sooner or later.

Probably the majority of punch press operators are young men or women who have little conception of the hazard of the job they are performing. They are careless or thoughtless, and difficult to educate on the dangers of their work. In some cases I have secured a show of interest on the part of the girls, particularly, in pointing out the fact that no boy would care to hold hands with a fingerless girl!

However, I am firmly convinced that the best, and in the end the cheapest method, of guarding punch presses, is to build safety right into the operation, through a chute device which is either made a part of the die or attached to it.

The mere slide itself does not give complete protection, if the plunger is open so that the operator can reach under it in case a piece should become misplaced. A guard or barrier should be provided in conjunction with the slide feed so as to prevent some hasty and ill-advised move of this kind on the part of the operator.

CHAIRMAN HENNING: Is the Nominating Committee ready to report?

MR. KAEMS: I suppose we would have to have a discussion first.

CHAIRMAN HENNING: All right. The meeting is now open for discussion.

Punch Press Experience From Mr. Kaems

MR. DUNNEBACK: I know a lot of you fellows came down here to hear a little more from Gus Kaems. My first knowledge of Mr. Kaems was at the National Safety Council meeting at Louisville, Kentucky, two years ago. After I saw his slides and talked to him personally and heard his talk I went back and I didn't lose a minute. What I got our manager to do was to send a practical, common sense mechanic out of the tool room down to Kenosha to stay a week with Mr. Kaems to see what he was doing. I know you fellows all want to hear more from Gus.

I also know that unless he can cuss a little he can't get it across so well. So I think I express the sentiment of all of us when I say we would like to have Mr. Kaems tell us in his own language the principle underlying this feeding process.

MR. KAEMS: You know it is awful when you are accused of a thing you don't do. Only yesterday I was over at the Cadillac Hotel and a fellow came up to me and he said, "Hello, Kaems, I'm glad to see you. We always like to hear you talk. We can understand you because you know how to swear."

Mrs. Kaems calls my attention to that too. That isn't nice and I always deny that I swear. She has said to me, "August, if you don't think you swear, you come damn near it."

I have learned in 20 years going through the plants that I could always make the other fellow understand what I was trying to drive at much better if I could swap a story with him, take a chew of tobacco or just tell it in my own way and swear a little with it. It gets it across much better. Then you know how we are all people of habit and it grows on one. I often say that I am not going to swear any more but sometimes I can't help it. If anyone of you have been in this work as long as I have you know that when things go wrong you just can't help swearing. You swear good and loud and it kind of relieves you. Otherwise you would go nutty.

Now I will have to say this all over again. I got started in this work some years ago when I went with the Commission. When we use the punch presses and they began to cut off fingers everybody began to look for some way to get around it. More money has been spent and more thought given to this one subject than to any other that has ever been brought out anywhere, due to the fact that when you get an accident on a press it is a serious one.

The First Safeguard Was Not So Good, After All

I remember when the first safeguard came out the man demonstrated very clearly to us that he could put a pencil underneath that gate when it came down and that it was impossible for an accident, and we all said "Hooray!"

I went out and helped sell that because I wanted to help cut down the accidents. You know if you go out to sell a thing, where do you go? You can't go to a stranger but you go to your friends. You tell them, "Now, boys, I now have a safety device for your punch presses. You buy one of them and your troubles will be over. I saw that thing work and I know it is going to do what it is expected to do. Get one."

"All right, we will buy it on your recommendation."

They bought one and pretty soon I got a letter from one of the men saying he wanted to see me. When I went there he said, "Here is your damn guard. We lost a finger on it. This is what happened."

Then of course that thing was poked in the head. Then the sweep guard came out and they said that where the gate guard was lame the sweep guard was strong. Again we got the samples and the same results—fingers were lost again.

I was called into a plant where they told me they had spent about \$20,000 in perfecting a gate guard and I found there a boy who had lost three fingers. Of course he was careless and all of that. Then I went and investigated and wondered why in the world that boy had to lose his fingers on as simple a job as that was. I went home and thought that matter over. Then I went back to that plant the next day and asked them to give me their machinist and said we would make the job absolutely safe.

The reason I went into that factory was because there was a dispute. We have a statement in our law that if a job is not perfectly guarded according to the commission's rules the boy was entitled to 15 per cent increased compensation.

That boy started to work again and he worked about a half day and he found he would not be able to run a punch press any more and that he would have to look for some other work for which he would be fitted. I began to think of the seriousness of that and then I began to wonder if something could not be done to eliminate that. Then the question arose in my mind as to why these accidents occurred? The accidents are due to the fact that a man must put his hand in the danger zone to put the piece in and again to take it out. That was the old way.

A Slide Feed That Increased Production

I went to that plant and we made a slide for that job and had it working in a very short time. It increased production and made it a safe job. From that day on I have steadily kept after this, making use of it wherever it could be done. If you do that, of course every time you make a die safe you have one hazard less to think of.

Probably the first thought that came to me about that was, why do we have railroad crossing accidents? The first safety sign I ever saw was when I was a youngster. The sign was at a railroad crossing and it said "Look out for the cars while the whistle blows and the bells rings." That was the first safety sign I ever saw.

Of course, in those days we were driving horses and the horse could tell much sooner than we could if a train was coming because his sense of hearing was better. But now we have come to a time when automobiles are being used and I don't care how careful a man is and how well he drives, if he keeps on crossing railroad tracks long enough sooner or later he will be caught.

I decided that the only way to stop that would be to stop crossing the tracks and that the same thing applied to dies. They should be fixed so that you wouldn't put your hand underneath the die no matter what happened. Something may happen to the press and it is bound to repeat no matter what we do. But if we don't have to put our hand in this danger zone, then of course we don't care what the press does. So I have gone on and applied it time and again. I have talked to my friends and they have applied it and wherever it was used they had the same results that we did.

The reason I went to the Simmons Bed Company was this: when I was working for the Commission they were running 700 presses and were cutting off fingers at a rapid rate. If I remember correctly, 36 fingers were cut off in 1919. I asked the Commission if they would let me alone so that I could go to that plant whenever I wanted to use my own time on it and I would finally stop their accidents, to which they consented. I went there and I knew that it was not necessary to cut those fingers on the jobs that they had. So I went to the

general manager, who had grown up from the ranks and to whom you could talk very easily. I talked this matter over with him and he said, "All right, Kaems, we will remedy this."

When he took it up with his engineering department, toolmakers, and so on, they said, "That bird is crazy."

After the next accident I was there again. He finally said, "Somebody in this crowd must be right or wrong." Then he put it up to his department superintendents and they said, "The only way to cure him is to hire this man and if he doesn't make good we will tie a can to him so fast that it will make his head swim."

So they put the proposition up to me and the first six months I was there they cut off seven fingers. I want to tell you fellows that I was sweating blood, knowing that each and every one of those accidents didn't have to occur. But it was like everything else. I couldn't go into that plant and tell those fellows they were a lot of damn rummies. If I had, I wouldn't have had a friend there in a week. The thing I had to do was this: when we had an accident I had to go ahead and find some way of overcoming it quietly. I tried to get them interested. That didn't help so I started out and just made one slide first. When I had that slide completed I took it into Mr. Farist's office and I said, "Mr. Farist, I have just made one job safe and increased your production 65 per cent."

He said, "The hell you did. Why, damn it, you couldn't do that. We are as productive as we can be. You couldn't increase that 65 per cent."

I said I did, and he immediately pushed a button and had the department superintendent come in. He said, "Bush, did we increase this production 65 per cent?"

He said, "Yes."

Problems in Making the Punch Press Safe

Then Mr. Farist said, "If that is the case, what is the use of talking about it? Let's get busy."

We have some 4,000 or 5,000 or 6,000 dies there and it has been impossible to have all of them made safe. If we take three dies a week and make them safe we are doing a big job. That would only give you 150 a year, but we are continually keeping at it. We have reduced our accidents and in 1924 we only lost one finger on a punch press. This year we haven't lost any up to date. That shows what you can do by just using horse sense.

The first question that will be asked is "How many draftsmen do you need?"

You can't do it that way. What I have done has been done in a very simple way. I couldn't have a draftsman if I wanted one. If I had a draftsman I might be able to tell him how to build it and then when he got started he would say it couldn't be done. We did it in a practical way. We took a piece of tin and bent it up and found how it would slide and then we would often run 25,000 pieces through just a piece of tin bent up.

There is another thing it does for us. Our scrap has been cut to almost nothing due to the fact, which must be conclusively shown, that by sliding the work in we were more accurate than by setting it in by hand. I won't say you can't set a piece as accurately by hand, but in a day's run the man's hand and all of the other things that enter into the work don't function as they should. For that reason we had more scrap before than we have now. When the slide is once made the piece is the same shape, it is the same weight and it has got to go the same way all of the time. For that reason our scrap has been almost nothing.

I wish that instead of a lot of foremen and a lot of the other men who have come to see that, that the executives would come here so that we could sit down and talk it over quietly between ourselves and make them realize what that work really means to them. I know that everyone who has been using this method of doing it will bear me out when I say that production increases immediately. Our punch press room with 700 presses has increased its production over 65 per cent. That speaks for itself. We are not figuring floor space and all of that, which would be an added saving also.

A Work Growing by Leaps and Bounds

When I went there they were buying presses continuously, buying presses all of the time. Now when we need a press, where do we go to get it? We go into the punch room because we don't need them any more. One thing leads into another. Many of these things I have shown here today are old. We don't do that any more. When we do it we make it automatic. You haven't any idea, what that does to you. This work leads from one thing to another. You can't stop it. You can't separate safety from production. When you make a job safe you make it productive.

I am glad to see that today this work is beginning to branch out; that the American Association of Mechanical Engineers is going to hold a meeting in New York on December 8 and a lot of this stuff you see here they want down there. That shows that people are beginning to think about it. The other day a gentleman said to me, "This thing is growing by leaps and bounds. It is like a snow ball which is small at first, but when you begin to roll it gets larger and when it gets to a certain size it grows tremendously fast."

That is exactly where we are at now. But all this work can be done. You can do it the same as Mr. Henning has. He can tell for himself that no more than five years ago he had no thought of what he could really accomplish when he once got at it. There are many more plants throughout the country from which I receive letters continuously that are getting the same results we are. And, boys, it is a worthy cause. Just stop and think of the maiming and crippling of the men who are working on these presses. I can't think of a thing which so gets me as to find that someone has lost a finger.

Fortunately, we are not employing girls at presses. They did have girls

once upon a time, but they took them off before I went there due to that very thing—that girls were losing fingers—and Mr. Simmons himself put a stop to that.

I have a picture of the Bosch Magneto Company. The week before I was there three girls had lost fingers and we sold this idea to them. That was fresh in their minds and they could see this thing through our eyes. Last spring I went down there again and you wouldn't have known the place because of the things they had really accomplished. It is the selling part that counts, but we can't sell it until the big man becomes really interested.

Let me tell you my own experience. I have been in our plant for years and I am going to tell you that our tool superintendent wasn't sold on this idea as he should be until a very short time ago. We had an understanding that no die was to go out unless I saw it. Yet dies went out which I hadn't seen and which were not correct and we had to make changes which cost money. I took this matter up with the general manager and told him that if we had real cooperation that would save a lot of money.

Backing of the Active Management All-Important

Mr. Lindblomm, whose picture you have just seen, is one of the most even-tempered men I have ever seen. When I would bring this matter up for his attention he would call the men in and give them a good talking and say, "Now, boys, don't do that."

If you threaten your men and say you are going to do so and so and then don't do it, they are not going to pay much attention to it. These men would go out and say, "The old man is only kidding."

He went up a step and someone else took his place. One day I walked into the tool department and found a new set of tools which had not been sent to me. I was just raising the roof with the department superintendent and I believe I said some of the things I am not going to say today. Our new superintendent stood up behind me and I didn't see him. When I got pretty well through he said, "What is the matter?"

I said, "Look at these dies. Here is a man ready to put them into a press when he knows it is contrary to rules and regulations."

He said, "Why, I thought you were going to see all of the dies before they went out."

"That is the understanding, but I don't see them. That is the trouble."

Fifteen minutes later the tool designer and the superintendent of the tool room came to my office and they tried to explain away why those dies had been brought in and I knew what had happened. They had been called on the carpet and if I know Mr. Smith, and I think I do, he talked very plainly to them and what he said was something like this: "Now, boys both of you know those tools should have the O. K. of Mr. Kaems before they go in there. Don't you?"

"Yes."

"Why didn't he see them?"

Then I would be willing to bet \$2,000 he said something like this: "This is the last time you fellows will be told about this. It won't be told to you again. If you don't do that, somebody else will."

And they know he isn't going to tell them again. After this there will be cooperation and the thing will be done. That is exactly how it must be done. I know your difficulties—each and every one—when it comes to doing some of these things. Unless it comes from the top, unless the fellow who has the real say, demands that that must be done you are not going to get anywhere. If you had a machine that was spoiling \$100 worth of material today, \$500 worth of material next week, and \$1,000 worth of material a month from now, would the general manager let that go through? No, he wouldn't. He would call in those men and say, "What is the trouble? Why is this machine spoiling all of this material?"

"Well, the machine is out of order."

"Then you fellows better get busy and fix it."

Of course he would say that. What is the difference? The fingers aren't overhead, if I may put it that way, and the material isn't itself up to a certain point spoiled material.

We must get it into their minds that that is just as important and more so; that that is the thing that must be done; that they must be taught and must get into this question and must demand that that thing be done. Until they do that, we can't get anywhere. I have talked to a lot of the safety men in large plants and when I hear of the large amount of red tape they must go through to have something done I just wonder how it is possible to do anything? No wonder we don't reduce punch press accidents if we don't get better cooperation from those higher up to push this thing along.

Safety Work Paid for by Increased Production

It has made wonderful strides, as I said before. Just this morning I had a long talk with one of the men here in this community and he told me confidentially that cooperation was coming finally. That is why I said it is taking this long time to come about. That is why I would like to see the managers here. I would like to see those in charge of these plants. I would like to have them go over those difficulties and see what can really be accomplished. We must sell it to them. I don't blame them for wanting production, but I know we could get this across if we could just show them all of the work that could be done for this in dollars and cents.

Our increased production has paid for all of our safety work and it has done a lot more, and that is what can be done in each and every concern in the country, I don't care where it is and I don't care what kind of work is being done. It is about time we got at it. Otherwise we will have more stringent laws and more things pushed upon our backs, which we sometimes think are wrong, and yet we owe it to our fellow men who are working for us. We must make better conditions for them

if we want to get on. If we don't we are going to have more trouble than we are having, due to the fact that we are not getting that ignorant class of boys; we are getting the boys who have gone through school and who are trained in a different way than they have been. It is up to us to make these conditions such as we can and look them straight in the face and then we can feel that we have done our share, and then only can we ask them to do their share.

CHAIRMAN HENNING: If there are any questions that you would like to ask Mr. Kaems he will be glad to answer them at this time.

MR. KAEMS: This gentleman was modest and he asked me whether we run small productions. I want to say, and I have often said, that our plant isn't any different from any small production plant in the country. Sometimes I think we are a little worse. Someone will get a rush order and he immediately gets busy and wants this at once. If we were running a small shop somewhere the men would have to take their turns until they got the material, but with us, where they are right in the plant, they go to the big men and say, "We must have this in order to get this order out." and the order is run through the line and they get it out at once. It is not unusual to have a job on a punch press changed four or five or six times a day.

The Cost of a Safety Slide Is Very Small

If you just stop to think about it, what is added when the die is made? If it can only be gotten down into their mind, the cost is so little that no one should hesitate to do that. As I said to you before, with a bent up piece of tin which was fastened on the bolster plate we ran 25,000 pieces just the same as with the slides we have now. We made these other slides first of lighter material. But we have a careless way of taking care of our dies. I have sometimes harped on that, but you know it is just like when you start poor housekeeping, they hang the clothes upon the floor and all that. They take a die and throw it in the die vault and bend it all out of shape. So we have gone on and made it so they can throw it and yet keep it in shape.

You can do this no matter how small the place is and no matter what you are doing. With 65 cents worth of material and two hours of work you can put that slide on the machine and increase production 150 per cent.

MR. DUNNEBACKE: Supposing a safety engineer wants to start in this slide feed work in press work. Where is he going to get the best results? Is the best plan to go to the chief die designer and ask him to go after it, or just to get some practical, common-sense, all-around handy mechanic to undertake the work?

MR. KAEMS: Don't go into the die room because everyone of the die makers works according to blue prints and they work according to the thousandth of an inch. That is our great trouble every time we have tried that. Yet time and time again, after it was on, we had to take it and loosen it up and do one thing or another to it. When I went there

the thing I asked for was just a good handy man, a good machinist. I was very fortunate in getting a fellow who had done a little safety work and he was a good mechanic. I told him first what we wanted and he was like all of the rest and he said, "You can't do that, Mr. Kaems." But he doesn't say that any more. We have a sign in our office which says, "It can be done," due to the fact that when I told him to change a certain job, he said, "You can't do that."

I said, "Are you sure you can't do this?"

He said, "Yes."

I said, "You don't want to commit yourself, but are you damn sure you know it can't be done?"

He said, "Yes."

In five minutes I showed him he was mistaken and since that time he has never again said, "It can't be done." I just tell him what I want and he takes care of all of the work. If he wants to get the thing just right he gets a rule and puts a piece of metal on it and he holds it there and it slides and in a little while he gets what he wants.

Get a Good Handy Man to Make the Slides

The thing to do is to get a good handy man and let him take care of that and let him get some other handy man to help him. We don't want a man who is going to get too technical because that isn't going to help you, but if you get one good man with good horse sense you would be surprised at what he can do for you.

We never had much success even by getting the tool makers to do that. In the first place, with one of those men everything must be polished and fine and cut down to a thousandth of an inch and all of that stuff and that isn't necessary at all. They spend three times as much time on it as they should. I do not say this to belittle any of you tool makers. You know your little troubles. When you build dies they must be down to a thousandth of an inch and that is the trouble with the tool makers. That is why I say, don't get someone who is too technical on this work. That doesn't need to be down to a thousandth of an inch. Just get some fellow to handle it who has some ingenuity; he has got to think a little. If you do that, you will be surprised at how many things he will work out. After the men find that a thing works well—they have a head just as well as we have and they give suggestions if they know they get credit for them.

If a man works out a little thing for us, he gets credit for it. There is another thing we have done. You hear time and again that you can't get men to use this and that. We haven't any trouble with that at all, due to the very fact that when you increase production and let a man earn a dollar or two a week more than he has been earning, I am going to tell you he is for you. He wants to make money, \$2 a week means \$100 a year. That is how we have been able to get the men to use it. We have sort of pushed them into it. We have had fellows who wouldn't work on it on a bet until they saw that the fellow working next to them was earning a couple of dollars more a week than they were and immediately they wanted a slide. After they get them they are for them.

You have to look at the other side a little bit. You can't push it all down their throats. That isn't fair; it isn't right. They don't give it the same thought that a lot of us have given it, but you can teach them. We haven't had a bit of trouble except with one man who has not one whole finger on either hand. He lost them all in our plant before we had these slides and he has been the hardest man to handle. He admits that his average pay has been \$42 a week due to the fact that we made slides for him. Once in a while he forgets himself and goes in there with a stub. I caught him once or twice—he has worked there for a long time—and I said, "Shorty, if I ever catch you doing that again you are going to get a different job. We don't want to do that because you have worked here for a long time, but you can pick out any kind of a job you want. Do you know of any job around here?"

He said, "No."

I said, "There is only one job you can do and that is sweeping, but you can't earn \$42 a week sweeping. Don't forget that. The next time I catch you doing that we will make you a sweeper without any talk about it." And we would. He thinks of \$42 against probably \$25 and he surely obeys the law and the rules.

Of course there are no two ways about it. You have simply got to put your foot down. I have tried everything in the world and yet there is just one way that you can make a man realize and think of it and that is when you hit his pocketbook.

One of Those Who Said It Couldn't Be Done

CHAIRMAN HENNING: The remark that Mr. Kaems made there hits pretty well home when he said, it can be done. I used to have that same habit and I used that same expression a good deal—it can't be done. I had to change that very quickly if I wanted to continue to work. At least, the executives over me discovered that it can be done and it must be done and therefore I had to change it and get down to hard tacks and the result was that we did get it done. I remember particularly that I was told, "Henning, it can be done and it must be done. If you are going to continue with this idea that it can't be done somebody else is going to do it." The result is that we are doing it.

It hit right home when he made that remark. I know Mr. Kaems would like to have me talk on our stuff. I don't know that I could say much about it because he has pretty nearly said all that can be said on that line of work.

R. H. LUCKENBACK (Budd Mfg. Co., Philadelphia): I wish I could get up and talk like Mr. Kaems can but I will say this: I used to be one of those fellows who said it couldn't be done but I have since realized that it can be done. Further than that, you have seen a little demonstration in the rear of the room showing how it can be done. Mr. Clark, who is here, would be glad to show anyone through their plant and show that it can be done. I was a lone visitor at his plant on Tuesday afternoon and I want to tell you that it was worth going to see.

CHAIRMAN HENNING: If Mr. Clarke is in the room we would like to hear from him.

E. F. CLARK (Ternstedt Manufacturing Co., Detroit): The picture that has been drawn here has been very much my own experience, not only at the present time but in several other plants. The one exception that I will name is the Universal Button Company.

I went with the Universal Button Company in 1912 and they had dies that were chipping off the fingers and apparently they didn't know how to grasp the situation. Being an employee of the insurance company at that time, it was to our interest to stop them in some way or get off the risk. Because of their recent experience, the management was induced to make the effort and started them off with a slide apiece. One of the girls had an accident on a slide feed caused by her leaning against the guard. The guard gave way and a piece was chopped out of her finger. This induced the manager to remark to me, "I wish we could do without the press operator."

Applying the Principle in a Button Factory

As a result of that I thought for a minute and it struck me that having a uniform product the size of the button, and it is perfectly round, that that would be an ideal thing to experiment on automatically, and I made the suggestion that they use a slot, similar to the one here, and that they take the blanks and roll them down and finally use the stripper plate with a bell crank on the press and in that way make the drop automatic.

They have done that and they have some very clever setups. They have a little pick and if the piece sticks on the point it comes down more rapidly than you could possibly do it yourself. It would pay anybody who has the opportunity to visit the Universal Button Company and see these automatic machines. They have about 60 presses and about four or five men are all of the employees they have in that department. They take stock from the blanket press up over the aisle and down to a forming operation. They have presses wherein three pieces are assembled in one die automatically. That is going the pace. That is really punch press work.

We are drifting that way and I want to say that Ternstedt is drifting that way faster now than they ever have within the four years I have been with them. It has been a hard struggle there with very few illustrations for the men to see and get ideas from in order to work out their own problems. But we have patiently drifted along and tried sympathetically to introduce the thing. I believe now that Ternstedt is on the right track with plenty of sand on the rails.

We have kept open house with a view to trying to demonstrate some of our safety guides. We have a diversified exhibit here that shows the different methods of making dies safe. Some of them at first glance don't appear to be safe but the safety is there just the same. Also, instead of making the job absolutely foolproof, we give the oper-

ators credit for having intelligence enough to understand that we are depending on them, that they are not willing to jeopardize their fingers. We also give them a systematic training of eight days in order to illustrate to them that these dies are to be handled in a certain way. It is expensive to have green operators shooting two or three pieces through a day in one operation and if a piece only gets half-way in it is fatal to the die also because it cancels the one side and destroys your tool.

We take them in hand and we tell them, "Now this company has spent money making the dies safe and it is up to you to assist; it is your fingers that are at stake. Only by following your instructions religiously can you save your fingers, and our job is to see that you follow those instructions."

Any time we catch an operator taking a chance we warn him and after that we say, "Here you are out," and out they go. This process of handling new employees, I think, is highly important unless you do make your tools foolproof, because after a time an operator will lose that sense of fear and get a sort of false confidence that will lead him to do something he shouldn't. We provide all manner of hand tools and we attempt to provide the right tool for the right job. I want to say that I hardly believe in the nibbers being a slow method of feeding. We have women up there using a pair of nibbers. There is one woman who does it very rapidly—I think 22,000 or 23,000 pieces a day—and there is absolutely no hesitation and absolute accuracy. That is due to the fact that we have allowed her to remain on the one job sufficiently long to secure this skill.

MR. KAEMS: I would like to hear from George Thompson. He can tell a good story if he wants to.

WHY I CAN TALK TO YOU ABOUT PUNCH PRESSES

G. S. Thompson, Detroit Insurance Agency, Detroit, Mich.

I had hoped you wouldn't get me started. If I get started on this die proposition, I am just like one of those repeating phonographs, I haven't got sense enough to shut up.

Let me tell you why I am in this insurance game and why I can talk to you about dies. When I was a kid they put me at die making. I went to work when I was 14 years old and had to go to work at 6:00 o'clock in the morning and work until 6:00 o'clock at night and I got \$3 a week. I was tied out to an old mechanic. Outside of living with my own family, that was about all I had that I could call my own. I have been through the mill and I have had the bumps. I have had a No. 9 shoe thrown up under my coat tails more than once. That is the way they used to teach me.

I decided to go in business for myself, and if you don't think it takes a lot of sand, try it, because when Saturday comes around and the bank balance is low you have to scratch gravel to beat the band because

the boys on the bench don't know anything about your troubles nor do they care anything about your troubles.

I finally got up to a plant of 60 men and we were perfecting factory processes. By that I mean that a company, instead of doing the experimental work in their own shop, which is expensive and which in the main is not entirely satisfactory because they are influenced by their shop condition, would send that work to us. If you will take somebody on the outside who doesn't know anything about the troubles of the shop and say, "That is what we want to do. How are we going to do it?", he will do it for you because fools have walked where angels fear to tread. That is the reason.

I found that it wasn't a really hard job to take the "t" out of "can't." You can do anything that you want to do if you want to do it badly enough. You have to sacrifice; you have to give something; you can't have your cake and eat it.

The Accident to Marie Started Him to Thinking

When the war came along a lot of us were wiped out of existence. I was one of those wiped out, but before that I had something that proved conclusively to me that it wasn't necessary to stick your hands were lots of other ways you could get them nipped off without doing in the mouth of a punch press to get your fingers nipped off. There that. I also found that you could make the press operator just as efficient without sticking his fingers in there.

We were making a die to make a Heinz pickle. It was to be made out of painted tin and it had to have all of the warts on it, too. If you boys haven't tackled painted tin you haven't been through the punch press game because when you press up painted tin you can't break the paint. You have to bring them up out of the paint. I had a girl working for me at this time and she insisted on putting her finger up there to make sure one of the warts would not slip off. I said to her, "Marie, you look out. You are going to get your fingers nipped in there." Sure enough about 9:30 or 10:00 o'clock, after the party the night before when you see four things where there is only one actually, Marie came in with a piece out of her finger.

I said, "You got it, didn't you?"

"Yes."

"What were you doing?"

"I was pushing that piece there and getting that wart out."

"Now, you have a wart on your finger and you will have one there as long as you live."

I decided that if a punch press would chop up a beautiful young lady's hand, I wasn't doing my stuff, so we turned the pickle around the other way. It was an American can press with two front rod stays in it. The first thing we did was to put on another piece of tin and in a few minutes we had the darn old pickle sliding down

just like they slide in the chutes when they brine them. I said to myself, "Here we have been doing this thing all of the time at a cost of 20 cents a hundred. Look at the money I was losing just because I was too dumb to see the thing."

Then we built other dies and other things until when the war was over and the battles were all won, I said, "I don't see any particular reason why I shouldn't start in the insurance game because an insurance man is a missionary." It isn't the experience he gets in one plant. He sees the experience they have in all of the plants. Then they gave me that heart-breaking job of following up accidents, of analyzing accidents.

It is an awful game when you go in a hospital and see a man laying there with a bandage, with his fingers chopped off or something of the kind—all perhaps because of foolishness, because of carelessness, although I have wiped that word carelessness pretty much out of my vocabulary because of something Mr. Bennett said in the A. S. S. E. meeting the other day. He says we say we are trying to make men think—we are all thinking all of the time but we don't always think right. That is the idea. We are thinking and our gray matter is working. Gus was the first man to come out before the world and tell the world how to do this thing. Lots of us know how to do it but we weren't liberal enough to come out and say it because we considered it stock in trade.

A Hard Test But the Problem Was Solved

I was down in a concern in Ohio and I knew the manager of the plant very well. He said to me, "Thompson, your stuff sounds all right, but can you do it?"

I said, "Yes, of course we can."

So he picked up a piece from his desk that looked like a crab. You fellows from the east know what a crab looks like. The moment you touch it it hooks fast to you. He said, "Show me how to feed that."

He didn't give me any tin or any part of his shop. All I had to do was to go back and buy a bottle of glue and steal all of the blotters and advertising matter that I could find in the hotel. I didn't get through until 3:00 o'clock in the morning but by that time I had this thing going down there every time. I woke up at 7:00 and I was out at the plant at 7:30 without breakfast.

At the gate the man said to me, "Where are you going?"

I said, "I haven't got time to talk to you." And I went right on. I was going up to see the big fellow. I was going to take his scalp that day. I put the thing on his desk and I commenced to shoot this thing down one after another. Finally he stopped what he was doing and he said, "What do you call that damn thing?"

"You said I couldn't feed that. There it is. Now you do it." So I shoved it over to him and he did it. He did everything he could to stop

it from working but it always went down where it belonged. Then he said, "Come on downstairs."

At 3:00 o'clock we brought in the foreman of the die department and said to him, "Look at that."

He looked at it and he said, "It works."

He turned to me and he said, "Will you stay here today?"

I said, "Yes, I will stay here today and tomorrow, too."

We started in on that plant and we fixed four dies Saturday afternoon and we fixed six dies Sunday. You know I don't get paid for working Sundays but Sunday is like any other day to me. I wanted to prove to that man that it could be done. When those slides were put into operation Monday morning a sign was put up on the wall and you can find that sign there today if you go to that plant. It says, "Any operator detected placing or removing a piece from between the dies with his fingers will instantly be dismissed. If you want to get fired, use your fingers on the dies."

One of the Old-Time Hard-Boiled Kind

There was a man there as hard-boiled as any man you ever saw. There is a man who has progressed along the line until today he is the head of a big organization. He was a toolmaker. He saw the application. He saw what could be done and he did it. You can do the same thing.

If you have a punch press section and you operate your punch press section as I believe it should be done, you men in the plants want specific cases proven to you. That is what you want. It is all right for us to tell you; it is all right for all of these dies to be brought here and shown to you; it is all right to tell you that this principle can be applied and that it can be done; but you have your own particular baby in your own plant. You have your own particular problem from a production standpoint. You can't tear down your organization to build it up with something else. You have to crawl along just as you did as a child, before you can walk. You have to creep to get your balance and after you get your balance you start; after you walk you start to run. There is nothing to it. This is the only way you will accomplish it in your plant.

There is no use fighting the die maker. There is no use fighting the die designer. It is a case of salesmanship, of selling. Do you suppose 15 years ago that you could have sold me on any kind of stuff like this? I would just say, "You're nuts. Get out of here." So will any other superintendent or die maker or manager in your plant today because he isn't thinking along that line. You can't make automatic dies for everything because it would sink you financially. It will sink your organization financially.

Just use common sense. As one of the boys over in that small plant session said, "use consecrated common sense." If you can use consecrated common sense in your job you will do this. You are not going

to slide every piece the first time. You are not going to produce a whole lot of production. There may be some dies on which you will penalize production a little bit, but if you do you have done this: you haven't decreased the rate of the employee but you have taken the burden away, and that burden is one, two or three fingers when they are chopped off.

I maintain today, and I always have maintained, that it is absolutely not necessary to feed a punch press with your fingers. I say again, and I am willing to back up the statement, that there isn't a piece made today that can not be fed some other way than with the fingers, just as accurately and perhaps a whole lot quicker.

Simple Problems Are Sometimes Hard to Work Out

It is fair to consider this point, too, in the shops. You men know as well as I do that the reason your dies break, the reason your dies wear out, is because the man feeding the press does not register his piece every time and it causes an undue strain on your cutting edges and before long your die is gone or the piece gets cross-sectioned and the die comes down on it and ruins it. Of course you die makers want to feel that when you put that piece in the slide it is going to go down there because that's your baby, that costs money, and you don't want it all buggered up. You want that die to remain. What is the result of the chute feed dies? Isn't it fair to assume if you place that piece in there in its position it is going to go to its destination every time? Of course it is and it is going to be 90 per cent accurate. With hand feeding at the best it isn't 75 per cent accurate, and you know it.

Doesn't it appeal to you that applying a principle of this kind levels off and cuts down the die repair? I know that it does. I know that Ed Clarke found it out. I know that a hundred of the other plants know that it did. So if it does it for them it will do it for you. If you want your Punch Press Section and you are interested enough in it, then don't be afraid to bring your die along.

I hope some day to see punch presses set up. I hope to see dies set up and operated, if necessary. I don't mean a great big fender die or a side rail die or a cross-section die, but just something that proves the purpose. Do you know that today there is one concern in town here that handles a sheet three and one-half feet long and eight feet wide and the man goes up and shoves it in the machine and goes away and leaves it? Would you try that on a combination blanking, forming and piercing progressive die? When it is done it is only a half-inch cross section. Yet it works and one man runs three blanking presses. Think it over. It isn't anything wonderful. It isn't anything complex; it just means using the old bean, that is all.

I think it was last year that Admiral Sims said it took him a long while to find out why they put the head on a pin. He finally figured out that the reason was to keep the pin from going in too far. The same

principle applies to this. Don't think for a minute that you are going out and turn the shop around and everything is going to go well, because it isn't. They put the head on the pin so it wouldn't go in too far. Go easy at first but when you do go, go all the way down to the head and stick there.

I haven't anything more to say to you than this. God bless you in your movement for a punch press department. May the greatest success in the world attend your purpose. Then let the charity of your heart and the liberality of your mind open up the sources of experience that you have all had and let it flow to the National Safety Council conventions so that you will have the biggest Section in the whole organization, so that you will have the greatest amount of good for everyone and so that you can return your employee to his home every night all in one piece.

CHAIRMAN HENNING: Gentlemen, it is just as Mr. Thompson said. You can make this one of the biggest Sections of the National Safety Council, and I believe we are going to do it by a lot of hard work; otherwise I don't believe we will be able to get anything.

The Nominating Committee ought to be able to give their report at this time. Mr. Schwab, I believe you are the chairman.

MR. SCHWAB: The Nominating Committee has met and has selected the following nominees for officers for this coming year for your approval.

REPORT OF THE NOMINATING COMMITTEE— POWER PRESS SECTION

Chairman, T. O. Meisner, American Can Company.

Vice-Chairman, J. H. Henning, Automatic Electric Company..

Vice-Chairman, W. Dittmer, Westinghouse Electric Company.

Secretary, A. L. Kaems, Simmons Company.

Executive Committee: F. Boraks, Liberty Mutual Insurance Company; H. Schwab, Aluminum Goods Company; C. S. Gerding, Western Electric Company; H. Sinclair, Worcester Stamped Metal Company; E. J. Clark, Ternstedt Manufacturing Company; L. W. Thompson, Wagner Electric Company; W. J. Graves, Michigan Mutual Insurance Company; J. Larson, Clum Manufacturing Company; R. Marter, National Enamel & Stamping Company; F. Mares, Perfection Stove Company; G. S. Thompson, Detroit Insurance Agency; G. Kuechenmeister, Dominion Forge & Stamping Company; S. H. Slaymaker, Fairbanks Morse Company.

CHAIRMAN HENNING: You have heard the report of the Nominating Committee. Are there any other nominations? If there aren't any, we will have the secretary cast a unanimous ballot for the officers as set forth in the report of the committee.

ADJOURNMENT.

Cement Section

New Officers of the Section

CHAIRMAN: R. FRAME

Alpha Portland Cement Company, Easton, Pa.

VICE-CHAIRMAN: T. F. HALPIN

Marquette Cement Manufacturing Co., Chicago, Ill.

SECRETARY: A. J. R. CURTIS

Portland Cement Association, Chicago, Ill.

Committees

MEMBERSHIP: HENRY A. RENINGER, Chairman

Lehigh Portland Cement Company, Allentown, Pa.

October 26, 1926

R. FRAME, Chairman

Insurance Manager, Alpha Portland Cement Company, Easton, Pa.

THE opening session convened at 9:45 o'clock in Parlor B of the Book-Cadillac Hotel, Detroit, Michigan. Mr. R. Frame, insurance Manager, Alpha Portland Cement Company, Easton, Pa., presiding.

CHAIRMAN FRAME: Gentlemen, it is a pleasure to see this fine turnout of men who are interested in the safety activities that have been carried on in the different plants for the past year. It is a pleasure to the officers of the Section to note the large increase in attendance. It is my hope that you will feel very much at home in this meeting, that the addresses will prove of unusual interest and that you will all feel free to enter into the discussion. Tell of the good work you are doing. Undoubtedly there will be questions you would like to ask, because there are those here who would be very willing to trade experiences.

The first item on our program is a report from Mr. Jacobsen covering the officers, and his report, as secretary of the Cement Section. He has been with us so many times that an introduction isn't at all needed. I know you are anxious to hear him.

H. G. JACOBSEN (Manager, Bureau of Accident Prevention and Insurance, Portland Cement Association, Chicago): Gentlemen, last year at the Congress in Cleveland we had a very good representation, but this year we will eclipse that attendance quite considerably.

As a part of the association activities, of course, you understand this

work of the Cement Section really runs hand in hand with the work of the Bureau of Accident Prevention and Insurance of the Portland Cement Association. These two bodies—practically one, you might say—have endeavored to keep up the work in our industry during the year. Immediately after the spring meeting of the association in New York, we held a meeting in Phillipsburg, New Jersey, for the eastern district, and we had present there a little better than 200 cement representatives. We had a fine program, and I am sure that meeting was the most interesting ever held in that section.

A little later we held another meeting at LaSalle, Illinois, where we had representatives from plants in the middle west, and we had around 100 representatives there from various cement plants.

Meetings of that kind have been held regularly from year to year and have helped us wonderfully in keeping up the interest of the various sections.

A Forty-two Per Cent Reduction in Accidents

I traveled through California about two months ago to attend the Pacific Coast Safety Conference in San Francisco and also the first aid contest being held at the same time. We had in San Francisco 25 or 30 cement men taking part in the various meetings. The Pacific Portland Cement Company's team went home with one of the prizes in the first aid contest. We contemplated holding another meeting in Kansas City, but it became impossible to have that meeting at the time we expected to hold it. I believe we should arrange a meeting in Kansas City, or in that territory. Kansas City is a good place for a Cement Section meeting, and it ought to be held some time in the near future.

You all know about the statistics prepared by the Portland Cement Association. If you have studied the figures in the little book containing statistics for 1925, and also figures for preceding years, going back to 1919, you will have seen that last year we made some wonderful improvements in our accident prevention work—a little better than 42 per cent reduction in accidents since 1920. Considering that figure is for the whole industry and not for a few plants, it becomes even more significant. We take both good and bad figures and compare them year by year. This year promises to be the best year we have had so far in the cement industry by a very wide margin.

We have a campaign going on in the industry at the present time—a general accident prevention campaign. For good reasons we don't call it a no-accident campaign, because we are not ready for that yet, although I think we will be shortly. We are trying during the last three months of this year to see if we can not eliminate practically all of our fatal accidents, at least. If we can do that, this year will stand out far ahead of any previous year.

I want to take this opportunity, men, to thank you personally for the interest you have displayed this year. It is difficult, I know, for people outside to realize how the accident prevention work in the cement industry has taken hold the last few years. I am not going back six or seven

years—just the last few years. There has been very remarkable improvement in the interest being shown, from the top to the bottom, at all our plants. I will say that the situation looks very encouraging and there is no reason why during the next few years the cement industry can not make some records that should be broadcasted all over the land. We have too many fatal accidents, but we are getting after those, too, and they are coming down. I hope this year to show a reduction of 50 per cent in fatal accidents. We can't eliminate all, but we can make a very considerable reduction.

The accident reports from the various member plants are coming in in very good shape now. We have very little trouble in getting accident reports. We have very little trouble in getting the man-hours. In fact, we meet very little trouble of any kind, except in connection with the accidents themselves. We have too many of them, and we are trying to eliminate them as far as possible.

Early this year at the meeting of the association in New York, the Portland Cement Association's safety trophy was awarded. We took considerable pride in awarding not only one trophy but two trophies, inasmuch as last year we had two plants that had no accidents at all. Those two were in Canada. No. 8 plant up at Port Colborne, Ontario, and the Duluth plant of the Universal Portland Cement Company. L. M. McDonald is superintendent of the Port Colborne plant.

A Record of 521 Days Straight Without an Accident

At Canada No. 8 they ran 521 days straight without an accident. In fact, Mr. McDonald told me yesterday that they have done 700 days with the loss of only 18 days. Gentlemen, that is a mark to shoot at.

The Duluth plant also did not have any accidents last year. The trophy given the Duluth Company will be unveiled on November 3, and the one in the Canadian plant will be unveiled inside of a week or two. It is unfortunate that it has taken us so long to get those trophies, but on account of their size and their great artistry it took a great deal of time to get them after the announcement of the awards was made. They are wonderful, and their owners will treasure them more than anything they have.

CHAIRMAN FRAME: You have been introduced to Mr. McDonald and Mr. Huth. I wonder if Mr. McDonald wouldn't tell us about how it feels to win a trophy. I know there is a certain wonder in the minds of these men as to how you have been able to go through an entire year without a lost-time accident. Mr. McDonald, will you tell us briefly how you accomplished this wonderful result?

L. M. McDONALD (Superintendent, Canada Cement Co., Ltd., Port Colborne, Ont.): There is one thing about an accident prevention campaign which bears mention and that is the fact that it takes a long time to get to the point where you can win a trophy; you have to work for a great many years. You will probably need to try various organizations

and many schemes, conduct a great publicity campaign. But the most fundamental thing in safety work is placing the responsibility on your foremen. You must place the responsibility for your safety, just the same as you place the responsibility for any other part of your plant, on well-qualified men. The men you have selected as foremen of the plant naturally are these qualified men on whom you must depend.

I can candidly say from the first day we placed the responsibility of the safety work on our foremen, which was in October, 1923, we saw a marked reduction in accidents. We could see that they were thoroughly sold on the proposition of safety. They were absolutely assured that the responsibility was theirs, and from that day on our safety work made a marked improvement. In fact, during 1924 we successfully went through nine calendar months without any accident, and we had only 35 lost days during that year.

So we have paved the way to this trophy from 1920 to 1924 by safety education. Education shows that accidents can be prevented. It certainly is an assured fact that if you once can get that idea into your organization—that accidents don't "just happen"—that there is a cause and a reason for every one of them—you can absolutely count on your safety work being successful.

My secret of success is contained in these few words: "Educate your foremen"; they in turn will educate their men. You will then soon have the whole plant educated in accident prevention work. If you once prove that accidents can be prevented, you will never have them afterwards.

CHAIRMAN FRAME: Thanks very much, Mr. McDonald. It is reassuring to know that your plan still holds up and that you are continuing the very good work that started some years ago.

How It Feels To Be Awarded a Safety Trophy

Mr. Huth, will you now tell us something about the trophy that you are going to place on display soon?

GORDON C. HUTH (Superintendent of Safety and Labor, Universal, Duluth): It feels mighty good to get a trophy. At our plant we didn't realize what we were getting until the other day—a week ago yesterday, I believe. I came into the plant and found a flat car and something of unusual size upon it. Upon investigation I found it was the trophy. It is a huge thing. We set it up the other day. It stands eight feet out of the ground, is two feet thick, and weighs 15,000 pounds. That isn't a thing that is going to deteriorate and fall apart in a hurry. We have a monument to our safety work from now on.

Mr. McDonald told you how the work was accomplished at his mill. I would say that what he has done is similar to what should be done in any place where there is successful accident prevention. I can say in just a word or two that we succeeded by various means and ways to get everybody in our organization to put his shoulder to the wheel, and in that way we accomplished what we did.

CHAIRMAN FRAME: I will now make the announcement that the Nom-

inating Committee was appointed some months ago: Major H. A. Renninger, of the Lehigh Company; Mr. Frank H. Sass, of the Universal Company. The third member was Mr. David Adam, of the Lawrence Company. I am sorry to say that he was unable to be with us on account of a hospital operation, but he sent his regards to all his cement friends and hopes to be with us another session. I am going to ask Major Renninger if he will kindly introduce the next speaker on the program.

Report on Membership in the Cement Section

MAJOR RENNINGER (Lehigh Portland Cement Co., Allentown, Pa.): Ten years ago our next speaker was good enough to come to a meeting of the Cement Section—I think it was here in Detroit. If I remember correctly, there were 10 present, and of those, six were the speakers. There were four in the audience. What I want to bring out is that we have grown from practically nothing to the size of this meeting here.

I want to make a short report to the Cement Section. When we started we had practically only two or three companies that were members of the Cement Section and members of the National Safety Council. At the present time our membership is 70. Among those 70 members, as nearly as I can figure out, we have something like 41,000 employees; and that does not include one concern which has been assigned to the Cement Section, which is doing work somewhat similar to the work we are doing, and also has a cement plant. That company is the Pittsburgh Plate Glass Company. Adding this to the number of employees, we have something like 53,000 men in the Cement Section.

I am glad to say that during the past year there were but four memberships canceled. Of those four, the Acme Company was taken over by the North American and is still a member of the Cement Section. The Tidewater, which was taken over by the Lehigh, is still a member. The Indiana Portland was taken over by the International. While they dropped out under their own name, they are still members of the Cement Association. The only resignation we have was the Wilson Portland Cement Company of New Zealand. I don't know why they resigned, and it is too far to go over to find out. We have nine new members this year, making a total of seven additional members.

If there is any one official who has been interested from the beginning in accident prevention, it is our next speaker. He was one of the original members of the Committee on Accident Prevention and Insurance of the Portland Cement Association when that committee was formed in 1914. Mr. Bissell, now Chairman of the Board of the International, was one member, and Mr. G. S. Brown, of the Alpha, and myself were the others. At that time Mr. Hill was elected secretary and remained in that position up to the time he went into service. If you will remember, he went into the flying corps and was killed. Since that time Mr. Jacobsen has been our very able and efficient secretary.

Mr. Brown has always had accident prevention work at heart. In the early days when we needed help and advice we always went to him. He

would always go to the Executive Committee of the Cement Association and fight our battles. I think you will agree with me that we are very fortunate in having Mr. G. S. Brown, president of the Alpha Company, to talk to us on accident prevention and what his company has done.

ACCIDENT PREVENTION FROM THE VIEWPOINT OF AN EXECUTIVE

G. S. Brown, President, Alpha Portland Cement Company, Easton, Pa.

In October, 1916, ten years ago, I presided as chairman of the Cement Sectional Meeting held under the auspices of the Fifth Annual Congress of the National Safety Council at the Hotel Statler in this city. At that meeting there were 14 present, including myself, and in looking over the minutes the other day I noticed that in my concluding remarks, I said that I hoped I could be with you again some day. That Cement Sectional Meeting was the second one, the first having been held in Philadelphia the preceding year.

When I look over the group that has assembled here today and compare it with the few representatives who were present ten years ago, I am impressed, as in no other way, by the increase in interest on the part of the cement industry in the protection of its employees from the hazards of their occupation. You gentlemen who are on the "firing line," so to speak, undoubtedly regard the subject of accident prevention as a somewhat abstract proposition and find it difficult at times to keep an active interest in it, when you have so many other matters pressing on you for attention—matters which are apparently much more important, in that the prosperity of your organization depends upon continuity of operation and economy of procedure in your plants. Nevertheless, in spite of this drawback, progress has been made in the cement industry in reducing accidents.

I do not conceive it to be my function to analyze in detail the statistics of the plants which have reported to the Portland Cement Association during the past ten years. This has been done in such a masterly way by Mr. Jacobsen, manager of the Association Bureau, that I can add nothing to it.

What I would like to do is, if possible, to bring some message of encouragement to you men who are working continuously to reduce accidents in the cement industry. My interest in this matter changed from the sentimental to the practical about 1910 or 1911 when the first compensation laws were being discussed by the legislatures of New York and of New Jersey. As I recall it now, the first law was passed by the state of New York and was later declared unconstitutional. This was followed by the enactment of a law in New Jersey which passed the constitutional test, and thereafter New York passed another law which also was declared constitutional. Since that date nearly all of the other states have passed compensation laws.

As a result of these early laws a determined effort on the part of the

management of the Alpha company to reduce the number of accidents about its plants was begun. Our work at first was more or less intermittent, but the fact that I, during the years from 1911 to 1915, was in close contact with the operation of the plants of this company brought home to me in a very emphatic way the real importance of accident prevention work; and as time went on, I gradually came to see that no effort that we could make to prevent the maiming and killing of our workmen was too great or costly to be tried.

While I no longer have the close contact with the operations of our plants that I had in those years, I still have the same active interest in the accident prevention work of our own company and of our industry, and it is a matter of pride with me that not only have the efforts of the Alpha Company had a measure of success, but the work of the accident prevention committee of the Portland Cement Association has also been successful.

Many different methods have been tried by the company that I represent and by other companies in the industry to stimulate the interest of the men themselves in this work. When we first started work, the greatest stress was laid upon the protection of machinery. I was very soon convinced that by far the major number of accidents about our works came from the carelessness and neglect of the individual who was hurt or of some fellow employee, rather than from unprotected machinery. Therefore, while we continue to follow the suggestions of the various state commissions, as to the protection of machinery, we felt that our real job was to get the cooperation of our employees themselves, and that has been our effort for the past ten years.

The One Per Cent Safety Bonus Plan

Frankly, it has been discouraging at times to see, that in spite of all we have attempted to do, after the final figures are made up and a review of the results for the year made, we at times seem to have gone backward. In recent years, however, I feel that we, as well as the industry, have made real progress. Shortly after the first of this year we made a careful study of the accident records of the Alpha Company and were far from satisfied with the result. We had, we thought, impressed the executive force with the sincerity of the president and directors in regard to this work, but evidently they had not gotten that fact across to the employees. I came to the conclusion that perhaps a monetary reward would stimulate the interest and enthusiasm of our employees, and after careful consideration by the management and consultation with the operating officials of our various plants, the Alpha Company established what we call "The one per cent safety bonus plan."

Without going into all the details of this plan, it is sufficient to say that if a mill has operated for a month without a lost time accident, the employees of that plant are entitled on each payday, so long as the plant goes without a lost time accident, to an addition of one per cent of their earnings as shown by the payroll. We are much pleased with the results so far. The lost time accidents for the first nine months of

this year at the various plants operated by an aggregate 40; the lost time accidents for the same period in 1925 were 94. The number of days lost during the same period in 1926 was 551, and in 1925 there were 1,539 days lost. The days lost per one hundred thousand man hours worked for the first nine months of 1926 aggregate 43, while for the year 1925 the number of days lost per one hundred thousand man hours worked was 494, which includes an allowance for four fatalities.

We have been extremely fortunate up to date this year, in that we have had no fatal accidents. Whether this safety bonus will in the long run continue to bring good results, time only can tell, but I am convinced that it has brought about a much greater degree of cooperation on the part of our management and employees than has been known in our organization heretofore. This attitude was well expressed by one of our superintendents, who in an address to the employees under his supervision, said, "When the company not only asks us to be careful but is willing to pay us for looking after ourselves, we certainly ought to comply with its request."

I have touched upon the value of cooperation and I think we may say that our industry has succeeded in getting not only a fair measure of cooperation on the part of the workmen, but, in many instances, on the part of the management of our plants. Nevertheless, there is, it seems to me, still lacking in many companies that full measure of interest and cooperation on the part of the chief executives which they should have.

The Attitude of Management the Determining Factor

These men, in my judgment, should give hearty and continuous support to the efforts of those who are charged with the actual work of educating our employees to safety methods. I speak from the standpoint of the chief executive of an organization, but I am sure that many of you present are executives also, although it may be in a subordinate capacity, and I want to urge upon you most emphatically complete and thorough cooperation on your part with the efforts that are being made in your plants for the prevention of accidents. I think there can be no truer statement made than this, "The attitude of the management will determine the attitude of the employees." If the attitude of the management is that of carelessness or intermittent attention to this particular problem, you can hardly expect workmen to have any other than the same viewpoint. If, on the other hand, the management takes a personal interest in these efforts, if it shows that it is willing to spend money for the protection of machinery and the education of its employees, it can expect a hearty response from these employees.

I can not close this portion of my talk better than to quote an extract from a letter written by W. J. Harahan, president of the Chesapeake & Ohio Railway Company, to Colonel George Harvey, editor of the *North American Review*. This journal had published an article entitled, "Murder on the Rails," and in writing a protest about it to Colonel Harvey, Mr. Harahan said, "The railroad managements have no responsibility

which is greater and no purpose which is more definite and pronounced than to protect the safety of the traveling public." I should like to substitute for "railroad managements," "managers of the cement industry," and for the words "of the traveling public," the words "of the employees of this industry"; and I wish that all of us who have any responsibility in the industry might take it as a statement of our plan and purpose. It would then read "The managers of the cement industry have no responsibility which is greater and no purpose which is more definite and pronounced than to protect the safety of the employees of this industry."

The Fatal Accident Most Important Problem in Industry

It is well known that competition is one of the strongest incentives that men can have, and this incentive in recent years has been used to great advantage in our industry. The trophy of the Portland Cement Association is being worked for by the individual mills of the organizations with much interest, and as the competition goes on, I think I can see a distinct increase in interest on the part of our mills. The offer of the trophy by the Bureau of Mines in 1925 called "Sentinels of Safety" was productive of great interest. The publication of the safety records by the press is of much value. Nothing is more conducive to the morale of a plant than to find that it has been mentioned by the press as having done well in some particular or over a specified time.

The fatal accident in our industry is our most serious problem. It is true that a permanent injury is also of serious moment, but the majority of those who receive permanent injuries are still able to earn their living, to care for their families and enjoy life. The fatal accident, however, removes from the family its wage earner; it takes from him the probable enjoyment of many years of life; it results in the disorganization of the home and the lack of education for the children, or makes it necessary to call for help from those charitably disposed. These are the practical results, but it also causes that great sorrow which the death of a loved one always brings to those who are in his circle of friends. The latter is a thing for which no adequate compensation can be made and the report of a fatal accident is the most distressing one that can come to me as the chief executive of our company. Every effort, therefore, should be made to prevent fatal accidents and as we are successful in such efforts we may count our whole campaign successful.

Your program promises to be most instructive as well as interesting; from your papers and discussions at this meeting you will get a great deal of benefit. When you go back to your plants, you will carry with you ideas which you can put into practical operation. It may not be possible to apply all of the plans which will be outlined at this meeting at every plant, but you will unquestionably get different viewpoints from those you have had in the past and I hope and believe that as a result of this meeting the cement industry will continue its efforts to prevent accidents to its employees with increasing success.

CHAIRMAN FRAME: We are very grateful to Mr. Brown for taking his

valuable time to meet with us today in the discussion of our accident prevention problems. I know we have found his viewpoint interesting, and it undoubtedly carries a large measure of encouragement so that we may continue our good work. Each of these addresses and papers is open for discussion or questions. I know Mr. Brown will be pleased to answer any question which you desire to ask.

T. F. HALPIN (Marquette Cement Mfg. Co., Chicago, Assistant to General Manager): I don't care to ask him any question, but I should like to take advantage of this opportunity to congratulate the Alpha Company on the very fine record which Mr. Brown just told us about, and I should also like to congratulate the active head of that company.

MR. JACOBSEN: I think it would be interesting if Mr. Brown would tell us how many plants have succeeded in getting under the line and getting their slice since this bonus has been granted. I understand that there was a month during which you had quite a run on the bank.

Further Discussion of the Safety Bonus Plan

MR. BROWN: As a matter of fact, I don't know exactly how the thing has worked out. We have 10 organizations working under this plan. I know there was one mill that had quite a struggle to get on; it couldn't seem to get started under the plan. They would work pretty nearly a month without an accident and then some fellow would do something he shouldn't. Although there would be a row about it, they wouldn't get their safety bonus.

One per cent was added to what the man earned. I should be very glad indeed, and I know our directors would be glad, to have every plant receive that bonus every pay day throughout the year. There is no money we would spend more cheerfully to gain the cooperation and enthusiasm of our employees in this particular work. Mr. Frame can perhaps give you some detailed figures. He may have them in his mind.

CHAIRMAN FRAME: With Mr. Brown's permission I will say that so far the Alpha Company has paid out about \$9,000 on the one per cent bonus plan. It began in May of this year. If we continue at our present rate, it looks very much as if the Alpha management will contribute almost \$16,000 in bonus awards. The Catskill plant and the Manheim plant have received their bonuses every month since May. The Catskill plant has had but two lost-time accidents this year. Those were in the early months and they have continued to collect their payments.

We have with us today representatives from all of the Alpha plants—some 10 in number. Mr. Searles is here from Martins Creek No. 3. I should like Mr. Searles to tell us briefly what the men of the plant think about the bonus plan and how much interest there is in it.

G. B. SEARLES (Plant Engineer, Alpha, Easton, Pa.): I am unprepared to say much about it other than to speak of the success of the plan. The men have been very thankful for the bonus every pay day—not particularly for the amount of money, but because of the things for which it stood. When we lost out a couple of pay days for accidents recently, we

were sorry to find that those accidents were lost time. Everybody in a case like that is anxious to see and tell the foreman in a department where the accident occurred how that particular kind of accident may be overcome and to ascertain whether the accident was serious or not. I feel sure this one per cent bonus plan has been a great success.

CHAIRMAN FRAME: Undoubtedly some of you other gentlemen are trying a plan to stimulate interest in safety which probably borders on the bonus idea. Perhaps it may be something better—something novel. You have the opportunity to let us in on it. Is there someone now who cares to report on his success along that line?

MR. JACOBSEN: I am not telling any secret when I announce what the International is doing, because that has been broadcasted. The International Company has a number of plants, two in Texas, one in Kansas, one in Alabama, one in Indiana, one in Virginia, one in New York, two in South America, and one in Cuba.

The early part of this year they started a bonus system—we may call it. It works this way: they divide their plants into groups, not exactly by departments, but attempt to draw certain dividing lines so that each group is on a fair basis with other groups in the same plant. Each year that a group runs without an accident, every employee in that group gets \$10 the first year. The second year if they succeed in carrying on without any accidents they get \$20, and so on up to five years. So that it is possible for men to win \$50 in one year if they have gone without accidents that length of time. If they have an accident, they immediately slide down to the bottom and start all over again. The plan has created considerable interest.

A Plan That Arouses the Interest of the Employee

I have been around to quite a number of the International plants lately, and many of the men are convinced that at the end of the year they will have a \$10 bill coming to them. I am sure that many of them will get it. On the other hand, there are several other groups that have lost out, due to a small accident, and one accident in that particular group means that every man in that group loses out. It is quite a calamity for the individual not only to have that particular accident but the stigma attached to him that he was the man who kept the rest of the fellows out of their bonus. I remember in one particular plant there was an accident and the men said, "There goes \$10."

I have explained to you how they have a lot of fun out of it. That is the only way to look at it. As Mr. Searles has said, the \$10, or whatever the amount may be, is only a very small part of it. I really believe the pride the men take in winning the \$10 is worth 10 times that amount and that is just the way it should be. I am sure that particular plan is going to work out very fine, too. There are a good many other schemes around the various plants that help to keep up the interest among the men—such as having men sent around to meetings of this sort and various affairs that we arrange for during the year at various places.

Mr. BUCK (member of local contracting firm): I have been appointed to attend this meeting of the Construction Section on account of our close relation with cement. We are concrete contractors here in Detroit. I should like to ask Mr. Brown if he carries his own insurance in his company?

Mr. BROWN: We carry our own insurance in some plants, and have state insurance in others. We take whichever is cheapest. We carry our own insurance in Michigan, Illinois, and New York. We are in the Manufacturers' Association in Pennsylvania. In West Virginia we belong to the state fund. For certain reasons we belong to the state fund in Ohio. There is no compensation law in Missouri, but we hope to get one there this fall.

Planning the No-Accident Campaign

C. C. REID (Office Manager and Safety Inspector, Ash Grove Lime & Portland Cement Co., Chianute): We have no bonus system, but we think we are making a fine record down there and we want to tell you men about it. Ending October 31, if we have no accidents until that time, we will have run seven months without a lost-time accident. Our first real accident prevention campaign was in June a year ago when a one-month campaign was inaugurated. We went through that successfully. We didn't start another campaign until July this year. During April, May, and June, up to July, we had no lost-time accident. We are going along so well that we want to make it six months more.

We had a meeting at which we had speakers and opened up a campaign. We had several out-of-town people address us. We put on a rather novel scheme to create interest. We built a large bulletin board about 12 by 16 in a sort of time office where every employee could see it as he went through. On that we had two sets of hands which ran from April to December, inclusive. As we went through each month without an accident, we would move up a hand.

Another device we had was a hand that counted the days. Every day that passed without an accident the hand would move up. On each side of the billboard was a space to be filled in every day which said, "If you work faithfully you appear here." On the other side were items of interest which were changed daily. At the time we started we appointed about 60 inspectors over the plant. Each inspector was to watch his department for infringement of safety rules and hand it in to one of the committees. If he infringed any rule he would appear on that board the next morning. We found that this created a lot of interest, for no one wanted to appear there. On the right side we changed the bulletins daily and entered items of interest to employees.

We have found that when we make our own bulletins the men pay more attention to them. We have a novel scheme of making bulletins. One of our employees, a painter, cuts out large posters and uses a spray gun brush on them and makes all sorts of posters that are, very interesting.

I want to say that if there is a minor accident, I am called to the office just as soon as that happens to find out whether it is going to be a lost-time accident. That is how much interest is created. Everyone is up and coming because they don't want to see that record broken. We hope to go along without any accidents not only this November and December, but also longer. I am going to try to get a different idea to take back to start in January.

CHAIRMAN FRAME: That is very fine, Mr. Reid. We share with you in the good wishes for your continued success. Mr. Stroud of the Mitchell plant of the Lehigh Company is here today. I have an idea he can add something to this discussion.

WALTER A. STROUD (Foreman, Lehigh, Mitchell, Ind.): I do want to tell these gentlemen who have their trophies to install that we have had ours now for six or seven months. I want to say that that trophy certainly is creating considerable interest, not only on the part of the employees, but on the part of the general public. It has been surprising to note the number of questions that have been asked as to just how we got it and what we did. Every man in Mitchell can answer those questions, and it certainly gives the employees a feeling of pride to tell about it. I have had occasion to talk with several employees, not only foremen, but the men themselves, about what a pleasure it has been to them to explain to a stranger in our little town just how we got that trophy.

MAJOR RENNINGER: As far as those Mitchell plants are concerned, I want to say in addition that the last report shows they have gone over 10 months without a lost-time accident.

Another Idea—"The Veterans' Safety League"

There is another thing which we are going to start at the end of the year which is of interest. We are going to start the Veterans Safety League. That will mean that any department which has gone through a period of five years can be a member of that League. I know that at one plant we just finished with three departments that had gone a period of five years without an accident. At Mitchell we have got nine departments that have gone 1,000 days, three departments that have gone over 2,000, and two that are almost up to 2,500 days. The quarry, which I feel is always the hazardous part, has three departments that have gone seven years.

CHAIRMAN FRAME: That is a wonderful record, gentlemen. I give you credit for it. Any quarry section that can go seven years without an accident is entitled to honors.

H. L. MEAD (Manager, American Cyanamid Co., Brewster, Fla.): I want to ask Mr. Brown one question. We have very much linked up our safety work with production. I wonder if the Alpha plants receive bonuses for high production in addition to the safety bonus?

MR. BROWN: No, they do not. I have never been able to work out what I thought was a fair method of compensation to apply to produc-

tion of cement. As all you men know, the production of cement is dependent upon a whole lot of factors besides the human element. If we would attempt to pay men by any scheme I have thought of up to date, using production as the basis for pay, we would find ourselves frequently in a position where the men wouldn't get anything. We have instances in which an accident happens and a piece of machinery breaks, or perhaps we have a storm come up that stops quarry operation, or something of that kind. Those instances are not the fault of the men, but the fact is that we can't run full time and we have got to cut our production—not on account of the men but for reasons that they can't possibly control. For that reason we have never attempted to pay men on any of the so-called bonus methods in our plant, except in the packing house. There may be some mills which pay on the basis of production, but as far as I am concerned, I wouldn't know how to do it equitably; nor have any of our people ever been able to work out any method which I thought was fair to the employee.

A Concrete Way of Showing Management's Approval

MR. MEAD: We don't have a bonus plan. We don't have it either for safety or production. But I wonder if it is absolutely true that the human element isn't present just as much in production as it is in safety, and whether the element in which the man isn't to blame doesn't enter into the matter of safety as much as in production? I know that we chalk up a big lost-time accident mark for a man who happens to have sprained an arm in some small way who is off for one day, and in the same manner we chalk up a lost-time accident for a fatality. We don't have many, but it seems to me it is true that the men aren't to blame in lots of accidents and also that the men are to blame in lots of lost production cases.

MR. BROWN: Perhaps I ought to say that I don't consider the safety bonus plan as a bonus. The amount is too small to be considered as an addition to the men's pay. What it is intended to do is to show in a concrete way that the management, including the directors of the company who gave their approval to this plan, are interested in this safety movement and that they are so interested that they are willing to pay money to have accidents stopped. When you divide \$16,000—which is the amount Mr. Frame estimates we are going to pay this year—among several thousand men, it isn't very much to each man.

But there are very few men who won't respond to that sort of a suggestion. There aren't many who don't want to see the stamp on their pay envelope, "Safety bonus," amounting to one per cent of what they have earned. I understand that applies from the superintendent down. It is not given because of the actual money value, because a man who earns \$150 in two weeks gets only \$1.50.

MR. MEAD: I wonder how far that same \$16,000 might go in another way. The money in itself is not important, as Mr. Brown has said. I wonder how far that would go on a vacation plan or something that

is possibly a little more constructive in preparing the men from the bottom up for reducing accidents?

VAL ROBERTSON (Electric & Safety Engineer, Canada Cement, Montreal): We are attempting to stimulate interest in accident prevention work in our plant. We have had rather a large number of trivial accidents, in which a man gets a little hurt, reports the accident, and takes a day off. So to try to stimulate his interest we have had some discs made, safety tokens—similar to our time checks. When a man comes in on shift he takes his ordinary check, an aluminum check, which corresponds to the number of his brass check. On this we have a message in French and English concerning safety. For in our province we have to deal with two languages which makes it hard to get an accident prevention campaign over, and the posters from the National Safety Council are in English, and the majority of our employees can't read English. I think it is a novel idea put up by our safety committee. We have had these discs struck. A man takes one out when he comes on shift and when he goes out he puts it back in the time office. We are of the idea that if a man does this twice a day he will know something about safety in time.

CHAIRMAN FRAME: New ideas are continually coming forward to interest the men in cutting down the accidents. Does anyone else want to add something to this part before we go to the next subject?

Eliminating Some of the Lost Time

W. F. WEIDNER (Quarry Superintendent, Lehigh, Mitchell): This is a place to exchange ideas on safety, and while I am not a speechmaker I want to tell you how we eliminated some of the lost-time accidents in our work. In my department it was always very easy for a fellow to be told to come back the next day when he had a sprained ankle or thumb. I finally appointed a committee of three whose duty it was to investigate the case of absence without permission and ascertain whether he was hurt. They would usually find he was working on his automobile, making a garden, buying a car, or something of the sort. We didn't follow that practice long before there were fewer lost time accidents. Perhaps what I have said will be of benefit to others here. The trouble with the minor accidents is that they are reported after the men are out.

O. F. SCHULZKE (Chemist, Missouri Portland Cement Co., St. Louis): At both our plants, St. Louis and Kansas City, beginning with January, we started what we call the foremen's no-accident bonus. This bonus is prorated on the number of men the foreman has working for him. In other words, he gets so much per head. At the St. Louis plant we have 27 men participating in this bonus, and the amount of money we give out each month averages from \$100 to \$130. We feel that it has also helped the quarry, which had a very bad year last year. We have split it up into five sub-foremen. Out of a possible 45 prizes up to the first of October, we have given 43. Although our record is nothing to brag about in the mill and is not as good as some records you have heard

about, we feel that this plan has helped and it has rewarded the man that we hold responsible for the accidents.

CHAIRMAN FRAME: Mr. Jacobsen has enjoyed the intimate friendship of the next speaker on the program, and I deem it a pleasure to invite him to introduce Mr. Green to our cement friends here today.

MR. JACOBSEN: This is an unexpected honor. I have had the pleasure of knowing the next speaker for many years. In fact, I think he got his job on my account. I didn't know him before he got his job, but I got the company frightened by telling them they had to have a darn good man, so they hired this particular gentleman. I tried to get him to go to Cleveland last year, but for some reason he found it impossible to come. So this spring in New York Mr. Frame and I happened to meet his "big boss" and we asked if Mr. Green could come over to Detroit to speak to us at the Safety Congress, and he said "Yes."

I then said, "We will consider that finished. We are not going to write to you any more about it. This is final with us. Much obliged." So Green is with us today.

Mr. Green of the Riverside Portland Cement Company, Los Angeles, has something interesting to tell us—a good many things that some of us frequently forget in connection with our accident prevention work—things of extreme importance—well worth considering.

THE RELATIONSHIP BETWEEN THE PHYSICAL EXAMINATION AND ACCIDENT PREVENTION

Eugene T. Green, Insurance and Personnel Department, Riverside Portland Cement Company, Los Angeles, Cal.

A few weeks ago in the city of Philadelphia some 130,000 people turned out to witness a prize fight which resulted in the crowning of a new champion. Youth was served that night. A young man who had previously passed a successful physical examination for service in the Marine Corps of the armed forces of the United States became a public idol.

His success is primarily and directly attributable to the fact that he entered the ring a perfect physical specimen of humanity. Obviously he was physically a better man than Dempsey. A few hours before he won the heavy weight championship he was obliged to undergo a thorough physical examination, which the legislature of Pennsylvania, in their wisdom, declared should be a pre-requisite wherever such contests are held. The legislature of nearly every state requires both principals to a boxing contest first to undergo a thorough physical examination, which accounts for the fact that in the prize ring these days we rarely hear of a serious injury.

Not long ago I witnessed a football game on the Pacific Coast, and during the four quarters of play not one man on either team was injured

seriously enough to be taken from the game. Sporting authorities agree that football taxes more severely the physical endurance of the contestants than does the prize ring, and after witnessing this game the thought immediately occurred to me that the fact that these men were in such excellent physical condition made it possible for them to engage in such serious physical encounter without resultant injury to themselves.

Before any man qualifies on the football teams of the big universities these days, he is first subjected to a thorough physical examination to determine his ability to withstand the punishment to which his body will be subjected.

The first qualification for military duty in any of the armies of the world is the ability to pass a physical examination.

It therefore seems appropriate that industry should give some thought to this subject when it has been shown the way by the great universities of this country, by the War Department and by the legislatures of our states.

High Standards of Health Influence Accident Rate

The time shall come in industry when certain fixed standards of physical condition must be realized. There is just as much reason to require a high degree of physical perfection as there is to demand that an applicant be possessed of intellect or skill.

We have reached the conclusion at our plants in California that the higher we maintain the physical standard of our personnel the more gratifying will be the results we are attempting to obtain in the matter of accident prevention. I have, therefore, come to this meeting to urge the necessity not only of a physical examination when an employee enters the service, but, likewise, repeat that examination during each succeeding year of his employment.

A few months ago we conducted thorough physical examinations of our employees, and as a result of those examinations we have come to the conclusion that fewer accidents should be expected from any industry employing men selected through that medium than from an industry which entirely disregards the physical status and selects their men at random. When this practice becomes universal I believe 50 per cent of this accident prevention problem will be solved. In any event, some drastic measure must be employed to mitigate the thousands of accidents that occur yearly in the industries of the United States. I am not convinced that any lasting good can come from relying solely on mechanical safeguards and the distribution of accident prevention propaganda.

It occurs to me that those of us who are engaged in the conservation of human life have paid far too much attention to the theory of constructing mechanical safeguards and appointing committees to watch out for the welfare and safe conduct of our men; in spite of all these precautions and our thought and study, we are still faced with the proposition that our efforts have been only in part rewarded, for safety in the industries of the United States still leaves a great deal to be desired.

In the hope that we may learn something of the causes of accidents, we have, during the past six months, devoted considerable time and thought toward ascertaining what physical defects exist in our personnel. We somewhat disregarded for the time being the effect and concentrated more attention upon the cause. By the effect, I mean, we subordinated the installation of mechanical safeguards to another method by which we sought to reach the cause.

During the past year accidents which seemed entirely preventable and wholly unnecessary continued to occur. Within a short space of time three deaths occurred at our plant under such circumstances that we became convinced that a physical inventory of our employees should be made. A man died at the steering wheel of his automobile upon his arrival home after completing the day's work in our plant. A machinist expired while sitting on the work bench in our machine shop after he had set aside an acetylene torch which he was using. The coroner found an enlarged heart. A man was sent to fuel an engine and while sitting astride the water jacket fell to the concrete pavement and suffered a fractured skull.

Having been confronted with accidents of this sort, we felt the time had come when we should take a physical inventory of our men and determine whether or not certain pathological conditions existing in them might not be responsible for accidents of this sort.

The Physical Examination Report

With that end in view we caused to be prepared a physical examination report, which we thought was an improvement on other reports obtained from large industries and life insurance companies on the coast. Our report recited the name of the man, the department in which he worked, length of time employed in that class of work, and then obtained a thorough family history. We further obtained a complete history of all the accidents and illnesses which he had suffered during his life. With that history we proceeded to the physical examination of every employee.

The necessity of such a report is very obvious. It is pertinent to know whether or not certain ailments which exist might not be directly attributable to some former accident or illness, or, perhaps, be congenital in their origin. We felt we were entitled to know whether or not injuries sustained elsewhere might not be responsible for physical defects which we found.

Before a man is hired by us for any service, he is first subjected to a more or less thorough examination. However, our plant has been in operation for 15 years, and no subsequent examinations were ever made, so, up to a few months ago we had many men in our service of whose physical condition we were entirely ignorant.

Accordingly, two very capable physicians were employed to look over every employee on the job. To my mind the most essential thing for comprehensive physical examination is the opportunity of the examiner to examine the patient stripped. One physician made a thorough test of

the eyesight, hearing, throat, teeth and tonsils, and then directed the men to the chief examiner, who went over them from chest to feet. In addition to this examination we required every employee to submit to a blood Wassermann for syphilis, and unfortunately we found in the personnel of two cement plants over ten per cent of our employees were afflicted with syphilis in some form. While it is true that most of these positive Wassermann's came from the Mexican element, it also happens that the Americans were well represented.

We found a man with syphilis was running an engine who only a few weeks before had been affected with dizzy spells while handling the throttle of that engine. He had in his charge the lives of several men and somewhat over \$100,000 in plant equipment. We found a syphilitic crane operator whose any act of omission could snuff out the lives of other men. We found one kiln burner who was color blind and who could not distinguish blue from vermillion. His work required him to be in the vicinity of fuel, gas and water lines, all painted a distinct color. In an emergency such as fire he probably could not distinguish between a fuel line and a water line if required to put out that fire.

Finding the Physical Defects in the Employee

Over 15 per cent of our men have actual hernias and over 50 per cent potential hernias. A potential hernia is one which will become actual if the workman so afflicted attempts to lift a heavy object when he is not balanced. To avoid the possibility of actual hernia he must always have both feet on the ground in such a position as to centralize any strain which may come upon the abdominal muscles.

Out of some 700 men examined we found over 2,600 defects, which means that on an average, four defects exist in every employee on the job.

Now, as to this subject of accidents occurring to these men of physical imperfections:

We must agree that a man who has syphilis does not have the coordination of mind and body that a normal healthy employee is possessed of. It was observed in many of the ten per cent of our employees who are syphilitic, that many of them had been injured under circumstances for which no reasonable explanation could be given, or else they contributed in some manner toward the injury of someone else. Syphilis is not a germ as we term germs in the popular sense, but rather an infection of the blood stream. When observed under the microscope these spirochetes of the blood stream are a multitude of black, spiral worms. The blood supply of a body so polluted first attacks the tissues of the brain, next the central nervous system and finally the means of locomotion. A mind can not remain alert and at the same time undergo the destructive ravages of syphilis. The very fact that the official statistics of the state of California show that 70 per cent of the inmates of our state institutions for the insane are afflicted with this condition should be evidence enough of the wisdom of that statement.

We found a great tendency toward throat trouble and pyorrhea among the men. It is well known that a pus accumulation in the tonsils or around the teeth causes focal infection. The kidneys and the bladder are required to absorb this infection, and any man whose system is fighting the effects of such a condition is not the same alert, efficient employee he would be if that condition did not exist. His mind is sluggish, his movements are sluggish, for the very simple reason that his vitality is being dissipated.

I am willing to admit that there may be all this necessity for mechanical safeguards, safety committees, bulletin boards, posters and what not to keep such a man eternally vigilant for his own safety; but I do not admit that all these mechanical precautions, these coats of armor we equip our workmen with, and all this accident prevention propaganda, will play such an important part in our work if it can be arranged that we may deal with more men whose minds are alert and whose muscular movements are not impaired by a toxic poisoning. This argument is not intended to prove either the worth or the worthlessness of the safety device, for we have expended many thousands of dollars in their installation, but rather, to suggest that in a broad sense any physical means to promote safety has its limitations. It can not be denied that the most insecure thing in the world is a feeling of security.

Large industries everywhere are spending thousands of dollars each year in training first aid teams, in the installation of safety devices and mechanical safeguards, and with the exception of a few, no thought whatever is given to the removal of causes which all too frequently make these installations necessary.

Keeping the Human Machine in Good Repair

In the last analysis, the human body is nothing more nor less than a piece of machinery. It functions efficiently only so long as we keep it in good working order. The same thought and attention should be given the repair and upkeep of our body that we give to an internal combustion motor. We would not think of driving an automobile more than a year without grinding the valves, adjusting the carburetor and tightening the brakes. By doing so we should have prolonged the life of that motor, and incidentally, perhaps, have prolonged our own life. The bodies of men are often subjected to a strain even greater than is a piece of machinery, and sometimes those bodies are more sadly abused. An annual inspection of the mechanism which enables us to be on the job and contribute something toward civilization and society should be just as much in order as the annual inspection we give the boilers around our plant and the motor cars we drive.

I can not help but feel that the one person who can do more than any other toward the prevention of accidents in industry has been entirely forgotten and overlooked, except after the accident occurs. Every plant should enlist the assistance of the plant physician, not only when a new employee comes to work, but also every year while that employee remains in the service he should have a physical examination. Such defects as

are found, should be remedied before they become serious, before they put a man in such physical condition and mental frame of mind that he becomes a target for an accident.

This apprehension which employers feel toward the reaction of their employees when they ask them to submit to a physical examination is without foundation. Our men met this request with enthusiasm, and when recommendations were made to them by our doctors for the care of their health and the correction of conditions and habits which existed, these recommendations met with whole-hearted response.

We have a benefit fund for our men to which each employee contributes in proportion to his earnings. This fund entitles the men to hospital and surgical care when they are ill or sustain injury outside the scope of their employment. This fund has been in existence over ten years, and a reserve well into four figures has accumulated. The men realized after these examinations were made that the entire amount they had accumulated could quickly have become dissipated if certain chronic conditions which were found were permitted to continue uncared for.

Employees Do Not Object to Rigid Examination

We have been asked whether or not our employees objected when we required them to submit to a blood Wassermann. There was not one protest, so you must realize that men these days are concerned about such things, and thinking men everywhere have come to the conclusion that there should no longer be any mystery about this affliction, for there is no scientific data about its acquirement to justify the odium which befalls its victim.

Many people guilty of no moral transgressions whatsoever are numbered among its victims. In cases where we found that condition, we obtained for the men a reduced medical rate and they receive treatment for this condition at cost. While they continue in their efforts to rid themselves of their affliction they may remain in our employ.

The whole success of this periodic physical examination depends upon the assurance of the employer to his men that he is actuated primarily for their own welfare and in that he must be sincere. If defects are found which warrant a change of jobs, the change should be made. Men should be placed at work which their physical handicaps and limitations permit them to do. However, the whole scheme will collapse and fail, if it is used as a weeding out process, and its purpose will be defeated if these measures are resorted to. There should be no necessity in any well organized plant to follow that procedure. Secondly, the men owe a duty to their fellow workers. Third, is the desire of the company to keep its employees in such physical shape that they may be able to work steadily, and their efficiency not be impaired. Finally, the frequency of accidents is lessened.

We have not had sufficient time to observe all the benefits which we believe will be manifest by this periodic physical examination, but my thought in urging this practice at this meeting is in the hope that you will take back with you to your plants the experiences which I am relating.

Our physical inventory was made at some expense, but we have already been more than fully repaid for that expenditure.

I can not help but feel that our men are representative workmen in industry and that the alarming number of defects found in our personnel will not only be our experience but will likewise be your experience.

I want to quote a brief extract from the report of the Surgeon General of the United States Army concerning physical defects found in drafted men during the war:

Army Experience in Classifying Physical Defects

"The percentage of defective men varied materially according to the section of the United States from which they were drawn. The number of defective men by states varied from 64 per cent in Rhode Island to 35 per cent in Kansas. Rhode Island, the most urban of all states, whose population is largely engaged in manufacturing, stayed at the top of the list largely because of the defective and non-resident stock which has been drawn to that state. Kansas, on the other hand, is largely agricultural and such of its population as is of foreign origin is of the more robust type. From the cities came the largest percentage of defectives—55 per cent—while those from the rural districts showed but 44 per cent. Of all class 'A' men examined during the draft 21 per cent were found physically unfit for all military service, or in other words, more than one young man in five was physically unfit for all military service, either at home or abroad. More men from the cities were rejected than from the rural districts and small towns, owing not only to the environmental condition in the large cities, but also to the character of the foreign population congregated in them. Thus Rhode Island, which has the largest number of defectives, had also the largest number of boys rejected. Forty-two per cent, or almost one-half of all between the ages of 21 and 30 who were examined from that state were rejected for any type of military service whatever, while from Wyoming only 13 per cent were found to be physically unfit."

It therefore appears that the boys from the wide open spaces constitute the greatest physical asset that the industries of our nation possess. These figures should impress us. Young men must be taught to realize that the industries of this country have come to the point where they place as great a value upon the physical standard as they do upon intellect, and the boy who sacrifices his health along the primrose path will in the end receive but scant consideration when he comes to the employment office. If the universal practice of a physical examination had been in force at the time of the selective draft it would seem that many states could have shared the distinction of Wyoming. Whenever industries of this country place a high value upon the physical condition of their employees a higher standard of physical manhood in the United States will obviously result.

In conclusion, may I hope that at the next meeting of the National Safety Council others of you from the cement plants of the United States

will come here and tell us of your experiences in accident prevention work by a periodic physical inventory of your men. Give serious thought to the advantages obtained by enlisting, as your greatest sentinel of safety, the plant doctor. Not after some crushed and broken piece of humanity is carried from the mill, some fellow whose physical condition was such before the injury that he could not think when danger confronted him, but rather enlist the help and good service of the plant physician every day of the year. Keep these men in shape so that they will not be needlessly handicapped by physical imperfections.

At every cement plant physical testers are employed. It is their duty to test cement for its tensile and compressive strength. We employ them because we realize that the first consideration in the use of cement is its factor of safety. The very word "cement" is symbolical of this thing we call safety. Therefore, safety should be the first consideration for the men engaged in that industry. When defects exist in our product its function as a factor of safety remains in doubt. By the same token, when physical defects exist in the men identified with that industry they constitute a great hazard to themselves and to their fellow workers. If we are convinced that we owe a duty to the user of cement by subjecting it to these physical tests, then we also owe the same duty to society, by ascertaining whether or not the physical condition of our men is such as to make them a menace to industry, to their fellow workers, or to themselves.

Correlating the Accident Statistics of Industries

CHAIRMAN FRAME: Mr. Green has given us a new angle on the importance of physical examinations. The paper has been presented in a splendid and able manner, and the material given is the outcome of Mr. Green's wide experience. I know that the subject is of unusual interest to you men and that you will want to ask him some specific questions.

With Mr. Green's permission, I want to make a little break in this morning's program. We have a gentleman here who has an interesting message to bring to us. His time is valuable. He must speak at other Sectional meetings. In order to permit him to render his valuable service elsewhere, I am going to call at this time on Dr. Ethelbert Stewart, United States Commissioner of Labor Statistics, Washington, D. C.

DR. ETHELBERT STEWART: I come to say one thing to you gentlemen, and that is that as the United States Commissioner of Labor Statistics, trying to correlate and bring together the accident statistics by industries, I find that the statistics of the Cement Section of the National Safety Council are the very best that come to my office. You have done a piece of work that must inevitably result in a rapid decrease in your accident rate. I don't know that each individual plant uses these things. I don't know that you are making the proper use of them. I can't answer for that.

In the first place, you have a definite industry. Cement means cement. It doesn't mean, as the chemical industry means, anything from lipsticks

to laundry soap. You have something definite to work upon and you have succeeded in doing the basic thing: get your one-man-hour exposure in your industry and relate your accidents to that. Statistics can not reduce accidents, but they can tell you where the accidents occur. They can tell you where to spend your money. They can save you from spilling your money all over the place when the most of your accidents are occurring along a very definite line. That is certainly worth while.

Again, I am able to say to the other Sections: Why can't you fellows do as well as the Cement Section? Have all the brains gone into the manufacture of cement? I have been able to use the fact that you are doing good work, that you are doing perfectly wonderful work, with very great effect. I have been able to show that you have reduced your accidents. You may say what you want about statistics—that is one of the standard jokes, like the mother-in-law joke and all that sort of thing—everybody thinks he can take a whack at the statistician and statistics—but if you come down to bed rock, you know if you are going to improve the accident situation in your plant, you have got to know where the accidents occur. That is statistics.

Industry Owes a Debt to Those Killed in Accidents

I just want to tell you how proud I am of you fellows and how much I have got out of the work you are doing. Industry owes something to its dead, as you said in your latest report. We have the grave of the Unknown Soldier. We are doing all that we can as a tribute to those who died on the battlefield. But industry owes something to its dead, just as the nations owe something to their dead. One thing that you owe to your dead is to do all you can to make this poor fellow's death operate to prevent other deaths as much as possible.

I may be going at this in a very bunglesome fashion. I didn't expect to speak here until last night when I signified my wish to tell you what I think of your work along that line. But I do want to impress you, if possible, with the importance of continuing and further perfecting your statistical work, not only for yourself but for the influence it is going to have on the other Sections.

I thank you for the opportunity you have given me to speak to you.

CHAIRMAN FRAME: We are grateful to Dr. Stewart for that kind expression on the good work that the Cement Section of the National Safety Council is doing. We are all very much interested in it, and I don't think there is a single person here who will not continue to send in his accident reports to the Bureau, his man-hours, and all other information which will enable the officers of the Section to understand how to center their efforts in this good work.

Mr. Green is almost a doctor in his knowledge of physical conditions and defects and the generally good results his company has obtained along that line. Mr. Green is doubly willing to enter into a friendly discussion with you gentlemen regarding the merits of this question. I know you have made mental notes of certain important questions that

have struck you during the course of his address, and it will add greatly to the success of your meeting if you gentlemen will come forward and let us have your questions.

N. C. LOUNSBURY (Safety Engineer, Nazareth Cement Co.): I want to take this opportunity to compliment Mr. Green and the Riverside Portland Cement Co. on what they have been doing along this line, because I know they are on the right track. The reason I know it is because we are doing exactly the same thing. I know from the results we have obtained we are on the right track. Furthermore, I want to say that every cement plant in the country should have some kind of active plant hospital.

You may think that is a rather radical statement, but I know, from what you have heard Mr. Green just tell you, that you can see its benefits. I want to tell you that in the past year, since we have had this dispensary of ours in active operation, the minor accidents which cause one or two or three days' loss of time have been reduced 90 per cent. Furthermore, we have never had a case of infection which has prevented a man from doing his regular work.

In our foremen's meetings, men have voluntarily stated that their work per man since this dispensary has been in active operation. I ever you may want to call it. The men in your organization will appreciate it. I have two men alongside of me who will bear me out in that statement.

Meeting the Cost of Operations and Lost Time

CHAIRMAN FRAME: It is only natural, when we study our accidents and try to win trophies and control that lost time, that we enter into a search of the question as to what causes accidents, and that brings us right back to physical examination to start off with. Is there someone else who wants to add a word or two on the subject?

MR. ROBERTSON: I should like to ask the speaker, Mr. Green, if I time books have shown a marked increase in the number of hours of don't know whether all you fellows agree with Mr. Green and myself, but I know if you try this out that you will find it works. It pays in dollars and cents, and it pays in the humane, altruistic aspect, or what-understood him correctly. I think you mentioned in your talk that out of the various disabilities the men have quite a lot which could be corrected by operation. Does the company go to the expense of operation and paying the men for the time lost?

MR. GREEN: We have a benefit fund for our men, to which each man contributes in proportion to his earnings. For each contribution the man makes, we make a similar contribution. We do pay, yes. We pay the men their wages while these conditions are corrected. By virtue of the contribution which they make into the fund, which is augmented by our contributions, all these physical conditions and defects are corrected and remedied without any cost to the men whatever.

MR. ROBERTSON: I should like to ask further, is it compulsory?

MR. GREEN: Yes, it is compulsory. It is a fund which may be used

only in the event of sickness or defect of a non-occupational character. Of course, in the case of injuries sustained in the scope of their employment, the expense is borne by the company. The men's fund takes care of non-occupational injuries only, all injuries off the job, and ordinary illnesses, and so forth.

MR. ROBERTSON: I am very much interested in that because we tried to institute something of the same kind. Unfortunately, in our Province it is not legal to deduct the amount from the workmen's pay. We tried to have the men pay into such a fund voluntarily, but it was not successful.

MR. GREEN: It is not legal in the state of California and elsewhere to make any deduction for hospital or medical care for occupational injuries, but if it is for illness which is not occupational we may make the deduction.

CHAIRMAN FRAME: If I am not asking for private information, Mr. Green, how much per month does a man pay into that fund?

Details of the Employee Benefit Fund Plan

MR. GREEN: The men whose salary is less than \$100 per month pay 50 cents. Those whose pay check is \$100 or over contribute \$1.

Of course, this fund has increased from year to year. We now have about \$5,000 in that fund. As a result of these examinations, we have a committee of our men who take care of this hospital fund. They came to me after these examinations were made and said that they realized for the first time during all their years of identification with our company that had we not at this time made these physical examinations and taken steps to correct these conditions which we found in our men that we would have had certain cases of ulcer which would have kept the men on their back for months and months. We had cases of epilepsy, Bright's disease, and any number of diseases which sometimes require months of hospitalization. These men realize that perhaps it may be this year, or next year, but the time would come when the entire fund they had accumulated would be dissipated in the care of these things. So we anticipated and warded off conditions that might later have become chronic.

Getting back to this subject of the 10 per cent. That was one exception in which we did not pay the cost of medical attention ourselves. That is, that is one of the rules of the hospital fund. It seemed to us to be putting a premium, perhaps, on moral transgressions by doing that, despite the fact that we do not know how it was acquired. I want to say that these men who did have a positive Wassermann when these examinations were made, with one exception, now all have been cured and the blood test which was taken on the last bunch a week before I left shows that only one of them had a positive reaction.

MR. BROWN: I should like to ask Mr. Green whether they have regular hours at which the physician appears at the plant, so that anyone in the plant is free to ask him any questions in regard to his personal

health, irrespective of conditions that may arise. For example, if a man comes to work feeling badly, he has to work. He has to earn a living and he comes to work in spite of feeling badly. He may have a headache or stomach out of whack. Do you have regular hours for the physician to appear at the plant each day to whom the man may go for advice?

MR. GREEN: We have three doctors at one plant and two at another. These doctors at Riverside are always available to our men. In addition to that we have a nurse who comes to the plant from 8 o'clock until 12. If men are feeling badly or there is something about their condition which the nurse could not undertake to prescribe for, then the man is indirectly prescribed for by the doctor.

MR. BROWN: But the doctor does not come to the plant daily at a certain time each day?

MR. GREEN: No.

MR. BROWN: What do you think of a plant of that kind, where the doctor has office hours, say, from 10 to 11 o'clock every morning and the men are privileged to go to that doctor during his hours of service at the plant and ask him any question they like or get medicine if they need it?

MR. GREEN: I think that is a splendid idea. At our plant conditions that the nurse can not take care of are cared for by the doctor. At our Golden State plant the doctor is at our hospital. We have a hospital for both plants. From 9 o'clock until 12 every day men may leave their work and come to this doctor, and he will prescribe for them and have them under observation.

MR. BROWN: As between the two methods, do you think your Golden State is better than the other?

MR. GREEN: Yes. As a matter of fact, we shortly contemplate establishing the same method at Riverside.

The Doctor On the Job Saves Illness and Lost Time

MR. BROWN: It has been my idea for sometime that if you have a doctor in a plant at certain definite hours every day, a great deal of sickness in lost time would be gotten rid of, because the men won't go to the doctor if they aren't sick enough to have the doctor come. If he goes to the doctor when he feels badly, the doctor will tell him what he has been doing that he ought not to do, and give him something to remedy his trouble, and in that way he may often ward off serious attacks of illness.

MR. GREEN: At Orlando we try to conduct the work so that there are three hours of time for a sick call. The man may leave his work and his place is substituted while he is gone.

I want to say something about the yearly periodic examination. It is held during the month of May. Next year, just as soon as we can, we are going to call the men in alphabetically, call them in again, and keep it up always.

MR. HALPIN: As I understand it, you have more than one plant doctor and that the men use their own prerogative as to whom they want to take care of them?

MR. GREEN: Exactly!

MR. HALPIN: Then the fee of the doctor is based according to the number of cases he handles?

MR. GREEN: The doctors are on our pay roll.

MR. HALPIN: At a stipulated salary?

MR. GREEN: Exactly!

MR. HALPIN: It might be interesting to those who have had a plant doctor, to know that we had one of the first in the cement industry; we have had one since 1918. He comes to the plant one hour each day. The hour has never changed. He comes from 2 o'clock until 3 o'clock and takes care of all the little ailments and slight injuries that might occur during the day. Our record shows that we have done fairly well at our plant in the last six or seven years. We hope it will continue.

MR. BROWN: In order that Mr. Jacobsen may not feel I was asking questions out of curiosity only, I might tell him that we already have at three plants a doctor coming at regular hours of the day. In other words, we are "sneaking up" on the proposition.

CHAIRMAN FRAME: During this interesting discussion of the merits of the plant doctor, we heard a few things said about a nurse. I should like to have Mr. Lounsbury tell us something about the male nurse they have at the Nazareth plant. I have heard very good reports, and I am sure it would add to the interest of the discussion.

A Practical Male Nurse Who Treated Many Cases

MR. LOUNSBURY: We have a male nurse at the plant who is on duty 10 hours a day, the same as most of the men in the plant. To show you how effective he has been, we have kept an accurate record of the number of cases which have come to the dispensary and found that the total at the end of the year was 2,098 cases of all sort and descriptions. I have a list in my pocket of the variety and number of cases which have been treated, and they take up two sheets of paper about 12 inches long. This man has had quite a good deal of experience. He has had 19 years of experience as a graduate nurse. I believe he started in one of the big hospitals in Boston and then went to the Canal Zone where he was in the Government hospital for practically 15 years.

This man has had so much experience with work of this kind that he is, with all due respect to doctors, able to serve in the capacity of a doctor within very large limits. If anything happens which is too serious for him to undertake, he is never afraid to admit it, and he will always send the man to a regular physician. We have three at our service right in the town who also take care of our men.

FRANK H. SASS (Universal, Buffington, Ind.): We have three nurses at our dispensary. That is, they operate on an eight-hour day. We have one graduate nurse who is a woman nurse who works from 8 to 4 in the

afternoon; from 4 to midnight, and from midnight to 8, the work is taken care of by men nurses, so there is someone in the dispensary all the time. The doctor reports to the plant every day at 11:30 and he stays until 12:30.

I think our doctor has been on the payroll pretty nearly as long as the first man that was put on originally. I think he came to our plant about 1906, or some such time as that.

From the tone of Mr. Green's talk, I don't think he is very favorable to mechanical devices. At least, I was led to believe that. As far as physical examinations are concerned, I think they are a good thing, but I should like to know just about how intelligent the men are at these plants where they don't think much of mechanical devices.

MR. GREEN: I think our men are representative men in the cement industry. I will say that there is a tendency on the part of our men to resent the proposition of our assuming the role of being our brother's keeper, and they believe they have as much sense as we have and that we don't have to build a Wall of China or put a coat of armor around them so they won't get hurt. At our Orlando plant the number of safety installations is less than at Riverside, and just because of the fact that we attempted to usurp that God-given faculty at Riverside they have in turn put the whole burden of responsibility of their safety on us, and as a consequence we have 50 per cent more accidents at Riverside than Orlando.

The Problem of Many Nationalities in Industry

MR. SASS: What is mainly the nationality of your workmen?

MR. GREEN: Mostly American. We have some Mexicans doing outside work, but such Mexicans as work inside the mill do speak the English language.

MR. SASS: I think we have representatives from about every country in Europe, and most of them when they sign their names use a cross. I don't doubt but that they were all given a certain amount of brains and everything else, but they don't use them, and you can't get them to use them.

MR. GREEN: I think the plants in the East have a decided advantage, because that is more or less of a melting pot. There is not one man in a hundred who comes to our plant in search of a job who has seen the inside of a cement plant. He doesn't know the difference between a ball mill and a steam shovel, whereas you men are in the cement district and have the opportunity of hiring men who are more or less raised with the industry, and I think you have the advantage in your favor.

MR. SASS: No, the men we have were not raised in our industry, by any means. Most of them are the fellows that the other fellow doesn't want—that's what they are. You probably find that your turnover is very small.

MR. GREEN: It is very great. Our turnover is 20 per cent a month.

MR. SASS: You are talking in small figures, then. We find that when

the industries around the Calumet region send out a call, then our men start leaving and we have to start hunting for more, because, of course, we are a little bit out of the way. Our men have to take a bus to get to work, whereas if they work down in Indiana Harbor, Gary, East Chicago, Hammond, all they have to do is step out of a backyard and they are at the job. They would rather do that than come to our place, get up and catch a bus and come up.

I met a man a short time ago from Australia. He says they pay no attention to accidents. He says that all the men are intelligent men and don't use any mechanical safeguards whatever because they are not necessary. I will wager there are a lot of us in this room who if we could say the same thing would feel mighty fine—but we can't do it.

MR. GREEN: I don't say that physical examinations take the place of safety devices, or that safety devices should be subordinated for something else, because we obviously are not accomplishing as much as we should by the things we are doing. I don't mean to say that physical examinations are going to result in our throwing our goggles into the Pacific Ocean. I do say we are relying entirely too much on the installation of safety devices and not getting back to the proposition of the human element. The first thing to do is to deal with the human element who are receptive to the things we have.

A Discussion of Labor Turnover in the Plant

MR. SASS: That is true. Still, at the same time you have got to have those mechanical devices; but I will admit that your physical examination is going to help you a lot because I really believe that the accidents we have had at our plant have been due to the physical condition of the man at the time the accident happened. At least that was the conclusion we came to. I think we are coming to physical examinations ourselves within a short time.

MR. HALPIN: I am rather interested in the matter of turnover. We all have large turnover, but when I have investigated I have found it is in the departments where we have seasonal work. You have a machine shop, burners, etc., that are always with you. Then your turnover only exists in your general labor and packing, and that condition exists in all cement plants.

MR. SASS: In the mechanical end—that is, skilled and semi-skilled work—I don't suppose we run any higher than anyone else, although I am inclined to think that perhaps our turnover in that respect might run a little higher.

MR. HALPIN: You say your turnover is 500 per cent a year. In other words, you turn over your whole plant several times a year, according to your figures. You actually do not do that because you certainly have a constant organization in your mill or you couldn't run. You couldn't change on your burners and head repairmen every day.

But you do have a large turnover in your seasonal jobs, and that condition exists in any cement plant. We all have that problem. Sometimes we might have to load 15,000 barrels a day. We get the men to

load them. Then three days afterwards we might have to lay all of them off again. The report says that 506 men left this month. Then you get called for it. If you analyze the figures you know why they left. Turn-over has something to do with accident prevention, because if you keep your men in the plant and teach them accident prevention then you are not going to have accidents.

A. E. SNODGRASS (Safety Director, Louisville Cement Co.): Do you find that you have a greater percentage of accidents with the new men?

MR. HALPIN: From our records I would say that the accidents occurred to the new men. I think almost everybody will bear me out in that statement. Mr. Jacobsen's statistics show that they happen to the new men, that is the really serious accidents.

Relative Importance of Mechanical Safeguards and Education

MR. JACOBSEN: I really think when you come down to brass tacks that you all agree, but you just say it differently. I agree with Mr. Green. The guarding of the machinery is the result of the education, and the education and the training are not the result of the guarding. I would much rather have an old rattletrap of a plant that wasn't guarded and have men in there who would listen to reason and would be willing to meet me halfway than I would have a brand new plant that was perfectly built and perfectly guarded in every respect and then do nothing more. We have a new plant which was built rather recently, and five men have been killed in that plant since it started up—not because the men were caught in machinery or anything of that sort. The machinery was in perfect condition. But the men for some reason or other—it is unexplainable—got into trouble. I don't know how they did it. Nobody can possibly explain in a reasonable sort of way how they managed to get hurt, but they did get hurt.

Just to illustrate this point: We had an old employee killed in a coal dust explosion because he used an open torch underneath the coal bin in the kiln. Somebody upstairs happened to shake down a little dust, a couple of handfuls, and that started trouble. The man was killed right then and there. He had been in the plant for years.

We had two other men killed in a coal dust explosion—men who had been in the plant for years, who should know all about coal dust. We had three men burned to death a little while ago in a cooler. They were working in the cooler and the gases from the kiln backfired from the cooler and burned instantly.

From all the reports we receive at the association office, it is plain to me that Mr. Green is right to a very large extent. You, Mr. Sass, are continually working along the same lines that Mr. Green is or you wouldn't get results. You have hardly had any accidents this year, and in spite of all the steel that is furnished you, you couldn't possibly prevent them except through training that group of men that you have all the time.

In regard to new employees, there are certain stock arguments that I always get. When I get out to Green's, he complains about the Mexicans, that he has too great a labor turnover. Down south they have too many

niggers. In the east they have two many foreigners. Those are stock arguments. Really, when we get down to brass tacks we generally find those things haven't got a thing to do with it.

I talked with a gentleman from the east a little while ago. He said they had a number of accidents in their plant, in which they lost about 1,800 days last year. I spoke to a gentleman there who is very well posted on what goes on in that plant and he said:

"Our plant runs in two shifts and our neighboring plant runs on three. Every time they need men down there they leave the two-shift plant and go to the three, and we have all the riff-raff. That in my opinion is the reason for all our accidents."

Then I spoke to the general superintendent. The funny thing about it is that I am a foreigner myself; so is he. He is the same kind of a landsman that I am.

He said, "Jacobsen, there are foreigners and foreigners. There are a lot of low-grade Italians and Poles and Lithuanians, and so on." I suppose he meant to say we were all right, while the rest didn't amount to anything. That was his reaction to the question.

After he got through talking I asked him, "Really, have you ever tried to figure out what is the reason for your accidents, what causes your accidents, who gets into them, how long the men have been with you? You are just guessing. Is it a logical thing to assume that the foreigners cause the accidents?"

Severe Accidents Sometimes Happen to Old Employees

I got out all the reports when I returned to Chicago, and I found that 70 per cent of all the men who had been injured that year were American people. I don't know how many were employed at that particular plant of either class; and about 70 per cent of all the men injured at that particular plant have been with them more than six months. A man who has been in the cement plant six months, according to your theory, is certainly not any longer a new man. Yet that has happened time and again.

I agree with Mr. Halpin that some of the most severe accidents happen to men that have been at the plant a long time, for the simple reason that men who have been at the plant a long time get into jobs where there is real danger. Most of the new men work around the yard, on the floors or things of that sort, and the old men as they graduate from one to the other get into the repair gang or run the steam shovel, and things of that sort. Naturally, they are very likely to get into severe accidents more than some of the new fellows.

After many years' study of this proposition I have come to the conclusion that it is purely and simply a question of training and education. If we get a man properly trained and educated he is not going to cause accidents. Suppose it is myself and I get into an old rattletrap of a plant. I have a desire to work carefully and see the men around me work carefully and keep away from accidents. Don't you believe I will

get a handrail put on the stairway and a guard put on the belt? I certainly will. That is logical. Mr. Green doesn't mean to say—if I may take the words out of his mouth—that machinery should be run without guards. I do say this, that if we forget to train our men and just simply guard the machinery we are not getting anywhere.

MR. HALPIN: I should like to take a parting shot at Mr. Green. He said we were endeavoring or assuming too much, that we were taking all of this accident prevention on our own shoulders. I have been at these meetings for a long time, and I think at every meeting we have had something on the education of the employees. I think if you will look at the records of the association during this time that the educational features have been the main part of our program. We have done nothing but endeavor to educate our men. It is not that we were in charge of accident prevention work and tried to do it all. We have tried to get the man to think for himself. I am not so sure that he understands we are trying to do that, but what we have been doing in the east has been to educate these men.

I presume most of you gentlemen here have known Mr. Jacobsen for a good many years, and you all know he is leaving us. He is resigning as manager of the Bureau of Accident Prevention and Insurance, Portland Cement Association, the first of this month. Of course, it isn't at all necessary for me to tell you what an important element he has been in the work and to speak of the wonderful record that he has compiled for all of us since he has been in here. I think I have known him just about as long, or probably longer, than most of you, some eight or 10 years. Shortly after he started with the association, back in 1918, he made a visit to our plant and started us on a course that not only compiled a wonderful record for our company, but saved us money and built up a morale that money couldn't buy.

I think it no more than right that we present Mr. Jacobsen with some testimonial of his endeavors since he has been in the association. I think that a little gift along with the testimonial will be appreciated by him and will let the world know that we have appreciated him. The suggestion is that we get a few dollars from each of you and that this afternoon we go out and purchase something appropriate and present it to him before the meeting is over today.

It was duly moved and carried that each member contribute to the gift.

ADJOURNMENT

TUESDAY AFTERNOON SESSION

October 26, 1926

The final session of the Cement Section convened at 2:10 o'clock, Mr. R. Frame presiding.

CHAIRMAN FRAME: It is a pleasure to announce the next speaker to you, principally because he has benefited from the many discussions that have arisen in Cement Section meetings and from the different articles that have been published concerning the success of member companies, together with his own initiative and ideas. I am sure you will enjoy the message he brings to you. It gives me great pleasure to introduce Mr. Parry of the Glens Falls Portland Cement Company, Glens Falls, New York.

A YEAR'S EXPERIENCE WITH A BORROWED PLAN

Edward H. Parry, Glens Falls Portland Cement Company, Glens, Falls, New York

When our chairman invited me to speak at this session of the Congress, I felt it would be entirely out of place, because I was so new at this safety work some of the old-timers might resent my intrusion. In giving this paper I have no desire to tell anyone how it should be done, but simply to give the experience of my own plant for the past year. It may be that our experience will be of value to some of you in settling your own problems, for, in the last analysis of this safety work, I believe, every plant is a distinct unit and differing conditions make it impossible for any rules except very general ones to be adopted. The purpose of these Congresses is for the exchange of ideas so that all of us may benefit by the experience of each of us. It is really a "Clearing House of Safety ideas."

I was given permission to choose my own subject and I have chosen "A Year's Experience with a Borrowed Plan." This subject was the most natural thing in the world for me to select, for it was just a year ago at this Congress that I became actively identified with the safety movement. I have referred to our plan as a borrowed plan for it is a mixture of the ideas I received during a week's study with Mr. Jacobsen, just previous to the last Congress. I feel that whatever credit is due us for the improvement we have made should go to Mr. Jacobsen, Mr. Sass of the Universal, Mr. Halpin of Marquette and Mr. McDonald of the Canada Portland. These gentlemen were kind enough to give me their ideas and I have felt perfectly free to use them as I saw fit.

The plant of the Glens Falls Portland is somewhat out of the line of travel and receives few visitors, so a brief description of the plant will not be out of place. We have a million-and-a-half barrel plant that during the past three years has gone through a complete reconstruction and is

now modern in every respect. We operate our own quarry situated about a quarter mile from the plant. Our entire force is about 350 men, made up largely of Italian and French-Canadian labor. The plant is operated on a three shift basis throughout the year.

The story of our accident experience for the past year would be without point unless the result of a previous period is briefly considered and comparison made between the two. In the calendar year 1925 we suffered two deaths, 38 lost time accidents, resulting in a total of 892 days lost time. Disability charges for our two deaths and permanent disabilities amounted to 15,999, or a total of 16,891 days. In a year's time we had dropped from 54th place in the severity rating to 112th place. There was an excellent chance for improvement and only a small chance to make a worse record.

Plainly the first thing to be done was a thorough examination to determine if possible what the reason for such a record might be. On the surface there was no apparent reason. A complete safety organization was in operation, bulletins were used, warnings were posted, first-aid treatments were compulsory and yet there were accidents with appalling frequency and severity.

A careful analysis of all accident records gave very little help. All departments seemed to be uniformly bad and it was not surprising that there was a feeling amounting almost to a conviction that the sacrifices of human life and limb were essential to the manufacture of cement. The only evident fact brought out by this analysis was that the human element was responsible for the great majority of the accidents. Machine accidents were very infrequent, and in that respect we were no different from other plants in the industry. Evidently the factor of "Interest" was the factor that was lacking.

A Meeting That Marked the Beginning of a New Program

The month of October was spent in an analysis of all accident records, the month of November in organizing a foreman's committee to take hold of accident prevention, and the last month of the year in perfecting plans for an intensive campaign to begin the new year.

In our first meeting together these foremen were accused of being responsible for more than 75 per cent of the accidents because of their failure to use the authority they had in the direction of accident prevention. That first meeting marks the beginning of our new program based on the personal responsibility of each foreman for the safety of each man under his jurisdiction. With the cooperation of this committee we felt sure improvement was certain, and the results show we have had the wholehearted support of each member. We made no mistake in placing our goal too high. We knew perfection was not possible in one year, so our aim was set on a good substantial improvement.

During these first three months of my "Experience" very little actual safety work was done. It was a period of preparation for the year 1926. This period resulted in one death and 18 lost time accidents, thereby hold-

ing up the tradition of the industry that the last three months of the year are more disastrous than any other period. It was a discouraging time for a new safety director.

We began this year with the following organization:

The foremen made up our central safety committee which has supervision of every angle of safety work. It was felt necessary to place authority behind the movement and these foremen gave us the most natural means of doing so. Each foreman was made personally responsible for the safe conduct of his department and safety was placed on an equal footing with production and efficient work. A mark against any one of these is a mark against the record of that foreman. This committee makes its own inspections, passes on all recommendations of the safety director and act as an advisory body for the safety director. Every item of the safety work is reported to them and they are constantly in touch with affairs. I can not too highly commend this committee for the help and support they have given me. Without this support I am confident we could not have made the improvement we have.

The Second Committee an Instruction Committee

The second committee is made up of representative workmen from each department and is essentially an instruction committee. Weekly meetings are held and all phases of safety work are taken up. Attendance is compulsory, a part of the men's work. The immediate good this committee does is a doubtful quantity, but each time the membership is changed each department has a man that has been instructed in accident prevention work and has had the safety idea thoroughly drilled into him. We rely on these men to help carry along the floating force that is continually changing.

Our plant is divided into 14 departments that follow as closely as possible the natural divisions of labor. A safety competition is run between these departments for periods of three months. At the end of each three months we wipe the slate clean and start fresh again. A cash award is given each man in a department that has completed the period without accidents causing loss of time.

This competition began on January first and on April first we were able to reward nine of the 14 departments. Five were eliminated by accidents that should not have caused loss of time. The old idea of taking a vacation for each slight accident was working. No effort was made by the personnel department to hurry these men back. In most instances when they came back their welcome was not a cordial one. They had caused their department to lose out in the competition. One man, I recall, lasted one day and quit, another two days, and a third less than two weeks.

Ever since that first period a man is back on the job the morning following an accident unless there is not a doubt of his disability. Vacations are not taken that way any more. I believe that is the most valuable lesson the safety department has taught. It has effectively cut out one of the causes of our consistently poor record and is naturally reflected in

our severity rating. At the present time we find our lost time accidents are serious enough to cause loss of time, and we have made our problem one step less complicated.

This first period of our competition showed up one failure of the idea. A department losing out in the beginning of a period would lose interest until the second one started. It was not thought advisable to shorten the periods, so this defect was let go. It was really a mechanical defect that could be met by close personal supervision on the part of the foreman. The second period of this competition was a complete success. There were no lost time accidents during this period and we were able to run 107 consecutive days without loss of time. Our best previous record had been 42 days. Our greatest pleasure at this record was that we had practically rid the plant of the idea that accidents were essential to the manufacture of cement. That was a victory in itself.

A Decided Reaction in the Third Period

During the third period there was a decided reaction, apparently without cause, unless it was due to the intensity of the work through the whole plant at the height of the shipping season. This third period spoiled our good record with four lost time accidents. This third period also marked the end of my year's experience on October first.

For purposes of comparison I propose to take the periods January 1st to October 1st of the years 1925 and 1926. The following figures cover these periods:

	1925	1926	Reduction
Fatalities	1	0	100 %
L-T Accidents	29	16	44.8%
Days Lost Time.....	6,437	386	94 %

As I have mentioned before, the last three months of 1925 resulted in one fatality and 18 lost time accidents. The first nine months of 1926 we show improvements of 100 per cent, 44.8 per cent, 94 per cent over the same period of 1925. Without undue optimism I believe we will be able to increase these percentages of reduction by the results of the last period of our competition. We have our men fairly well imbued with the essential idea of safety and that is "No Chance Taking." Our paramount idea has been that the management does not expect or want any man to take any chance of injury. We expect to take care of the machine hazard and we expect every man to watch his own step.

From the humanitarian point of view our experience has been successful. We may say we have prevented one fatality and a considerable amount of serious and painful injuries. Any corporation in these advanced times would gladly spend any reasonable amount to prevent a fatal accident, but these advanced times also provide us with compensation laws that are expensive and it is perfectly possible to justify an intensive safety campaign from the financial viewpoint.

New York state is probably the most liberal of any in its provisions for

injured employees. In certain cases the maximum benefits for a fatality may reach \$25,000. No other state can attain this mark at the present time. Compensation is based on two-thirds of a man's average weekly wage, with a maximum rate of \$20 a week. Payment is not made for the first week unless disability should extend seven weeks.

The cost of our compensation insurance for the first six months of 1925 amounted to approximately \$13,590.49; for the same period of 1926 approximately \$1,748.83, or a saving of \$11,841.66. I regret that I was not able to obtain cost figures for nine months of 1926 but the Actuarial Department of the State Insurance Fund is undergoing a reorganization and I have had to content myself with the figures for six months.

The cost of our competition was \$2,770 and that amount covers the increased cost of the safety department in 1926 over 1925. Adding these figures to the incurred medical and compensation cost for 1926 we can show a saving of \$9,071.66. We justify our giving a cash bonus for safety by the fact that we are taking it from our Insurance Fund and giving it to the men. It should not be necessary to purchase a man's safety, but there is nothing that appeals to the average working man like an increase in his pay envelope. We were anxious to get immediate results and took this means to stir up interest.

A Year of Hard Work and Satisfying Reward

I do not want to convey the impression that the officials of my company base the success or failure of accident prevention work on any profit or loss result. My job was to cut down accidents and it was certainly a pleasure to justify that work from the financial viewpoint without resort to the plea of humanitarian feelings. Every safety director has a possible "out" on that plea, for no one can measure the value of human life in terms of the cold dollars of our business world.

So much for the accident experience of my plant during the past year. It has been a year of work, with the reward of results obtained. As representative of my company, I am anxious to know how many plants can show greater percentages of improvement than we have. Our committee is quite proud of these figures, but it does want to know how we stand in comparison with other plants. We are not yet able to compete with the leaders, but we expect to be there in time.

We are trying to build a solid foundation so our superstructure will stand the test of time. Our leaders in the industry have made a long ladder for us to climb, but we are working on the assumption that the only thing a record is good for is to be broken. If in this calendar year we climb up a few rounds in the association records we will consider that a recompense for our work and an incentive for further improvement.

CHAIRMAN FRAME: Mr. Parry has made one more contribution to the long list of successes which have come to those who take an active and right kind of interest in trying to curtail accidents to employees. He brought out many good points in his paper. I think you remember

he asked some of the representatives present to state what their progress has been so far this year. His paper is now open for discussion. You responded splendidly this morning. Who is going to be first this afternoon?

MR. SASS: Mr. Chairman, I was wondering about this excuse that Mr. Parry mentions in regard to taking a vacation. How does that come about? Hasn't the doctor got the authority to say whether the man is able to work or not?

MR. PARRY: Mr. Sass, we are located in an entirely different position from you. We have a small plant with 350 men. We have no plant physician at the present time. We have a staff of city doctors that we call on, as the case may be, and they take on compensation cases in addition to their regular practice. In fact, we don't get any real cooperation from them. A man may be hurt and the doctor will say, "Well, if you feel like it, take off a couple of days," when perhaps he would be a lot better off on the job. That is a condition we have got to change; but we haven't been able to change it yet.

MR. SASS: There should be somebody in authority to say what length of time the man should be off, if he should be off at all.

MR. PARRY: One period of three months of that competition settled that. As long as that competition is in force we won't have any trouble. Of course, the men will gradually lose interest in it, and it will have to be changed by some other plan to make it as interesting as it was to begin with.

Malingering of the Employee a Big Problem

MR. McDONALD: I was very much taken up with Mr. Parry's paper, because it really goes through practically the same stage of evolution that was necessary for us to go through to reach the degree of perfection—if we can call it perfection—that we reached.

Malingering, in my opinion, is one of the greatest difficulties we have to contend with in accident prevention work. It is difficult, as in the case of Mr. Parry and myself, to depend entirely on local doctors with family connections with the men, and to have them cooperate with you so the employees will return when they legitimately should. You have got to stimulate among your own men that policy which really should be the duties of a doctor—more especially when you haven't got a plant doctor of your own and have to depend on the doctors of that district to do the judging for you.

I find myself, and experience proves, that it is absolutely an absurdity for a man to lose one day or two days for an accident of any kind or nature. I scarcely believe there is any minor accident which will compel a man to lose a 24-hour period from work. He could just as well have used his own judgment and used his own discretion and worked for that 24-hour period as lose the minimum time of one day. When you get to the more serious accident, then you have to depend largely on the judgment and discretion of the doctor, but if you can get the full cooperation of the doctors to realize the effect on the record of the plant of

those long extended periods, which can not be called anything but vacations, you are then really making a good step toward bringing down your days lost and bringing the stimulus to your accident prevention work.

I have found in our experience that malingering is one of the biggest factors we have to contend with. We are fighting it all the time.

CHAIRMAN FRAME: Who else has something to add on malingering that cuts into everybody's accidents and gives a list of lost-time accidents when in reality you can cut them down 50 per cent to start with in the cases in which the men stay out one, two, three, four and five days for minor injuries, minor scratches? Where they are handled with discretion and a little forethought, the man can stay on the job and it is certainly more to his advantage than taking these vacations.

Another Plant Approves the Safety Bonus Plan

Mr. ROBERTSON: I was very much interested in the address Mr. Brown gave at the first session, as well as the address by Mr. Parry. The thing that particularly interested me was the bonus system. I am just going to say something about the bonus system. I don't want to offend anyone by what I am saying.

In this bonus system, I take it that each individual man in the plant gets a bonus of either one per cent, or some stipulated amount. Gentlemen, do you think it is necessary to bribe a man to protect himself from getting hurt? That is just a point to consider.

I quite agree that it is a fine thing to work for a trophy, and to have everyone in the plant work toward that end. Those trophies are wonderful things and have done a great deal to cut down accidents. We are all trying to win the trophy. We have got one and we hope to bring another up to Canada.

CHAIRMAN FRAME: Mr. Rader, I wonder if you would add something to this bonus discussion and the merits of the system and how it works.

F. H. RADER (Electric Foreman, Alpha, Easton, Pa.): In regard to the bonus system, we find it works out very nicely. When it was first instituted, the thought went around quite generally that according to our brother's idea it was more of a bribe system. But we hunted up the matter and found that idea existed in the minds of those in whom the safety work had never taken root. You know, we have some fellows in the plant who make a little guess at safety work. We found this idea prevailed in those men rather than in those who were at the head and were extremely interested in safety work.

Then we got around to those men and talked over the matter, and we finally got them to see that it wasn't a matter of a dollar or two per month in their envelope. While that was appreciated, of course, I don't think there were any in our plant who actually needed the extra dollar or two, but rather they got the idea that it was to encourage those not interested to come along. After they had actually received the first or second bonus, they began to open up their brains a little and began to think differently. Finally they thought, "It is not the money so much,

but I don't want to be the fellow who is going to keep you out of your bonus."

We have a safety committee of all the foremen around the plant. I have actually gone through our plant and seen men working on certain jobs that were rather dangerous. I heard one fellow say, "Look out there. You are going to keep some fellow out of his bonus if you get hurt. Don't do that. Tie that or put a heavier chain on that." That idea has got all over the plant.

We had a fellow just a couple of days ago who got a little hurt, and he said jokingly, "Gosh, I was afraid I would have to lay off, but I decided not to because I didn't want to keep you fellows out of your bonus." That was said in a joking way, but we have instituted in their minds a purpose that we never dreamed we could get.

While this little monetary award doesn't amount to much, it has really taken what you might say the lower class of employees and given them a consideration and a thought, and it helps the rest of us who are actually interested in safety work as it ought to be carried on, and we are getting rid of (we might almost call them) these hunchbacks, because they don't stand up straight to show themselves. They seem to put more time into their work.

Amazing Interest Shown by Employees in Safety Effort

CHAIRMAN FRAME: Dan Ziegler is here from the Catskill plant. I want Dan to say a few words because at his plant they have had only two lost-time accidents so far this year. They have had wonderful success and I need not tell you that because of that record they have shared in the bonus payment every month. There has been some comment at this Catskill plant about this bonus.

DANIEL L. ZIEGLER (Plant Engineer, Alpha, Catskill Plant, Clementon, N. Y.): This reminds me of what Mr. Frame was saying on Sunday evening. In previous years we were pretty unfortunate in our accidents. Since this bonus system came into effect, it is amazing to note the interest and the reaction that have taken place amongst the members. Of course, it was discussed at our various safety meetings, and it didn't seem to meet with very much approval. The same old argument came back: you are bribing the men to be saved. But as the months went on, we were gathering influence and the men realized it wasn't a bribe. None of them think so now, because they see the cause and effect and the results that have been obtained.

One of the main things we can show down in our plant is what we have accomplished with the quarry. We haven't had an accident in our quarry for 21 months. In our mill they feel that if the quarry can do that they can do it in the mill itself. Interest has been generated through the effect of this bonus, and we hope to continue that way.

CHAIRMAN FRAME: While we are talking about records, is there any company that has a clear record in 1926? If so, we should like to hear about it.

MR. BAYLOR (Louisville Cement Co., Louisville, Ky.): We have a record

in our quarries of going two years without a lost-time accident, the 19th of August. When I left home I told our general foreman, "Whatever you do, let's put her over for 1926." We have done it. We can do it again. What we have found out, (myself, anyhow), is that you have got to educate your men if you want to get any success. You can't drive them. That has been tried. You have got to educate them. Start with the foreman and then go down to the men. When we have a new man I go to the quarry once or twice a day. There the older men take the new one and educate him as to the hazards of the job.

"Four years ago we had a man cut his finger doing that," they will tell the new man. That is the way they watch him. In the stripping and in the quarry and explosives crew we have only one division. We have not hurt a man in 25 years due to explosion—premature explosion. We did have a premature explosion last year, but it seemed as if the men got away in the snap of your finger. We have not had an explosion that killed or injured a man in 25 years.

CHAIRMAN FRAME: That opens a new angle of thought. Who else has a record he can boast about?

The Foremen Are Responsible for Employee Safety

MR. ALLEN (U. S. Gypsum, Oakfield): We have a record of 22 months, not a lost-time accident in our warehouse. The man-hours during that period cover 800,000, during which time we had 750 new men. New men constitute our biggest hazard. We have put the matter of safety up to the foremen. Our foremen have given us good results. We have them to thank for our success. Every new man has been taken over with the idea that nothing must happen to him. When you get your foremen working on a basis of that kind your success is almost assured.

CHAIRMAN FRAME: Mr. Allen, wasn't it your company that won the trophy from the United States Bureau of Mines?

MR. ALLEN: I couldn't say, sir. I am in the warehouse and have nothing to do with the mines.

MR. JACOBSEN: They won the trophy.

MR. BAYLOR: What kind of shelter have they got for their men? Do they ever lose any men by blast? We have cylinders to protect our men. If anything we do will be of benefit to anyone else along the line of safety, we will be glad to give anyone the details.

CHAIRMAN FRAME: Thank you very much. That is the kind of cooperation that gets results.

W. F. WEIDNER (Lehigh, Mitchell, Ind.): The previous speaker asked a question about the protection of men in quarries. We have had a great deal of that experience. The plant has a sheet metal drum of a cone-funnel type. It runs up about six feet cylinder type and then is finished out like a funnel. We have any amount of those of different sizes. For illustration: with a shovel crew, in plug hole drilling they shoot from two to five times a day, and they will have one of the larger size, because it will probably stand there for a week so that plug hole shooting will hurt no one. Then we have smaller ones for end lines or

dinky men where there are only three or four men. They can lay them down or roll them anywhere. We have done this for three years and we have never had a man hurt from plug hole shooting.

When it comes to battery shooting, we make an arrangement with the dynamite foreman that everybody is clear for shooting, and we don't take anyone else's word for it.

N. B. WIRT (Motor Repairs, Alpha, Manheim, W. Va.): We don't use any cylinder because we mine stone and there is a rib of pillars to get behind on account of plug hole shooting. For other blasting they use sheet iron that is fixed up a slope, so the blaster can get under it while they are shooting. On their shovels they use sheet iron roofs, which in case of shooting in another tunnel or taking down a bad tunnel from the roof or side wall, the men are protected. This is found to be a very good system.

No Man Liked to Lose His Safety Emblem

Speaking about the bonus. The one per cent bonus did our place more good than anything else. We used the monthly safety button first. It did some good. Of course, it was new in the way of safety work. Then they used the button in this way: if a man had a minor accident, whether he lost any time or not, he had to deposit his safety button for 30 days. The men hated to go into the office and hand in their button to the foreman for a finger smashed or some trivial accident like that, something that didn't require any lost time. That got pretty well next to the individual employee in thinking safety. He didn't like to lose his button.

If someone didn't have his safety button, his fellows would ask, "What became of your button?"

He would say, "I got my finger mashed and had to turn it in for 30 days."

So when the bonus plan came around they didn't get the idea that they were trying to purchase the accident or the men's safety, but they simply created the idea that the company was extremely interested in the employee not getting hurt. They looked at it that way. The bonus plan has been a very good plan in our plant. I think it has made more of a success than anything else—not because of the amount of money involved or anything like that. But we lacked interest in the individual employee, and that bonus plan seemed to bring that around more than anything else.

C. L. BURN (Pennsylvania Dixie Cement Corp.): I have lived in the south so long that I am a little superstitious about getting up to brag. We have a remarkable record this year. I attribute it to the education we instilled in the men. We have not had an accident since January 12 of this year, or 287 days. Last year we had 15 accidents, with 581 days of lost time. This year we have had two accidents and 10 days of lost time. I have said enough.

CHAIRMAN FRAME: That is a start in the right direction. Who can add a few more words to this wonderful testimony? Accident prevention is not a dead issue.

A. J. EALES (Bessemer Lime & Cement, Youngstown): I haven't much to say, but I do want to say that Mr. Parry's paper is a lot more optimistic than the old fellow from Glens Falls was when at Buffalo. He certainly was pessimistic in his attitude on safety then.

But I think we ourselves have done fairly well. We have had three accidents, with 38 days of lost time. I attribute that entirely to the education of the foremen. For a long time we couldn't get the foremen to get really interested, but now I think we have got our foremen thoroughly interested in the safety movement. That gives us one idea before we have had an accident here. We had a man with a slight accident, and he was going to lay off. The foreman said, "If you lay off I am going to ask for my time." So we have sold the foreman on it, and I think that is the main feature. Sell the foremen and the foremen will sell the men.

CHAIRMAN FRAME: This question of foreman's responsibility is a highly important one. Who else can add something to it?

Artificial Resuscitation Saved His Son's Life

W. A. WOODRUFF (Lehigh): We made a fairly good record this year. In fact, the way we count it, from the first of last October until the first of September, we got through without any accidents at all. During the whole of this year we had no lost-time accidents up to the first of September. Then about the 15th, I think it was, we had a fatal accident. That is the only accident we have had so far this year.

There is one question that hasn't been touched upon that I'd like to hear discussed. That is the question of artificial resuscitation. All the foremen and all the safety men have been taught that prone method of artificial resuscitation. I think it is a very valuable thing. I think so because I saved my own son's life by that very thing. We have had one or two cases of it at the plant, and I just wondered how much of that had been practiced in other plants or whether it was practiced at all.

CHAIRMAN FRAME: Mr. Woodruff, before we go into the answer to your question—and I think there are a number who will answer it very quickly—will you give us a little more detail on that occurrence. I am sure it will be a good practical lesson to all of us.

MR. WOODRUFF: My son was taking a bath in the bathroom and was overcome by natural gas. The gas was escaping and he didn't know it. He fell over in the bathroom, and when we called him to supper he didn't answer.

My wife said, "Thornton doesn't answer. There is something the matter. The door is locked."

I rapped on the door and called for him, but he wouldn't answer. I maintained that he wasn't there, but my wife insisted that he was. So I had to go around and tear open the window and get in. I found him on the floor. He was still breathing, but heavily, as is customary under those circumstances. I got him out in the fresh air and applied artificial resuscitation, as we had been taught at the plant by our plant doctor.

Along that line, I want to say we have a good record for having a plant doctor. He has been with us ever since the plant has been running, 25 years. What saved my son's life, the doctor himself said, was the work that I did immediately. If we had waited until the doctor came we might have lost the boy.

CHAIRMAN FRAME: That is undisputed testimony as to the value of resuscitation, of teaching the men how to go about it when the emergency arises. Is there someone else who is using this same method? If so, will he tell Mr. Woodruff something about it?

W. W. HAMILTON (Plant Engineer, Alpha, Ironton, Ohio): We have 15 men at our plant who have taken this course in the Schaefer method of the Bureau of Mines. They have a car going through Ohio several months and give a week's instruction free of charge. To show you the value of this, we had 75 miners overcome at one time with gas and these 15 men worked on these fellows and we didn't have a single day's lost time as the result of this accident, due to the fact that the men were trained to handle such cases.

CHAIRMAN FRAME: That is a wonderful feat—75 men overcome by gas and all at the same time, practically—at least they were all discovered in that condition. They had some first aid men trained in this method, and these trained men went ahead, as Mr. Hamilton has explained, and by their successful manipulation of this prone pressure method were able to resuscitate all these men, so that they did not lose any time from their work. Without it, there is no telling what might have happened. If there is a delay before the doctor arrives, it may prove fatal. Can someone tell us about resuscitation? You are likely to meet with it in any number of ways.

Need for Artificial Resuscitation Always an Emergency

E. G. HAMMER (Electrician, Alpha, Jefferson Barracks, Mo.): One thing is certain: You shouldn't give up that method. We worked one hour and fifteen minutes on a man and brought him around. After that they came with a pulmotor, but they could only use the pump and could not give him any oxygen. The doctor said the resuscitation method saved his life.

C. H. DENMAN (Chemist, Alpha, Bellevue, Mich.): You can never tell when you are going to need this method. We had our departments divided off so that three or four from each department would come to the laboratory and the first aid men would instruct them in this method. We had only one occasion to use it in the mill. One of our men was out joyriding with two or three strangers. I don't know whether he had had "white mule" or not, but one of the fellows went all in. A doctor was sent for. The doctor looked at him and said, "He is done for."

The fellow at our mill said, "He isn't." He rolled him off the cot, started work on him, and brought him to. So you can never tell what you are up against with doctors.

We have two doctors in our town. One likes to keep a patient as long as he can, and the other doctor is very easy. He is this easy:

There is a truck driver who was a little discouraged about his work. He came in and said he got kicked with a Ford truck. We gave him a little rubbing on the wrist and fixed him up. The next time we saw him he came up with a big aluminum splint.

We said, "Where did you get that?"

"The doctor put it on."

"Is your arm broken?"

"Yes, cracked bone."

We had an investigating committee at our mill to go to the bottom of every accident. I immediately went to the doctor and asked him if this man had a broken bone, and the doctor said that his arm was strained so he put on the splint. I immediately said to the man, "I want to see you at Dr. Haight's office (that is a dentist in our town who has a wonderful X-Ray)."

He said, "I'll be up there at 2 o'clock."

Handling the Doctor Who May Want to Interfere

He was there before I was, had the splint off, had moved the chair and got underneath and taken a picture of the arm, which showed no broken bone. That fellow didn't care about accidents or time lost or anything of the sort.

In regard to the bonus, we find although it isn't much, it does help. We will have men come for first aid and other men will follow them and say, "Say, Charlie, is that man going to have any lost time? Is that going to affect our department?" Although it doesn't amount to much, it surely creates more interest.

MR. HAMMER: In regard to resuscitation: with all due respect to the medical profession, many times in the case of shock, drowning, gas, etc., medical men tend to fool around a little while. As long as they have the patient under their care you can't touch him. It is a good policy to get the doctor to declare him dead so you can begin working on him.

We had a case happen in St. Louis in which the doctors declared the patient dead. As soon as this was done, they pushed the doctor aside, and that man is climbing poles today for the Union Electric.

MR. SASS: A few years ago I used to be on some kind of a team that answered pulmotor calls. That is, we would jump into an automobile, throw the pulmotor on board and away we would go. When somebody would get tired of living and try to commit suicide, we would work on him. Sometimes we were successful; sometimes not.

The pulmotor is a rather hard proposition to work with, providing it is in the hands of an inexperienced man. In such a case, it is likely to do more damage than good. As far as this prone pressure method of resuscitation is concerned, we teach our committee men at the different committee meetings. Then periodically when we hold our different safety committees throughout the mill, we instruct as many men as we possibly can. One plays the part of the patient, and the other is the operator. This way the man gets an idea of how it feels to be worked upon and he also gets the idea when he is working on someone else.

MR. KLEIN (Universal): On this subject of Detroit not knowing what the safety convention is, this morning on the way in I picked up a gentleman staying in the outskirts of the city. He noticed my badge and said, "What is this about?"

I started to explain and said, "Last year in Cleveland I went back with just one idea, just one phrase that I thought was the most worth while thing I had gained during my time in Cleveland."

He said, "What was that?"

"Stop at the curb. A man from Chicago organized the Stop-at-the-Curb Club for children."

This is outside of cement. When we teach our men safety in the mill, we feel we have gone a long way. Mr. Huth has the perfect record. We all hope to accomplish it. We have gone a long way in the mills, and all of us hope to have perfect records, but outside of that safety work is not as good as it should be.

The idea of stop at the curb is an excellent one. Children can join this club by writing to this newspaper and giving their names. All they get is a button which says, "Stop at the curb." If any child running along the street will stop at the curb, there is a life saved practically every time. These children will run out. I have told the men in our plant to apply that everywhere, that where there is danger, that is the curb line and to stop at the curb, to think an instant before they go ahead.

A Banquet Helped Put the Safety Idea Across

In our mill I have tried to put a curb line on all danger places. If every man will stop at the curb, the same as this Chicago newspaperman tried to get the children to do, it will be one way of stopping our accidents.

CHAIRMAN FRAME: We should like to have a few words from all of you. Is Mr. Switzer here?

E. C. SWITZER (Petoskey Portland Cement): Our company during its operations got a very poor record for accident work. We have had a safety committee for the past three years, but we weren't able to put the safety idea into the men until about a year ago. Then we got the men together at one of the hotels of our city and had a banquet for them. We had one for the men on the day shift earlier in the evening, and had a later banquet for the men on the other shift.

The result has been that during the present year we have had so far two lost time accidents. In January, the latter part of January, we had an accident that caused the loss of six days. In May we had a man get his leg broken in the quarry, cutting up old iron for scrap and other stuff that had been broken by blast in the quarry, by which he lost 120 days. Those were the only lost-time accidents we have had so far this year. For us it is quite a record. It is not what we hope to accomplish but it is something that is worth while.

Like others who have spoken today, we have gone through the valley of tribulation and we are making progress. We hope some day to arrive

at the point where we can go through a year or series of years without any lost time.

MAJOR RENINGER: There is just one thing I want to call attention to which I think we ought to take a little notice of. Year after year we come here and we just talk about our individual plants or what the other fellow did. We don't give very much attention to safety matters outside the plant. Just a short while ago a gentleman spoke about the curb line. There are children in and around the plant, and that is something we are vitally interested in. We have had one or two accidents of children hurt by cars or in some other manner.

Safety Committees Should Do Work Outside Plant

In small towns—and most of our plants are located in small towns—your cement plant is probably the biggest operation there. I think it is up to safety committees to do some work outside the plant and to try to educate the children. I think we ought to pay more attention to that and not be selfish and confine the work to the plant alone. We should spread out. If we ever want to get across this message of safety, we have got to branch out, particularly in the small towns. The only people who can talk safety in small towns are the safety committees of the plant.

Last year over 15,000 children of school age were killed. I think one of the saddest stories happened to a man who usually gets to this Congress, an assistant superintendent of the Carnegie Steel Company, a man whom a great many men know. His little daughter was hurt last week, run over by an automobile, and that is why he isn't here at the present time. I think the safety committees can do a lot to get the superintendents and teachers interested and educated. I think every safety committee of the companies ought to try to see that the schools in that town get a copy of the safety educational bulletin, that they get a copy of the safety calendar, and things of that sort. We can spread this gospel of safety, of school safety and at-home safety. I think it would be an interesting subject for every safety committee to take up, to make it part of your program to talk about public and school safety. I think it would be interesting for all of us to carry home that idea, not to be selfish and confine the safety work to our employees and the plant proper.

MR. EALES: Along that line, whenever we have a general safety meeting, we get an outside speaker and we have the speaker in the school to give safety instructions to the school children. Along with that we have a motion picture film. The last one we got was "Ask Daddy." That film is solely for children. If you haven't seen that film, you want to get it. I am sure that it will help you in your safety work with children, because your children are eventually going to be your workers, and if you have them trained in safety before you get them, it will be all the easier for you.

MR. DENMAN: We have a meeting twice a month. One is a foremen's meeting, and the other is an open meeting. At this meeting we usually

try to get an outside speaker if possible. We have started this year to invite the public, that is, the business men, the school boys, and the superintendent of schools, particularly. We have had some men come to us and say, "I didn't know you men did this work." They rather thought we had to kill men every once in a while. We have tried this way of getting to the children so when they grow up and have to go to work they will know what safety means. We had a speaker at the school auditorium and joined with them and had a wonderful meeting. I think it has done a lot of good.

F. E. TOWNE (Superintendent, Manitowoc Portland Cement Co., Manitowoc, Wis.): Mr. Chairman, I said too much last year. Last year was our first year of really serious activity in safety work due to the fact that we were practically a new plant. I am almost afraid that we have not got our bearings, so to speak, and that there was a certain amount of good fortune wrapped up with the results we had last year.

So far as numbers go, our record this year is not as good as it was last year, I am sorry to say. In terms of lost-time days, we have only about one-fourth the number of lost-time days and about one-fifth the number of compensation days that we had last year. I am certainly convinced that the real necessity in safety work consists of two things: perhaps primarily education; and hand in hand with that, being everlastingly at it. Keeping the thing before the men all the time promotes the spirit of safety and gets it so thoroughly drilled into their system that they take real pride in the results being obtained.

Men Are Often Reluctant to Report Accidents

We had one striking illustration of that a few days ago. A man had the misfortune of turning his ankle. The injury was very painful, but he didn't say much about it. The next day we noticed he was limping around and having considerable trouble. We asked him what was the matter. He told about his misfortune. While he was lining the kiln, he had stepped on some clinkers, slipped, and turned his ankle. When asked why he hadn't reported the incident, he said that it didn't amount to very much.

As a matter of fact, it really did amount to something, we tried to tell him, and as is always the custom, we insisted on his being reported to the doctor at once. We take that measure of determining whether or not an accident is serious, by either reporting to the doctor or to the superintendent of the hospital with which we have direct connection. The result was that the physician called at his house and told him that the ankle should be put in a cast, that his absence wouldn't last long and he would be back at work in five or six days. He put on hot applications that night to help remove the inflammation and the next day he would put it in a cast.

The doctor returned the next morning about an hour later and did not find the man. The man was on the job. The hot applications worked wonders.

We asked him if the ankle was any better, and he said that it was a great deal better. He kept right at that with hot applications all night long and used a hot water bottle, and the doctor said he really did think that 75 per cent of the injured men every place could do for themselves what otherwise would necessitate the services of a doctor over a considerable length of time.

One thing more that came to my attention this morning was an inference drawn partially from Mr. Green's statements concerning the guarding of machinery. Along that line, the habit has become so thoroughly settled upon the men in construction work of any nature at our plant that the guard rail and guarded runway are generally the first things to go around a piece of new machinery of a permanent nature. After the machinery is put in, then the wire netting or the guard around that machinery is put in. The one big thing this does is to create a sentiment for safety.

The Malingering and the Man Loyal to His Plant

A good many men feel they have just as much sense perhaps as the other fellow. They are not going to get caught in that but they do realize there is a certain element of accident when their back is turned. A piece of loose clothing or something of that kind may be caught. They have got to the point where they will not take the chance. I believe that is hand-in-hand with the spirit of education. The more education we can drum into the men, the less chance they will take.

J. H. LEGGET (Superintendent, Plant No. 5, Canada Cement, Belleville, Ont.): Just one thing crossed my mind when Mr. Parry was talking on the subject of malingering. It seems as if you have to go into giving a bonus to keep the men from getting hurt.

I thought of a case that happened at our plant where we took on quite a few men for some construction work. In one gang there was a man who met with a little accident—not serious at all. The man had just started to work. It was a gang that had several hundred days clear, with no lost-time accidents. That record didn't mean anything to this young man. He laid off for a day and came back to work and spoiled the record. They had to go back and start all over again, after having had 600 days clear.

A day or two afterwards a man in another department had a finger broken. He had been with us for quite a time and he secured the first aid treatment laid down by Mr. Jacobsen. The first thing he said when he got in the office was, 'I don't need to lose any time. I'll be on the job inside half an hour.'

The doctor put his finger in a splint and the man was on his job within a half hour after he met with the accident.

CHAIRMAN FRAME: Gentlemen, we have with us Mr. Curtis, of the Portland Cement Association, who has always been vitally interested in promoting the welfare of that important organization. He has a few words of good cheer and optimism to give us at this time with partic-

ular reference to the importance of keeping up the standard of our accident prevention.

A. J. R. CURTIS: Mr. Chairman, probably it is inappropriate for me to say anything at this time. As yet I must plead ignorance of accident prevention work and would prefer to listen. However, I am surprised and delighted with the enthusiasm of your meeting. It was much beyond my expectation to see the number that have come here for this session devoted entirely to cement mill safety.

In our industry we have made the proud claim for years that "Portland cement contributes much but consumes nothing." The product of the cement mills goes into structures which greatly benefit humanity and guard it against danger. Indeed every dollar spent for cement brings benefits worth much more; but we can hardly say, and intend it to be taken as literally true, that our product consumes nothing as long as we have mill accidents. As Mr. Brown stated so clearly this morning, one of the great objectives in the business of manufacturing cement is to sustain our workers and help them to attain contentment and happiness unmarred by the tragedies called accidents.

The Cement Section Suffers a Great Loss

The Cement Section suffers great loss in Mr. Jacobsen's resignation. Our speakers have brought that out and it has been very pleasing for me, as his friend and associate, to hear the fine sentiments expressed concerning Mr. Jacobsen and his work. He has engaged in it wholeheartedly for nine years and in that time I have never seen "Jake" downhearted or out of patience. He has always been busily occupied with schemes and plans for enlarging and perfecting the work.

When a salesman goes out to sell goods the desire to get the name on the dotted line is the thing that keeps him concentrating, but in work of this kind, I believe that accomplishment depends almost entirely on inspiration. If a man doesn't believe in accident prevention work 100 per cent, his efforts can not possibly succeed. There is hardly a person so far down the intellectual scale that he can not detect whether the man addressing him really believes in the thing he is talking about or not. Success with safety work in the cement industry seems to be due largely to the fact that the superintendents fully believe in the work and have impressed the idea on foremen so well that the latter have taken it on down the line to each individual worker.

Mr. Jacobsen tells me that he has been trying to arouse greater interest in our accident prevention magazine. As a result a considerable amount of material of the right sort has been collected and the distribution built up to something over 2,000 copies. These results, he tells me, have been accomplished by hard work. I can not feel that 2,000 or 3,000 copies of a magazine circulated every two months represents the possible good to be accomplished by the use of the printed page, when we are considering the accident prevention work of about 140 cement plants employing 45,000 to 50,000 workmen.

The point is illustrated by an incident the other day. I visited a mill which seemed to have an unusually low proportion of illiteracy. Apparently most of the workers read English. This mill, which is using the magazine somewhat more extensively than the average plant, distributes only 14 copies, although there are some 150 men employed. Without wanting to be critical, I would like to suggest that the investment in money and effort in this magazine can be fully justified only through the effective use of greater numbers.

The responsibility for making the magazine interesting rests largely with you men who have actual charge and supervision of safety work in the mills. We can not provide the kind of talent that will duplicate your knowledge and experience. What one man can do, even though he be privileged to travel around, is small indeed as compared with the daily opportunities of those who see what goes on in the quarry and about the mill. The magazine requires a great many short, snappy plant safety items, with photos or sketches, if possible.

Can we not depend upon you to put your shoulders to the wheel and help us in Chicago who want to help you? If so, there can be no question about the future success of our safety campaign.

CHAIRMAN FRAME: I am sure we can back up the thought of Mr. Curtis that there still remains much to be accomplished in the good work that Mr. Jacobsen started in the prevention of accidents and the creation of enthusiasm and the right kind of business and trying to limit the number of injured men.

I think at this time we might call on Major Reninger for the report of the Nominating Committee and proceed with the election of officers for the ensuing year.

Report of the Section Nominating Committee

MAJOR RENINGER: The Nominating Committee appointed by the chairman, after careful consideration of this subject, submits to you the names of the following persons:

Chairman—Mr. Russell Frame, Alpha Portland Cement Co.

Vice Chairman—Mr. Thomas Halpin, Marquette Cement Co.

The Nominating Committee feels that a chairman should serve for two terms, as it takes him at least a year to become acquainted with the work.

The Nominating Committee also offers the following suggestion, or resolution, that all past chairmen become permanent members of the Executive Committee of the Cement Section.

Respectfully submitted,
(Signed) DAVID ADAM, Lawrence,
FRANK H. SASS, Universal,
HENRY A. RENINGER, Lehigh.

CHAIRMAN FRAME: I am not qualified to enter into the vote or the expression of opinion of those present, so I am pleased to delegate the continuance of this important subject to Mr. Jacobsen.

CHAIRMAN JACOBSEN: You have heard the nomination of Mr. Frame as chairman and Mr. Halpin as vice-chairman. Are there any other nominations from the floor?

(It was regularly moved, seconded and carried that the secretary be authorized to cast a ballot electing Mr. Frame chairman and Mr. Halpin vice-chairman.)

CHAIRMAN FRAME: I am sure I am grateful to have your expression of confidence in the officers of the past year. We realize we can do nothing but coordinate the efforts and the good-will of those who have helped us in the past. I can do nothing more than promise that the officers will devote their best accomplishments to further the work of accident prevention and to make our meetings interesting and to provide speakers which will add greatly to our purpose.

Mr. Halpin as vice-chairman will have the floor.

MR. HALPIN: All credit for the success of the association the past year is due to the chairman and not to the vice-chairman, for he has had nothing to do.

A Testimonial Is Presented to Mr. Jacobsen

CHAIRMAN FRAME: At this time I want to express the keen loss which the Portland Cement Association and which the individual plants, particularly the employees of the plants, including the officers, feel in the loss of Mr. Jacobsen. As you have heard a number of times today, this is the last meeting in which he will be officially connected in this important line of work.

I am going to ask Mr. Halpin to further express the feeling that we have on Mr. Jacobsen's loss.

MR. HALPIN: Mr. Jacobsen, speaking on behalf of the members present, we can not permit you to leave the association of these men who have been with you a good many years without at least a written testimonial of our sincere regard and appreciation of your efforts these many years. I have a testimonial, written and signed by the members of the member companies here, which I take pleasure in presenting to you.

In addition to this written testimonial we want to present a monetary testimonial of our appreciation of your good work and your friendship and everything that goes with it. I am no speechmaker but I present this on behalf of the members present.

(Members arose and applauded.)

MR. JACOBSEN: You know, gentlemen, this is quite a surprise. It certainly is good to know that I have that many friends here. You may think that you are going to get rid of me with this, but I am going to stick with you to the bitter end. I have had the pleasure of serving the Portland Cement Association for a good many years in this kind of work. Really, when all is said and done, it has been a pleasure, because I have made more and more friends every day out among the plants and in this kind of work.

When you get down to brass tacks, there is only one thing that counts. I think that is friendship and good-will in accident prevention work. Without that you get no place. I certainly want to thank you for this wonderful surprise. I don't want to look a gift horse in the mouth, but of these two things, I would rather have this testimonial. This watch I am going to carry and look at, and the testimonial I am going to take home and preserve forever. I don't have any children to show it to, but I am going to keep it anyhow.

We are going to meet tonight, gentlemen, at the dinner party. I am not going to give you a lot of sob stuff, but will you all do me a personal favor and be present tonight?

MR. McDONALD: Mr. Chairman, I certainly would like to voice the sentiment of the former speaker with respect to the departure of Mr. Jacobsen. It doesn't take but six years to go back, to feel that Mr. Jacobsen, for myself, for my plant, for my organization, in fact, I speak for the whole organization of the Canada Cement Company, by his personality, by his good-will, by his friendliness, by his thorough knowledge of accident prevention work, was a great incentive to us in our plants in the showing we have made in the years gone by. We cherish his friendship, his memory, and we join with the others in wishing him Godspeed in his future career.

MAJOR RENINGER: I feel there are a great many men right here today who probably would like to get up and say something but who are more or less backward. I do know everybody here, and the plants throughout the country, feel the same towards Mr. Jacobsen as we do here. I feel that what Mr. Halpin has said, and what the Canadian representative has just said, and what I am saying here today, is the expression of everyone in this room and of the men back at the mills throughout the United States.

MR. TOWNE: May I ask if the latter portion of Mr. Reninger's report was adopted concerning the suggestion for the members who were past chairmen becoming permanent members of the Executive Committee?

CHAIRMAN FRAME: I don't believe it was. I am glad you called it to our attention.

(It was regularly moved, seconded and carried, that all past chairmen become permanent members of the Executive Committee of the Cement Section.)

ADJOURNMENT

Joint Meeting of Cement and Quarry Sections

October 27, 1926

E. E. EVANS, Chairman

President, The Whitehouse Stone Company, Toledo, Ohio

THE joint meeting of the Cement and Quarry Sections convened at 9:45 o'clock in the Book-Cadillac Hotel, Detroit, Mr. E. E. Evans, Chairman of the Quarry Section, presiding.

CHAIRMAN EVANS: Gentlemen, we will at least attempt to come to order. Mr. Frame, chairman of the Cement Section, suggested that I open the meeting. He had a very strenuous day yesterday, and on the strength of that I have agreed to relieve him to some extent. That doesn't necessarily mean that I shall relieve him of all the work.

I want to say at this time that I believe the Cement Section is to be congratulated upon finally persuading Mr. Frame to act as their chairman for another year. I think those quarrymen here will agree with me that the Cement men have shown mighty good judgment, and I want to at this time take the opportunity of congratulating Mr. Frame.

R. FRAME (Alpha Portland Cement Co., Easton, Pa.): Thank you, Mr. Evans.

CHAIRMAN EVANS: At the last National Safety Congress held in Cleveland an experiment was tried. The experiment was a joint meeting of the Cement and Quarry Sections. It worked out so satisfactorily and the meeting was so harmoniously conducted that it was decided to continue the plan this year. The attendance this morning would indicate that it is and will be a satisfactory meeting.

With reference to the safety movement: I am convinced that there must necessarily be some merit in it, because when any project has sufficient merit that it will permit quarry operators and cement men to conduct a joint meeting and do it harmoniously, I am sure there is merit to that project. Not that we have anything against the cement men. If we did, we wouldn't show as great a willingness as we have to cooperate with them in this world-wide safety movement.

We have rather a lengthy program, and I believe that any further remarks from me would necessarily be a digression. However, I am going to take advantage of an individual who is a little taller, carries

More avoirdupois than I do, and have him at this time say a few words to you. Mr. Frame!

MR. FRAME: Members of the Quarry and Cement Sections of the National Safety Council: It is indeed a pleasure on the part of the cement men to meet again with our good friends from the Quarry Section. Mr. Evans has stated that the meeting worked very harmoniously last year, and the cement gentlemen felt that it would well serve our purpose to have a joint meeting again this year.

Safety is indeed a live subject. There is never too much that we can do to cut down these accidents, and I know of no better method than a meeting of this sort whereby we can report on the progress made, present our individual problems, and encourage that discussion which enables all of us to understand the other man's viewpoint and the peculiar methods which he has used to obtain those results which we all are after.

CHAIRMAN EVANS: I am quite sure we are now going to have an interesting talk, or perhaps a paper on "Safety in the Cement and Quarry Industry." We will have the pleasure of listening to Dr. R. H. Lansburgh Secretary of Labor and Industry, the State of Pennsylvania.

SAFETY IN THE CEMENT AND QUARRY INDUSTRY

R. H. Lansburgh, Secretary of Labor and Industry, State of Pennsylvania, Harrisburgh, Pa.

I am a little dubious as to just why I was brought before this particular joint meeting, unless it be that in Pennsylvania in the last year we have been making extensive investigations into quarry accidents, and as a result of those investigations and with the complete and most hearty cooperation of the quarry industry of the state, have developed in Pennsylvania for the first time a safety code of regulations governing the operation of quarries.

Any of you who are from Pennsylvania will realize some of the problems that have been met and faced during the last year in the development of this quarry code. We feel that it probably represents almost the last word in quarry safety. Just at the present time it is being lived up to by the quarries of the state, enforced by our department.

From the experience which we have gained in the development of that code and the discussion leading up to its development, as well as our experience in inspection under that code in the last six months, we have learned one very fundamental fact; and it is about that fundamental fact that I am going to talk to you this morning.

The cement industry is the most completely organized for safety in the United States. The closely knit organization which you have developed extends not only throughout the cement plants themselves, but into the quarries in connection therewith.

The quarry industry, other than that portion of it which is connected with the cement plants and certain outstanding large operators prob-

ably here represented, is almost totally unorganized for safety. This condition represents a challenge to those of you interested in quarry safety, peculiarly because of the extremely hazardous nature of the quarry industry and the fact that a very large majority of its accidents are of the type which can only be reached through effective safety organization.

There is probably no other industry in the country where such a large percentage of accidents arise from non-machine causes, or where safety practices, as developed from experience within the industry, bear such an important relation to accident reduction.

Five causes stand out prominently as representing about 75 per cent of all accidents in the quarries of Pennsylvania. The statistics of the United States Bureau of Mines indicate similar conditions throughout the United States. The five causes are as follows:

1. Explosives and explosions.
2. Cars and engines.
3. Falling objects.
4. Falls of persons.
5. Handling materials.

Explosives and Explosions

The first cause is one which to consider brings with it endless discussion of the handling and use of dynamite. Experts claim dynamite can not prematurely explode, but accident reports show continually from one to six persons injured by premature explosion of dynamite. Examples of accident reports are as follows:

"Man preparing to charge a hole, the dynamite exploded and killed one man and injured four others." Another, "Men were charging a hole in the quarry, the dynamite exploded injuring four men." In the first instance, the man who prepared the charge should not have been permitted to carry the charge to the body of men working on the bank. Only the person necessary to place the charge should have been permitted to handle it or be near it. He should not have been permitted to create an unnecessary hazard which did not in any way assist in the carrying on of the work. In the second case, when charging holes for blasting, seldom if ever is it necessary to have more than two persons, and in many instances only one person is necessary, to prepare the blast. In every instance the number of persons handling the charging always should be kept down to the minimum because of the danger of premature explosion.

Another type of accident reports reads: "Two charges of dynamite had been placed, both charges being connected with the switchboard. After the charge had been set off these six men returned to the place to work, when suddenly one charge which had failed to go off discharged, injuring all six men." In this case after the charge had been set off, only the person in charge of the blasting should have been permitted to return to the working place, and he should have made a thorough and

complete inspection of the cause of the second charge failing to fire before permitting the other five men to return.

Without getting into detail or technicalities of handling explosives, it is perfectly evident from that type of report (which we are constantly getting) that if consideration is given to keeping the number of men around the explosives down to the minimum the total number of injuries is going to be reduced.

Cars and Engines

This class of accidents in general is caused by lack of supervision and a disregard for the well-known safety practices. Oil and gas engines operated in quarries where artificial light is seldom used should not show such a heavy toll of human life or such a large number of non-fatal accidents.

Tom Smith was riding on the trip. He cut the engine loose and fell under the trip. Death resulted two hours later. He should not have been permitted to ride on a loaded trip. If he was the conductor, he should have ridden on the engine and not on the trip. If the track had been properly graded it would not have been necessary to make a flying switch, which evidently caused this accident. Flying switches can be entirely eliminated by proper grading of the track, which can be done in most quarries at very little expense.

John Brown was assisting the work to replace a car on the track when the engineer started the engine, throwing Brown under the car. A fracture of the left leg and fracture and laceration of the right leg resulted. If the foreman or other person in charge of retracking the car had been a real safety man, he would not have permitted the engineer to move the engine until he was certain that every person assisting in the re-tracking was out of the danger zone.

Jim Green was loading a car when the car upset, pinning him underneath, which resulted in a compound fracture of the left leg. This case illustrates clearly the necessity of placing only competent persons in charge of quarry operations. It seems impossible to believe that a foreman or other person having charge of a quarry failed to see that the load was so heavy on one side that a car would topple over and injure the workmen. Proper supervision could and will prevent such accidents.

Accidents due to falling objects are principally caused by falls of material and clearly illustrate the necessity for careful inspection of the working face. Too much emphasis can not be placed upon face inspection, as the following accident reports show: "While employee was loading shale into a car a piece of shale fell from above, striking him on the head, causing a fracture of the skull. Death resulted ten days later."

"Employee was repairing channelling machine. A piece of stone fell striking him on the head, causing instant death."

"Employee was charging a hole for a blast when a stone fell from above fracturing his right arm."

"Employee was barring stone when a loose stone fell from above fracturing his left foot."

"While loading shale, a piece fell from the face and employee suffered a bad contusion of the left leg."

Such reports are received by us daily from the quarries of Pennsylvania and illustrate the necessity not only for daily inspection but constant inspection of the working face. If the foreman can not find time, the plant must provide for inspection by a competent person during the time when men are loading and before men are permitted to commence drilling. Face inspection is one of the most important means of reducing accidents.

Falls of Persons

The nature of quarry work requires men to be at the face during almost every hour of the day, and they are constantly in danger from slides and falls. The use of life lines and belts is the greatest safety factor for men employed in this class of work.

To illustrate the necessity for life lines and belts in such operations the following accidents are available: "Employee was working at the top of the quarry, his foot slipped, causing him to fall 40 feet into the quarry. Death followed a few minutes later."

"Employee was barring stone from face when another stone fell from above causing him to lose his balance. He fell into the pit below and received injuries which caused his death the following day."

"Employee barring stone from ledge 15 feet above the quarry floor when his pick slipped, causing him to lose his balance, falling into the quarry and resulting in serious injuries."

"Man was barring stone when a piece of stone struck him, knocking him from the ledge. He fell eight feet into the pit and death resulted from the injuries."

This is sufficient evidence of the need of life lines and belts in quarry operations. While the use of these devices would not have prevented these accidents, I am positive they would have prevented loss of life in the three fatal cases cited.

Handling Materials

Handling materials stands out very conspicuously among the accidents in quarry operations. During the first six months of 1926 15 per cent of all accidents in the quarries of Pennsylvania are charged to this cause. Broken bones, mashed fingers and injured hands and feet result from the careless handling of material. Failure to use goggles when loading and breaking stone is responsible for many of the accidents charged here. The following type of accident reports are commonplace.

"Man was loading stone when a piece of stone flew from the hammer of another employee, striking him in the eye." "Employee was breaking stone with a hammer when a piece of stone hit him in the eye." "While

loading stone, a fellow employee pulled down some loose stone, and before injured man could get out of danger his foot was smashed." "Fellow employee was pulling rock down from ledge when it broke, rolled down and crushed injured man's leg."

And yet that type of accident is one which can very definitely be prevented by proper safety organization. Furthermore, as we all know, safety organization pays dividends finally as well as from a humanitarian aspect. I therefore asked the head of a department of one of the large industrial states of the United States, which has as one of its duties the prevention and reduction of industrial accidents, to say to you that there is a general field before you. That field is, after having cleaned up your own operation and your own job, to interest the men around you, to interest your fellow quarry operator.

This type of accident clearly indicates the lack of safety spirit caused by lack of the proper safety organization, and it is evident that a campaign of education among foremen, as well as employees, is necessary to reduce this type of accident, as well as the other types which have been discussed.

The interesting fact about a large percentage of quarry accidents is that there are no complicated engineering problems involved in their prevention. Accidents from machinery are relatively few.

The present accident situation in the quarry industry in the United States represents a challenge to you who are interested peculiarly in quarry safety to stimulate the interest of that great mass of quarry operators who, as yet, have paid but little attention to that element in our daily industrial life which we have all come to Detroit to discuss—safety.

Discussion Following Dr. Lansburgh's Paper

CHAIRMAN EVANS: I am sure that we feel deeply grateful to you, Doctor, for the interesting and instructive talk that you have given us this morning.

I might say, too, that several meetings of the quarrymen of Ohio have been held in that state during the past year. The last meeting was called by Mr. Kearns, who is Superintendent of the Division of Welfare and Hygiene of the Industrial Commission, at which meeting the consensus of opinion of the quarrymen was that Ohio should have a quarry code.

We took that stand largely from the fact that the larger operators were spending time and money in an attempt at least to properly safeguard the employee. Our rate has been steadily increasing, not because of fatalities that might occur in the larger plants, but because of the lack of interest manifested by the smaller operator. In other words, many of the quarry operators who are conducting a safety campaign in their plants are penalized because the smaller operator does not consider it worth while. A quarry code, if I am correct, Doctor, will correct those evils, to some extent, at least.

DR. LANSBURGH: It should if it is enforced.

CHAIRMAN EVANS: The state should enforce it.

An opportunity will be extended you men at this time to ask any questions of the Doctor with reference to statements he has made in connection with the operation of the code in Pennsylvania.

VAL ROBERTSON (Electric and Safety Engineer, Canada Cement Co., Montreal): I was very much interested in Dr. Lansburgh's paper. We operate quite a large quarry in Montreal.

The point I am particularly interested in is the inspection of the face quarry. Also, you say the men use life lines, I presume, when they are throwing down any of the overhanging rock. How do they go about it? We have never used them. We do inspect the quarry face, but as to using life lines, we have never tried that. I would be very much interested to hear Dr. Lansburgh or someone else tell me how to go about it. As you know, it is a pretty hard thing to get the quarrymen to put on a life and a belt line.

Use of Life Lines in Pennsylvania Quarries

DR. LANSBURGH: Mr. Robertson, if you were to take a trip through Pennsylvania tomorrow through the quarries of the state, you would wonder where I got that stuff on life lines. That is, you would find but very few of them being used. A year from now you are going to find a lot more, because of course that particular feature of safety is one which is going to meet with the opposition of employees until they get used to it. At the present time our department is endeavoring to extend the use of life lines, not only out through the quarry industries but through many industries. If any of you know about the hazards of window cleaning, for instance, you know that one of the fundamental safety devices in cleaning windows above ground level is a belt to hook on to a proper device on the window, so that the man can't fall.

You may also know that it is very difficult to get the men not alone to wear the belts but to use them. You constantly read how in large cities, say, New York, where your hazard is greatest, men drop to the pavement and are killed, with their belt around their waist, which had not been hooked on.

Similarly, in bridge erections some of the largest companies, such as for instance the American Bridge Company, have for years been playing with the idea of life lines and belts. It is only recently that they have really made a dent in the minds of their workers as to the necessity thereof.

For instance, in the erection of the great Delaware River bridge spanning the river from Philadelphia to Camden, there were men who lost their lives because they dropped into the water, despite the fact that one of the regulations of the company which was erecting a portion of that bridge provided for life lines. It was not until the end of that job, really, until some men had lost their lives, that the life line really came into more or less general use in the construction of that bridge.

In quarry operations exactly the same thing is faced. It is not common practice and it has not been common practice. Quarry operators in Pennsylvania who know the desirability of experimenting with that, mostly recognize the fact that the main difficulty there is going to be in getting the worker to know that this line is not going to hamper him, and to realize that if he slips, we will say, and gets a broken rib from a broken life line (which he may very possibly do) that it is better to have a broken rib than to be dashed to pieces on the floor of the quarry below.

All of that is a process of education which we are only starting on. The quarries which have started the use of life lines in Pennsylvania (I am told by our inspectors), are mostly certain slate quarries which have some of the most hazardous conditions to deal with. Of course, it is not practicable, generally speaking, to use a life line unless a man is working for some continuous period in approximately the same place. That is, the difficulties of the line are greater than the benefits derived, possibly. I am sure that I am answering your question exactly in the way that you wanted. If I am not, I hope you will ask again more specifically. Generally, the major difficulty in the use of the life line is in the education of the worker, not in any production aspect at all. The fastening of the line at some convenient point is simple, but getting the worker to put it on is not.

Life Lines Will Prevent at Least Some Accidents

CHAIRMAN EVANS: There is a gentleman here who has had some experience directly and indirectly with quarry operation. He needs no introduction to you men. I am going to call upon him to enter this discussion. There are many things that can be brought out that will be of benefit, I am quite sure. At least, any statements he may make to you will be of interest and benefit. We will now hear from Mr. Jacobsen, of the Accident Prevention Bureau of the Portland Cement Association. He is going to start something.

H. G. JACOBSEN: I came in after Dr. Lansburgh had read most of his paper. I really don't know what he has said. However, we had Dr. Lansburgh with us last year, and I think we are on friendly terms with the Doctor.

In regard to this matter of life lines, I certainly believe that the life line could be used to considerable advantage around quarries—cement quarries as well as other quarries. Every year we have men badly injured and sometimes killed, due to slipping on the quarry face. I am sure, Dr. Lansburgh, that a life line can be used in many cases.

On the other hand, in many cases it will be difficult to use. The difficulty lies in getting the men to use it rather than getting a place to tie it to. The same thing holds true in regard to using life lines along the plant proper. Each year several men are killed, for the reason that they did not use life lines. Our great trouble is not in the quarry but in our bins. I believe that is an item which will be discussed later and so I will not talk about that now.

There is another thing that we have trouble with in our quarries, and that is our quarry cars. We have more men killed every year from operation of quarry cars than from anything else. I feel that I can positively say that over a period of years quarry cars take a bigger toll than anything else we have. While in some instances it may be due to poor construction of car, in the majority of cases it is due to carelessness and neglect and faulty operation of the cars we do have. We have men caught in coupling and uncoupling cars and in switching and from riding on the quarry trains. We had one man killed a little while ago while riding between the locomotive and the first car on the train.

We have tried to lay down a rule that no man should ride a train except on the rear end, where he is generally safe. In this case, the car jumped the track and buckled up, went into the locomotive at an angle and squeezed the man to death. We also had another man killed in the same way—being squeezed between two cars. I asked if that particular man rode on the last car of the train, and I got a letter back which said "Yes, but the train was backing up."

Accidents Come When Men Forget to Think

It is ridiculous, men, how we tie ourselves to rules and forget to think for ourselves sometimes. The rule says you have got to ride on the last car of the train. The man did. But the train was backing up. In other words, in spite of the rules we have and the rules we can make, we have got to come back to the man and rely on his intelligence—whatever he has of it.

We have other accidents in quarries, but that quarry car trouble is the greatest we have. Without question, that is very outstanding. We have very little trouble with explosives. We have, in fact, very little trouble with anything else. We have some wonderful records in our cement quarry. We know several quarries that have gone for a year or two without any accidents at all. In other words, we come to the point where our quarries in a good many instances are far safer than our plants. Although people that have not given the question much consideration invariably think that the quarries are regular slaughter houses. They are not, as far as we are concerned.

CHAIRMAN EVANS: The one main point that has been raised in connection with the statements made by the Doctor, as I gather, is with reference to the use of safety lines in and around the quarry face. Off-hand, I would say from our experience that it is not altogether practicable. But in many instances they can be applied if the danger is very evident.

MR. FRAME: When the quarry code was first proposed in the state of Pennsylvania, I understand there was considerable objection raised to the regulation but through the splendid manner in which Dr. Lansburgh handled the situation, hearings were held at different parts of the state, and it was quite noticeable how the protest melted when these meetings went over the code in detail and the objections were boiled down, and

almost complete harmony was restored. I think it would be interesting if Dr. Lansburgh would tell us how he brought about that situation: in view of the proposed code, this will very soon follow in the state of Ohio and many of the quarry operators are representative of that state.

DR. LANSBURGH: In the first place, our department is checked by law with the development of such codes. Those of you who come from states that have never had any experience in it should be sure to turn out of legislation which incorporates specific safety provisions in the laws passed by the legislature; because you and I may sit here and discuss something this morning and say it is fine and incorporate it in a law, and during the year practice in the industry may change and you have on your hands a law which is obsolete.

We have just one law of that sort on our books and we know all about it. That is a law which prescribes the exact construction of motion picture booths, passed in 1909. You all know how the motion picture industry has changed since 1909, and anything passed then is entirely obsolete.

Laws Should Be Flexible Rather Than Rigid

There is just one saving clause, and that is a clause which says that our department shall have the right to modify any of these specific provisions in case the intent of the law can better be worked out by such modification. But the department has been trying for the last three legislatures to get the specific provisions of that law repealed and just leave that provision in it. If it hadn't been for that saving clause, the motion picture interests of the state of Pennsylvania would be in a fine jam at the present time. Exactly that thing exists every time you try to incorporate specific safety provisions in law. The thing to do is to get an enabling act and then let some proper state authority, after due public hearing, pass the regulation. That is the authority that we have to start with.

It is not written in the law that we must have public hearings, but that is our policy. It is the only sensible policy. If you are developing a code providing for safety regulations in any industry, the thing to do is to get the people most interested in it, namely, the people of that industry, to sit around and work out the code. This code was worked out by experts in our department and then taken to public hearing throughout the state.

As Mr. Frame mentioned, at the beginning there was opposition. That is an old story with us. We get opposition from every industry until the industry understands what it is all about—very properly so. I have had enough connections with industry to know that is a very healthy condition. If industry didn't want to know, they would be very likely to get anything shoved down their throats.

As soon as the quarry operators of Pennsylvania understood that this was a code based on practice, on best practice throughout the state, as

soon as the department could prove to them that it was practicable the opposition entirely vanished.

Of course, as is always the case, at each of the four or five public hearings, very valuable suggestions concerning changes in the tentative code were presented, and of course the code was modified. We haven't any perfect code yet, but our experience is going to show us what are the best provisions for that code. We know that certain provisions of the code will again have to be modified, but all we have to do is to modify them. We don't have to come before a legislature and ask them to modify it and maybe get it through in the last day of the session. At any time the code is open for modification upon petition. If there is anything in the code which proves to be impracticable, we know we will get the petition. We know that in applying the code our inspectors will see what is impracticable. Then you have a situation where the industry and the State Department are constantly working together to see that the state safety code is not only on a practicable basis but a continual basis of best practice in the industry.

Just as soon as any reasonable man in any industry learns that that is what the situation is, any opposition against so-called government interference with business, or anything else you want to label it, vanishes into thin air, because there can be no opposition against proper safety precautions. You men who are safety men know that. It can't stand up.

CHAIRMAN EVANS: We are going to listen to what I am sure will be an interesting talk by a gentleman who is conversant with the proper use of cables. I say the "proper use" without any modification because if there is any piece of equipment in a quarry that is abused, it is the cables. I am going to call at this time upon Mr. H. L. Williams, consulting engineer of the Williamsport Wire Rope Company, Chicago.

WIRE ROPE

Howard L. Williams, Consulting Engineer, Williamsport Wire Rope Co., Chicago, Ill.

It is a great honor to be invited to give a paper before this section of the National Safety Council, and I hope it will be possible to offer something that will be of value to you, something that will create a better understanding between the wire rope users and the wire rope manufacturers, and at the same time aid you in getting better service out of your wire rope, as well as increased safety.

Wire rope is not of recent invention. Its history dates back to the past ages, but I have no desire to tax your patience by tracing this history down to the present day, because I feel sure you are more concerned about wire rope and its present use.

Wire rope is a highly specialized product, a delicate piece of mechanism, and great care should be taken to use the correct grade and construction for your purpose, and proper care should be given the rope before and while in use.

Wherever wire rope is used, human life is endangered. We can not emphasize this point too strongly.

When you purchase equipment using wire rope, it is a pretty safe rule to use the grade and construction of wire rope specified by the engineers designing the equipment, because they have given the problem careful study and wire rope manufacturers endeavor to work with the equipment manufacturers in deciding upon the best rope to use for their equipment.

Of course, if you alter the equipment after purchasing, it may be necessary to change the grade of construction, or both, of the wire rope. However, this should be done only after careful investigation and, if necessary, submitting your problem to the manufacturers of your equipment or to a wire rope engineer.

Submit Your Wire Rope to an Expert Engineer

In fact, all your wire rope problem should be submitted to an engineer, and not left to the average salesman, who will probably recommend that you use his company's sky-blue-pink strand because it is the highest priced and strongest rope they make. Perhaps it is the best rope for some purposes, but it may not be the best rope for your purpose.

Some may recommend that you use a special or freak construction, made only by his firm and given some fancy name. These furnish good talking points for salesmen and may be adapted to special purposes, but that does not necessarily prove that they will give good service on your equipment. In fact, my experience has been that none of these freak constructions stay on the market very long, and eventually their users all go back to standard constructions.

In buying wire rope you should be absolutely certain that you are getting the quality specified. It is difficult, almost impossible, for an expert to tell the grade of material used in wire rope by its appearance alone. How, then, can you expect your storekeeper or supply man to be sure he is getting the grade of rope that was specified? This is a very important factor from the safety standpoint which is being emphasized at this meeting.

In Chicago last week we had an accident report and the company said they were using steam plow rope. On investigation we found they had put on a piece of iron rope they thought was plow. Somebody picked up a piece of iron rope and thought it was plow, not knowing the difference. Of course the elevator fell. Nobody was injured but there might have been.

Most wire rope manufacturers realize the importance of this point and have taken steps to identify their highest grade rope by a painted or colored strand, but other grades of ropes are not so identified. This fact induced our company to place a distinct printed marker running through every foot of the hemp core of each separate grade of wire rope we manufacture.

The importance of this is also realized by the manufacturers of equipment. I quote from a letter by the president of Orton Crane & Shovel Company: "Our customers are entitled to know what they are receiving and in adhering to our policy of safety, we insist upon knowing the grade of cables with which we equip our cranes and shovels."

Very often an operator, in emergency, will accept anything that looks like wire rope in order to keep going and escape the expense of a shut-down. This can be avoided. Wire rope users should carry a spare rope for the same reason that auto users carry spare tires.

Care of Wire Rope After Received

After you receive your rope, be careful to protect it from the weather and from injury until you are ready to install it.

A five-eighths inch 6x19 wire rope (six strands of 19 wires each) made in one size wire construction contains 114 wires of .040 .042 inches in diameter. Some other constructions of this size contain wire much smaller in diameter.

While a five-eighths inch rope is strong and rugged, you must realize that the individual wires, being small, will not stand much abuse. The reel containing the rope should not be rolled over sharp objects. Heavy or sharp objects should not be thrown on top of reels or coils. Trucks or cars should not be allowed to run over rope. Acid should not be allowed to come in contact with wire rope. If the rope is not to be installed at once, it should be thoroughly lubricated to prevent rust.

Installing Wire Rope

When you want to break a wire, you first kink it, which causes it to break very easily. A kink in wire rope thus has the same effect. A wire rope that has been kinked is sure to give you trouble. A large percentage of the trouble reported to wire rope manufacturers is caused by rope being kinked either before or after being put into use. A wire rope so damaged may give way after being in service but a short time, causing much damage and even loss of life. Very often the employee is not aware of the damage done to the rope by kinking.

When wire rope is received on reels, do not allow workmen to lay reel flat and pull or loop the rope off as you would Manila rope. The reel should be placed on a spindle or shaft and the rope taken off by revolving the reel. If the rope is in a coil, it should be uncoiled by rolling along the floor or ground. Never lay the coil flat and pull the rope from the coil.

When installing wire rope, be sure sheaves are in line and that rope is not binding or chafing against side of sheave.

Never pound wire rope with a steel hammer. The wires being small can not stand this abuse.

Be sure sheaves, drums, guides and rollers are not scored, especially when putting on a new rope. A rope in use is usually pulled down some

in size, therefore, the score worn in the sheave, drum, etc., is usually smaller than the diameter of the new rope. This will cause serious damage to a new rope.

When two moving objects come in contact there must be wear. Sheaves, guides, rollers, etc., should be made of softer material than the wire rope or the rope must sustain the wear. It is a question of which you would rather have sustain the wear, the sheaves, etc., or the rope.

Lubrication

This is an important factor and can not be too strongly emphasized. Proper lubrication will reduce the wear caused by rope operating over sheaves, etc.

It will also prevent rust and corrosion. Most of the oil companies have oil or grease prepared especially for wire rope lubricating and dressing. A dressing containing graphite is probably the most satisfactory. It should also contain penetrating oils so that the inner wires are lubricated, reducing internal friction and preventing rust. This is very important from a safety standpoint, as often the inner wires will fail because of rust or corrosion while the outer wires may show very little rust.

Fittings

Thimbles should be used where the rope is to be looped or where in attaching it is necessary to make a short bend. Unless a thimble is used, wires in the rope are likely to be damaged, causing rope to give away.

In attaching clips, be sure that the working end of the rope is placed in the base of the clip, while the U-bolt will bear against the loose or dead end. This will prevent crushing the rope bearing the load and breaking many of the wires. No matter how many clips are used they should all be put on in this manner.

When putting on sockets, etc., be sure not to allow any strands of the rope to become slack. One or more slack strands will throw the burden on the other strands, reducing the strength of the rope.

In conclusion, let us consider some of the causes for the failure of wire rope in service, in addition to the ones we have mentioned, and consider means of preventing these sudden failures.

We have mentioned—

Specifying wrong grade, size, construction, etc.;

Not getting grade specified;

Abuse of rope before and after installing;

Bad sheaves, drums, guides, rollers, etc.;

No lubrication, or wrong kind of lubricant;

Improper adjustment of fittings.

It is rather easy to watch the natural wear of wire rope in service. It is the sudden giving away that causes damage and is so important from a safety standpoint.

Crushing rope by allowing it to pile up on drum, or by getting caught

between sheave and frame of machine, or caught in some other manner, is one of the causes for sudden failure of ropes.

Jerking wire rope or overloading it will strain it beyond its elastic limit and after being so abused, it is likely to give away at any time, even with a small load.

We believe that all manufacturers, like ourselves, are doing everything possible to put out the best wire rope that can be manufactured, and if the users of wire rope will do their part in watching the points mentioned, a great many delays and accidents can be avoided.

CHAIRMAN EVANS: I am sure we feel indebted to you for your talk on cables. I believe the rest appreciate the fact that you are rather a modest gentleman because you have not given us a sales talk as applied to your company, but have given us some very valuable information as to how to use and treat wire cables.

General Round Table Discussion

The portion of our program that we are about to enter now, to my mind, will be the most instructive to you men here. Just how instructive it will be will depend largely upon how earnestly and enthusiastically you may take part in the discussion. This is going to be an informal discussion of problems which do confront the quarry operators and must necessarily confront the cement operators who are quarrying stone.

It is designated as a round table discussion. As the word implies, "discussion" means that if it is going to be productive of benefit to us, there must necessarily be a general discussion. The first subject which we will consider is that of how to protect workmen with regard to storage bins. Mr. Jacobsen a few moments ago, you will remember, attempted to enter in, or had a notion to enter this discussion. I am quite sure that he is rather familiar with some of the problems confronting quarry operators in dislodging stone in storage without unnecessarily endangering the life of the individual who may be in the bin at the time that the held-up storage gives way.

You will pardon me for stating an actual experience that occurred at the plant with which I am connected. We have, or did have, rather a large storage bin for screenings. A man who had been in our employ but a very short time was sent up into the screening bin to dislodge some screenings because of the moisture of the stone they had hung up and refused to come out through the bin gate. This fellow, without giving any thought to his personal safety, jumped in on top of what appeared to be a binful of screenings. Considerable of the screening had been taken out from the bottom. A crust, as it were, appeared on the top. His landing on the top dislodged quite a percentage of the screenings. In other words, he broke through and the screenings completely covered him. If the bin gate had not been open at the time he would have been killed. As it was, he passed through the bin gate with the screenings and we were able to revive him, but he was nearly suffocated.

The thought with reference to a safety line would apply in that instance. Had that individual been supplied with a life belt and to that belt attached a cable or rope, the danger would have been eliminated to a great extent.

I mention that as an actual occurrence and to suggest a line of thought which might be engaged in in this discussion. We should be glad to hear from anyone at this time. In view of the fact that Mr. Jacobsen had an inclination to speak of storage bins, I am going to ask him to open the discussion.

MR. JACOBSEN: I don't think there is a cement man in here—and I notice a few—who hasn't had experience with his bins, one way or another. The same thing takes place in the quarry industry. The reason I started to speak about that to begin with was that that is the most outstanding trouble we have had in the cement industry. The bin question has been the most troublesome. We have had more men killed in bins than in any other way over a period of years. To my notion it is entirely unnecessary to have a man lose his life in any kind of a storage bin, provided a few precautions are taken. It seems to me that the great trouble comes from the fact that men do not realize the danger in connection with such a simple thing as a binful of pulverized or finely crushed material. It looks so innocent that a new man on the job doesn't realize the danger.

If a man were compelled to use a life line on that kind of a job and always have a man stationed outside to watch that he conducts his work in a proper manner, to see that the life line is attached in the proper manner, I am sure that we could eliminate every one of those accidents. We do have plenty of things happen in regard to life lines. I won't mention this instance because there is a man here to help you out, Mr. Evans, who had a peculiar case some years ago. I will point him out to you.

A Fatal Accident While the Watcher Was Absent

We had another man killed a year or two ago in a bin. I will describe the case for you. There was a man in the bin. He had a life line tied to him, and he had a man watching outside. The chain sometimes gets interlocked. In that event we get trouble. That man standing outside is supposed to watch the fellow in the bin. He got thirsty and went out to get a drink. When he returned a second or two after, the accident had occurred. The fellow was covered up and was killed. That fellow forgot that he was stationed there to watch that fellow in the bin, and he was supposed to be there every second as long as that other fellow was in the bin.

We had exactly the same instance a short time after. The fellow in the bin asked the fellow outside to get him a plank to stand on. The fellow turned around for a second or two to get the plank, and when he came back the other fellow was gone.

I could point out numerous similar cases. I just mention these to

show you the little things that cause the trouble. The men have their life line, but you see how little it takes, even using the proper, prescribed methods, to get into trouble if you don't do it right.

In my opinion, we come back to the same question. It is a question of educating the men. Every man on the job ought to think for himself. Use the rope, but the important thing is to use his head. We can't get away from that. In my opinion, there is no reason in the world why any man should be allowed to go into any kind of storage bin without using a life line. It should be absolutely prohibitive, and there should be a man stationed outside to watch that fellow while he is in the bin, and the man should realize that he is there to watch him—not to take a rest. It is a safety measure which is just as important as no smoking around dynamite. We have had far more men killed in bins than from dynamite or anything else in the cement industry. I am sure that out of all the cement men there isn't a one who hasn't had one or two cases of bin trouble. If there are any men here who are so modest they don't want to get up, we will simply have to put a stick of dynamite under them and get them up.

CHAIRMAN EVANS: If you need any dynamite, we will call on McLaughlin.

One Man Was Supposed to Look After Six Others

You prefaced your remarks by stating there was a gentleman in the room you would point out to me. I should like to have you do so at this time. My idea is that he might have something to contribute.

MR. ROBERTSON: Mr. Chairman, the accident that Mr. Jacobsen was reciting happened at our plant some three years ago, I believe. We have six bins where we store our crushed stone. Owing to climatic conditions—we are up rather far north—we have a lot of trouble with the stone freezing in these bins. At times, especially at night, we had to put men in to feed the stone so it dries. In this case we had the six men and we had belts and safety ropes attached. Also, we found a place to attach the end of the rope, but we only supplied one man to look after six men working in the bin.

That was our mistake. He couldn't watch the six men. In this case the man who was killed had actually called for a little more rope. His movements were restricted and he asked for some more rope and they allowed him to have the extra amount. Then a slide came. He went down into the center of the discharge chute. When he called for help, three or four men started to pull him out. Then another fall came and broke the rope. When they got the man out he was dead.

There is only one thing I have against the safety lines and belts. That is, when you put a safety line or belt on a man you in a way give him a false sense of security. He seems to think as long as he has the rope attached he is perfectly safe. We are now of the opinion the safety belt is necessary, but that it is absolutely essential to have another man hold-

The thought with reference to a safety line would apply in that instance. Had that individual been supplied with a life belt and to that belt attached a cable or rope, the danger would have been eliminated to a great extent.

I mention that as an actual occurrence and to suggest a line of thought which might be engaged in in this discussion. We should be glad to hear from anyone at this time. In view of the fact that Mr. Jacobsen had an inclination to speak of storage bins, I am going to ask him to open the discussion.

MR. JACOBSEN: I don't think there is a cement man in here—and I notice a few—who hasn't had experience with his bins, one way or another. The same thing takes place in the quarry industry. The reason I started to speak about that to begin with was that that is the most outstanding trouble we have had in the cement industry. The bin question has been the most troublesome. We have had more men killed in bins than in any other way over a period of years. To my notion it is entirely unnecessary to have a man lose his life in any kind of a storage bin, provided a few precautions are taken. It seems to me that the great trouble comes from the fact that men do not realize the danger in connection with such a simple thing as a binful of pulverized or finely crushed material. It looks so innocent that a new man on the job doesn't realize the danger.

If a man were compelled to use a life line on that kind of a job and always have a man stationed outside to watch that he conducts his work in a proper manner, to see that the life line is attached in the proper manner, I am sure that we could eliminate every one of those accidents. We do have plenty of things happen in regard to life lines. I won't mention this instance because there is a man here to help you out, Mr. Evans, who had a peculiar case some years ago. I will point him out to you.

A Fatal Accident While the Watcher Was Absent

We had another man killed a year or two ago in a bin. I will describe the case for you. There was a man in the bin. He had a life line tied to him, and he had a man watching outside. The chain sometimes gets interlocked. In that event we get trouble. That man standing outside is supposed to watch the fellow in the bin. He got thirsty and went out to get a drink. When he returned a second or two after, the accident had occurred. The fellow was covered up and was killed. That fellow forgot that he was stationed there to watch that fellow in the bin, and he was supposed to be there every second as long as that other fellow was in the bin.

We had exactly the same instance a short time after. The fellow in the bin asked the fellow outside to get him a plank to stand on. The fellow turned around for a second or two to get the plank, and when he came back the other fellow was gone.

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ing on to the end of the rope in such manner that he can't slip away from it, and to always keep the line taut.

As you know, the great difficulty is to get men to wear these safety belts. And we continually experience the trouble. We have to clean off our corrugated iron roofs. It is the hardest job in the world to get the men to put on the belts, and it is still harder for one man to tell another to hold the line. He thinks it is absurd to have four men working and four men standing by. I am convinced that is the only safe way of handling the situation. It really means two men to the line: one on one end, and one on the other.

M. H. HUNTER (U. S. Gypsum Co.): I should like to bring out a line of thought. There is a question in connection with safety belts and life lines. Just what has been the experience on temporary jobs, in the case of a man going down in the bin for only a minute or so? I wonder if that is not the time, really, when accidents happen. It takes only a few minutes to get down the bin, and they fail to use a rope in such cases.

My experience in connection with using safety locks on the switch is that they don't use the lock, excusing themselves on the ground, "It only takes a little while." Then something is liable to happen. I should like to have that question answered if any of the gentlemen here have had experience along that line—in which an accident occurred because the use of a rope and line was dispensed with on account of going into a bin for only a few minutes.

Generally About Ten or Eleven Men Killed Each Year

CHAIRMAN EVANS: I think you are right in what you say, because in a crushed stone operation the screening bin is probably the only bin that will hang up. That doesn't happen very frequently. It does during wet weather because the moisture in the screenings causes it to become almost as firm as cement. For that reason it holds up. As has been stated, in the extreme northern sections where freezing weather starts early, it freezes occasionally. I think that happens very seldom in stone producing plants, with the result that has been mentioned. It takes just a moment and it is necessary for a man to go down into the bins so very seldom that safety appliances are not used in connection with the employee. That is merely stating my observation. You all have had some experience, and in order to have a general discussion I should like you to relate what has happened in your particular case. It seems to be rather an important subject for us to consider.

MR. JACOBSEN: I merely want to say that the men may not realize how serious it has been with us, but we have each year generally about nine, 10 or 11 men killed in bins in the cement industry. That is how serious the situation is. It is not a question of once in a while, every two or three years, but at the rate of eight, nine, 10, or more men killed each year. That has been the biggest item we have had on our list for years.

W. A. WOODRUFF (Lehigh, Iola, Kans.): We have had considerable trouble with bins at Iola, Kansas. We have lost five men in our shale bins. It was all preventable, as far as that is concerned, we all realize that. But it shows how dangerous the bins are. We have had the same experience with the bin freezing on top and men being caught in that way. We have used the life lines. They gave us some satisfaction, and of course they are a big help, but they don't save all the men.

We generally put two men in the bin, one to watch and one to take out the material. We also went to the bottom of the bin, and constructed a concrete roof in there with a place underneath where the men were at work, so that they and the material sent through the chutes would be protected by a strong concrete roof. That is the way we overcame the trouble in our bins.

The Foreman Carries the Key to the Locked Bins

MR. HUNTER: I brought up a question a little while ago in the spirit of help. Just to give you an idea of how important we consider the matter of the safety of a man in bins, our vice-president, Mr. Knott, issued strict orders that bin doors be locked and the key kept by the foreman whenever necessity arose for a man to go down in the bins. The foreman goes up with the men and sees that the proper safety belts are used. If the time for going to the bin is short, in that case the foreman stays there until the man comes out, locks the door again and keeps the key.

But if it is necessary for the man to be in a bin for an extended period of time, in that case he stations a man with strict orders not to leave that bin door until the men are out of the bin, and then to lock the door and bring the key to him. That is why my experience in the past on the safety line has been that a man can get injured on temporary jobs—something out of alignment. That is why I brought up that question.

J. W. HAWK (France Stone Co., Toledo): What is the use of going into a bin where you have to use safety lines?

CHAIRMAN EVANS: I am stating from personal experience that by the use of a long pole all the material isn't dislodged by punching up through the bin gate.

MR. HAWK: Can't an agitator be put in those bins to agitate that stone without having to go into the bin and punch it down?

CHAIRMAN EVANS: I think that would be a rather complicated arrangement. I don't know just what thought you have in mind with reference to an agitator, but as far as the stone quarry end of it is concerned, it applies almost entirely to screenings.

MR. HAWK: We killed three or four men about eight or 10 years ago, but I don't think we have killed any since, and I haven't heard of any being killed. We don't send anybody into the bins. We use agitators altogether.

CHAIRMAN EVANS: I think it would be of interest to everyone if you would tell us more about the method.

MR. HAWK: Agitators can be made from the material that almost any plant has got around the quarry.

CHAIRMAN EVANS: I think it might be interesting to some of us at least to get some idea from you as to just what sort of construction this agitator is.

MR. HAWK: In making an agitator to use above the bins, you can use material you have around the place. They can be made from steam shovels, steam or hoist chains, or anything like that. The crank from an old steam engine could be used for making this equipment. This may be used with friction for running it, and it should not be run over 20 or 25 revolutions per minute. You would be surprised at the results. You can take the screenings out there in less time than 10 men can take it out.

CHAIRMAN EVANS: That is located centrally?

MR. HAWK: Right over the gate.

CHAIRMAN EVANS: I think that might apply to most of us who have had trouble in connection with the material holding up. Is there further discussion?

Too Long a Life Line Has Caused a Fatal Accident

C. H. DENMAN (Alpha, Bellevue, Mich.): Our bin trouble has been with the raw material. We have lost men before we had the belts, and we have lost them since. The trouble with the belt was they had too much line. We had a man up above, but the line was fast. Mr. Robertson's idea is the only one I can see that will overcome that difficulty. As soon as a man starts to slide, if he gets under the material, no one man or two or three men can pull him out. The great thing is to have a man out there to catch him before he gets under. Since we have done away with both line and men getting in, we have lost no lives. We have hopped bottom bins that will draw out to a certain extent. We have let this material hopper in there until it will draw out freely. Now we use a long tube or a pipe with a valve on it and air. Since that, we get all the material out that is absolutely necessary, nobody is in the bin, and we haven't lost any lives.

MR. ROBERTSON: You will excuse me for still talking on the safety belt. I should like some gentleman to tell me what he actually means by that safety belt, and also which is the best type of harness to use to attach to your man? I think you will agree that simply attaching a belt around the waist is practically useless after a man has got into a chute, because you can't pull him. He is suspended and you can't do anything with him. I wonder if somebody could tell me what kind of harness he uses?

W. F. WEIDNER (Quarry Superintendent, Lehigh, Mitchell, Ind.): I have had charge of the quarries. We have a bin proposition, too. In fact, we use the life line. We also use it in our crushers. Fortunately, I have never lost a man, and I have been with the company about 21 years, in that respect. Whether it is because of the way we have han-

died the situation, I don't know. We crush our stone with a mill. From two and one-half inches it goes down to dust. We put everything in the same bin. But I saw the danger in the arrangement we had a good many years ago. We take some gas pipes, three-quarter inch in size on account of the weight. We put a sharp tool on the end of each in the shape of a chisel. They are about 12 feet long. Then we build a platform on top of the bend, and I use short safety ropes so if a man does fall, he can't fall where he gets covered up.

Another thing, I never allow my bin pullers to pull stone while we are cutting down stone. I never allow the shutter open while we are doing that. After they cut the stone down, we allow them to open the shutter to fill the cars. But you don't lose any time anyway. It is just as easy to fill them afterwards as it is to have the shutter standing open empty. I have never had a man fall. The theory is to have a short rope directly over him. I have never liked the idea of having a rope coming out on an angle, because the slide of the stone may sweep him sideways. That is the method I have always used, and I use the same method around our big crusher. We absolutely allow no slack in the line—none whatever. When he hasn't enough room to work, the man himself has to give that slack. I use my rope double. It goes up through the big I-bolt. We use no belt; we use the rope instead.

We have a big steel rope in the ring, and the man can fit this to suit his own body. We find the rope to be better than the belt. We can fit the rope, double rope, and snap it on. That rope can be lengthened all the way from six to 10 feet, but with instructions that at all times he must not have any slack in the rope.

CHAIRMAN EVANS: I think that is a very good thought. I am sure that many of us have made a mental note of it.

A Life Belt Over the Crusher Mouth Means Safety

A. C. HEWITT (Engineer, American Lime & Stone Co., Bellefonte, Pa.): Answering Mr. Hunter who asked about the type of safety belts: at one of our plants where we have large-jaw crushers and it is occasionally necessary to get along the top of the crusher while it is running, our superintendent at that plant has devised a safety or life belt which the man gets into like he would get into a coat. In other words, it has a loop which fits around each shoulder and a strap down the back and a belt around the waist, so that the only attachment he has to make is to attach the belt at the top, between the shoulders, and at the ring to which the rope is attached. In that way, if a man falls he always is caught in an upright position, so he is not in any way hurt.

MR. JACOBSEN: Just one more thing—pardon me for interrupting. But along the line of the bin question, after a man does get caught in a line, it is sometimes very difficult to get him out. We have had several experiences in that respect. Some of the inventive minds in the cement industry have adopted the idea of having a barrel right near the bin

so that when they do get a man uncovered, just the head, they put a barrel over him so that if another slide does take place, the man is saved. They can keep on working and take time about it and save the man's life.

CHAIRMAN EVANS: That is a good suggestion. I don't know how this discussion has appealed to you men, but I am impressed with the statement made by Mr. Hawk with reference to a mechanical agitator. If something of that kind could be constructed in every bin where material stored is liable to be held up, it eliminates absolutely any necessity of having a man in or near the bin. In that case there would be no danger of a man becoming suffocated or carried down with the material in the bottom of the bin. If something of that kind could be devised, then this talk of safety belts over bins, the procuring of a barrel to put over a man's head in order to prevent suffocation and giving him free air and many other things could be dispensed with. That is how this subject with regard to agitators appeals to me.

How Practicable Is a Life Belt or Harness?

Protecting the individual versus guarding machinery in a stone crushing plant is general in its application. What applies to guarding machinery in a stone crushing plant applies to guarding machinery in any plant or industry. I believe that each individual here has something in the way of a method that may be peculiar to those adopted in other plants. Perhaps there should be a general discussion of this matter, with particular reference to the machinery that may be guarded.

In the cement industry, as I take it, you have stone crushers because you have mentioned life belts at the feeding stone crushers. You have your bins the same as we do in the stone crushing plants; and there isn't any of us but what can improve upon our safety methods with reference to guarding machinery or properly instructing the individuals who may be in and around that machinery.

As I say, this can be general in its application. But I believe before we can enter into a discussion or invite a discussion, it will be necessary for someone to be somewhat specific in mentioning crushers. That has been dealt with to some extent, but in my mind it is not entirely clear just how practicable a life belt or a harness and rope could possibly apply with absolute safety in so far as feeding a crusher is concerned. The safety would be practically assured if you had someone at your crusher standing over the men to see that they put on the harness.

I am going to ask you a question: have you had men feeding the crushers who would, upon your approach to the crusher mouth, immediately put on the harness?

MR. WEIDNER: We have been fortunate with the crushermen. I have a man feeding the crusher who has done it for years. I have had but three different men in the 20 years I have worked with them. We have a fellow who tends to the motor. I make this man responsible, to begin with, for all our safety rules. Perhaps we handle our safety committee

a little bit differently than some others. I have a safety committee in every department at all times. I have changed that committee. We have different men, but yet we have someone in every department. The motor tender is supposed to see that the safety man is following our safety rules.

I want to be frank with the speaker. We don't have any trouble with our safety rules. I have never caught a man refusing to obey any of our rules concerning a crusher. We don't work so very many men in our crusher, and I always try to make it a practice to have a man down to understand what we want. If he feels he is afraid of the job, we are afraid of him, and we give him some other job. In other words, we don't put him on the work. That is one of the rules I have made in our safety game. Sometimes I find a man who will make a good steam shovel man but who is not worth a dime on the dynamite works. Sometimes a good dynamite man is not worth a dime in the crusher building.

I didn't want to discuss that, but I have found that the best experience I have had was a great deal along the line of letting the man who is capable of doing what you want him to do be on the job.

CHAIRMAN EVANS: I recall an experience that an Ohio operator had in connection with the crushers. This happened a couple of years ago. The man who fed the crusher during a lull in the stone coming up the incline sat on the spider of the crusher and fell asleep. He didn't put on the safety belt with the harness. He fell into the crusher and was killed. Of course, that is the human element. If you knew that man was in the habit of falling asleep and saw him sitting on the spider of the crusher, you, of course, would have told him just what the result might be, and consequently through educating that man you could correct that fault.

How an Accident Happened at the Stone Crusher

DON C. SOUDER (France Stone Company, Toledo): I should like to know if any of the boys here have had any one killed in a crusher. There has been a lot of talk about crushers. Can you tell me if anyone has been killed in a crusher, and what was the cause of that accident?

MR. WEIDNER: I might answer that question. I don't know the year, but it was something like 22 years ago that this happened. Perhaps Mr. Jacobsen will remember the incident. Lehigh had a man killed at the plant I am working at just before I came there. But they didn't have as large a crusher. They had what they called a No. 9 Allis-Chalmers. I suppose different quarries have different ways of discharging their stone into the crushers. That has a lot to do with the men working around the crushers. In our particular case, we are not using size-up cars but dump steel cars with an end door on them; which every quarryman knows is not a desirable piece of equipment, especially using the 91 shovel and trying to put out from 6,000 to 8,000 pounds to the shovel. Anyhow, that is the equipment we have at the present time in the car. That is what we are using. That is what they were using at that time but on a smaller scale.

This fellow was the crusher attendant. As you all are aware, they were not practicing safety rules at the time; that is, there were no such things. Every man practiced his own safety rules as well as he could. This man's particular job was feeding the crusher. Every so often there would be a car on which the latches wouldn't trip. He would latch the cars in case they didn't latch when they pulled up.

In this case, the fellow unlatched the car, and a rock being thrown out of the car struck him about the shoulder and threw him head first into the crusher, where he was killed.

About the belt: I merely want to say we have been using a belt, but there is more danger in getting dumped into the crusher than there is in a man ever falling into a crusher. If you had side dump cars and you are pulling on the level of your crusher that would be a different proposition. Our stone falls about 12 or 14 feet out of an end car. To head off that safely for the crusher tender, he has a signal that the hoist men are absolutely under control of at all times.

To make it still more safe, after he blows his signals for a stop, he will not make any move until he sees that the hoist has stopped. Of course, we have to depend to a certain extent on our hoist men, with whom we have so far been fortunate. As I said before, we are particular about the length of the rope we have—never to allow any slack when he has to do boring or anything of that sort. Many times a man has slipped with a rock and fallen down, and because there was no slack in the rope, it was simply a matter of getting up again.

Various Opinions About Guarding the Crusher

CHAIRMAN EVANS: Indirectly answering Mr. Souder's query with reference to crusher feeding, my knowledge and observations are that the crusher is the only piece of machinery in a stone crushing plant that you can not guard. Your gears on the machinery, your elevators, your stairways, your runways, can and should be guarded so as to protect the employee. The open mouth of the crusher, where you dump in the stone, is the only piece of machinery that can not be guarded by screens or otherwise. Consequently, we are discussing the crusher proposition, taking it for granted that if a code is in effect in any state that the employer lives up to the rules and regulations for properly guarding gears and other machinery.

MR. SOUNDER: Yes, but I still want to know if you know of any crusher feeder that was killed in a crusher while he was feeding it, not while dumping the car. We have always discussed at meetings the subject of men getting killed in the crusher, but what we want to know is what crusher feeders have been killed? Nobody seems to be able to tell us about a crusher feeder having been killed in a gyratory crusher.

MR. WOODRUFF: I don't want to take up your time and keep you from your dinner, but I do want to enlighten the gentleman. That thing actually has occurred. We had a case of that very kind at Iola, Kansas. The crusher feeder slipped. The material was being dumped at that time on

a kind of slanting platform. It is his business to rake it down into the crusher. The crusher feeder platform was tolerably well empty, a little in each corner. The man stepped on the slanting platform to rake what was in the corner down to the crusher when he slipped and went through the crusher. It was the worst mutilated body I have ever seen. It made a safety man out of me as far as keeping life belts on the men is concerned.

MR. SOUDER: But that was not a gyratory crusher.

MR. HUNTER: Mr. Chairman, when Mr. Weidner was talking for the first time on this crusher problem, I was utterly amazed at his practical presentation of the subject. I believe he hit at the heart of the problem. I would have bet a million if I had it against a dollar that he was a foreman. I asked him a little while ago and found out that was what he was. He is a foreman. Without getting personal, I wish you would pay him a compliment for his presentation, because I firmly believe that that is your big problem in accident prevention work: the practical application of organized safety on the job.

CHAIRMAN EVANS: We all join with you in that feeling.

A Safety Screen Has Been Placed About This Crusher

ALFRED H. LEH (General Foreman, Grant Portland Cement Co., Philadelphia): I must take exception to the remark that you made about its being impossible to guard a crusher. We have in operation a trailer crusher 36x48 inches, and I will say it is practically impossible for a man to get in the crusher. The only way a man could get hurt by the crusher would be in the event that he wanted to commit suicide. This arrangement, however, is brought about by mechanical feeds. I don't know if anybody is familiar with the feeder or not. We don't dump on the crusher and in turn take the feeder to the crusher. The crusher itself is surrounded with a safety screen four feet high. The only way one could get into the crusher would be by getting over the top of the safety screen.

CHAIRMAN EVANS: What I said applied to the gyratory crusher, with possibly a mouth 38 inches and then trying to get a 40-inch stone through it. Of course, it would be impossible to guard the mouth of the crusher because you would have to get down and do something with the stone.

MR. SOUDER: Then you haven't answered my question yet.

MR. JACOBSEN: I just want to answer Mr. Souder's question point blank. He asked if anyone knew of any accident with a gyratory crusher. I know of an accident in a gyratory crusher which happened long before I came with the cement industry. I don't know of a single one during my affiliation with the industry, but I do know of one man being killed before I came with the industry.

MR. SOUDER: We had a man killed in a gyratory crusher, and he was a crusher feeder, but it happened that a fellow workman caused the accident. There was no stone being hoisted up the incline; we had side dump cars. He walked up on the platform where the cars are dumped and was

talking and visiting with fellow workmen. All at once the hoist man noticed in the quarry that the locomotive had brought another train of cars to the foot of the incline and the cable hooker hooked his car on, and the hoist man looking out of the window watching the cable hooker, started his hoist. As the cable drew up, it hit the fellow on the legs, that is the employee who was on the platform, and threw him into the crusher. But, of course, he was really out of the course of his employment. He wasn't on the platform on the floor where the crusher is located. He was merely visiting and this cable in drawing up hit him on the legs and threw him into the crusher.

CHAIRMAN EVANS: I don't want to adopt a gyratory crusher as a plaything.

Dr. Lansburgh, you must necessarily have had some experience in your department in connection with what we have been discussing—crushers. Is there a regulation in your code that is somewhat specific as to how an operator shall guard against accidents at the mouth of the crusher or any portion of the plant?

The Crusher Is Stopped for All Emergency Work

DR. LANSBURGH: Very frankly, I can't answer your question. I have been trying to think what regulation we have on that, but I have forgotten how we finally ended up. It seems to me the answer to the crusher question is to use some device so that nobody has to get near the crusher at any time. That has been brought out here several times and that is modern practice. I think that is what everybody is getting to as fast as possible. I think, however, that I can get copies of the accident report of men who have been killed in gyratory crushers, but I don't have them with me this morning.

MR. EATES: If we have a man who has to go into the crusher at all—that is, the gyratory crusher—we stop the crusher. With regard to the guarding of the crusher, ours is guarded with a standard rail on two sides. On the other side the cars are dumped. On the one side we have the wood for the electric cars and they dump automatically. On the other side we have a car of our own make—steam—which is dumped with a hoist. The whole car dumps it up so that no man is on the edge of the crusher at all except on the two sides where the rails are. Should a stone lodge in there and we can't displace it with a hook on a hoist, and we have to have a man put a chain around it, we stop the crusher and the man puts a life belt on and puts the chain around and then comes out of the crusher before the crusher is started up again.

CHAIRMAN EVANS: The next subject is the advantage of inspection trips to all operators on each stone out-cropping. I want to ask a question at this particular time that is pertinent to the subject—that you may want to discuss, and how many men here have broadened their knowledge of safeguarding machinery in quarry operation by visiting other plants or getting in touch with their competitor, as it were, and each checking

up on the other? I should like to see the hands raised if there are any here.

There was a show of three hands.

CHAIRMAN EVANS: I think that is one of the fundamental phases of safety in quarry operation, in a word, cooperation. You know, when stonemen are not cooperating to the fullest extent, we are not going to go ahead as an industry. We should feel absolutely free to visit the plant of our competitor and he to visit ours. The reason this subject has been mentioned is perhaps because of a thought that was presented by an individual in the stone crushing industry in New York. This individual told me that he has several competitors—as all stone producers have—and while they fight like thunder in securing business, when it comes to the question of safety in the operation of their plant, he and his competitors are a unit.

Twice each year safety men from each plant are assigned to join a group that make a practice of visiting every plant in that locality, and each evening they check up and exchange ideas. In exchanging ideas they are finding fault with each other. In other words, you may enter my plant and see things that have been missed by our safety engineer. Perhaps something that is absolutely wrong has been missed by the safety engineer, and hence is corrected. He sees it each day and it does not impress him as a rather dangerous situation. But when you point it out, he realizes the danger, with the result that a correction is made there.

Advantages of Visiting Other Cement and Quarry Plants

If you desire to enter into a discussion, I think it should bring out the fact that in cooperating in the interests of safety we can no better serve our employee than to visit plants and check up on each other. The few hands that were raised in response to my question would indicate that it is not a general practice to visit the plants of your competitors. I do. I haven't been thrown out yet. The result is that our plant is protected to the extent that in the plant we have not had an accident this year. It is protected because we have secured ideas from our competitors that we have applied in safeguarding our machinery and in protecting the employee. There is where our knowledge has been obtained.

Gentlemen, the meeting is open for a discussion. Personally, I would feel that we had accomplished a great deal if we could leave this room feeling that we were sold on the idea of checking up on the other fellow. It is going to broaden our perspective. At the same time it is going to help the other fellow and he will help us.

MR. JACOBSEN: Mr. Chairman, you didn't get a representative vote on your question at all. I know you didn't because I am sure that every cement man here has visited some other plant and has attended meetings for exchange of ideas and been around to numerous places. It is merely natural modesty on the part of the cement men that caused them to keep down their hands.

I join with you, Mr. Evans, in your statement that there is nothing that will enlighten you more than getting around and seeing something in the other fellow's plant, to talk with some other people, to get their ideas on the subject, and go home and apply it in your own affairs. It has been my experience, traveling around to all the cement plants in the country, that you are always ready to receive new suggestions with a free and open mind, say what you want, tell your purpose. Tell your purpose, and people then are generally more than pleased to see you and are willing to enter into a discussion with you about the question of accident prevention. I would like to show Mr. Evans how many cement men in here have been in our plants. Will you raise your hands?

There was a unanimous show of hands.

CHAIRMAN EVANS: I thought that a meeting of this kind would be productive of absolute confidence of one in the other. I had no ulterior motive in asking that question. The fact that I am in the crushed stone industry should not cause you cement men to hesitate in raising your hands. (*Laughter.*) I see that Mr. Jacobsen is in about the same position as Mr. Frame. He has the cement men subsidized. (*Laughter.*) Otherwise they wouldn't have elected him the second time to serve as their chairman.

Stone Quarry Operators Need a Little Educating

Is there any further discussion on this matter? It may be a common practice with you cement men, but I think that the stone quarry operators need a little educating. I think our session is going to bring about a closer cooperation. So much so that there won't be any hesitancy on the part of any one operator to visit the plant of a competitor until he is thrown out.

MR. EALEST: We have five quarries in our district which are close together. I know that in all five of those quarries anyone is free to go there from the other plants with no restrictions at all. They will take you around and explain anything in any of the five quarries there.

CHAIRMAN EVANS: I want to say in all frankness that I have visited some stone crushing plants—if they could be called stone crushing plants—and it would bankrupt the owner of those plants if he were compelled to safeguard his machinery to the extent that some of the rest of us are doing. He has absolutely no idea or thought of protecting the employee, much less his pocketbook; and as a result the stone producers who are safeguarding the machinery and have some thought in mind with reference to protecting the employee are penalized because of the lack of interest on the part of the very small producer.

MR. EALEST: They don't get inspectors around like Dr. Lansburgh's men.

CHAIRMAN EVANS: That is why we invite the safety code in Ohio.

Gentlemen, if there is nothing further to be brought up, I am going to call on Mr. Frame to say a few words. I know he has been very quiet, which is something very unusual for him.

MR. FRAME: Mr. Evans, I feel as if I want to compliment you and the other members of the Quarry Section on behalf of the Cement Section for the very splendid program which they have again put on today. I want to say to the cement men here that this entire program was arranged through Mr. Evans' Section, that the Cement Section had little if anything to do with it. However, we have enjoyed it all the more. Our interests are identical when it comes to the discussion of safety in quarries. We appreciate being with you gentlemen, and I again want to express the wish that we may enjoy a joint meeting with you again next year.

I might take this opportunity to invite the quarry operators to attend the first day's session of the Cement Section meeting, which is generally held a day previous to the joint meeting. While you may hear of some things or some problems in the cement industry which are not identical with your industry, I think when it comes to the discussion of the education of men, responsibility of foremen, and many other problems, you will find something of mutual benefit. We will welcome you there. I again want to express our appreciation to you for your program this morning.

CHAIRMAN EVANS: I want to say to you, Mr. Frame, and I am speaking for the quarrymen, that we deeply appreciate your expression of goodwill, and we feel, too, that the activity of your organization has in very great measure encouraged us to the activities that we have assumed in the Quarry Section.

ADJOURNMENT

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ADJOURNMENT

JOINT LUNCHEON SESSION

Wednesday, October 27th, 1926

R. FRAME, Toastmaster

Insurance Manager, Alpha Portland Cement Company, Easton, Pa.

The joint luncheon of the Cement and Quarry Sections convened at 12:30 o'clock on the Mezzanine floor of the Book-Cadillac Hotel, Detroit, Mr. R. Frame, president of the Cement Section, presiding.

CHAIRMAN FRAME: Gentlemen, I am indebted to Mr. Evans, of the Quarry Section, for the pleasure of presiding at this delightful luncheon.

At our session this morning we were discussing the intimate problems of prevention of accidents. We talked a great deal about crushers, bins, explosions, etc. One of the most important elements of the question has been saved for this particular time. You have no doubt got a great many mental notes as to what you want to do when you get back home. The most important duty, as I see it, is for you to sell the ideas which you have gathered here today to your manager, to your foremen as you come in contact with them, and to your workmen.

I feel that this particular subject of selling safety is going to be ably handled by the gentleman who will address you in a few moments. It gives me great pleasure to introduce to the guests, to the members of the Quarry and Cement Sections, Mr. J. R. Davis, General Manager, United States Gypsum Company, Gypsum, Ohio, who will speak to you.

SAFETY, A SALES PROBLEM

**J. R. Davis, Works Manager, United States Gypsum Company,
Gypsum, O.**

It has been generally recognized since the beginning of the safety movement that any organization must be practically sold on the idea of safety before satisfactory progress can be made in the prevention of accidents. All have undoubtedly used this very expression in one way or another, but how many of you have actually applied good sales tactics in putting safety across in your plant? It is only logical, if men must be sold on the subject, that sales methods be used, and it is just as easy to sell safety as it is to sell some article of merchandise.

One of the greatest sales weapons in the world today is modern advertising. It is a science in itself and takes on many forms, such as outdoor advertising, magazine, and newspaper advertising, form letters, etc. All of these have their value in a good safety organization. Sign boards, bulletin boards, plant papers, and circular letters should be, and are being used to advertise safety.

But are we using good advertising practice in this phase of our work? A good advertising man realizes the value of attractive sign boards and frequent changes in their makeup so that they constantly attract attention. He places them where the most people will see them and wastes little money in boards on the back roads and by-ways.

Are we applying these same principles to our Safety advertising? Our bulletin boards should be made as attractive as possible, the bulletins should be regularly changed and attractively arranged to draw the men's attention. News and other bulletins may be used on the board for the purpose of drawing the men so that they will read the safety bulletins while there. Bulletin boards and sign boards should be placed where they will be seen by the most men. Don't stick them off in corners, in out-of-the-way places, and expect men to read them. At night they should be well lighted, just as the live advertising man lights his sign boards. The same principles apply to the use of house organs, circular letters, etc. More thought should be given to the actual sales value of these mediums.

The Modern Sales Organization

I recently heard a luncheon club speaker say that modern advertising was the greatest spreader of Bolshevism in the world today. His reason is that it makes us all dissatisfied with the things we have. I do not believe in Bolshevism or desire to spread it, but if our safety advertising can make the men dissatisfied with their careless lot, we have made a big advance in getting safety across.

I know that many men will say this is not a new thought. You are following all these points at the present time and still do not receive the proper reaction from your men. Remember though that advertising is only a part of selling, and don't deceive yourself that you are really selling by doing only this. Here is where the real selling comes in.

A modern sales organization consists of a sales manager, division managers, territory supervisors, and actual salesmen. These may be backed up by special sales representatives, demonstrators and service men. All of these are already found in your own organizations, properly placed and fairly well equipped to take their part in an organization to sell safety.

In our larger plants the safety supervisor, or the safety engineer, or whatever he is called, is the sales manager for safety. It is his duty to direct the advertising and the efforts of the organization in conducting your sales campaign. Naturally, he must be properly qualified to fill the position and must be properly backed up by the management, the same as any sales manager. In a smaller plant where it is not possible to have a full time safety man, the plant manager becomes sales manager for safety, the same as most small plant managers are also sales managers for their products.

If there are various departments in the plant, the heads of these departments are the division managers for safety. They are the ones

who should know their own territories and under the proper guidance of the safety man, they should direct the work in their department. In the larger plant where there are additional men in the safety organization, some of these may act as division managers for certain parts of the plant and the department head then becomes a territory supervisor in the scheme. Other men in the safety department, such as inspectors, and so on, take their place as the demonstrators and service men for safety. They demonstrate the proper and safe way that work should be done and see that the workmen derive the greatest benefit from the safety work.

The next, and probably most important part of the organization, is the actual sales force. Who are the safety salesmen in your plant?

Your foremen. Much has been written and said regarding the foreman's place in accident prevention, but after all isn't he really the direct salesman of safety, and are not results produced directly proportional to his ability as a salesman? No live sales manager would put a salesman on the road to sell his product unless that man knew considerable about the product and was himself actually sold on it. It is unfortunate, but true, that most of us go about our safety work blindly, scarcely realizing the value of the foremen in this work. Many times our foremen are working directly against our best interests, because they are not sold and the proper efforts have not been made by the organization to sell safety to each of them, and through them to the men in the plant.

Constant Contact Sells the Safety Idea

One thing that a sales manager follows is the number of calls made by a salesman. It has been definitely determined that the volume of sales is in almost direct proportion to the number of calls made. Many companies today have adopted automobiles for the very reason that they speed up their salesmen and increase the number of calls. Since the number of calls, or contacts, determines largely the volume of sales, who, then, in your organization is better fitted to sell safety than the foreman who is in constant contact with the men?

There are many ramifications in the modern sales organization, but after all it is personal contact which is largely responsible for most of the sales that are made. Advertising places the man in a favorable state of mind to the thing that is being sold, but it is usually the personal contact which finally closes the sale. How many automobiles would be sold as a direct result of advertising if the live auto salesmen did not follow up the prospect and close the deal? There are today several instances of great success in industry based entirely on the program of national advertising and direct personal contact through a widespread sales organization. Two of these that come to my mind are Fuller Brushes and Realsilk Hosiery; and let me say here that if these companies stopped their national advertising, or withdrew their salesmen from the field, they would soon cease to exist.

Their success is dependent on the continuation of sales work; and the success of our safety work in the end is not so much dependant on how good a sales organization we build up, but on how well they continue to use their salesmanship, for few men stay sold on anything.

No company is ever really a success, no matter how strong their sales organization, unless they have rendered a direct service to their customers and stood back of their products. In exactly the same way our efforts in selling safety will be of no avail unless we back it up with the proper spirit of service and prove to the men that we stand back of the safety movement without any reserve.

CHAIRMAN FRAME: You all enjoyed very much the splendid points brought out by Mr. Davis as to how we should take advantage of salesmanship in bringing about a deep regard for the prevention of accidents. That is all on the program today. We hope you have enjoyed the luncheon and that you all will come back next year with even more fervor.

ADJOURNMENT

Chemical Section

New Officers of the Section

CHAIRMAN: S. E. WHITING
Liberty Mutual Insurance Company, Boston, Mass.
VICE-CHAIRMAN: C. E. RICE
The Dow Chemical Company, Midland, Mich.
VICE-CHAIRMAN: E. C. ROGERS
Grasselli Chemical Company, Cleveland, Ohio.
VICE-CHAIRMAN: DR. LEONARD GREENBURG
U. S. Public Health Service, School of Medicine, Yale University, New Haven, Conn.
SECY. & STATISTICAL COMM. CHAIRMAN: C. F. WHITEMORE
Western Electric Company, Chicago, Ill.

Committees

POSTER, H. L. MINER, Chairman
E. I. duPont de Nemours & Co., Wilmington, Del.
MEMBERSHIP: I. V. KEPNER, Chairman
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
PROGRAM: A. L. WATSON, Chairman
The Koppers Company, Pittsburgh, Pa.
NEWS-LETTER EDITOR: E. W. SPENCER, Chairman
Chemical Warfare Service, Edgewood Arsenal, Maryland.
ENGINEERING REPRESENTATIVE: L. A. DEBLOIS
National Bureau of Casualty & Surety Underwriters, New York City.
EXECUTIVE COMMITTEE (The Officers and)
M. F. GRASS
The Grasselli Chemical Company, Cleveland, Ohio.
DR. H. E. HOWE
American Chemical Society, Washington, D. C.
S. H. KERSHAW
National Safety Council, Chicago, Ill.
J. L. KISTNER
Elliott Service Company, Chicago, Ill.
DR. C. L. REESE
American Institute of Chemical Engineers, Brooklyn, N. Y.
J. S. SHAW
Hercules Powder Company, Wilmington, Del.

PROF. C. -E. A. WINSLOW

School of Medicine, Yale University, New Haven, Conn.

October 26, 1926

J. L. KISTNER, Chairman,
Elliott Service Company, Chicago, Ill.

THE Tuesday Morning Session, October 26, of the Chemical Section of the National Safety Council, was held in the Henry II Room, Statler Hotel, Detroit, Mich., and convened at 9:30 o'clock, Mr. J. L. Kistner, Elliott Service Company, Chicago, Ill., presiding, and Mr. C. E. Rice, Director of Health and Safety, The Dow Chemical Company, Midland, Mich., acting as secretary.

THE CHAIRMAN: It is a pleasure to welcome you, gentlemen, to this particular meeting. We are gathered for the purpose of obtaining certain specific information relative to our industries that will help to eliminate accidents occurring in those industries.

If any problem arises that you think we could solve or if we can be of any help to you in giving constructive ideas or criticisms relative to problems in your industry, I hope you will speak about them.

I am going first to call upon a few chairmen of the various committees. Mr. Kepner, chairman of the Membership Committee, will report.

IRA V. KEPNER (Chairman, Membership Committee): Mr. Chairman and Gentlemen: At our meeting held in Cleveland in 1925 we had 187 members. During the past year we lost 13 of those members due to the companies being absorbed by the larger parent companies or going out of business. But in their stead we obtained 25 new members. So at the present time we have 197 members or firms in the Chemical Section. We were working hard all during the year in connection with the National Safety Council in an endeavor to get new members. I wish that you boys who are interested in the Section would see if you can not interest some other chemical concerns on the outside and see if we can't bring them in. The only way we can do it is by personal contact. You can write letters and go to a lot of time and trouble but it doesn't have the same effect. Your efforts will certainly be appreciated by the Section.

THE CHAIRMAN: I will now ask Mr. Rogers, chairman of the Poster Committee, to give us a report on what work has been done in regard to getting posters for the Section.

E. C. ROGERS (Chairman, Poster Committee): Unfortunately during the past year we have not been able to get out as many posters relating specifically to Chemical problems as we have in past years, but we have secured a source which will give us a reasonable supply of posters for the coming year. I never before realized how difficult it was to make up a poster that would apply to the majority of the members of the

Section. When you stop to think of the diversity of products manufactured by the concerns we represent, you see why it is not an easy matter to get a poster that would be in general demand.

For instance, if I should make a poster covering zinc smelting, I don't presume there would be a great demand for it. It would apply to my business, but your products are so different we need your help in telling us what you want, not only from the standpoint of what the safety man likes but what would be interesting and useful to your men. When the new poster chairman is announced I think you should not only tell him what you need but also help him in gathering enough data to make up what you want. He can't do it alone, he doesn't know what your problems are. If he makes it upon his own experience he might not fit your needs. So help the new chairman by telling him what you want and by assisting him in getting the information.

THE CHAIRMAN: I would like to hear suggestions from some of the members at this time relative to obtaining posters for the Chemical Section. The National Safety Council, as we all know, has a staff of photographers who are willing to go to any plant and secure pictures that in any way will help to advertise safety in chemical plants. I am quite sure many of you fellows have conditions in your particular plants that would, if photographed and advertised, help a lot in other plants in reducing accidents. If any of you men have conditions of that kind, I'd like to hear from you.

Ideas For New Chemical Section Posters

S. E. WHITING (Assistant Chief Engineer, Liberty Mutual Insurance Company, Boston, Mass.): I suggest you call on individuals here that you know and make them get up and give you at least one suggestion on a poster so we can get the assistance. It is a difficult problem, and unless you men give us the ideas at least, we can't go through with them.

THE CHAIRMAN: I will call on Mr. Greenfield for suggestions.

C. W. GREENFIELD (DuPont-Viscoloid Co., Arlington, N. J.): I don't know as I could give you a suggestion offhand, but I am very much interested in the uses of the gas mask where there may be fumes. In fact, I have seen very few posters on that subject.

THE CHAIRMAN: I'd like to hear from Mr. Wakefield.

G. H. WAKEFIELD (DuPont-Viscoloid Company, Leominster, Mass.): On that subject, I hadn't given it any thought before I came up here and you have taken me rather by surprise. I should like to mail something in along that line rather than suggest something at the present time.

THE CHAIRMAN: Has Mr. Fellmer any suggestions?

M. L. FELLMER (Elliott Service Co., Chicago, Ill.): Out of a clear sky I can't think of anything in particular except specific eye posters, posters on the danger of neglecting eye injuries and a very good antidote, but I believe there is a poster of that kind in existence. I remember at the Monsanto Chemical Company we placed a poster which the Council got

out over every drinking fountain cautioning men that had an acid burn to use the jet of the water fountain in washing out the substance that entered the eye and we had good success.

THE CHAIRMAN: I'd like to hear from Mr. Miushull.

G. E. MIUSHULL (Safety Engineer, DuPont Rayon Company, Buffalo, N. Y.): I don't know that I have anything to suggest in the line of a poster offhand except what Mr. Fellmer just said, the immediate use of water after an eye injury or any kind of caustic or acid burn on the face or hands. Of course, they understand if they get a heavy dose they get under the shower. The average man doesn't think of the water. He looks for a neutralizer. I think if you put up a poster such as Mr. Fellmer spoke about it would be all right. We had one at the dye works, but it was not quite large enough and could be improved upon.

THE CHAIRMAN: It is a question in my mind whether we will do more good by having a general poster than we would by having a specific hazard poster pertaining to the chemical industries. I'd like to hear from Mr. Riederer in regard to that.

A Poster to Depict An Emergency Eye Wash

E. J. RIEDERER (Atlas Powder Company, Wilmington, Del.): I have not given this matter very much thought. The trouble we experience in our industry is that it is rather limited and in obtaining photographs for safety conditions we might expose a process or apparatus that is used only by one company. It would not be fair in a case of that kind to publish a poster for the simple reason that other companies would not use that kind of apparatus. We have things we have worked on for years and tried to develop guards for the individual case. In the explosive industry, it is a little difficult. However, there are hazards which are the same in all plants which I do believe can be fairly well covered by posters.

THE CHAIRMAN: I think that the way we will do the most good with posters in the chemical industry is to get subjects that apply a good deal to chemical industries in general. We all know the value of advertising safety and if we can advertise safety with a medium that applies to this particular business, I believe a lot of good could be accomplished.

I'd like to hear from Mr. Stratton in reference to that.

R. C. STRATTON (Travelers Insurance Co., Newark, N. J.): I believe the ramifications of chemical work are so varied that general bulletins will fit the case much better. Of course, that can be coupled with specific hazard photos. One in particular would be for those industries handling chromates and chromic acids regarding the peculiar type of chrome sores that come out from the handling of the material. That would be a suggestion. Along general lines, I have to concur with the other speakers and particularly the suggestion for chemical eye injuries, which are quite potent and which are working out. In a plant I know at the side of the drinking fountain they put on a separate jet for use as an emergency eye wash.

IRA V. KEPNER (Pennsylvania Salt Mfg. Co., Philadelphia, Pa.): On the back wall here are a few of the posters gotten out by the National Safety Council in the past year. I'd like to know what some of you gentlemen think of those posters. Are those the right kind? Is there any improvement we might make during the coming year? It is a problem to get out these posters and get them out regularly. Our own chemical members want a poster that applies particularly to the chemical industry. The only way we can get that is through suggestions from our members. In these samples, some have drawings, some are actual photographs. I would like to get the reaction of you gentlemen on these posters along that line. Could any of you give us any suggestions or help for the coming year? As your chairman said, the National Safety Council has a staff photographer that would be glad to go around and take pictures, providing he were permitted to do so, and where he could take a number of pictures which would pay him for his time. Are these what the membership wants, are they the kind and do they apply to our industry?

J. STERNER (Murphy Varnish Company, Newark, N. J.): We need a poster in the varnish line where benzol is used. It has a tendency to leave a skin rash which if not taken care of becomes infected, and we have quite a bit of it in our plants, sometimes with blood poisoning. A poster on this hazard in the lacquer trade would be very beneficial.

THE CHAIRMAN: I'd like to hear from Mr. Roach.

Many Posters Provided for the Chemical Trades

JOHN ROACH (New Jersey Department of Labor and Industry): I feel a great and vital interest in this subject, too, and I was surprised in looking over this list of posters available to notice how many of them have been provided apparently for the chemical trades.

I realize as most of you gentlemen do that the ramifications of the chemical industry extend into almost every industrial activity and that if we were to attempt to adopt a poster of a general character it would have to have such composite features as perhaps would render it unintelligible to the average workingman.

It seems to me this subject of developing a poster service for the chemical industry is something that might very well be committed to an intelligent committee that represents in some measure several of the more important branches of the chemical industries employing the larger number of people.

In some of the chemical plants a poster that would draw the attention to eyes affected from acid splashes would have no practical value whatever. On the other hand, there are industries where the danger to health or life is not from acid splashes but probably from vapors or contact with toxic substances. Then again you have the branches of the chemical industry where the material is corrosive and dangerous to handle, causing severe and painful burns, such as the chromates and the caustics. Posters along that line might very well help out the danger

of chrome burns and the extreme risk that is run when men handle the caustic materials without protective gloves and masks.

And then you get into this question of the risk from the substance and the vapors. It would probably take one with some highly developed dramatic instinct that would build up a poster that would have real practical value; but if it were done it seems to me it might more properly result from committee conference where all the facts might be given proper consideration. I know that that kind of poster service, whether in the form of a warning paragraph painted on a poster or by an allegorical picture, has a distinct value.

While you were discussing eye splashes an instance came back to my mind that occurred in one of our New Jersey industries where the workmen were handling nitric acid. Some two weeks before the incident a First Aid department had been organized in the plant and great stress had been laid on the value of instant treatment to save the eye. One of these workmen got some of this liquid splashed in the eye. A First Aid man chanced to be in the vicinity and he grabbed the injured man, put his head under a spigot and washed that eye out and saved the sight, although, of course, the man did suffer a painful burn. Now that kind of service has a very great value. It didn't prevent the accident but it prevented the loss of the eye.

Most Accidents in Chemical Industry Are Common Ones

MR. ROGERS: I have never seen figures in regard to chemical accidents throughout the country to verify this statement, but I will venture to say 85 per cent of the accidents in the chemical industry could occur any place and I don't believe over 15 per cent are due to the fact that we are in the chemical business. For that reason I am wondering whether our posters should not be broadened out to cover general matters as well as purely chemical matters. I also think that if the men would watch for unsafe practices and build posters on what they find, they would do as much good as anything else.

For instance, the other day I saw a man about to start to repair an acid line that had sagged. He was going to level it up. He never took the trouble to turn off the line. There was a good chance to break the line and perhaps be burned. That kind of thing causes accidents. We don't get the accidents, as a rule, in the dangerous places. We get them through someone doing some fool trick like the one I just cited, and I think if everybody would report such incidents we could build posters from them that would do a whole lot of good.

MR. STRATTON: I want to revert back to the value of photographs or drawn pictures. To take the question out of the chemical industry and put it into a general one, our experience proved to us that a photograph has a far greater value from an educational standpoint than a drawn picture or slogan. I don't know why that should be any different in chemical work. The pictorial presentation of a thought to the average workingman has more educational value than words which perhaps are

unintelligible to him. You appreciate that when you realize the average intelligence in any plant is that of a fourteen-year-old boy and the average workman can't read high flown English. This is why it has worked out that the photograph has the greater value.

It was stated a few minutes ago that photographs might disclose secret processes but it is easy to restrict a photograph to the safety features and block out the rest. The objection should not enter into the problem at all.

C. B. DICKEY (Corono Chemical Division, Pittsburgh Plate Glass Co., Milwaukee, Wis.): I think Mr. Rogers' suggestion the most practical one I have heard and I think most hazards are matters of ordinary care. It is always some little fool thing some man does that causes the accident.

MR. MITCHELL: In regard to the poster exhibit, take the two posters, the grave yard and the old bed at home; I'd like to get the opinion of some of the men here whether that kind of poster is popular or not. Personally, I don't care for it; I'd rather have the poster that was like the one with the acid spigot or something like that. I think general posters of that nature are over-done.

Good Posters May Be Used Again and Again.

MR. FELLNER: It just occurs to me that once in a while in taking exceptions to posters of a general nature we overlook somewhat the psychology of the thing. No matter how familiar we are, no matter how stale these things appear to us who see them every day or week, we must not forget that to the fellow who sees them for the first time they are of a different value. Very many of us formed a habit of using a poster for a while and then throwing it away. Personally, I never have had that happen. I always post my posters in such a manner that they can be used again and then file them under proper classifications. I think that impression may be a subconscious one but I think it crops out in the remark the gentleman just preceding me made.

T. F. WETTSTEIN (United Lead Co., Keokuk, Iowa): I would suggest that you take a census of accidents and of those causes that are causing the most accidents, and try to act them out in the place where they happen, and then take photographs.

THE CHAIRMAN: That is a very good suggestion, Mr. Wettstein.

Has anyone any further suggestions? If not, we will consider the discussion closed.

I would like to hear from Mr. Whiting, his report for the Industrial Poisons Committee.

S. E. WHITING: The Industrial Poisons Committee is not a research committee, if I may repeat what was said last year, merely a compilation committee. The real research work is done by the committees such as the Benzol Committee and the new one on Spray Coating methods. It may be worth while to emphasize that we put in convenient form the

best information we can gather on commonly used poisons. For example, take the data sheet on Nitrous Fumes. If the DuPont Company has had a generation of experience with nitrous fumes and has developed a certain technique in the matter, it does not follow as a matter of course that everyone knows what that technique is. So we put it here on a one page sheet, and, if you have nitrous fume exposure, I feel it is your duty to get copies of this data sheet at one cent each and post them in your plant, and give it to your doctor as well, so that he will know the situation, because we go into the medical treatment as well as the plant conditions and also the individual workman's part of the problem of avoiding fume poisoning.

Six Bulletins Issued on Industrial Poisons

We have now issued six bulletins; one on carbon monoxide, one on hydrogen sulphide, one on chromium. A speaker just mentioned the danger of chrome sores; we feel we have put into the Chrome Bulletin some very definite and practical ideas on handling chrome sores. The fourth of our data sheets was on Nitrous Fumes, already mentioned. Next comes Benzol. Take the Benzol situation—many of you have seen the final report of the Benzol Committee, a fine research job, but don't expect very many factory men to read that whole report. I don't know how many pages it has and I don't think all users of benzol will read it, but this Benzol data sheet contains the gist of that research which cost thousands of dollars and much labor by experts. Of course, we had the O. K. of the Benzol Committee before issuing the data sheet.

Now, this fall we have had the impertinence to issue a data sheet on Lead; it is printed in the November issue of NATIONAL SAFETY NEWS. The exposure to lead is very broad. I think there are very few industries that don't have it more or less. It is causing disability. I think it is up to everyone that has that exposure to utilize this Lead data sheet and I don't care particularly whether it is absolutely the last word or not, looking at it as a layman. No doubt many doctors will disagree with our conclusions, the advice on treatment, etc. But we did take this precaution: we got the most up-to-date information on lead research that we could find. The sheet was checked by a department in Harvard University Medical School that has been spending at least \$10,000 on the investigation of lead poisoning.

My only criticism on this work of the Industrial Poisons Committee is that after we finish the individual data sheets they are not being utilized as fully as they might be in minimizing these hazards from common poisons.

THE CHAIRMAN: Our first speaker on the program this morning is Dr. Ethelbert Stewart, Commissioner of Labor Statistics, Washington, D. C. You no doubt are acquainted with Dr. Stewart and some of his work. I will call on Dr. Stewart to address us.

NEED OF A MORE DEFINITE BACKGROUND FOR STATISTICS IN THE CHEMICAL INDUSTRY

Ethelbert Stewart, United States Commissioner of Labor Statistics

In 1860 the average span of the life of man in the United States was 38 years. In 1925 it was 57 years.

Most of this has come from the result of our attacks upon the causes of infant mortality. We have been saving the babies. Today the baby death rate on the east side of New York is less than it is on New York state farms, or on the farms of the middle west, where we have centered our fight in the cities. In the two decades from 1900 to 1920 we decreased the death rate of children from five to nine years by 48 per cent, from 10 to 14 years by 42 per cent, from 15 to 19 by 12 per cent.

In all of the earlier years of life our death rate has decreased, for we have waged a war on tuberculosis that has practically wiped it from the earth. Epidemics of cholera, yellow fever, in fact any epidemic that spreads over a very wide area, have become things of the past. In each case these gains have been the result of determined, well organized intelligent fights against the underlying causes of diseases.

With the introduction and radical development of high speed machinery the revolution in type and method of building construction, and with the advent of the automobile, we are faced with a new source of death rate, a new method of shortening the average span of life. We are killing our population now by accidents; I will not say instead of diseases, but in addition to diseases, and we are not organizing on any plane or scope at all commensurate with the necessities of the case an adequate attack upon this menace. There has been some remarkably good sharpshooting. What we need now is the choice of a battleground and a line of battle which will warrant us in saying as Grant did that "We will fight it out on this line."

In fact, the worst disease that we have today may be described as a placid indifference to the hazardous occupations. We are "going after" the few remaining serious ailments. We are "going after" cancer, though admittedly we are still a long way "after"; however, with much greater hope, for once we get it we have got it. We are "going after" diabetes, and there isn't much doubt that within the next twenty years it will be as thoroughly controlled as tuberculosis is today, although it is not susceptible to the same social attacks.

A very few of us when compared with the whole number are "going after" our death rate from accidents. We are able to work up a great deal of enthusiasm among our own crowd, but the crowd is small. The only thing we can say to cheer us on is that it is growing.

I have estimated that the death toll from industrial accidents is probably not under 23,000 per year, while the non-fatal injuries number 2,500,000. The public accidents as distinguished from the industrial, by which I mean automobiles, railroads, etc., run up to 22,000 probably. And these accidental deaths for the most part occur within the ages where the death rate indicates an increase.

The question that interests us especially here today is how much of this annual toll of death, how much of this annual maiming and crippling of men is attributable to the chemical industry.

When you ask me for statistics I must in common with all other statisticians whose statements are worth anything ask you in return, "Statistics of what?" In this case I am perfectly willing to attempt to give you some statistics of accidents in the chemical industry if you will tell me what you mean by the chemical industry. I have seen no two classifications which agree and I have seen no classification—not even that of the Bureau of Labor Statistics, which under most circumstances is reasonably intelligent—which contained, to my mind, a particle of common sense.

I can give you the statistics of accidents in a sort of catch-all group which has been called the chemistry classification, but which, if we take the larger elements of employment into consideration, might just as well have been called something else. This group usually includes smelters and copper refiners. I am unable to see where there is any more chemistry involved in making pig lead out of lead ore, zinc lead out of zinc ore, copper pig out of copper ore, than in making pig iron out of iron ore. Almost one-fifth of the deaths occur in this industry. The frequency rate is greater than the average of the frequency rate of the entire group including this industry.

A Confusion of Terms in Classifying Statistics

I fail to see where there is any chemistry or chemical process involved in grinding oxide of lead mixed with oil in grinders until it becomes what we call paint, any more than it is chemistry to grind wheat into flour. I fail to see where there is any chemical process involved in mixing hot rosin with hot linseed oil and boiling them together until you have a thing we call varnish. It is no more a chemical process than lard rendering. The manufacture of linseed oil consists in grinding the seed, boiling the meal and pressing, purely mechanical processes in each instance and at each stage of the game. Yet here again nearly one-fifth of the deaths and a very large percentage of the total and permanent disabilities charged to the group occur in an industry which might just as well be classified with cement mixing.

In the case of soap making it has been stated that here two or more chemicals under heat do, when brought to the boiling point, react upon each other so as to produce a third substance which we call soap. I grant you that; but in the manufacture of glass a mix composed of sand, which out of deference to the gentlemen present we will call silica, mixed in the dry with salt, soda ash and lime as a flux, or where the higher grades of glass are to be produced a form of lead instead of lime, when subjected to a high degree of heat results in a most astonishing chemical action which produces an entirely different substance, namely, molten glass. Up to this point the manufacture of glass is purely a chemical process, infinitely more complicated than the manufacture of soap, and yet you do not have glass manufacturing classified as a chemical industry. There

is no more chemistry involved in the manufacture of soap than there is in the production of sulphite pulp or sulphate pulp.

In the manufacture of some of the dyestuffs we doubtless have to deal with real chemical processes. Just how far this group should be weeded out I do not know. Certainly in the manufacture of ink, blacking and polishes we have to deal solely with a mixing process.

The essence of my plea to you gentlemen today is to get together and reclassify your industry so that it shall include those things which properly belong to the chemical industry and those things only. You need not be bound by anything. The Census classification of 1919 bears very little resemblance to the Census classification of 1923. The classification of the Bureau of Labor Statistics follows closely upon that of the Census only because in our volume of employment work we must have the total number of employees to form a basis for our weighting. This we can only get from the Census, hence to a very great extent the Bureau of Labor Statistics follows the Census, right or wrong. You gentlemen need not follow the classification of the workmen's compensation commissions because there is no startling resemblance between the compensation classification of chemical industries of New York and Pennsylvania or in fact any other of the states except those which have copied absolutely from somebody else. I took occasion the other day to ask the Bureau of Foreign and Domestic Commerce for its classification of the chemical industry. The classification as a whole does not conform to anything that I have ever seen before and some of their groups might include anything from a lipstick to a bar of laundry soap.

Reclassification in Chemical Industry Urged

Now it is utterly useless to talk about statistics of accidents or anything else as related to a group of things which have so little in common. You may say that the Chemical Section of the National Safety Council subdivides its various groupings and gives the accidents separately, and to this extent gets away from the difficulty of which I speak. Within certain limits this is true, but after all the total is a combination of all these dissimilar groups, and the grand total and averages include figures for industries which have no place in the classification.

I would urge that the chemical section proceed at an early date to give us a classification of the industry which can be defended from every point of view, and I can assure you that when such a classification approved by this organization is completed you can force its adoption by the Census, and by reason of its adoption by the Census most other Government bureaus would adopt it necessarily. You can force its adoption upon the compensation commissions and upon their premium rating bureaus, and you can force its adoption upon the rating bureaus of the insurance carriers. When I use the word "force" I do not want to suggest anything even resembling boxing gloves. Every state and federal organization wants the best classification and groupings of industries possible. The Census Bureau must perforce use large groups. It can not subdivide

as we would wish it to do because of the enormous amount of work involved. A chemical classification is a convenient catch-all because in the last analysis everything is chemistry. When we breathe we inhale a quantity of air which contains a percentage of oxygen which the system extracts almost instantly and uses to oxidize the blood—purely a chemical process. When the farmer raises corn or wheat he is simply applying the chemical processes of air and earth and sunlight to transmute them into grain. The air above the earth and the waters beneath are alike chemical compounds, and what the poet Aratus said may be properly applied to a personification of chemistry, "In him we live, move and have our being."

But when you ask a statistician to give you an accident hazard rate on this sort of classification, he goes up in the air. The first step, therefore, toward an intelligent handling of this subject is an intelligent classification and a real definition of what we mean by chemical industries.

I would suggest in passing that if it is possible to do so there might well be a classification which would be based upon the actual manufacture or production of chemicals as distinguished from their use in the production of other things. This distinction alone would eliminate a number of the absurdities, such as soap.

Statistics Will Show Where Effort Should Be Expended

But I do not pretend to tell you what to do. I simply wish to advise you what I think you ought to do to make it possible for us to really get a line upon the accident rate in the industry. Once you define your industry the methods of securing the accident rates of the industry are the same in chemistry as in anything else: note and report every accident which causes the loss of time beyond the day, turn or shift in which the accident occurs, giving the cause and nature of the accident, and tabulate these in connection with the actual one man hour exposure not only to the industry but to that department of the industry or occupation in which the accident occurs.

And right here I want to pause long enough to congratulate you and thank you as a section for having compiled, so far as your membership is concerned, a record of one man hour exposure. The application of these accidents to your exposure will give your rate not only of frequency but severity, which will show you where your accidents are happening and where your severer accidents are happening as against your minor ones.

This is all that statistics can do toward accident prevention. Each individual employer or manager of each individual plant must do the rest. Statistics can not prevent accidents. They can only show you where it will pay you to get busy.

I am presenting here a table containing the information in existence in the Bureau of Labor Statistics up to the present time on accidents in the industry, partly as it is now classified, but from 1914 down for a particular section or group of plants which probably do come under a

more circumscribed and refined classification than the general one. This shows that in 1908 there was a death frequency rate per million hours exposure of 3.5, dropping in 1919 to 0.41; that in non-fatal a single group of plants, perhaps the largest single group, has dropped from a frequency rate per million hours exposure of 25.87 in 1915 to 16.30 in 1920, the total million hours exposure from 37.12 in 1916 to 16.8 in 1920.

Number of Full-Day Workers, Number of Accidents, and Accident Frequency and Severity Rates in the Manufacture of Explosives, Dyes, and Chemicals, 1908 to 1920* and 1923 and 1924**

Year	Hours of Exposure (thousands)	Equivalent full-year workers	Frequency rates (per 1,000,000 hours' exposure)		
			Fatal	Non-fatal	Total
1908	9,963	3,321	3.50	-----	-----
1909	12,129	4,043	2.06	-----	-----
1910	14,070	4,690	2.20	-----	-----
1911	14,184	4,728	1.20	-----	-----
1912	13,719	4,573	.80	-----	-----
1913	12,873	4,391	1.71	-----	-----
1914	12,899	4,133	.57	-----	-----
1915	160,398	53,466	.59	25.87	26.46
1916	112,581	37,527	1.07	36.05	37.12
1917	119,202	39,734	.43	35.33	35.76
1918	195,405	65,135	.46	25.69	26.15
1919	51,624	17,208	.41	18.22	18.63
1920	48,396	16,132	.50	16.30	16.80

Year	Hours of Exposure (thousands)	Equivalent full-time workers	Number of accidents	Frequency rates (per 1,000,000 hours exposure)	Severity rates (per 1,000 hours exposure)
1910	14,070	4,690	430	30.57	14.43
1920	48,396	16,132	813	16.80	3.67
Explosives					
1924	4,330	1,443	22	5.08	2.80
Dye Manufacture					
1924	5,450	1,817	96	17.61	6.14
Total Chemicals					
1923	18,044	6,015	422	24.55	4.78
1924	48,450	16,150	1,187	26.13	3.07

*National Safety News, Feb., 1921, p. 4.

**National Safety News, June, 1925, p. 31.

This shows what can be done by extreme care, and I think this corporation has exercised extreme care in a group of plants that may properly be classified as chemical plants. I may say that the control of this group of plants is entirely satisfied that safety pays, and it is going on with more and better improvements and methods. I think the accent perhaps should be upon methods.

DR. STEWART: Outside of the paper I just want to say one thing in regard to a point that was brought up here this morning and that is the very large percentage of accidents in the Chemical Group that might occur anywhere. I suppose most industries would show the same thing but anyhow your industry shows a very large. In fact, the highest per

attention at this time. I feel very bad about this matter, since I promised to be present. Have several requests for my paper."

Copies of Dr. Fetzer's paper can be secured from the Council, I am quite sure, and it is printed at this point in the Congress Transactions.

REPORT OF THE COMMITTEE ON OCCUPATIONAL DISEASE AND HAZARDS IN THE CHEMICAL TRADES, OF THE AMERICAN CHEMICAL SOCIETY, APRIL, 1925-1926

Dr. L. W. Fetzer, Chairman, Dallas, Texas

The first Committee on Occupational Diseases and Hazards in the Chemical Trades reported in the month of April of the year 1914.

A report was rendered each year thereafter and in every instance the respective committee has stressed in one fashion, or another, the dictum "that industrial efficiency, upon which the production of material wealth depends, has its strength in a healthy working force or factory personnel."

In the interim, that is between the appointment of the first committee and the present one, there have sprung up, in the various public health, strictly medical and safety organizations, groups or sections who are concerned in the various aspects of industrial health. Each of these groups, or sections, has tried in its own way—and sometimes at a great disadvantage; to obviate some of the untoward conditions which exist, or are supposed to exist, in certain plants.

Labor organizations have also contributed their moiety to the elucidation of the occupational disease problem and they, like all the rest, have brought about some improvement.

The representative universities of the country, through their departments of public health, industrial hygiene, pharmacology and physiology, and with superior research facilities, have cleared up many mooted problems, and have pointed out new hazards in industrial work.

Then we have the work of the state and government agencies, like the United States Bureau of Mines, the United States Public Health Service, U. S. Bureau of Labor, and others, who give us data which are very welcome indeed.

Each year gives the matter of occupational diseases more publicity than the year before, and no little of this is bestowed upon the chemical and closely allied industries irrespective whether it be just or unjust.

There are a great many reports pertaining to occupational diseases on record which will not bear ordinary analysis in the light of modern findings in pharmacology, physiology, chemistry and pathology. In contrast to this statement we must add that there are probably hazards which need early removal for the good of the working force and the industry owners alike.

Some members of the chemical industry have joined one, or more, of the health and safety organizations, mentioned in the foregoing, hoping in this way to keep abreast of any hazard which may come in their particular factory. In fact a number of these have shown even more interest in that they have contributed, more or less, in a financial

way to certain studies, or surveys, which are carried on by a sub-committee of the particular organization. All of this is laudible and deserves special commendation.

Then we have constituents of our industry who are concerned only with the making of chemicals and allied substances, and who content themselves with meeting the issues as they arise.

The committees during the past few years have suggested ways and means of meeting up with the occupation disease situation. They have placed emphasis on one point especially, namely that of making a study of these conditions within the confines of the American Chemical Society. It has been argued that "occupational diseases are purely and simply medical problems." We have met this statement, and similar ones, with the rejoinder that a great deal of our public health, and industrial health work, is being successfully administered by professional men who are not physicians. Even this statement is not offered to mean that the committee recommends that matters which have to do with the industrial health should be taken out of the hands of the medical fraternity. The committee only wants to remind the colleagues in industry that good clarity can only come to the situation when the chemist becomes a better industrial hygienist and the physician knows more about what goes on in the works in a chemical way. This represents the crux of the matter, and it has been said before.

Plan for Clearing House on Industrial Hygiene

It has been remarked that chemists have their hands and minds full if they keep pace with the progress being made in industry. An unexpected accident, and perhaps a fatal occurrence, blots statements like this one into oblivion.

In this matter of occupational diseases we are still in the formative period. Your committee has on several occasions mentioned the good that could come from a modest and well directed clearing house for occupational hygiene. The idea which owes its inception to the late Charles Baskerville, ought to be set up by the chemical fraternity for the purposes of the chemical industry. Until we have an institute of this character the data on occupational diseases and hazards in the chemical trades will remain unanalyzed and unclassified.

The committee has tried to settle on some plan whereby a clearing house on industrial hygiene will become a reality. After going over the literature detailing some of the experiences of other organizations it came upon a plan which has been put into practice by the Mid-Continental Oil Association. Briefly told, the Mid-Continental people have a "Safety Institute" at Tulsa, Oklahoma, in charge of a full-time safety engineer. It has been in existence for about three years and it is supported by graded subscriptions paid by the oil refiners. Built around the institute is a "Safety Council" composed of the safety men, claim agents, and statisticians, from the respective oil concerns. All of it represents an honest effort on the part of the oil refiners, to do something apart from what is being done by extraneous private agencies, and the state and

governmental agencies. It appears to your Committee that no difficulties should lie in the way of creating such an institution. Only good can come from it.

The Role of the State in Industrial Hygiene by Emery R. Hayhurst (*American Journal of Public Health*, Vol. 15, No. 8, pp. 681-685), is a timely discussion and is of importance because it brings out just how much of a part the states and some of the territories and insular possessions are playing in Industrial Hygiene.

Taking the states as a whole this preliminary study revealed that very few were giving any attention in an official way to the subject of industrial hygiene and outside of sanitation to the health of the worker, or to the prevention of occupational diseases. It was further found that standards as to what ought to constitute healthful working conditions were practically lacking in the statutes and present only in one half dozen state departmental regulations. It is questioned whether many of these standards would bear the light of present day knowledge. While some of them are excellent, some questionable, some wrong, others are mere verbiage. "Enforcement is almost a dead letter in many of the states and in many of them the personnel charged with the work is insufficient or incompetent. Under the circumstances there is the inclination to sidestep the issue of proper inspection and supervision of industrial hygiene matters." Serious consideration should be given to the placement of the subject of industrial hygiene. Should its supervision be in labor departments or health departments? In what department should the end results, i. e. occupational diseases, be considered? Does it make any difference provided trained personnel is on the job? See also "Industrial Health under Non-Medical Supervision" in the *Journal of American Medical Association*, Vol. 85, No. 8, pp. 561-564, by the same author.

Government Should Control Sale of Hazardous Substances

It has been frequently suggested that regulating the distribution and sale of hazardous substances might well be a function of the Federal Government. J. A. Tobey, in the *American Journal of Public Health*, Vol. XVI, No. 3, pp. 244-249, brings up the subject anew and lists a number of substances and commodities which enter into daily life and into the industries, and which under some circumstances represent hazards. A few of the items mentioned are lye and other alkalies; commercial acids such as hydrochloric, sulphuric, nitric, etc.; paints and varnishes and rat poisons. The discussion of the paper by E. Stewart, which in some respects is an extension of the topic, relates to white phosphorous in matches, and industrial hazards of radium.

Since mental symptoms have been noted from exposure to anilin, arseniuretted hydrogen, benzene, carbon disulphid, carbon monoxid, carbon tetrachlorid, dimethyl sulphate, dinitrophenol, ether, hydrogen cyanid, lead, manganese mercury, methanol, methyl bromid, naphtha (benzine), nickel carbonyl, nitroglycerin, selenium, tellurium, toluidin, trichlorethylene, turpentine, etc. (See Hamilton Industrial Poisons; Kober and Hay-

hurst Industrial Health;) it is not too far fetched, the Committee believes, to stress the importance of including mental tests in the periodic examinations of working men in chemical plants. It is a well-known fact that many individuals who show good stability when performing tasks under ordinary conditions, will temporarily break down when engaged in another industry and show gross and dangerous incapacitation or nervous instability. This is strikingly brought out from the examinations made on aviators at the aviation fields and especially at the School of Aviation Medicine Research Laboratory, located at Mitchel Field, L. I., N. Y. Put some workers under unusual atmospheric conditions and they will do unexpected acts.

More Emphasis on Industrial Hygiene in the Schools

Psychologic and psychiatric examinations have also done much to discover and to satisfy the grouch, the kicker, and the general trouble makers in industrial establishments. Such examinations frequently prevent undesirables from joining the working force at all. Some persons who appear mentally sound to the employment official are often grossly pathologic to the observing psychologist and psychiatrist. It has been shown that not all of the so-called "nervous breakdowns" are due to overwork. Many of these are due to financial or familial troubles, while the occupation they are engaged in is simply incidental. Rest will relieve the condition due to overwork, but not so with the other.

More emphasis is now placed upon industrial hygiene in the curricula on chemistry and chemical engineering than ever before. In some schools and universities where the subject has not received attention we have the assurance of its introduction in the next term. The seed will find most fertile soil in these places.

The subject of eyesight conservation has been mentioned repeatedly in our reports. A publication comprising 219 pages, and of great value, is one entitled "Eye Sight Conservation Survey," by J. E. Hannun, issued as Bulletin No. 7 by the Eye Sight Conservation Council of America. Although this publication does not contain very much on occupational eye diseases which could come from the chemical trades it contains a great deal of material which ought to be read by everyone who has control of industrial workers. Other publications issued by the same organization are "Eye Conservation in Industry," which is part of the "Study of Waste in Industry" conducted under the auspices of the Federated American Engineering Societies, and "Eye Tests in Industry," a pamphlet prepared for the purpose of assisting firms to establish visual tests as a regular procedure. It is through reading such tersely written publications that new view points are gained for accident prevention.

The proper lighting of factories has been the subject of discussion for quite a number of years. It is only comparatively recently that very marked strides have been made in this comprt. The literature is vast.

The physiologic aspects of glare are discussed editorially in the Journal of the American Medical Association (Vol. 86, No. 7, pp. 488-89).

It comments especially on the findings of B. A. Nowakowski, from the School of Public Health and Hygiene and Johns Hopkins University, and reported in the *American Journal of Hygiene*, Vol. 6, No. 1, (Jan. 1926), who believes glare a condition of visual discomfort which depends on two factors and both due to contrasts of illumination on the retina. One of the factors is attributable to the failure of the eye to adapt itself to a stimulus of a small area and of high intensity in consequence of which there is an irritation of the hypersensitive retina. The contrast between the glare spot and the surrounding retina produces discomfort that is proportional to the intrinsic brilliancy of the glare light. The other factor is a depression of visual acuity when there is a sufficient contrast between the illumination of the glare spot and that of the fovea.

E. R. Hayhurst, in the *American Journal of Public Health*, Vol. XVI, No. 3, pp. 218-223, gives a clear-cut, terse discussion of the problem of carbon monoxid poisoning in its various aspects, bringing up the question what constitutes the delayed type of CO poisoning; the possible late sequelae; whether asphyxia explains all of CO poisoning; is CO poisoning a disease or an accident?; CO hemoglobin during smoking; gas fired heaters; automobile exhaust gases, with emphasis on the question whether moist combustion mixtures are more conductive to CO formation than dry mixtures; and finally whether tetra ethyl lead gasoline constitutes an additional hazard to the distributor and user?

The Problem of the Miner's Safety Lamp

Since the gas hazards in manholes are similar to those in mines, the Mine Safety Committee of the Bureau of Mines (Report of Investigations, Department of Commerce—Bureau of Mines No. 2710) was asked whether the miners safety lamp is a practical device for indicating inflammable gases in manholes. The Bureau's committee does not deem the safety lamp suitable for manholes because hydrogen gas may be formed therein. On the other hand, the safety lamp is safe in the presence of methane, but it should not be used in hydrogen or acetylene, because they cause explosions in the presence of these gases. The dangerous gases found in the manholes under observation contained ammonia, benzol, carbon monoxid, gasoline, hydrogen sulphid, sulphur dioxid, carbon dioxid, nitrogen, ethane, methane, hydrogen, and unsaturated hydrocarbons. The possible source of each of the aforementioned gases is mentioned. It is believed that most of the respiratory hazards or explosion hazards arise from the leakage of city gas—natural or manufactured gas; into the sewer system. Tests for explosive gas mixtures were made at the manhole with a gas bomb constructed of a 2 by 2 by $\frac{3}{4}$ inch pipe tee, reducers, stop cocks, and an automobile spark plug in the $\frac{3}{4}$ inch opening which is illustrated in the original. Gases from the hole were transferred to the bomb with a rubber hand bulb and tubing and sparked by means of two dry cells and an automobile spark coil. Explosions are indicated by a kick on a pressure gauge attached to the bomb. Explosive gas mixtures were found in one hole at Pittsburgh and two

at Philadelphia. Tests with palladium chloride test papers for CO indicated that the method is satisfactory for concentrations of the gas which will overcome persons quickly, but is not sensitive enough to detect lesser amounts which exert their effects on man more slowly. The holamite indicator (iodine pentoxide) is more satisfactory in this regard. These findings can find application in numerous chemical works.

The Bureau of Mines in its investigations of gas masks for use in mines and allied industries has studied and developed various types of masks for protection against noxious gases and fumes that may be present in mines, metallurgical works, chemical and other industries.

Chemical and Physical Tests on a Type of Mask

In Reports of Investigations No. 2719 of the Dept. of Commerce—Bureau of Mines, there is recorded the results of chemical and physical tests that were made on a type mask (see Schedule 14A, Procedure for establishing a list of permissible gas masks; fees, character of tests and conditions under which gas masks will be tested: Bureau of Mines, August 25, 1923), which is intended for protection in air against all gases, vapors and smokes. The mask may be identified by an approval plate bearing the seal of the Bureau of Mines and the number 1403. The tests were of two kinds, those made with chemical testing apparatus involving chlorine, hydrocyanic acid, sulphur dioxide, phosgene, carbon tetrachloride, gasoline, ammonia gas and carbon monoxide and those by men wearing the masks in poisonous atmospheres and in most instances engaged at certain tasks. The latter tests were made in sulphur dioxide, 1 per cent carbon tetrachloride, 1 per cent ammonia gas, 2 per cent carbon monoxide, 2 per cent and 0.5 per cent cotton smoke (?); and tin tetrachloride smoke, 0.5 per cent. All of the tests were of 30 minutes duration excepting the smoke tests, which lasted 25 minutes. The chemical and physical tests showed that the canister provided protection against all classes of poisonous gases, vapors and smokes and can be safely used in most cases where respiratory protection is needed. Notwithstanding the important limitations of never entering an atmosphere containing less than 16 per cent of oxygen, and concentrations of poisonous gases exceeding 2 per cent (3 per cent for ammonia), is stressed.

The maximum permissible resistance of canisters to the flow of air at 85 liters per minute, four inches of water during the test life was attained only in one instance. The permissible limit for the complete mask is five inches of water with a canister of maximum (four inch) resistance and a complete mask showed 4.6 inches on inhalation; on exhalation the resistance was only 0.3 inches. The Bureau of Mines specification for filtering efficiency against smoke is 50 per cent; all of the service canisters showed 67 per cent efficiency which is a substantial margin.

The masks worn in the poisonous atmospheres gave good protection throughout all these tests. The life of canisters for successive different gases is also discussed in the original.

In our 1924 report we gave the findings of the Commission for the

Investigation of Carbon Monoxid Poisoning of the American Gas Association. One of the recommendations was that cases of CO poisoning be treated with an inhalation mixture consisting of 95 per cent of oxygen and 5 per cent of carbon dioxid administered by a special apparatus. Three appliances for the administration of the $\text{CO}_2 + \text{O}_2$ mixture were examined by the Commission and passed as satisfactory. The oxygen-carbon dioxid method has now been in use for about three years and at the present time 300 organizations possess approved apparatus for giving this treatment. Reports coming from many of these organizations indicate that the inhalation treatment is exceedingly valuable in mild gassing, where it relieves or prevents the occurrence of headache, nausea, etc. Serious cases which are still breathing revive rapidly and thoroughly, and it is practicable to use the method with the prone pressure artificial respiration method when breathing has ceased. (C. K. Drinker, *Journal of Industrial Hygiene*, Vol. VII, No. 12, pp. 539-558) J. S. Haldane gives expressions as regards the soundness of this method of treatment in *Journal of Industrial Hygiene*, Vol. VIII No. 1, as follows: "I wish to say at once that I am strongly in favor of the carbon dioxid admixture. Not only does the carbon dioxid, by increasing the depth of breathing hasten in corresponding degree the elimination of carbon monoxid from the blood, but the carbon dioxid itself gives marked and immediate relief to the anoxemia . . . I remember well how disappointed I was about 30 years ago when I tried on myself the effects of pure oxygen when I was on the point of losing consciousness during experimental carbon monoxid poisoning."

Reports on Cases of Poisoning from Illuminating Gas

Bed sores appearing early in a previously comatose, or still stuporous, patient are regarded by M. Rabinowitz, *American Journal of Medical Sciences*, Vol. 170, p. 98, as indicative of carbon monoxid poisoning. These lesions are not found so early in other conditions.

Gurich (*Munchener Mediz. Wochenschrift*, Vol. 72, pp. 2194-2197); *Journal of American Medical Association*, Vol. 86, No. 6, pp. 455, reports on four cases of fatal poisoning with illuminating gas in which the heart changes were hemorrhagic necrotic foci surrounded by leucocytic infiltrations. The septum, and particularly the papillary muscles of the left ventricle showed the most severe changes. The median layers of some of the arteries of the brain were necrotic and filled with lime.

The carbon monoxid literature is reviewed very satisfactorily in Public Health Bulletin No. 150, by R. R. Sayers and Sara J. Davenport.

While we are on the topic of gases it is well to refer to the valuable work being done by the Chemical Warfare Service on protection against gas poisoning. In "Chemical Warfare" Vol. 12, No. 2, pp. 3-5, we have the first of a series of discussions, on "Chemical Warfare Agents and First Aid Treatment" which deals with chlorine. Then the excellent and more pretentious Army Medical Bulletin No. 16, the results of a

study made by Lt. Col. H. L. Gilchrist, Medical Corps of the U. S. A., on special duty with the Chemical Warfare Service, published by the Medical Field Service School, Carlisle Barracks, Pennsylvania. Both of these publications, although intended for the use of regular army and reserve officers, have a very great peacetime value.

According to A. R. Koontz (*Archives of Internal Medicine*, Vol. 36, pp. 204-219) war gases can hardly cause serious disability. Experiments made on animals (dogs whose lung tissue is far more delicate than the same tissue in man), with lethal concentrations of war gases showed practically no pathologic lesions from two months to two years after recovery. In only a small minority of the cases was the lung damaged, but this was not extensive and is generally in the form of small patches. All of this is ultimately resolved into fibrous tissue.

According to the *Journal of American Medical Association*, Vol. 86, No. 12, p. 882, the director of the U. S. Veterans Bureau has appointed at the request of the American Legion and other agencies a board of physicians to study the residual effects of war gases. The investigations are to be started at once and will cover a period of twelve to eighteen months and necessitate the study of the present physical condition of about 70,000 men who were gassed during the war.

The Modern Theory About Adequate Ventilation

Industrial poisoning is reported in a chemical worker by H. E. W. in *Journal of American Medical Association*, Vol. 85, No. 14, p. 1031, from inhaling denatured alcohol containing one gallon pyridin base, and one gallon of benzine per hundred gallons. The actions of the various constituents are discussed and preventive measures are stated.

Our ideas of the causes of discomfort and inefficiency in what is usually regarded as due to bad ventilation has been subjected to considerable revision during the past two decades. The crowd poison theory is no longer accepted and authorities agree that the most important principle in general ventilation is the maintenance of thermic conditions in the air which will promote normal heat loss from the body. The dry bulb thermometer reading as the sole index for judging comfort is no longer tenable, while the question whether the wet bulb thermometer reading can be absolutely relied on is also open. The subject reported upon by C. P. Yaglou (*The Thermal index of atmospheric conditions and its application to sedentary and to industrial life* by C. P. Yaglou), (*Journal of Industrial Hygiene*, Vol. VIII, No. 1, pp. 5-19; see also "Ventilation in Hot Industries," June issue, *Fuels and Furnaces*, 1925, by the same author) of the Harvard School of Public Health and formerly research engineer of the American Society of Heating and Ventilating Engineer's Research Laboratories.

A thermal index of atmospheric conditions was developed by comparing the warmth sensed under a wider range of temperature, humidity and movement of air. This is called the effective temperature index. It is determined by means of charts, given in the original, from the

dry and wet bulb temperature readings and from the movement of air. With this method it was found that measurable physiologic effects of atmospheric conditions were found to follow closely the scale of effective temperature, regardless of temperature, humidity and movement of the air. The effective temperature for the comfort zone at rest was found to lie between 63° and 71°. The practical application of effective temperature to sedentary and to industrial life is given in detail, and the upper limit of temperature efficiently endured with muscular work was found to be 80° effective temperature. A method for improving hot industrial conditions is suggested.

At its recent meeting the Committee of the National Research Council (Science, Vol. LXIII, No. 1630, pp. 328-329) on the "Atmosphere and Man" reviewed, among other things, the plans for presenting the essential facts of certain investigations which were made for the committee (of the N. R. C.) by representative manufacturing establishments on the effect of indoor and outdoor conditions on industrial efficiency. Consideration of these records led the committee (N. R. C.) to suggest that graduate schools of the universities should delegate a number of specified researches within this field to qualified students. Emphasis is made on the ever growing interest in the effect of atmospheric conditions on health, mortality, and efficiency, and the hope is expressed that it might be feasible to pool the interest of hygienists, physiologists, meteorologists, and statisticians in order to unify many of the specific endeavor under way.

Cases of Resuscitation After Apparent Death

Resuscitation was accomplished after the cessation of vital functions for over 15 minutes (N. C. Kapur, Indian Medical Gazette (Calcutta) Vol. 60, p. 582) by flapping a cold wet towel onto the chest, respiration, heart sounds, and pulse were restored.

H. Schridde reports (Klinische Wochenschrift, Berlin, Vol. 4, p. 2143) on 37 deaths by electric currents of not more than 220-250 volts. Burns were not always present, but in most cases evidences of a thymic constitution were noted. Edema of the legs was found in 21 cases, while cause of death in the remainder could be explained by auricular fibrillation.

Prof. Jellinek in a lecture (*Journal American Medical Association*, Vol. 85, No. 26, p. 2048) before the Vienna "Seminar Abende" for general practitioners discusses the causes, pathology, and treatment of accidents due to the electricity. The sovereign remedy is artificial respiration, but it must be applied early and may have to be continued for several hours. Until death spots appear, there is still hope even though the current strength was heavy. All of this is also true of injuries by lightning.

In the mining, metallurgical and chemical industries, numerous problems arise requiring determinations of solid and of liquid particles suspended in air. Frequently, these problems are of local interest and involve purely economic or operating difficulties; on the other hand, toxic

effects from the inhalation or the ingestion of substances suspended in air may be a matter of concern. This paper, by Philip Drinker and Robert M. Thompson, entitled "Determination of Supenoids by Alternating-Current Precipitators," in *The Journal of Industrial Hygiene*, Vol. VII, No. 6, pp. 261-272, is devoted to a discussion of portable alternating current precipitators applicable to the quantitative determination and microscopy of dusts, fumes and smokes in air.

In the gravimetric determination of dust in air, it is often desirable to use apparatus and methods which permit sampling at high rates of air flow. Otherwise it requires too long a time to collect enough dust to make reliable weighings. P. Drinker and R. M. Thompson, Harvard School of Public Health, Boston, Mass., in the *Journal of Industrial Hygiene*, Vol. VII, No. 8, pp. 352-357, describe an improved form of the Drinker, Thompson, Fitchet dust sampler. For previous work see *Journal American Society of Heating and Ventilating Engineers*, Vol. 30, p. 695.

Considering the apparatus from the viewpoint of the field worker, the following disadvantages are to be noted: (a) care is required in cleaning out the collected dust; (b) the apparatus is unsuited to the determination of fumes like freshly burned ZnO, or smokes like tobacco, which are difficult to wet with water; (c) the water evaporated by bubbling air through the apparatus must be replaced; and (d) the water freezes if the wet bulb temperature of the atmosphere reaches 32° F.

Advantages of the Apparatus

The advantages of the apparatus are: (a) samples of dust are collected at rates as high as 300 liters per minute, at gravimetric efficiencies of 95 per cent. or more; (b) the resistance to air flow is low enough to permit the use of light vacuum cleaner motor fans, the speed of which can be controlled by rheostat; and (c) the total weight is about 25 pounds, when the vacuum cleaner motor, mounted as in Figure 2, is used, and 10 pounds, with the Hancock ejector.

Philip Drinker gives the size-frequency and identification of certain phagocytosed dusts in the *Journal of Industrial Hygiene*, Vol. VII, No. 7, p.p. 305-314. From the size measurement of phagocytosed dusts and their approximate frequency of occurrence in endothelial cells from sputum of men exposed to dusty air, an attempt is made to predict the relative power of certain dust particles to produce pneumonokoniosis.

From a comparison of dust inhaled, as sampled by electric precipitator, and dust in the cells from human sputum, selective phagocytosis is indicated.

The medium size of the phagocytosed particles was found to be 1.15 microns in diameter and the mean 1.275 microns, in cells whose diameter varied from about 13 to 17 microns. The size-frequency curve of the phagocytosed particles is shown to be asymmetrical, and plots as a straight line on Hazen's logarithmic probability paper. Photomicrographs of the dust cells and the size-frequency curve of the phagocytosed particles are given, with details of the methods used in measuring the

particles and determining their size-frequency distribution.

The quantitative determination of dusts, fumes and smokes in air presents a problem of interest and practical importance to the ventilating engineer, hygienist and the physician. (*Journal American Society of Heating and Ventilating Engineers.*)

A classification of dusts, fumes, and smokes is suggested and is based on the size of the particles and the methods by which they are liberated into the air. Owens' jet dust counter is described, and its usefulness in general dust problems discussed with the aid of photomicrographs of dust and fumes collected by his device.

Electric precipitation is discussed in its theoretical and practical aspects as applied to small precipitators for the determination of dusts, fumes, and smokes in air. It is shown that practical operating efficiencies at close to 100 per cent can be obtained in field and laboratory work. Photographs of complete and incomplete precipitation of ammonium chloride fume are given.

Study of Dust Particles in the Lung Tissue

A method of mounting transparent celluloid foils on which particles have been precipitated is described in detail. By this method measurements of particle size may be made from the collected sample of dust, fume, or smoke without disturbing the precipitate.

The physical character, the size, and the chemical composition of dust particles that reach the alveoli of the lungs by inhalation have generally been studied after they have become fixed in the lung tissue, or after they have been ingested in the alveoli by the phagocytic action of the "dust cells." Ultimately some of these loaded dust cells come in contact with the ciliated epithelium and are expelled with the sputum. While dust in sputum can be examined, measured and analyzed chemically on suitable microscopic mounts, it happens that dust thus examined may have been contaminated with dust from the upper respiratory passages. All of this will not allow judgment as to the characters of the dust particles which eventually reach the depths of the lungs and which are responsible for lung damage. R. M. Thomson reports from the department of ventilation and illumination of the Harvard School of Public Health (*Journal of Industrial Hygiene*, Vol. VII, No. 9, pp. 385-390) on a method and apparatus for sampling alveolar dust. Through the examination of the alveolar air for dust content it appears possible to predict with a greater degree of certainty the amount of damage which is likely to result from the inhalation of toxic substances. Alveolar dust can be sampled directly by using Owens' jet dust counter, Kotze's konimeter, Hill's dust counter, or an apparatus in which is incorporated the best features of the former three, in conjunction with Haldane's alveolar air sampler. The purpose of employing Haldane's sampler is to prove that the specimen is truly alveolar. Analyses were made with the Haldane gas analysis apparatus. The method is said to have a broad field of usefulness in studying the actual particles which reach the lungs by vocations involving much dust.

Cecil K. Drinker, Philip Drinker, and Katherine R. Drinker, in the

Journal of Industrial Hygiene, Vol. VIII, No. 10, pp. 440-443, report on an effective method for conducting experiments on dust inhalation. The natural protection of the lungs of animals against the inhalation of dust is very great, and is enhanced by quiescence and light breathing when dusty atmospheres are encountered. These facts have made it hard to introduce dust into the lungs without long exposures or excessively heavy concentrations of dust in the air breathed. By adding 10 per cent carbon dioxide to dusty atmospheres, breathing is much increased and short exposures result in uniform and satisfactory distribution of dust particles in the pulmonary alveoli.

In problems proceeding from the inhalation of dusts, fumes and smokes it has long been desirable to know something definite of the size and dispersion of the particles as they occur in the air. P. Drinker, R. M. Thomson, and Jane L. Finn (*Journal of Industrial Hygiene*, Vol. VII, No. 12, pp. 567-576) conclude that the photometric methods in field work have a primary advantage in the rapidity with which the readings are made and the subsequent reduction of work in the laboratory. Photometric methods may be applied to all true colloids like acacia in water or tobacco smoke in air, as well to coarse unstable suspensions like silica dust in water or in air. Among the disadvantages are expensive equipment requiring great care, in accuracy and use, and not being of coat pocket size. The methods can not be indiscriminately applied to different suspensions, or even to the same substance suspended by different methods unless the size dispersion and color are alike. They can not be applied with quantitative accuracy to suspensions in which the concentration of particles is approaching the region of opacity to light.

A Study of Humidity Control in Residences

A study of humidity control in residences is reported by P. Drinker in the *American Journal of Public Health*, Vol. XV, No. 8, pp. 689-695. According to C. E. A. Winslow of the Department of Public Health, Yale University School of Medicine, the first definite step toward first-hand scientific study of industrial hygiene in the United States was inspired by a problem of factory ventilation. In an article printed in the *Journal of the American Medical Association*, Vol. 85, No. 13, pp. 968-973, Winslow discusses the subject of factory ventilation and industrial tuberculosis as a general problem, the relation to poisonous fumes and dusts in which carbon monoxide and lead are regarded as the most important of the purely industrial poisons, although it is mentioned that there are many others that affect smaller groups of workers in a more or less intensive degree: dusts predisposing to tuberculosis, and methods of control. Silicosis comes in for a share of the discussion.

May R. Mayers of the Bureau of Industrial Hygiene of the New York State Department of Labor (*Industrial Hygiene Bulletin*, Vol. II, No. 8, pp. 29-32) reports observations in differentiating between pulmonary tuberculosis and silicosis. In so far as the clinical appearances in both of these conditions are similar and in fact do frequently occur together, and the X-ray findings in the advanced case of silicosis are almost in-

distinguishable from that of advanced tuberculosis it is entirely impossible to understand either, unless one knows the pathological changes going on in the body. Case histories and X-ray pictures are included in the article. A new bulletin on silicosis is in the hands of the printer.

C. M. Salls, chemical engineer, of the Bureau of Industrial Hygiene of the New York Department of Labor (*Industrial Hygiene Bulletin*, Vol. II, No. 9, pp. 33-34) gives a report on the physical and chemical analysis of siliceous dust samples.

C. Norris and A. O. Gettler give the post mortem and chemical findings of four cases of poisoning from tetra ethyl lead which was acquired during the manufacture of the anti-knock compound, (see *Journal of the American Medical Association*, Vol. 85, No. 11, pp. 818-820). A volatile lead compound was isolated from the brain tissue of two cases although a non-volatile lead compound was present in all four brains. No volatile lead compound was observed in any of the other tissues examined.

Findings in the Investigation of Lead Poisonings

Contrary to the usual findings in lead poisoning, the bones in these cases did not show a very high lead content when compared to the amount found in the other tissues. Calculated on equal portions of tissues the brain and liver exceeded the bones in lead content. Since the brains contained much more lead than is usually found in cases of lead poisoning, it is assumed that brain tissue has a specific attraction for tetra ethyl lead. As the lungs contained a somewhat high amount of lead, it was concluded that absorption occurs through this channel, while the large amounts found in the liver and kidneys can be explained "as a process of attempted removal from the body." All of the organs, inclusive of the blood, contained lead.

The committee appointed a few months ago by the Surgeon General of the U. S. Public Health Service, consisting of Profs. W. H. Howell, Johns Hopkins University, D. E. Edsall and Reid Hunt, Harvard University, Julius Stieglitz, University of Chicago, W. S. Leathers, Vanderbilt University, A. J. Chesley, and C. E. A. Winslow of Yale University to establish whether any ill effects can come to the public health from the products of combustion of gasoline containing tetra ethyl lead has rendered its first report on January 17, 1926. For those interested in the matter, we suggest that they first read *Public Health Bulletin No. 158* as a prologue in order to obtain clear vision to the subject. The committee concludes on the basis of actual observation that there are at present no good grounds for prohibiting the use of ethyl gasoline as a motor fuel provided that its distribution and use are controlled by proper regulations.

The *Journal of the American Medical Association*, Vol. 86, No. 5, p. 353, commenting editorially on the report remarks: "If the use of leaded gasoline becomes widespread, conditions may arise that would render its use more of a hazard than would appear from this investigation. . . . In the meantime . . . physicians should consider the

possibility of lead poisoning in persons who have been exposed even slightly to ethyl gas fumes even though the evidence thus far is negative." For the complete report of the Surgeon General's committee see *Industrial and Engineering Chemistry*, Vol. 18, No. 2, pp. 193-196.

Hein, Agasse-LeFont and Feil in *Paris Medical*, Nov. 29, 1924, p. 445; see also *Journal American Medical Association*, Vol. 85, No. 2, p. 151, examined fifty-two workers who were engaged in making tiles for chimney pieces and other glazed work. Lead colic was absent in the men having the greatest exposure to lead—namely, the enamel makers. A characteristic lead line was present in 50 per cent of the workers and characteristic stippling of the red cells was found in all (100 per cent). Although the proportion of persons having lead signs was much less in other branches of the ceramic industry it was far from negligible.

What some regard as a novel case of lead poisoning is reported by the Paris correspondent of the *Journal of the American Medical Association* in Vol. 85, No. 25, p. 198. Bread, baked in an oven fired with wood coated with lead salts coming from demolished ships, poisoned thirty-five persons, making them very ill.

Details of Some Cases Reported

A rather complete monograph on Lead Poisoning has now been issued by J. C. Aub, L. T. Fairhall, A. S. Minot, and P. Reznikoff and comes from the Harvard University School of Public Health and the Medical Clinic of the Massachusetts General Hospital through the Williams & Wilkins Co., Baltimore, Md. Some of the material has been substantially noted in the committee's 1925 reports.

Carey P. McCord and A. Friedlander (*American Journal of Public Health*, Vol. XVI, No. 3, pp. 274-281) report what has occurred amongst the help in the galvanizing room of a sheet metal plant during the past three years. Of a crew composed of 20 men, 15 have been engaged at this kind of work for a period varying from six to 22 years. Twelve of these 15 exhibited the characteristic signs of severe gastrointestinal inflammation, culminating in a few instances in gastric or duodenal ulcers.

R. F. Lutz in the *Journal of Industrial Hygiene*, Vol. VII, No. 6, pp. 273-290, describes a method for determining small amounts of zinc in materials of an organic nature, utilizing the fluorescence produced by the action of zinc salts on urobilin. It is capable of determining, with an accuracy of 10 per cent, amounts of zinc ranging from 0.01 mg. to 0.5 mg.

Biologic material containing zinc in small amounts may be easily and safely ashed by incineration at 450 degrees C. according to P. K. Thompson reporting in *Journal of Industrial Hygiene*, Vol. VII, No. 8, pp. 358-370.

Manganese poisoning and its effects on the central nervous system, with a report of six cases is given by R. F. Gayle, in the *Journal of the*

American Medical Association, Vol. 85, No. 26, pp. 2008-2011. Manganese more often than is recognized causes symptoms in workmen handling this ore. All persons are not susceptible to the toxic effects of manganese, which explains why many engaged in the industry for many years show no untoward results. For other data on manganese poisoning see previous reports of the committee.

W. B. Castle, Katherine R. Drinker, and C. K. Drinker (*Journal of Industrial Hygiene*, Vol. VII, No. 8, August, 1925, pp. 371-382) report on cases of necrosis of the jaws of workers engaged in applying a luminous paint containing radium to watch dials. The investigations were begun at the request of the president of the company involved and were done in part at the plant and in the Harvard School of Public Health. In the work an analysis of other agents possibly toxic, was made with no positive findings, nor was the necrosis at all like the ordinary infections of the jaw which do occasionally follow the extraction of a tooth. The examination of the blood of the five workers, coupled with the use of photographic films demonstrated over exposure to radium. The over exposure was of a peculiar type since it also permitted the inhalation of particulate material containing a radium salt. While the evidence seems to point conclusively to radium as the detrimental substance the matter is not definitely proved. The safest course appears to lie in the direction of applying general and specific preventive measures which are stated in the original.

Dangers in the Use of Radioactive Substances

Under the caption of "Some Unrecognized Dangers in the Use and Handling of Radioactive Substances with Special Reference to the Storage of Insoluble Products of Radium and Mesothorium in the Reticulo-Endothelial System" H. S. Martland, P. Conlon, and J. P. Knef, report their findings with cases ranging in severity from mild ones showing only a slight necrosis of the alveolar borders (jaw bone) and without anemia or leucopenia, to severe ones showing profound anemia with extensive almost complete destruction of the upper and lower maxillae. The death of one of the patients allowed them to obtain accurate clinical and pathological laboratory data. In the organs after death amounts of radioactive substances were found sufficient to be determined quantitatively by alpha radiation and penetrative gamma rays, notably in the spleen, liver, and bones, which represent to a largest part of the reticulo-endothelial system.

In several cases radio activity was noted in the body and in the expired air, while pieces of necrotic jaw bone removed during life from a girl now dead over three years showed considerable alpha radiation. The organs, especially the lungs of a chemist and physicist who died with an acute leukopenic anemia of the pernicious type due to the inhalation of radioactive dust and emanation, showed the presence of radium, esothorium and their decayed products.

Frederick L. Hoffman also investigated unusual cases of necrosis *Journal of the American Medical Association*, Vol. 85, No. 13, pp. 961

965) among young women who at one time or another were employed at a radium plant engaged in the manufacture of luminous watch dials. At the outset of the investigation Hoffman was frequently confronted with the statement that the cases had been diagnosed as phosphorus necrosis. Through the elimination of wetting (pointing or tipping) the brushes between the lips the disease will probably disappear or become extremely rare.

The Paris correspondent of the *Journal of the American Medical Association*, Vol. 85, No. 20, p. 1571, reports on some cases in which principally leukemia followed either the use or preparation of radioactive substances. Two of the persons affected were civil engineers engaged in the same laboratory preparing radioactive substances of the thorium group. One of them succumbed to pernicious anemia and the other to a myeloid leukemia. The other cases occurred in roentgenologists. For other data pertaining to radium consult 1925 report of the Committee on Occupational Diseases A. C. S.

G. M. MacKee and A. C. Andrews (*Journal A. M. A.*, Vol. 85, No. 22, pp. 1715-1720) report, among other things, that the ultra-violet ray, regardless of how employed, is of no practical value as a preventive against acute or chronic radiodermatitis.

Experiments With Radium Upon Bone

D. B. Phemister (*Journal of the American Medical Association*, Vol. 86, No. 12, p. 902) gives data to show that the necrosis in bone produced by radium is different than the necrosis produced by other conditions. Bone killed by radium in the treatment of tumors (sarcoma) behaves in the same way as found in experiments made to prove the point.

T. Koniya reports (*Klinische Wochenschrift*, Berlin, Vol. 4, p. 2012) an experiment for detecting the presence of heavy metals in the circulation. In a test, sulphur emulsion was injected in one leg of a subject while the other leg received an injection of an insoluble bismuth preparation. The fact that the tissues were stained black is taken as an indication of the entrance of the metal into the circulation.

G. F. Roberts and A. J. Hosmer (*California-Midwest Medicine*, Vol. 23, p. 636; abs. in *Journal of the American Medical Association*, Vol. 85, No. 8, p. 636) believe sodium thiosulphate to be the remedy of choice in acute and chronic poisonings by the heavy metals. Moist applications of a one or two per cent solution are very beneficial in the treatment of burns or dermatitis caused by arsenic and mercury. In acute causes of poisoning the original dose should be 1 gramme given intravenously, once, twice or three times daily, all depending on the symptoms.

Copper itch, a form of dermatosis which affects the arms and legs, causes itching, a red and somewhat scaly skin and has a tendency to become chronic, is reported by E. G. Shelley in the *Journal of the American Medical Association*, Vol. 86, No. 13, p. 971. Since the data are reported in the form of an inquiry to the periodical a reply giving directions for obviating the condition is included.

The result of an investigation on the poisoning of the stomach by K. Sick, (*Deutsches Archiv für Klin. Mediz.*, Leipzig, Vol. 148, pp. 318-343) with mineral acids is reported. Emphasis is laid on the sequella.

Fluorin, in a vermin destroying composition, is recorded by Dryenfurth & Kipper in the *Medizinische Klinik*, Berlin, Vol. 21, p. 846. The treatment recommended consists in washing out the interior of the stomach with lime water followed by large draughts of the same. Calcium chlorid is then injected.

A dermatosis was produced in three blue print workers through contact with potassium dichromate solution. For persons susceptible to this substance H. J. Parkhurst recommends (*Archives of Dermatology and Syphilology*, Vol. 12, pp. 253-260) frequent rinsing of the skin with a saturated solution of sodium bisulphite, followed with rinsing by water.

Volumes 2 and 3 of "Skin Injuries from Vocations and Industrial Work" by K. Ullman, M. Oppenheim and J. H. Rille, published by Leopold Voss, Leipzig, are now available. It represents a serious attempt to bring within one compass material which heretofore has been much scattered. The first volume was mentioned in a previous report.

Report of the Subcommittee on Benzol

The third progress report of the subcommittee on Benzol, Chemical Section, National Safety Council, was presented at the Cleveland Safety Congress held September 28-October 2, 1925.

From a practical standpoint, the report here presented represents essentially a final one, although a much more extended survey of the entire investigation with reviews of literature and the full data of completed laboratory investigations will be presented to the National Safety Council later for publication. While no real canvass was made for cases of benzol poisoning for this third report at least seven fatal cases (acute and chronic) have been brought to the attention of the benzol committee. The data are handled under the following headings: The use of benzol in enclosed systems; the use of benzol otherwise than in enclosed systems; concentration of benzol in the air of workrooms studied; chronic poisoning of the workers as evidenced by blood examination; and a study of the toxicity on animals of the homologues of benzene (xylol, toluol, Hiflash naphtha) in comparison with benzol. The results of the animal experiments with xylol, toluol, Hiflash naphtha and benzol—all given either subcutaneously or intra-peritoneally; showed the first three to be relatively free of the specific affinity for the central nervous system and the blood forming organs characteristic of benzol. If this tentative conclusion is confirmed by inhalation experiments to be performed later, the serious attention of manufacturers now using benzol should be invited to the possibility of substituting one of these relatively harmless substances wherever the conditions of a given manufacturing process make it possible to do so.

Paint solvents are reported to be the cause of a troublesome dermatitis amongst the painters of an industrial establishment. J. A. Turner

in the *Journal of Industrial Hygiene*, Vol. 7, No. 7, pp. 293-343, incriminates principally turpentine, paint thinner and naphtha. As a preventive he recommends thorough washing of the parts—hands and forearms; with soap and water followed by thorough rinsing with clear, warm water and seeing that the skin is dried. The eruption appears as a dry skin but within 24 hours there may be blister formation. The blisters which contain a clear fluid have a tendency to coalesce and if broken leave an eroded surface with a red inflamed base. The chief symptom is itching and burning which may be promptly relieved by an application of a one to one-thousand potassium permanganate solution. This solution also promotes healing.

Anilin and Anilin Products a Source of Poisoning

Anilin, and anilin products, have been incriminated from time to time as a source of poisoning but in many of the cases on record other substances and conditions are undoubtedly at fault. In the past year C. W. Muhlenberger (*Journal of the American Medical Association*, Vol. 84, pp. 1987-1991) reports 10 cases of poisoning from shoe dyes containing brown or black dye stuffs dissolved in anilin or nitrobenzene; six were said to be due to anilin intoxication.

A. J. Patek (*Journal of the American Medical Association*, Vol. 86, No. 13, pp. 944-945) increases the number of poisonings from this source by three. Hearsay information is included in this article as follows—"I am informed that cases of anilin poisoning (with cyanosis as the principal symptom) are not infrequent in a large local chemical plant where anilin dyes are manufactured."

E. A. Oliver (*Journal of the American Medical Association*, Vol. 86, No. 12, p. 902) after eliminating every factor that could bring about an irritation of the skin (dermatitis venenata) in a certain patient comes to the conclusion that the ink used in the rotogravure section of a Sunday newspaper was the offender.

A fatal case of pyrogalic acid poisoning is reported by R. Pewney (*Medizinische Klinik*, Berlin, Vol. 21, p. 970). A patient affected with a skin disease (psoriasis) was smeared with an ointment containing pyrogallic acid and five minutes later became unconscious, spasmodic and cyanotic. Death ensued in 24 hours. The urine contained much pyrogallic acid, and albumin. It is estimated that about 10 grammes of the substance was absorbed. Autopsy data are included.

Liver necrosis and liver cirrhosis (J. Davidson in *Journal of Pathology and Bacteriology*, Edinburgh, 1925, Vol. 28, pp. 621-626 abs. *Journal American Medical Association*, Vol. 85, No. 25, p. 1996), were produced experimentally in rabbits whose ears were smeared with coal tar for the production of cancer.

Dorothy K. Minster reports 42 cases of occupational diseases in the tanning industry, in the *Journal of Industrial Hygiene*, Vol. 7, p. 299.

A fatal case of formaldehyde poisoning is reported upon by B. S. Kline, in the "Archives of Internal Medicine," Vol. 36, pp. 220-228.

Attention is invited to a book entitled "Industrial Poisons in the United States," by Alice Hamilton, A.M., M.D., published by the Mac-Millan Co. It deals with the poisonings that can arise in almost any industry, and as such it represents a digest of the literature including that of foreign countries. The personal investigations of Dr. Hamilton are incorporated.

In order to grasp quickly the extent of the field of industrial toxicology your committee urges reading a lecture given by Dr. Alice Hamilton, of the Harvard University, School of Public Health, before the School of Public Health and Hygiene of Johns Hopkins University. Although the paper is entitled "Recent Advances in Industrial Toxicology in the United States," it gives one a good view of the entire situation.

The policy of the editor of *Industrial and Engineering Chemistry* to include articles dealing with safety measures and industrial hygiene in that valuable journal is profoundly appreciated by the committee. It represents an open mind and clearness of vision which can only be of lasting benefit to the chemical industry.

Progress was also made with "Chemical Abstracts," but not enough. We can appreciate the difficulties which lie in the way of adding additional sections to our truly monumental abstract journal, but we can not gainsay that a section on Industrial Hygiene and Occupational Diseases is not of all import. The very nature of our profession calls for the section. The fact stands out blatantly.

Explosives in Transport Present Few Difficulties

THE CHAIRMAN: The next speaker on our program is Mr. B. L. Huestis, of the Bureau Explosives, New York City. I was notified by the War Department some time ago that I hold a Captaincy in the Chemical Warfare Reserve and my job in the next war will be looking after the transportation of poisonous gases and explosives for the Chemical Warfare Service, so I will be very much interested personally to hear this paper.

B. L. HUESTIS (Bureau of Explosives, New York City): Mr. Chairman, members of the Chemical Section: Before starting to read my paper I notice in the program the word "explosives" was tacked on to the title. That was not the way the request was originally tendered to me and I therefore left out all mention of explosives; but before going on to read I want to say that there is also a satisfactory reason for having done so other than that already stated, in that an explosive inspires such a wholesome psychological respect that the provisions made for its safe transportation have been and are pretty fully complied with. As a result, explosives in transportation have not presented any considerable difficulties for a long time. For example, a couple of years ago the loss and damage statistics in the transportation of explosives by rail (which includes some five hundred million of explosives at the very least) was \$75 of property damage and one man injured. I think there is very

little opportunity to compare that with anything else in the transportation field.

SAFETY MEASURES IN THE SHIPMENT OF CHEMICALS

Bronson L. Heustis, Supervisor, Accident Department, Bureau of Explosives, New York City

Modern industry calls for a great variety of raw materials. Correspondingly, the finished products are almost without number. As it frequently happens that raw materials are not obtainable near the place where they are turned into salable commodities, and even more frequently the finished products are consumed at points far removed from point of manufacture, it is necessary that both raw and finished products be transported, often over considerable distances. In the chemical industry it is particularly true that many of the materials used or produced are inflammable, poisonous or otherwise dangerous. It has been found necessary to study these materials, to analyze their behavior under a variety of conditions, in order to determine methods of packing and handling which will permit their shipment with a minimum of danger to life and property.

Let us begin by a consideration of the substances classed as corrosive. This includes acids, anhydrous liquid, chlorides, bromine, etc. Of this class, undoubtedly more sulphuric acid is shipped than any other similar material, and in consequence, more cases of leakage, etc., are reported than of any other corrosive liquid. Despite this fact, the greatest actual damage has been done by nitric acid. In the fifteen years since 1910, for which the Bureau of Explosives has full records, the loss charged against nitric acid in process of transportation by freight or express amounts to nearly three-quarters of a million dollars, practically three times the loss charged against sulphuric acid, though the ratio of reported cases is over three to one in the opposite direction.

Roughly speaking then, nitric acid has proven itself nine times as dangerous as sulphuric acid. This brings before us the fact that the major hazard of corrosive liquids is not in their corrosive properties, but in the ability of many of them to cause fire on contact with ordinary combustible substances.

With the exception of concentrated sulphuric acid, most corrosive liquids cannot be shipped in ordinary steel drums. Glass carboys or small bottles are the most widely used containers for such materials as nitric acid. During 1925 there were shipped by the major companies 136,482 carboys of nitric acid, and 781,632 pounds in glass bottles. From these figures it is evident that a concentration upon the proper security of these containers would be a notable contribution to the cause of safety.

The regulations of the Interstate Commerce Commission for the safe transportation of dangerous articles provide definite specifications for the construction, cushioning and closure of carboys and of bottles in

boxes, and also methods of semi-annual test for the strength of the carboy package. In addition, specific precautions are set forth, the most important of which may be mentioned here.

Nitric acid must not be packed in the same outside package with any other commodity. At times this precaution is disregarded, this neglect usually also extending to the use of such cushioning material as excelsior or shavings. With this combination, fire is almost inevitable, a small leakage being sufficient. Nitric acid, bromine, phosphorous trichloride, phosphorous oxychloride, sulphur chloride, titanium tetrachloride, tin tetrachloride, dimethyl sulphate, and any other material having the power of igniting combustible material must be cushioned with fireproof packing such as mineral wool, sifted ashes, infusorial earth or other similar material capable of serving both as packing and as absorbent for any possible leakage. In some types of package, special wood cushioning is permitted. If it is desired to pack bromine with other commodities, the bromine bottles must each be cushioned in non-combustible packing inside individual sealed metal cans.

When Nitric Acid Escapes from the Container

When materials such as nitric acid and the others listed with it escape from their containers and come in contact with carboy boxes, car floors, etc., ignition does not, of course, take place instantaneously. The danger is that such leakage may be unnoticed or disregarded. In one such instance liquid was noted dripping from a box car as it entered a freight-yard. Neither conductor nor yardmaster thought it necessary to look into the matter, as the dripping was not great. A few miles further on, it was necessary to cut the car out of the train while it burned to the trucks. It was a solid load of nitric acid in carboys.

There are other tricks of corrosive liquids which will bear watching. Undoubtedly no chemist in his right mind would think of putting hydrofluoric acid in a glass container, but we have at least one case where a company, receiving a barrel of hydrofluoric acid in leaking condition, quickly transferred it to a number of empty carboys which chanced to be on hand. By the following morning, the carboys no longer existed as such, and the acid was all over the floor.

A simple precaution applying to liquid shipments generally, whether corrosive or not, is to avoid filling containers too full. Some space must be allowed for the contents to expand under a possible higher temperature than that at which the container was filled. This is just as necessary in a steel drum or tank car as in a glass bottle. In addition, many liquids give off vapors which may easily build up a considerable pressure unless expansion space is provided, or the vapors vented off. The best way of doing this with glass containers, such as the carboy, is to use the porous earthenware stopper developed for that purpose, which permits the escape of vapors or gases but keeps the liquid from splashing out.

An important point to be observed is that, after emptying, carboys

which have contained corrosive liquids must be thoroughly washed out with water and drained. Many cases have been reported to the Bureau of Explosives of burns suffered by freight or express employees by acid running out of supposedly empty carboys. The shipment of such containers without washing and draining is prohibited, but it is still done occasionally by those who do not realize the danger, and whose lack of understanding of the Interstate Commerce Commission's regulations on the subject is as complete as their lack of judgment. While the regulations do not apply this requirement to glass containers smaller than carboys, it is excellent practice to wash out bottles before returning them. In a recent case, a fire broke out in a car containing, among other things, a return shipment of empty nitric acid bottles. The suspicion is strong that leakage from these bottles caused the fire.

While, in general, corrosive liquids do not constitute an actual source of trouble unless they splash or leak out of their containers, it must also be remembered that some give off vapors so caustic in character that they form an actual menace to health, if not to life itself. Such liquids as bromine, tin bichloride, etc., if leaking vapors in any appreciable quantity, are extremely troublesome to handle unless gas masks are available or excellent ventilation can be secured. Fortunately, the presence of such vapors even in small amounts, is easily detected; but it is safer to prevent the escape of the vapors as fully as possible. The porous stoppers already mentioned do not pass objectionable amounts of vapor, as the pores are extremely small.

Not All Troublesome Liquids in the Corrosive Class

Not all liquids which cause trouble are in the corrosive class. If we were not confining our attention to materials of most immediate concern to chemists, inflammable liquids would certainly predominate as enemies to safety. There are, however, even with the limitation which prevents a discussion here of gasoline and many others, a sufficient number of inflammable "chemical" liquids to cause plenty of concern. Carbon bisulphide, "sweet scented" laboratory aid and insecticide, is one of the most notable offenders. With its low flash point, and igniting as its vapors will at a low temperature, carbon bisulphide has accounted for over \$120,000 loss in transportation since 1910, not to mention personal injuries resulting from ignition of its vapor.

One safety rule to be remembered in connection with carbon bisulphide is that its shipment by EXPRESS is forbidden at all times and under all conditions. When it comes to freight shipments, we are fortunate in the existence of certain properties peculiar to all inflammable liquids. In other words, these liquids will not ignite, nor burn, while they are liquid. They must one and all be vaporized and the vapors mixed with a proper amount of oxygen, before either ignition can occur, or combustion continue. As long as the liquid is completely confined, with sufficient outage or vacant space to prevent bursting of the container from possible vapor pressure, it is safe.

If there is any leakage, even though slow, in time such an enclosed

taneous combustion among them, for this is a property possessed largely by that class of materials known as inflammable solids. Here we find the substances which, on mere contact with air, or with moisture, will ignite spontaneously, or set fire to combustible material. The most familiar, of course, is yellow or white phosphorous. This material is forbidden in express shipment, except when consigned to certain government laboratories. By freight, it must be packed in water, or dry, in airtight steel grenade bodies, to prevent the slightest contact with oxygen. Sodium or potassium sulphide, when fused, will also ignite spontaneously on contact with air. Metallic sodium and potassium have so great an affinity for water that they decompose with sufficient evolution of heat to ignite the liberated hydrogen; so these substances must always be shipped in oil in sealed bottles, in cans or in hermetically sealed cans or tight metal drums to prevent contact with moisture. Calcium phosphide and phosphoric anhydride are other typical materials which give off great heat when in contact with moisture. As it is not practicable to pack them in oil, hermetically sealed containers are a necessity.

Hazards of Calcium Carbide and Ordinary Charcoal

Though not listed by the Interstate Commerce Commission's regulations as a dangerous article, let us give a bit of heed to the bumble calcium carbide, a substance in itself harmless, but giving off, even in the presence of atmospheric moisture, highly inflammable acetylene gas. A recent importation of 400 drums of this material was packed in containers of such light gage material that about 20 per cent of the drums were punctured. As the weather was damp, a great deal of gas was generated, elaborate precautions being required to avert a fire or actual explosion.

One of the commonest, most inert-seeming, and yet mysterious of materials is ordinary charcoal, which is almost unique in its peculiar bent for spontaneous combustion. Tests have been made and logical theories expounded to explain why and how spontaneous combustion is set up in charcoal, but the case is not yet fully proven. We do know from experience what precautions have been effective in preventing charcoal fires, but at times even these precautions fail, due to unforeseen variables. Long air exposure after the charcoal comes from the airtight coolers, is used to reduce the possibility of future trouble from residual fire. Even so, if a large piece of partly burned wood, or brand, or a rotted knot is in the lot, sparks may be retained through and beyond the air cooling period.

Charcoal will often ignite spontaneously if it comes in contact with a moderate amount of water. In the past 16 years our records show close to 1,000 fires in the transportation of charcoal, with nearly a third of a million dollars loss; though the causes of these fires were various and in some cases indeterminate, water in the coal played an important part in many.

One theory for the effect of water on charcoal is based on the well-known property of charcoal for absorbing a proportionately enormous volume of any gas. When the charcoal is wet, absorption of the water drives out air and other gases from the pores of the material; when the liquid begins to dry out again by ordinary evaporation, the charcoal is then left in an unstable condition and begins to reabsorb air. This absorption, involving, as it does a great reduction in volume of the air, is productive of heat exactly in the same way as heat is evolved in the cylinder of a mechanical compressor. This process is most dangerous when it occurs in a confined space, so that the developed heat cannot escape, gradually rising to the ignition point of the material. Whether or not this explanation is the true one, experience has amply demonstrated the value of good ventilation in charcoal shipments, particularly those consisting of bagged or fine material.

Ignition will not take place if the charcoal is thoroughly saturated with water. On the interesting theory that the absorption of water by charcoal may be stabilized, thus preventing fires by uncontrolled absorption of moisture from the atmosphere or equivalent sources, some companies have tried wetting down the charcoal and letting it dry out again until a sort of point of equilibrium has been reached. While this method has apparently shown good results, the fire records of the Bureau of Explosives do not seem to establish a definite superiority for this method.

Oxidizing Materials Are of Two Classes

In brief, those who must use or ship charcoal will do well to see that it has been adequately aired following manufacture, that it is kept from dampness, and that it is not shipped or stored in quantities containing the full range of sizes from large lumps to dust. Lump should be separated from screenings, and these from pulverized material, always bearing in mind that the finer the size of the material, the greater its susceptibility to spontaneous heating. Fine material, though containing a greater percentage of air space, has poorer internal ventilation, greater proportionate exposed surface of the grains, and is more easily ignited by generated, or externally applied heat. Very fine material should not be permitted to accumulate as dust on beams and other parts of buildings where it is stored or used, because of the possibility of so called "dust explosions."

Another type of material somewhat allied to inflammable solids is found in what are classed as oxidizing materials. While it is true that nitric acid is an oxidizing material of great effectiveness, only solids are included in the classification given in the regulations, as nitric acid is already cared for in the corrosive liquid class. Oxidizing materials are of two general types: (a) those which may decompose in the presence of water or of combustible substances, with liberation of nascent oxygen in amounts sufficient to start fire; and (b) those which, while relatively inert in themselves, will in the presence of a fire already

begun, supply oxygen enough to accelerate the existing combustion seriously.

In the first class, examples to be noted are sodium peroxides and chromic acid crystals. The second class covers nitrates, chlorates and similar materials of high oxygen content. The alkali peroxides must be packed in tight metal containers in strong wooden boxes made in accordance with the Interstate Commerce Commission's regulations, while chromic acid in any form must in addition be in glass bottles of not over five pounds capacity, having securely fastened glass stoppers, the bottles being packed in non-combustible mineral packing in the metal cans already mentioned, in the outside wooden box. While this is the only packing allowed by express, when shipped by freight, certain less elaborate packing may be used.

Requirements for Packing Nitrates Less Stringent

The requirements for packing nitrates, etc., are less stringent, especially by freight. When shipped in this manner, ammonium or sodium nitrate may even be in bulk, provided the cars are paper lined to prevent sifting. The greatest hazard of many of these materials can be obviated if fire is kept away from the container, be it a barrel or a box car. It is not so long ago that a box car took fire, evidently from a hot-box; and because of the nitrate loading, both car and lading were lost, due to the resultant intensity of the blaze.

Not all of the second class of oxidizing materials are so relatively safe as these common nitrates, however. Chlorates are known for their kinship to explosives, as they can often be decomposed by friction, or by shock of high intensity. As even a moderate heating will cause chlorates to give off free oxygen, their chemical instability is evident. It may be considered as axiomatic that chemical instability and shipping hazards go together. A slight hint of this may be found in the fact that in only five incidents involving potassium chlorate, over \$54,000 damage resulted.

Thus far, the principal danger attendant upon the shipment of such materials as have been considered, is that of fire, possibly accompanied by what may in effect be regarded as explosions. We come now to another large class of commodities which have a more insidious, though frequently not less serious hazard. This group contains the poisons of all sorts, solid, liquid, or gaseous.

It may be assumed without question by some that everyone knows the danger in a poisonous substance, and that all we need do is to place a label on the poison, bearing a good large red skull and crossbones, whereupon self-preservation will prevent danger to those who must handle the package. Such an assumption is convenient, but that is all. One would imagine a dry poison like calcium cyanide to be fairly safe, as no one is likely to swallow any of it even if it leaks from the package. Consider, however, the situation of the gang of stevedores who not long ago were working in the hold of a steamer, getting out drums of calcium

cyanide. Some of the drums leaked. Calcium cyanide may give off fumes of hydrocyanic acid at a slow rate. In this instance, fifteen men required hospital treatment, though fortunately there were no fatalities.

Other dry poisons, such as calcium arsenate and the many other common materials so widely employed as insecticides, may, if loaded in a car with food products or stockfeeds, cause serious trouble if sifting or leakage occurs. A few years ago a number of horses were killed by eating feed that had been shipped in a car previously loaded with a dry poison insecticide. Recently nearly a carload of flour and feed had to be dumped because someone loaded with it fiberboard drums of arsenate of lead, and the drums were not leak-proof. While the Interstate Commerce Commission's regulations do not specify the container for such poisonous solids or liquids, they do contain proper methods of packing, described at considerable length. Fundamentally, the packages must be sift proof or leak proof, and strong enough to withstand ordinary handling without opening up anywhere.

Ordinary Poisonous Liquids Under "Class B"

Ordinary poisonous liquids, which are placed with solids under the heading of "Class B" poisons, have the same hazards as the solids, except that liquids are naturally more apt to leak than solids. Tight, strong containers, handled with reasonable care, should obviate trouble with these materials, though as an added precaution, they should not be packed with or loaded near any foodstuffs. There is one poisonous liquid, however, which deserves special mention. This is aniline oil, a liquid which has staining and contaminating powers distinctly out of the ordinary. If it leaks, its characteristic yellow stains will appear on everything nearby, and should the leakage occur in a car much work is required to clean the car, so that staining and contamination will not affect future shipments of other materials. Even though the container does not actually leak, aniline oil spilled on the outside of the drum at the time of filling will produce serious trouble. Immediately after such a drum has been filled, closed and tested for leakage, it must be thoroughly washed all over the outside. Water will do, but dilute acetic acid is much better. Similar precautions are in order before an emptied drum is shipped back to point of origin. In addition to the foregoing, a special label or marking is required on the package, giving instructions for proper closure, and for the washing precaution.

Two other classes of poisons may be shipped, "Class A," poisons of a gaseous nature or which give off vapors of which even a small amount would be dangerous to life, and "Class C," those which on contact with fire give off intensely irritant or dangerous vapors, such as tear gases. Class C poisons are mostly intended for military or police use. Common examples are, brombenzylcyanide, chloracetophenone, and diphenylchlorarsine. Such materials may be safely transported in tightly closed metal cans, or in grenades, packed in wooden boxes.

Class A poisons on the other hand, which are extremely dangerous,

must in general be shipped in special gas cylinders made in accordance with Interstate Commerce Commission's Container Specification Number 33, which covers elaborate construction and testing designed to eliminate the slightest trace of leakage. Hydrocyanic acid in gas form, or in water solution stronger than five per cent, cyanogen, carbonyl chloride, are among the Class A poisons. Two of the Class A poisons, bromacetone and chlorpicrin, may also be shipped in glass bottles, not over one pound per bottle, properly closed, cushioned and packed as detailed in the Commission's regulations.

The greatest hazard attendant upon the Class A poisons is not merely their deadly nature, but the fact that, like certain snakes, they literally strike without warning. Even the characteristic bitter-almond odor of the cyanide gases is not in itself offensive or unpleasant, and some of the other materials do not even give this much warning. It is therefore unsafe to place any reliance upon the ability of anyone to recognize his danger in case of leakage of a poisonous gas, hence the ultra-careful packing is mandatory under the regulations as already described.

Important Books of Regulations Should Be Secured

We must bear in mind that limits of space and time here have made it impossible to do more than name the individual hazards of certain substances, and the general dangers peculiar to a large number of substances as a class. The essential details of the entire field are, however, concentrated in the Interstate Commerce Commission's regulations for the Safe Transportation of Explosives and Other Dangerous Articles, to which a number of references have been made. This publication, the result of a vast amount of practical experience, laboratory research, and cooperation between industry and the regulatory powers, contains packing, shipping and handling instructions which are not only intensely practical, but which are also mandatory. They must be followed by all, which is tantamount to saying that no one, shipper or carrier, can keep out of trouble unless the regulations are known, understood, and applied.

The Commission does not publish the regulations for free distribution; their most-used forms are "B. W. Dunn's Tariff Number One," and "Bureau of Explosives Pamphlet Number Nine," a compact little volume containing, with amendment supplements, more than four hundred pages. Both of these books are complete and are published by the Bureau of Explosives, 30 Vesey Street, New York, being furnished practically at the printing cost. In whatever form they may be obtained, however, every shipper of chemical materials needs to have these regulations constantly at hand. They are not only law, but are in addition a veritable mine of information on the properties and packing of every type of substance which has dangerous properties from a transportation standpoint. Interpretations of anything in the regulations not fully understood are gladly furnished by the Bureau of Explosives; the chemical laboratory of the Bureau stands ready to aid in determining the transportation hazards of materials of all sorts.

THE CHAIRMAN: The paper which Mr. Huestis has just delivered is a very interesting one indeed and the amount of damage to both property and health is very great indeed. In my own personal experience, several years ago I had occasion to see some cases of bromine that were shipped from New York to Baltimore. They were shipped in glass bottles holding about two quarts. By the time the shipment arrived in Baltimore, half the stoppers in the bottles had come loose, the bromine had evaporated and half the shipment was lost.

When we stop to consider the type of labor that handles our chemicals in shipment, we can readily understand why it is so necessary to ship chemicals properly. In my own experience, I find that smaller plants where they ship only small quantities here and there are the greatest transgressors of that particular code and cause the most amount of trouble. Is that right, Mr. Huestis?

Most Large Shippers Are Thoroughly Cooperative

MR. HUESTIS: That is apt to be the case. We have very few large shippers who are not thoroughly cooperative.

THE CHAIRMAN: In that connection I believe it would be very well worth anybody's while to investigate Commerce Commission regulations. As someone remarked a while ago, you have to be a Philadelphia lawyer to go through them, nevertheless I believe it would pay anybody to investigate the Code thoroughly before shipping any dangerous or inflammable materials.

I just wondered whether Mr. Huestis could tell us anything in connection with shipping liquid ammonia and chlorine in tank cars.

MR. HUESTIS: You mean, of course, the liquid ammonia and gas. Ammonia is not covered as a dangerous article by the regulations. These gases, ammonia, liquid ammonia gas or chlorine or carbon dioxide, and various other things, may be shipped in tank cars. There is a special type known as Class 5 under the American Railway Association tank car specifications which must be used. In the regulations will be found the loading rates, as I may call it, on those gases. It was primarily in tank car shipments that you were interested?

THE CHAIRMAN: Yes.

MR. HUESTIS: You see, the Chairman's remark about the Philadelphia lawyer is well evidenced by the fact that although I have been working with this book for years I never pretend to know what is in it or where to find it. Therefore, I should think others of necessity would have to do the same.

Now, ammonia is shipped in tank cars—chlorine, for example, may be loaded at a rate of $1\frac{1}{4}$ pounds for each one pound water capacity of the tank car. If the tank car will hold 10,000 pounds of water it will be 12,500 pounds of liquid chlorine, and in the same way sulphur dioxide may be loaded—that has its own loading rate. Anhydrous ammonia is a little over half pound per water pound capacity and chlorine $1\frac{1}{4}$ and sulphur dioxide the same as chlorine, so the regulations cover all the

points. If you have a copy you can tell how much you can ship in the cylinder or tank car. But the American Railway Association specifications are to be used for such purpose; that is, a tank car that has a special shell and without the usual bottom outlet or dome cover that ordinary tank cars have.

THE CHAIRMAN: I'd like to hear from Mr. Watson in reference to shipping chemicals. I understand his firm ships quite a few chemicals throughout the year and I think he will give us some very interesting information in connection with it.

A. L. WATSON (Personnel Director, Hooker Electro-Chemical Co., Niagara Falls, N. Y.): I have nothing special to say on this subject. Mr. Huestis has just mentioned the subject of chlorine in which the industry I am connected with is chiefly interested and we, of course, comply with all the regulations in regard to shipping chlorine both in tank cars and various sized cylinders.

One of the greatest difficulties we have had in handling cylinders has been in the cylinders which are returned supposedly empty. We have had some trouble and several accidents because the returned cylinders had been used for other purposes and contained small quantities of other chemicals. When the chlorine was recharged into the cylinder, chemical reaction took place and explosions have occurred. We have overcome that difficulty by making a very thorough inspection of every cylinder which is returned from the consumer. We introduce a special small light inside the cylinder and inspect it after it has been both steamed and washed with water. For the last four years we have had no trouble along that line.

Rubber Lined Tank Cars for Shipping Muriatic Acid

We haven't run into any difficulties with our tank cars so far. They are very thoroughly inspected and cleaned after they are returned and the only other chemical which we ship in very large quantities, of this nature I mean, chemicals of the nature which you are talking about, is muriatic acid and we have rubber-lined tank cars for the shipping of that acid and they are very thoroughly inspected upon return empty and all damage to the rubber lining is repaired immediately before it is reloaded.

THE CHAIRMAN: Is there anyone else who has anything to discuss at this time? Now is a good time to bring up your problems.

G. K. NICKEL (DuPont Company, Parlin, N. J.): I'd like to ask Mr. Huestis if the I. C. C. regulations cover the placarding of empty tank cars that have contained such liquids as gasoline or other solvents?

MR. HUESTIS: I might say in that connection that there has been more correspondence through our office on the subject of placards than on almost any other one subject. Not lengthy correspondence with any one individual but exactly the same inquiry from a large number of people.

The empty tank car which has contained any dangerous article what-

soever need not be placarded in any way under the regulations as they now are. The shipper of the empty tank has the option of applying thereto a special placard saying the tank car is empty and has previously contained thus and so, but it is not necessary under the regulations. The only statement in the regulations is that placards which have been previously applied to the car on account of its contents must be removed or defaced so they can not be read or painted over before the car is shipped back as empty.

Mr. NICKEL: The reason I mentioned it was that I understood there were no definite regulations. I have heard the thing discussed along various lines and my own notion is that this Chemical Section could possibly investigate and see just what if any hazard exists. It is my understanding that the speaker touched on that and said that the car must be tight. Suppose the car is not tight or the car isn't empty entirely, as is the case in lots of returned cars? Wouldn't it be well for this Section to consider that particular hazard if there is any hazard there?

The Hazard of the Empty Tank Car

Mr. HUESTIS: I think, Mr. Chairman, I can add a word. There is an actual hazard in an empty tank car. There is no question about that, especially when it is not tightly closed. It is particularly evidenced in tank cars with such material as gasoline. The chlorine tank car or acid tank car usually can't be entered readily by trespassers or unauthorized persons while the car is on the road and the openings in them are usually so small that no rapid rate of leakage is possible. But in the case of tank cars which have been used for gasoline or benzol or any other similar inflammable liquid and which are provided with 15-inch dome openings in which a man can get, there is a definite hazard.

Now, we have never had a record, for example, of actual explosion of tank cars which were full of inflammable liquid, the chief reason being that if the car is full and has no air in it to cause an explosion there is no possibility of one. But if a tank car contains 50 gallons of benzol, let us say, and the rest of the contents is a mixture of benzol vapor and air, there may be a possibility of such serious trouble providing the mixture is right. Anybody that drives any kind of motor vehicle knows what that means.

There is another hazard which has nothing to do primarily with fire and that is the asphyxiation hazard of unauthorized persons getting into these cars. It is surprising how many men don't realize that in order to breathe they must have air. They get into a car that is solid full of unbreathable vapor and if nobody is at hand to pull them out it is the last of them.

I might cite a case that happened last year in the south where two tank cars, one of which had contained gasoline which is listed by the regulations as a dangerous article and kerosene which is not on account of its higher flash point, were in the railroad yard and apparently the

dome covers had not been screwed down tight. Anyway three boys came into the railroad yard and started to play around and got on the tank cars and found the dome covers could be removed, took them off and looked inside and they decided to climb in. Two climbed in one tank and the other in a spirit of fun laid the dome cover back on top of the tank. Then, not realizing what he had done, he proceeded over to the other tank and climbed in himself. Hours went by and night came and the parents missed them. A search was instituted and some small boy who was related, I think, to the Yard Master, remembered having seen the boys playing around the tank cars. They investigated and the two boys were found in one and the other boy in the other. It just so happened they hadn't been in long enough to be completely asphyxiated and subsequently recovered.

This Peculiar Accident Proved Fatal

That is not the principal feature of this one accident. In getting out one of the boys from the gasoline tank a man went down into the car. They were working, I might say, by the aid of a pocket flashlight and put a rope around him and hauled the boy out. Then it came time to get the man out. Of course, the man was beginning to be under the influence of the vapors himself. Just then the man who had the flashlight up above at the dome dropped it into the car in his excitement. Somebody on the ground in spite of the obvious hazard of doing so took up a lighted lantern and held it over the dome so they could see. The resulting explosion of vapors killed the man in the tank car and injured seven or eight around the dome badly. That one case which is unfortunately only one of a considerable number shows there is a definite hazard about an empty tank car.

MR. WHITING: I would like to inquire, Mr. Chairman, whether all the chemical experts here today who are responsible for safety in the plants are getting these Bureau of Explosives bulletins? How much will it cost to be on the mailing list; \$1 or \$2 a year?

MR. HUESTIS: They certainly ought to be if they are not. The bulletins I believe cost the enormous sum of two cents apiece.

MR. WHITING: You men can be on the mailing list if you spend a few dollars and I think you are missing a bet if you are not getting these bulletins as issued and turning them over to the foreman or whoever is in charge of the materials handled. Otherwise you may wake up with a bad accident at your own plant such as Mr. Huestis mentioned and such as has happened elsewhere. The Bureau bulletins are very valuable in keeping your men alive to tank car dangers.

MR. HUESTIS: I don't want to be accused of being an advertising or sales agent for the bulletins but I may say they are written primarily for the railroad employee but contain information just as good for plant employees in the chemical industries, and at the present time some 85,000 copies of this bulletin every three months are printed and distributed to the railroad companies who send them out to their station men, their yard men, freight train conductors, etc., who are supposed

to read and take heed. It might be a good idea if any of you who represent large industries having a number of plants to make some distribution of those bulletins in the suggested way because they are written not for the superintendent or president of the concern but for the man who handles the stuff.

THE CHAIRMAN: In connection with this topic I wonder if Mr. Nickel could give us any idea as to what a committee, if appointed, could do in the way of eliminating any future accidents connected with empty cars? You said an investigation by the Council—I wondered what suggestions you had along that line.

MR. NICKEL: My own suggestion was that probably the information could be circulated through the Council to bring out the hazard, the ultimate goal being the placarding of the empty containers, or tank cars. We can all realize that such practice would not cost much and it might save any number of serious accidents. I think that placarding is the ultimate goal.

Discussion on the Labeling of Empty Tank Cars

MR. RIEDERER: If I am not mistaken, in years gone by, acid tank cars had to be placarded "ACID" and the acid placard stayed on until the tank was absolutely cleaned out and steamed out until there was no acid in the car. That has been changed today and when the acid tank car is unloaded, so-called, the acid label is removed. I believe that the Bureau, if I am not in error, made a mistake in getting away from the old system. The unloaded tank car is not empty—I don't believe you will find five per cent of such tank cars which you could call empty. There may be anywhere from 10 to 50 pounds residue, in winter time, of acid contained in the car and the car is certainly not empty although the consignee returns the car empty. I can't understand why that label or placard "ACID" is taken off simply because the receiver claims it is empty. He may not have taken the dome cover off to learn if there may be a little acid left. I recall in about 1900 or 1901 that one chemical company was monkeying around a tank car and a man used a hammer on it. There was a spark and that was the last of two men. Now, in my estimation, unless a tank car is washed out and thoroughly cleaned and a person can go in the car, it is not empty. Certainly not if it contained nitric acid and mixed acid and I don't agree with Colonel Dunn changing the regulation.

THE CHAIRMAN: Have you anything to say in connection with that, Mr. Heustis?

MR. HUESTIS: I am not in a position to give an opinion for the Bureau on empty car handling. I may say that the Bureau of Explosives in the first place is not a government body although it has certain functions assigned to it by an Act of Congress, peculiarly enough. The Bureau is primarily supported by the railroad companies, certain steamship companies and express companies and certain industrial organizations of which Mr. Riederer's company is one.

The regulations were made up as far as possible in cooperation with the industries and, therefore, in order to have anything incorporated in the regulations it was necessary to enlist the cooperation of the industries as far as possible. Now, whatever the opinion may be in the Bureau as to the advisability or inadvisability of placarding empty cars, the regulations are as they now are because a majority vote of the greatest number of people who had to do with the matter was in opposition thereto. However, that doesn't mean that the situation is as fixed as the laws. If a sufficient amount of interest were aroused by all concerned to reverse that vote it would be reversed. The Bureau simply wants to arrive at the conclusion which appears by majority vote to be the most reasonable.

MR. RIEDERER: Mr. Huestis, wasn't that partly due to the tariff charges, that is, so they wouldn't charge for return acid instead of empty cars? Wouldn't that have something to do with it? The Bureau and the shippers got together and called return tank cars empty and forgot the safety feature.

Important United States Bureau of Mines Papers

MR. HUESTIS: That is only one of the points. Another important point is that a large number of shippers objected to the expense and trouble of applying these placards. I think that is to be considered.

A. L. THOMAS (Service Superintendent, DuPont Co., Wilmington, Del.): Wasn't it also due to the shippers objecting to washing the cars with water and weakening the iron?

MR. RIEDERER: You simply had to mark them empty. If the tank car wasn't empty the acid card stayed on it. You didn't have to wash it out before you returned it but the acid placard stayed on. Don't you remember, we had it painted on so you wouldn't have to tack it on every time and rip it off; so we had it painted on and wrote on it with pencil, "Empty." Now, when the tank car is blown out it hasn't any label at all and they do ship glycerine in tank cars now, too. You have to be mighty careful you don't get any acid in a glycerine tank.

MR. HUESTIS: As for my personal ability to make any comments on the condition, it was brought about before my time and I am not acquainted with the history of it.

THE CHAIRMAN: In connection with this discussion, Mr. Rice has tendered me a copy of instructions for unloading cars at their plant. Mr. Rice has kindly consented to let anyone who is interested have a copy.

Has anyone else anything to suggest or say in connection with this paper of Mr. Huestis?

HAROLD J. SEGRAVE (Mine Safety Appliances Co., Pittsburgh, Pa.): In connection with the question of tank cars containing gasoline and petroleum vapors possibly or residual amounts of petroleum or gasoline, it might be interesting to some folks in this Section who don't get the publications of the United States Bureau of Mines to know there are

two papers which contain considerable information about tanks and the toxicity of petroleum vapors. One, I believe, is a technical paper, No. 348, and the other is technical paper No. 352, both of the United States Bureau of Mines. Those papers will give more information, of course, than my comments could and you can easily send for them.

THE CHAIRMAN: In the Petroleum Section, I think, we can secure some papers delivered during this Congress having very valuable information concerning tank cars. They usually have a vigorous discussion on tank cars containing inflammable oils and liquids.

Owing to the absence of Dr. Fetzner I have secured a man who is familiar with respirators and gas masks. Although we have a discussion on that tomorrow and a paper by Mr. S. H. Katz on "Filtering Efficiencies of Dust Respirators and Gas Masks," I think Mr. Segrave can give us some very valuable information at this time.

TYPES OF GAS MASKS AND RESPIRATORS

Harold J. Segrave, Mine Safety Appliances Co., Pittsburgh, Pa.

Gas masks and respiratory protections can really be divided into four groups. The first group, self-contained oxygen breathing apparatus; the second group, gas masks of the filtration and canister types; third, fresh air apparatus such as hose type gas masks; and the fourth, respirators, so-called, in which we class all mechanical filters.

Self-contained oxygen breathing apparatus is a device which entirely eliminates the outside air. The apparatus as used nowadays consists of a supply of oxygen under pressure, a breathing bag from which and into which the wearer breathes and a regenerating cartridge. This regenerating cartridge is designed to hold a chemical substance which will remove the carbon-dioxide from exhaled breath. This apparatus is entirely free of outside conditions, insofar as protection to the respiratory system is concerned provided the apparatus is properly designed for the exposure.

I might explain that last statement by the fact that the exposure of a man with an oxygen breathing apparatus having rubber parts that will not keep out the substance to which he is exposed, such as benzol or gasoline, is a very hazardous apparatus even in the hands of an expert, which is evidenced by Mr. Daniels' going into a tank containing a few inches of gasoline to rescue a man who had been overcome. He dipped the breathing bag of his apparatus, which was made of a rubberized fabric, into the gasoline, the breathing bag became porous, he had gasoline filtering through the bag into his supply of air and oxygen, and due to the fact he was breathing through his mouth had no means of detecting the gasoline vapors by smell and he inhaled enough gasoline vapors to kill him and that is one of several cases.

The self-contained oxygen breathing apparatus, as I say, is free from outside conditions insofar as respiratory protection is concerned. The apparatus is heavy and cumbersome due to the fact you must have a

high pressure cylinder of oxygen with it. But when it is right it is safe in every gas.

The second class is gas masks of the canister type and in that class we include all types of the filter type which include chemical protection. Needless to say, the greatest demonstration of what gas masks of this type could do was during the World War where we had gas hazards in profusion and the gas masks as provided did a very good job. Since the war, gas masks have been adapted to industry, fire fighting work and are very widely used, indeed. Gas masks of the canister type, however, depend for their oxygen upon the outside air. That is, they do not add anything to the air that is breathed through the canister so that the first limitation of a gas mask is that there must be enough oxygen in the outside air to support life.

Another limitation is the length of life of the canister in the concentration of gas encountered and, of course, it depends also upon the breathing rate of the wearer. These are fundamental principles which do not have to be explained more fully. Gas masks are very widely used particularly in your industry.

The Third Class of Respiratory Protection

The third class of respiratory protection is the hose type gas mask. In the hose type gas mask we have an individual ventilation, let us call it, from a remote place where there is fresh air. Air is either drawn or blown through a hose into a mask and as long as the mask is tight and the remote end of the hose is kept in fresh air why the wearer is absolutely safe from the gases entering. Of course, the hose mask is limited to some extent by its cumbersomeness, by the length of hose you can use and by the tendency of the wearer of a hose mask, particularly of the blower type, to apply it in a very careless manner.

Now, I have been in contact with the illuminating gas industry for a great many years and nine out of 10 men, talking about gas masks, will say, "I like the hose mask because you can apply it to the gas and it doesn't make any difference whether it is tight or not as long as you have air going through." And that statement "as long as it doesn't make any difference whether it is tight or not" is where we find most of the accidents. The gas mask of the hose type should be applied properly, whether you are going to draw air in by the suction of the wearer or blow air in, because there are so many things that could happen to a person operating a blower that wouldn't have anything to do with the man wearing the gas mask.

Let us say, a man is working in a tank, another man is operating the blower and blowing air to him through a hose type gas mask, and somebody else says he needs a new broom or a new shovel or different type of shovel to shovel up that muck he is in—"go and get it." Well, the man operating the blower, knowing if he stops the blower the man can draw air through the hose, might stop turning the blower and go for the other shovel. It only takes a short while. But meanwhile if

the mask isn't properly applied the air the man is breathing will come from the place of least resistance and will go through the leaks around the gas mask face piece, and all this can be obviated by a very small amount of instruction and care.

The fourth type of respiratory protection, respirators, is the mechanical filtration type and there has been such a number of discussions in this Section on that subject I think it is needless for me to try to call on my small experience to give you any more on it. Moreover, I believe that Dr. Katz, of the Bureau of Mines, has made an extensive research into that and his paper tomorrow will probably give you the latest and best information along that line. I won't say anything further here except that respiratory protection of the mechanical filter type usually is made just as light as possible, to cover the nose and mouth. A man will not wear a full face piece in a job where he has to wear it all day.

In my opinion, whenever we have a job that is hazardous from a gas or corrosive dust problem and we allow a man to wear a respiratory protection which covers merely his nose and mouth, we are admitting a compromise between the efficiency of an apparatus and safety. I have observed that whenever you place any respirator over the nose and mouth any motion on the face is always relative to the respirator. Any twisting of the face, any talking is always a motion of the respirator relative to the face. That is mostly where these respirators fail, from my observation. Whenever we have really a lethal atmosphere to enter, therefore, I am uncompromising in the recommendation of a full face mask which will not move relative to the face.

Hydrogen Sulphide in the Petroleum Industry

I have an instance in mind, in the petroleum industry. Hydrogen sulphide, as you know, is very deadly. Men gauging the amounts of oil in tanks have been overcome over the manholes in tanks so that at least one company has instituted the practice of having tank gaugers on their rounds take a watcher with them. In other words, two men to do the work that one man could easily do, and they want to get rid of the second man naturally.

They are going to attempt to do away with the second man by providing respiratory protection in the form of a gas mask. But these men have to climb up and down stairs at night, be on the tops of tanks in all kinds of weather, and if they were to wear a full face mask their vision would be cut down and they sometimes gauge 30 or 40 tanks an hour, which involves considerable running around in a dark yard. Now there they are introducing another hazard. The men won't wear a full face piece. They either have to err a little along the lines of safety and give the men something they will wear or else continue with the watcher. Now, we have taken a respirator face piece and placed it on a mask, giving the men additional instruction in the use of the mask, and they are going ahead and using it for this tank gauging proposition.

A question was asked me recently by a fireman as to what was the

best apparatus. He wanted me to say that an oxygen apparatus was the best. So I thought a moment and I said: "Well, the best way I can answer that is, what is the condition?" He said: "All the conditions." I said: "There is no best apparatus for all conditions. Each condition must be looked upon and judged by itself, and the apparatus be chosen to take care of the condition."

It is just like a pair of goggles. You can get a pair of goggles that are made out of boiler plate and if you have port hole glasses in them no one will wear them. They are a protection but no one will wear them. But if you get a pair of goggles that give 95 per cent protection and the men will wear them because they are comfortable and light and they get 95 per cent protection, why we have a fair amount of exposure protected against. So that we must look upon each condition as a separate one and provide the equipment for that condition.

A New Type of Rubber for Gas Masks

THE CHAIRMAN: This question of gas masks and respirators has quite a bit of attention every year at this meeting and we learn something every time it is discussed. There is no question they are valuable in the chemical industries and such industries as the petroleum industry and they serve their purpose very well.

This concludes our morning program.

I will ask the chairman of the Nominating Committee to have his report by tomorrow.

Is there anything else in connection with any of the papers discussed this morning that you would like to take up right now?

MR. SEGRAVE: Mr. Chairman, last year you folks as usual gave the manufacturers an opportunity to show anything new they have and there was a little discussion about rubber used in gas masks. Our company didn't stop at what we knew then. We have gone further and we have a new rubber for gas masks which we feel is the latest and best and I know a great many of you folks are interested in that phase. I'd be very glad to go into that question in detail with anyone after the meeting or over at our booth.

Another thing, we have something new here. Mr. Lewis asked me to bring it over. Here is one of our compromises between efficiency and what a person will wear in the nature of a paint spray mask to take care of the solvents used in paint spray and I wish everyone would have an opportunity to see it.

THE CHAIRMAN: I think you can go right now into detail. I think there are members here that would like to hear about the new respirators and masks that you have.

MR. SEGRAVE: This is a paint sprayer respirator with a valve such as is used on the Army mask. But in paint spraying work the use of a mechanical filter falls short in that it doesn't give a protection against the solvents; it does the liquids but not the solvents. They are usually volatile and do give considerable trouble. We have a small canister

here which we fill with activated charcoal, but it is refillable and there is a filter at the bottom and top of the canister. The bottom filter can be replaced more frequently and the chemical content can be replaced as needed as the fumes start to go through. It is the old style nose respirator but a little better shape than the average one we think.

MR. KEPNER: What is the weight?

MR. SEGRAVE: I am a poor guesser. It is made out of copper. And it is used because we can't expect a workman doing that work to wear a full face piece.

MR. KEPNER: I'd like to say we have been using the large type bag covers for spray paint and we found so much trouble with them on account of the paint getting in the face piece that I think this would be a dandy thing. Can you get refills for those?

MR. SEGRAVE: Yes, you refill them yourself.

This rubber that we use in gas masks has been taken up with the best authorities we could find on the subject. I believe our Pittsburgh office has worked in close cooperation with the Chemical Warfare Service and others and we have a rubber here that is a little better, if anything, than the face piece rubber in the 1917 or 1918 type moulded rubber mask. Probably some of you know a good many of those masks are still in use and are giving good service. This rubber is at least as good as that and we think better. But we are still making the Cox type face piece so we lose none of the flexibility or fit that we had in the Cox type headpiece. We use a black rubber because that was recommended to us as being better protection against light and heat—they are enemies of rubber.

The Fit of the Gas Mask the First Consideration

We also used a stockingette on the outside to keep the light off. We have used as many precautions as possible and we feel we have a face piece rubber now that will please everyone.

The rest of the mask is the all-service gas mask that has been spoken of so much that I won't say anything further about it now.

MR. KEPNER: I'd like to know what the experience has been of the members with the stockingette on the outside. We used the stockingette type just referred to and we would get bleach on it or acid and this puts our gas masks on the bum in a short time. So the Mine Safety Appliance Co. very kindly made an all-rubber mask but we found in that type the head piece tears out. We are now back to the stockingette type again. I wonder what experience some of you boys might have had with your gas masks.

THE CHAIRMAN: The latest practice I think now is to impregnate the stockingette right into the rubber. It is almost an impossibility for the stockingette to come off any more. It is impregnated right into the rubber. I don't think you will find trouble in practice with the latest type face piece now being used.

MR. SEGRAVE: I might say, Mr. Chairman, the question of elastic

headbands is a very live question. If we could have a moulded rubber headband of just plain rubber we would do away with a lot of troubles as far as the corrosion and loss of headbands is involved. But when we use a moulded rubber headband, so far as we know now, it is very uncomfortable to wear and it does not give the necessary resiliency to give you a tight fit. You will all agree in the last analysis the fit of the gas mask is the first consideration; even if we have to change the headbands every two weeks. Let us have one that the men will wear and one that will fit. We are more anxious than any of you folks to get something of that kind and we are working on it continually. I hope I will have something at the next meeting possibly that will give us something better on that.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The Wednesday morning session, October 27, of the Chemical Section of the National Safety Council, was held in the Henry II Room, Statler Hotel, Detroit, Mich., and convened at 9:50 o'clock. Mr. J. L. Kistner, Elliott Service Company, Chicago, Ill., presiding, and Mr. C. E. Rice, Director of Health and Safety, The Dow Chemical Company, Midland, Mich., acting as secretary.

THE CHAIRMAN: The first topic on our program is a paper by Mr. S. H. Katz, Associate Physical Chemist, Experiment Station, U. S. Bureau of Mines, Pittsburgh, Pa. Mr. Katz has been unable to get to the meeting and in his place he has sent Mr. J. J. Forbes who is Supervising Engineer. Mr. Forbes will give us the paper as Mr. Katz has outlined and any further information that we may require.

Mr. Forbes will show a few slides in connection with his paper.

I wish as many of you men as possible could stay for the round table discussion this morning since we hope to take your problems one after the other and try to reach a definite conclusion in reference to them. You are here for the purpose of obtaining specific information that is going to help you to eliminate certain problems in your particular industry and we hope this morning in this round table discussion to thoroughly thrash out those problems.

I have received a telegram from Dr. Greenberg, who is chairman of our Program Committee, stating that he would be unable to attend. Dr. Greenberg has accomplished some very excellent results in preparing the program for this Section this year, and I regret very much that he is unable to attend. He is one of our very active workers in the Section and his absence is greatly missed.

I take great pleasure now in introducing Mr. J. J. Forbes of the Bureau of Mines.

J. J. FORBES (U. S. Bureau of Mines, Pittsburgh, Pa.): Mr. chairman and gentlemen: I regret that Mr. Katz was unable to be here and as I am the only one from the Bureau of Mines coming to the National Safety Council Congress he asked me to present his paper for him. I don't profess to know very much about his subject but I will very gladly present the slides and read his paper to you and if you have any further questions in connection with Dust Respirators, if you will refer your questions or inquiries to Mr. Katz or let me have them before we leave here, we will see you are cleared up on them.

In addition, if you live near Pittsburgh or have occasion to stop in Pittsburgh, if you will come over to the Experiment Station I know Mr. Katz will be glad to clear up any questions. The paper is to be

published in the technical journals and also by the Bureau as a report on a technical investigation.

It might be interesting to tell some of you gentlemen that last June or July Congress passed a bill appropriating \$2,000 for convention expenses for the Bureau of Mines. There are 20 sections in the Bureau. Each one of those sections got \$100. Our Chemical Section's funds were used up six months ago. Hence the reason that Mr. Katz could not get here. It is regrettable but I am sure you will understand the situation. I am the only one coming to the Congress and I have three papers to read for various men in the Bureau.

FILTERING EFFICIENCIES OF DUST RESPIRATORS AND GAS MASKS*

S. H. Katz, E. G. Meiter, and G. W. Smith, Experiment Station,
U. S. Bureau of Mines, Pittsburgh, Pa.

Dust respirators or filters to prevent inhalation of dust have been used in various forms for generations. Of course, it is best to prevent the formation of dust or remove it at its source before it arises into the air, but this is not always practicable and in some dusty processes the means for satisfactorily removing the dust is yet to be developed. The next expedient is the use of respirators, and, though the respirators have been imperfect, such protection as they do afford is beneficial.

The principal disadvantage of respirators is the discomfort to the wearers. A source of considerable annoyance in many types of respirators has been the resistance to air flow, as this imposes extra effort in breathing and may become excessive. Other discomforts may become pronounced, such as pressure at the edges in contact with the face; heat due to the face cover; the warm, humid exhaled air in contact with the face; and the prevention of cooling evaporation and radiation. In cold weather the heat effects are not discomforting. It is annoying if much exhaled air is trapped and rebreathed. Some respirators fit the face so poorly that much of the air is inhaled through openings between face and respirator without removing the dust. Ineffective check valves may permit breathing unfiltered air. However, despite the lack of perfection in any one type of respirator, the respirators on the whole have been of much value.

In the development of gas masks for industry at the Bureau of Mines, gas-mask canisters were made with two filters of cotton wool each $\frac{1}{8}$ to $\frac{1}{4}$ inch thick between wire screens. These were found to give good protection against smokes such as those produced by ordinary fires in carbonaceous matter¹, wood, coal, cotton, paper, and the like. The fire-

¹Fieldner, A. C., Katz, S. H., and Kinney, S. P. Gas masks for gases in fighting fires: Tech. Paper 248, Bureau of Mines, 1921, 61 pp.

*Published by permission of the Director of the Bureau of Mines.

man's gas mask² requires only the two cotton filters to protect against smokes so dense that the hand is invisible before the face (the cotton-wool filters do not stop passage of the gases or vapors; chemical absorbents are needed for them.) Laboratory measurements of the filtering efficiency of the canisters by the tobacco smoke method showed that only 50 per cent efficiency against tobacco smoke was sufficient as a filter test for gas masks that give good protection in general industrial



Plate I

Plate II

Plate III

use. Gas masks of this filter specification have often been used successfully for protection from very dense suspensoids in air or from those somewhat difficult to arrest, but they are too heavy and cumbersome for general or continuous use as dust respirators. For that reason attention was turned to the simpler and lighter dust respirators.

This paper describes some of the popular forms of dust respirators on the market; some results (Tables 2 and 3) of laboratory tests of the respirators are given, including filtering efficiencies against tobacco smoke and air-floated silica dust.

It is beyond the scope of this paper to describe more than a few typical respirators and to give their filtering efficiencies as determined by the laboratory tests. For this purpose representative types found in industry have been selected.

Respirators With Sponge Filters

Plate I shows a respirator with inclosed sponge filter. The body or frame is of sheet aluminum held in position by an adjustable band around the head. A pneumatic rubber cushion edge is in contact with the face; on the upper side is a metal disc check valve for passing out

²Katz, S. H., Bloomfield, J. J. and Fieldner, A. C. The Universal and the fireman's gas masks; Tech. Paper 300, Bureau of Mines, 1923, 22 pp.
 Steidle, Edward. The fireman's gas mask and its use. Paper read before Louisville, Ky., meeting of International Assn. of Fire Eng., Sept., 29--Oct. 2, 1925, 36 pp.

the exhaled air. The seven holes in the frame front are backed by a bronze-wire screen filter of fine mesh, and the sponge is stuffed into a pocket behind the screen so that it fits the pocket closely. The sponge may be wet if desired. The wet sponge can absorb small quantities of water-soluble gases such as ammonia or hydrochloric acid gas. However, the gas-absorbing properties of the small amount of water are so light, even in case of the favorable gases mentioned, that the respirator is in no sense a substitute for a gas mask.

Plate II shows a respirator of similar construction but molded of white rubber. The holes are backed by a gauze filter cloth sewed to a rubber ring. A sponge is held in the pocket behind the cloth. The edges of the rubber body itself lie against the face. The entire respirator may be washed in water or disinfectants without corroding.

Respirators With Paper Filters

Plate III shows a dust respirator which is fairly widely used. The body is made of molded white rubber with thin edges formed to lie parallel against the face. At the outer end is an adapter of sheet aluminum which crimps and binds a circular filter paper over an aluminum edge. An arch of stiff metal wire is attached to the rubber body in position over the bridge of the nose. The wire may be shaped by bending so as to grip the nose and conform the respirator into the contours between the nose and cheeks. Leakage of air at these places is a serious defect of many respirators. The filter paper is made of cotton fiber, loose in texture. There is no exhale valve on this respirator; the breath passes outward through the filter as well as inward. However, these respirators are made with exhale valves if desired.

Plate IV shows another respirator with paper filter. The body is of sheet aluminum with pneumatic rubber cushion adjacent to the face. The exhale valve is mica-disc type. The front has a brass wire screen in an adapter of aluminum. The paper filter is crimped over the circular edge of the frame by the adapter; this paper is gauzy, spruce-pulp tissue, and 4 to 10 thicknesses are used for a filter.

Respirators With Felt Filters

Plate V shows a respirator employing a felt filter. It has a sheet aluminum body and pneumatic rubber face cushion similar to those described. An exhale valve of rubber is attached at the lower side. The felt filters 6.4 cm. (2½ inches) diameter and about 4 mm. (3/16 inches) thick, are of cotton and wool mixture of loose texture. The felt is placed between two fine wire, close mesh, circular bronze screens which spring into the circular channel. The felt filters are to be changed when resistance to air flow increases through clogging with dust.

The respirators so far described are all similar in design but Plate VI shows a British make of respirator which introduces new principles. The body or frame work is a woolen felt about 6 mm. (¼ inch) thick. It is lined with a rubberized cloth to prevent the moisture-laden exhalations from wetting the felt cover. The inhaled air passes through the

felt to the space between felt and rubberized lining and then through a check valve (rubber-disc type) to the nostrils. Another similar check valve passes the exhalations out. A strip of lead metal is inclosed in a piece of fabric sewed to the respirator at position over the bridge of the nose. The lead may be modeled to fit the respirator closely to the lines of the face. This respirator provides a broader filtering area than those described, and resistance to breathing is accordingly reduced and

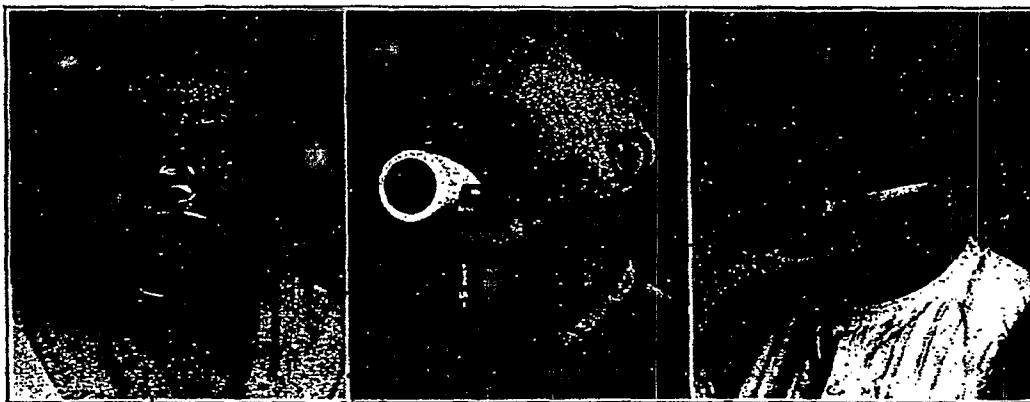


Plate IV

Plate V

Plate VI

clogging is also less rapid. The filter on this respirator can not be changed; if it becomes clogged it must be cleaned by heating, by vacuum cleaning, or by blowing air through it. The respirator covers only the mouth and nose and is called a "half mask."

Plate VII shows a "full mask" dust respirator made in England; it employs the same principle as that just described. The filtering surface is a loose woolen felt about 6 mm. ($\frac{1}{4}$ inch) thick lined with a rubber sheeting (two layers of rubber with cloth vulcanized between) about 2.5 mm. ($\frac{1}{10}$ inch thickness). The air filters into the space between felt and rubber sheet, then passes through two rubber-disc check valves, one under each eyepiece, and to the nostrils. Exhalations are discharged through a "square" rubber check valve inclosed in the sheet-metal snout. This respirator covers and protects the eyes as well as the respiratory organs, plane glass eyepieces similar to those in a Tissot gas-mask facepiece are set into the respirator; in fact, the entire construction of facepiece and head straps is similar to that of Tissot-type gas masks. The full-mask respirator has a larger filtering surface than any of those described, and clogging is accordingly slower.

Plate VIII shows a respirator with cloth filters. The body is made of pyroxylin fabrikoid, impervious to air. The central portion of the fabrikoid is cut away and the filtering medium is sewed into its place. The filter consists of an outer layer of fine silk gauze and then three layers of cheese cloth. The outer edge of the fabrikoid is bound with tape, and

3-ply of cheese cloth clogged with silica dust until at $3\frac{1}{2}$ minutes the filtering efficiency was 100 per cent. Larger filter areas generally clog more slowly, but this was not always the case; for instance, respirators No. 6 and 7 with larger filter areas of felt clogged to 100 per cent effi-

Table 3. Efficiencies of industrial dust respirators filtering silica dust. Determined with Tyndall apparatus. Rate of air flow, 32 liters per minute.

Respirator illustrated by	Filter material	Resistance to flow of air at 85 liters per min., in. of water before After test (max.)	Number of tests	Initial efficiency, per cent. min. max.	Highest efficiency after clogging, per cent	Time to reach highest efficiency min. sec.
Plate I.	Sponge ^a	0.7	1	9	30	0
Plate I.	Sponge ^b	0.8	1	22	55	4
Plate II.	Sponge ^a	0.6	2	17	28	15
Plate II.	Sponge ^b	0.8	2	23	30	2
Plate III.	Paper	0.5	4	63	100	0
Plate IV.	Paper	0.25	1	45	100	1
Plate V.	Felt	1.3	2	70	100	1
Plate VI.	Felt	1.5	1	37	100	3
Plate VII.	Felt	1.1	1	63	100	15
Plate VIII.	Silk gauze and cheesecloth	0.4	2	20	100	3
Plate IX.	Cotton flannel	0.6	2	61	100	5
Plate X.	Absorbent cotton	0.2	1	50	100	3
Plate XI.	Cheesecloth ^c	0.3	1	23	23	...
Plate XII.	Cotton wool ^d	3.6	2	99	100	0

^aSponge dry.

^bSponge wet.

^cFiltering efficiency is taken from test of cheesecloth held in flange exposing 100 sq. cm. and tested at rate of 10 liters per minute. There was no increase in filtering efficiency during 2 minutes.

^dArmy canister type H.

encies in even less time than No. 8. This may be due partly to differences in density of the dust clouds, but the texture of the filter is also a factor. The silk and cheese cloth filter respirator, No. 8, showed 6.1 inches resistance when clogged to 100 per cent efficiency, whereas the larger area of felt in No. 6 had only 2.2 inches resistance. The paper filters clogged to 100 per cent efficiencies quickly and developed high resistance to flow.

Some tests of concentration of silica dust in the testing apparatus indicated 2.3 grams per cubic meter of air, or less. Such concentrations are about 100 times greater than dusty air in which men may work. Hence clogging of filters in actual service in respirators would be much slower.

The effect of texture is well shown in the case of the sponge filter respirators, No. 1 and 2. One of these respirators has a body of aluminum, the other of rubber, but they are otherwise nearly alike, and the different results are due almost entirely to the different sponges. The better sponge showed an initial efficiency of 9 per cent, which increased to a maximum of 30 per cent when the sponge was dry. When the sponge was wet the efficiency started about at 22 per cent and increased to 55 per cent. Inability of these sponges to clog to higher efficiency than 55 per cent must be due to presence of some relatively large channels through them, which allow the dusty air to pass without filtering. By wetting the sponges their effectiveness against the silica dust was materially increased. A comparison of the efficiencies against tobacco smoke and against dust shows that respirators generally remove about twice the proportion of dust or more as compared with tobacco smoke. Since many dusts in industry are less difficult to restrain than the suspensoids used for testing, the tests indicate that the respirators are of very considerable value in preventing inhalations of injurious dusts although they do not restrain all.

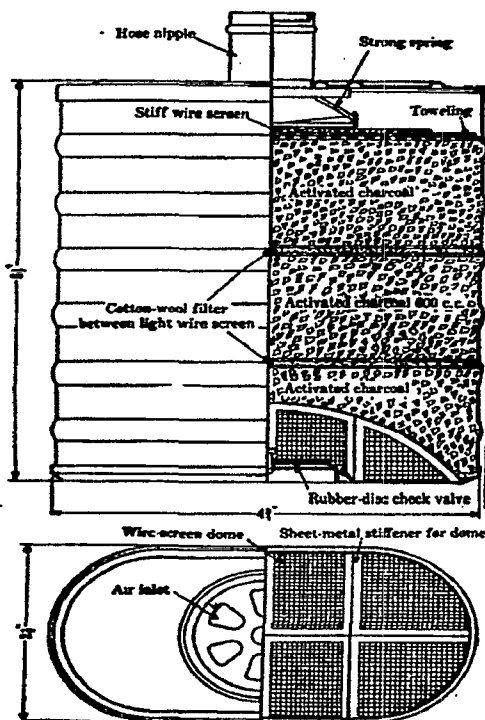


Figure 1

Details of gas mask canister with absorbent cotton filters.

Comparison of Filtering Efficiencies of Fabrics

The tests of dust respirators described heretofore are not well adapted to show the inherent filtering qualities of the filter materials, because no two of the respirators expose the same areas of filter, and structural differences also influence the test results. In order to compare the filtering qualities of the fabrics and papers better, other tests were made by exposing 100 square centimeters of each fabric to the smoke and dust

clouds in the Tyndall apparatus by means of a special holder. It is beyond the scope of this paper to present the detailed results of these tests, but they are being published in Technical Paper 394 of the Bureau of Mines, entitled "Dust respirators: their design and filtering efficiencies." The following considerations, however, are interesting.

The filtering efficiencies against both tobacco smoke and silica dust increase with the numbers of layers of fabric, but each succeeding layer produces less increase than the ones before it. It was found that, in effect, each layer in a multiple-ply filter develops about the same efficiency as every other layer; in other words, each layer in a filter removes about the same proportion of the smoke or dust which penetrates to it and the concentration of the dust does not affect the respective filter actions.

The Filtering Efficiencies Expressed in Equation

The relations between filtering efficiencies and the number of plies in a filter outlined above may be stated mathematically by means of the expression

$$Q = qp$$

where Q is the proportion of dust passing a filter of p plies, and q is the proportion passing a single ply.

From this equation the filtering efficiency of a filter of any multiple of layers or plies may be determined when the efficiency of a single ply is known.

The resistance to air flow increases uniformly with the number of plies (after the first ply). The relation between resistance and filtering efficiency of multiple ply filters is expressed by

$$\frac{(R-C)}{(r)}$$

$$Q = q$$

where R is the resistance of a filter of p plies.

r is increase in resistance of filter per ply, and

C is a constant.

By means of this expression the efficiencies of filters made of various materials may be calculated when a maximum tolerable resistance is specified. Results show that for any one resistance more efficient filters can be obtained from loosely woven materials such as cheese cloth in many plies than from tightly woven materials such as muslin in fewer plies.

THE CHAIRMAN: Mr. Whittemore, will you please leave Table No. 2 on the screen for a minute until we get through with the discussion on Filtering Efficiencies of Gas Masks?

There is no doubt a lot of you who have use for various types of masks and respirators in your particular industries and I'd like at this time to take up a discussion on some of the types used by the members here in order to determine the efficiency they are getting right now

with that particular filter or mask whichever it happens to be. I am going to call on a few men who have had quite a bit of experience in respirators and masks in order to get their opinion as to the efficiencies of certain respirators and masks.

Mr. Fellmer, while with the Monsanto Chemical Company, had considerable experience with home-made respirators. I think he can give us a few words on the efficiency of such a respirator and what the particular use of such a respirator is.

M. L. FELLMER (Elliott Service Co., Chicago, Ill.): The experiments with respirators at Monsanto were suggested to us at the Louisville Congress in 1924 when someone brought along a cheesecloth respirator made up by the New York State Department of Labor and tested by that department, which showed according to their figures a far higher efficiency than any of the commercial respirators on the market.

A Pronounced Dust Problem at Monsanto

We had at Monsanto in common with a good many other chemical industries a very pronounced dust problem, irritative dusts, chemical dusts, and we were spending a great deal of money for commercial respirators and when it was suggested at that meeting that those things were not quite as efficient as they might be we set about experimenting with this respirator, samples of which had been brought along to the Louisville meeting.

We found in the first place that a respirator in order to be worn by the men continuously must be so constructed that it can be worn with the minimum of discomfort. Just as the speaker said a while ago, men will wear respirators around the neck rather than around the front of their mouth and nose because they are cumbersome; they chafe their skin, they stop the flow of air, they are heavy, they are unsightly, there are a dozen different reasons why they won't wear them. We found that men in some of our operations preferred to take an ordinary piece of rag and tie it around their face because it was comfortable. We set about using this respirator which the New York State Department had tested and found that it had another little defect, which was that it wouldn't fit quite as nicely to the face as it might and that it took some adjusting. It had a one-inch tape by means of which it was to be fastened around the head, and if you take men with calloused hands why they are not very efficient in adjusting such things and the result was that the respirator didn't fit the face.

So we experimented with this thing and finally evolved a respirator which we put into general use made out of about eight thicknesses of cheesecloth with a pocket fashioned throughout the center in which pocket was put a large piece of absorbent cotton. This cotton was left protruding over the edge of the pocket so that the nostrils of the wearer were buried in the cotton and the cotton pocket covered his mouth so he inhaled and exhaled through this layer of cotton. We found that the men took to this respirator instantly and wore it

without any compulsion and we furnished new ones as they wanted them as they became soiled. We fashioned them in our own sewing room and they cost us about eight cents each and we had very good results.

I have been away from the Monsanto Chemical Works for almost a year but Mr. Clarence Nairn is here and I would like to have him tell us what the further experience with the respirator has been.

C. A. NAIRN (Monsanto Chemical Co., St. Louis, Mo.): All I can say is that we have just continued to use the respirator as I found it.

THE CHAIRMAN: Could you tell us what specific service these respirators are used for?

MR. NAIRN: We have used them over the entire plant in every manufacturing process we have.

THE CHAIRMAN: What are the manufacturing processes? You make certain specific chemicals?

MR. NAIRN: Yes, we manufacture "humorn," "manillan," caffeine, aspirin and several other different chemicals. We make heavy intermediates, different kinds of acids, and we use those respirators throughout the plant generally.

Respirators Must Be As Comfortable As Possible

IRA V. KEPNER (Penn. Salt Mfg. Co., Philadelphia, Pa.): We use a respirator very similar to what Mr. Fellmer has mentioned, in fact, it was copied from his and that of New York. We use it in the handling of dust in soda ash and also in our coal grinding, but no chemical.

THE CHAIRMAN: One thing I'd like to call your attention to, this is supposed to be a cotton wool filter in this particular mask that he talks about. The efficiency of cotton wool against any one of the other agents that are used as filtering mediums—

MR. FELLMER: (Interposing) Mr. Chairman, if you will permit me to call your attention that these two last represent what you might call gas masks; they are not like respirators any more and the resistance to breathing is so great that particularly in the climate of the Central Section (Missouri, perhaps a little bit below there) you wouldn't get a man to work with a respirator of that kind very long. We have to take into consideration that we have different climatic conditions from what they have in Europe and while the English respirator shown us here might be perfectly applicable in the climate of England, I submit to you it wouldn't do for us very much in any one of our climates here because the perspiration would soon make a man discard that respirator. One of the things we have to look for is to make the wearing of respirators as comfortable as they can be made and the filtering capacity as great as it can be made without increasing the resistance in breathing and then fashion a respirator in such a manner that it can easily be slipped on without any adjusting.

I would like to refer all of you gentlemen to the minutes of the Cleveland Congress of last year and you will find in the transactions

of the Chemical Section a full description of the respirator which we used and fashioned just like Mr. Kepner did at Pennsylvania Salt after the design of the New York State Department of Labor's respirator; and I have no doubt but what Mr. Nairn, if you address him at his works, will be glad to give you a full description as well as a sample perhaps.

THE CHAIRMAN: One of the great dangers of using respirators—I personally found this to be the case—is using a respirator, an ordinary respirator, in an atmosphere containing toxic gases. We have several men with us this morning that I think are fully capable of discussing the use of a mask where there are toxic gases present and I am going to call on Mr. DeBlois of the National Bureau of Casualty and Surety Underwriters, to say a few words.

L. A. DEBLOIS (National Bureau of Casualty and Surety Underwriters): I thought I knew a little about it until last week and now I have decided I don't know anything about it.

To Remove Dust or Fumes at the Source is Safest

I want to call your attention, though, to the tentative report of the investigation of the Paint Spraying Committee which will be given before the Joint Meeting of the Rubber Section and Chemical Section tomorrow, because I presume there will be further explanation of tests made by the Bureau of Mines covering in particular the use of respirators in fumes such as benzol and also in the use of dusty atmospheres, silica

Of course, it is perfectly obvious that the safest way to handle either dusts or fumes is to remove them at the source and get away from the respirator difficulties and problems in that way. If that isn't possible (and in most cases it is possible), obviously the next expedient is the air mask; that is, a mask supplied presumably from the compressed air system of the plant with an excess within the helmet and a leakage around the face so that you get away from all your trouble of cooling and condensation of perspiration and possible leakage of exhaust valves and so on.

We used to believe that the ordinary respirator without fresh air supply was no good whatever in a fume atmosphere. In the early days of the DuPont Company experience in acid manufacture, mixed acid fumes, there were some bad cases of fumes where men had worn respirators, thinking they were protected, and the company went through a long series of experiments wondering whether a respirator could be constructed to absorb fumes—I am not talking about gas masks, but respirators—and the DuPont Company came to the conclusion it couldn't be done and they'd have to rely on gas masks or fresh air supply masks.

Mr. Chairman, I'd rather not say anything further because as I say my opinions on it have been entirely reversed by the experiments that have been made very recently by the Bureau of Mines. I think they are extremely interesting, a contribution to our knowledge on respirators, and I certainly hope everyone here will attend the meetings and hear

that preliminary report of Dr. Smythe on the paint spraying investigations.

DR. COLCORD (Carnegie Steel Company): We have had quite a large experience with the protection of men who must enter chambers containing poisonous gases in the manufacture of the by-products of coke. Now, benzol was just mentioned by Mr. DeBlois. We made last year 18,000,000 gallons of benzol but that is so precious we don't let any get away. So the men about our benzol stills don't breathe enough benzol to hurt them so we don't have to use masks and we don't have benzol poisoning. But our principal use of masks for protection of men from poisonous gases is for men who must go into a tank and clean out the sludge or waste products.

There we have at least tried out the various kinds of masks. We tried the kind that have the chemical canister that filters out or absorbs the poisonous gas and then supplies oxygen, and two deaths in another plant of the same company occurred with the nose pinch type. Those have been entirely discarded and all masks of the chemical type we have practically laid aside and are using one mask only to protect the men. We find it efficient and that is the mask of the type in which the men wear a close-fitting kind of mask about the face connected with a rather large tube and the fellow at the other end turns the crank and pumps the air to the men.

A Bad Accident With a Man in a Tank

We had one serious accident with that type in which the man down in the tank took his mask off to spit out some tobacco juice and he got enough carbon monoxide to make him fall over and the man who went in fell over but they both lived. Since then we have taken the precaution of tying a rope around the man's waist and have a man handy to pull the man out of the tank if anything happens.

But we are finding that type of mask efficient; it isn't fool-proof, no mask is that we ever tried; but with good horse sense used with it and care, we find we can protect the man with that type of fresh air mask.

The case that got carbon-monoxide poisoning in the tank was rather interesting from a chemical standpoint because the tank had anthracene in it and you would naturally expect anthracene poison. I had the air in the tank analyzed at once and we found only carbon monoxide in the air but we don't know where it came from unless there was a decomposition in the sludge or perhaps other things besides anthracene as impurities.

Another one of our serious cases of gas poisoning, in which the man wore no mask and should have done so, was from naphthalene poisoning, from which the man almost died from convulsions and spasms of the diaphragm, very serious ones; and later he lost two or three toes from gangrene.

C. W. GREENFIELD (DuPont Viscaloid Co., Arlington, N. J.): This is a very interesting subject and a great deal has been said on it at

various congresses. It is a subject that I don't believe we can get enough knowledge on. There are three points involved, in my opinion, as to when, where and how to use the respirator and the gas mask. Where we have occasion to use a respirator it would not be suitable to use a gas mask. I have never heard it discussed as to whether the employee keeps the same respirator for his own particular use or whether he passes it along to the other employee on another shift. Individual respirator practice involves in some cases a considerable expense, we will admit. In the respirator where a paper filter is used I have known it to be used by inserting two or three layers of the paper instead of one, all in accordance with the convenience of the employee. I have also known where that particular type of respirator has been used where they have stored it in places whereby it has been impregnated with something that would injure his health possibly more than the material that he is trying to protect himself from:

Supervisor or Foreman Has Big Responsibility

I believe that the supervisor or foreman of the department has a big responsibility placed upon him in having the proper inspection made for each respirator to see that the filter is changed regularly, realizing that the employees in many cases are usually foreigners who do not know the difference between a proper filter and an improper one, and I believe that the foreman or supervisor in charge should properly inspect these to see that the filters are changed regularly.

Where you can use a respirator, don't attempt to use a gas mask, because in the first place the employee often resents the use of a gas mask all day long and in some cases you can't blame them where a respirator would do.

It is information that is instructive to us that we receive here on this subject and I would like to hear a discussion as to the proper inspection and how these respirators are inspected and when.

A. L. THOMAS (DuPont Co., Wilmington, Del.): We are as particular with our masks as we are with our goggles. In our plant we issue a respirator to the individual man and the Safety Department itself looks after the sterilizing of the respirator once in a while and cleaning it out and although the filters are changed often, we don't like two men to wear it on account of the rubbing coming in contact with the face. And in our weekly inspection we look over, as far as we can, the respirators.

THE CHAIRMAN: The next topic on our program is the treatment of chemical burns and it is one that I think you will be very much interested in. We know chemical burns, as a general rule, require treatment entirely different from the ordinary burn, inasmuch as there are always complications to look forward to and a secondary reaction due to the chemical changes that take place.

We are very fortunate in having with us Dr. E. C. Davidson, of the Henry Ford Hospital, who will talk to you on the subject.

THE TREATMENT OF CHEMICAL BURNS

Edward C. Davidson, M. D., Henry Ford Hospital, Detroit, Michigan.

A number of months ago your Chairman invited me to speak at this meeting on the treatment of chemical burns. Having had a reasonably wide experience with the management of such cases the invitation was promptly accepted. Had I realized how little of our information about such injuries was based upon established scientific facts my acceptance would have been given with considerable reserve and the subject would have been limited to certain special types of chemical burns.

The literature on this subject is quite extensive. The mass of it, however, consists of clinical reports of special methods, but no comparative data are given upon which an impartial observer might arrive at a conclusion. For a number of years, I have treated alkali and acid burns by the generally accepted method of neutralization. From the chemical point of view this seems rational. At your meeting in 1925 discussion of the paper presented by Dr. Wm. F. Boos, on industrial poisons, raised the question whether neutralization of an alkali or acid burn were the proper method. Most of the standard surgical text books advise neutralization, but some writers (See notes 1 and 2) have advocated the free use of water as a first aid measure and secondary neutralization.

It seemed obvious that the same question would again be raised this year and could only be answered by taking this problem to the experimental laboratory and under carefully controlled conditions determining the influence of different methods of treatment on the clinical course of such burns. In case some of your members are opposed to the use of animals in settling questions of such paramount importance to the workman, it may be stated that all experiments were performed on anaesthetized animals, and, with the exception of those with cyanide, were repeated on a minor scale upon volunteer laboratory workers and upon the speaker. From these observations certain conclusions may be drawn.

True Dermatitis

According to Fordyce (See note 3), ~~contact dermatitis~~ is more or less an individual peculiarity. For while there are persons so sensitive to an irritant that they react after a short exposure by an acute dermatitis others remain entirely unaffected. Instead of reacting sensitivity to the specific irritant an increased susceptibility appears to develop. The occupational skin lesions which are most frequently encountered is an eczematoid dermatitis. This is the dermatitis venenosa most commonly in bakers, barbers, cloth handlers, shoe workers, steel handlers, florists, grocers, linoleum workers, mechanics, ~~housewives~~ and numerous other workers in materials which are irritating to the skin. These are the problems of the dermatologist and will not be considered in the present discussion.

Only those lesions will be considered which are caused by escharotics, or chemical irritants which are characterized by their tissue destroying activity. Chemical burns are often considered analogous to heat burns. In each instance there is a coagulation necrosis and devitalization of tissue but there the analogy ends. In a heat burn the destructive agent, regardless of its temperature, soon chills and further tissue necrosis ceases, while with a chemical burn if the irritant is not removed penetration continues as long as the agent is present in sufficient concentration to devitalize tissue. Chemical burns differ in another respect in that absorption may rapidly take place and cause death.

From this it may seem that the successful management of such cases depends entirely upon one factor—that is the complete removal of the irritating agent or rendering the chemical inert. It is known that the severity of a chemical burn depends first upon the concentration of the caustic agent and secondly upon the duration of the contact. This second factor may be controlled and more good may be derived by the workman from proper first aid treatment than in any other type of industrial accident.

Classification

Most of the chemical irritants produce the characteristic reaction of inflammation by causing tissue necrosis through coagulation of protein. The degrees of tissue injury are identical to the changes seen in heat burns. First degree burns, or dermatitis erythematosa, are characterized by dilatation of the small blood vessels which gives the skin a red appearance and upon palpation, the surface feels hot. This congestion is accompanied by itching, burning sensation and pain.

When the irritation goes no further the superficial layers of skin separate as small dry scales. When the irritant continues to act after going through the above stage fluid collects in the tissue spaces more rapidly than it can be carried away by the lymphatic vessels and forms blebs or vesicles. This characterizes second degree burns. If healing takes place without a complicating infection there is no scarring. Should the chemical continue to act after passing through this second stage the skin and deeper structures may be actually corroded or cauterized, which constitutes a third degree burn. In such burns there is loss of tissue and scarring takes place.

Acid Burns

According to Sollman (See note 4), the action of concentrated acid upon skin consists of the withdrawal of water to form acid albumins. The affinity for water is so strong in the case of concentrated sulphuric acid that the elements hydrogen and oxygen are split off from their chemical combination with carbon, leading to charring.

In view of the disagreement in the literature concerning prompt neutralization of acids, the effects of various concentrations of nitric sulphuric, hydrochloric, acetic and trichloroacetic acids were observed

in experimentally produced burns. The technique consisted of immersing the hind leg of an anaesthetized rat for a given period into the acid which was to be tested. Three groups of animals were kept under observation for each acid and concentration tested. In the first group the excess of the chemical was carefully wiped away and was considered the control; in the second group the acid was completely neutralized with a five per cent solution of sodium bicarbonate; and in the third group the acid was carefully washed away either in a large tank or under running tap water. The results were uniform throughout in a large series of experiments.

Immersion of a rat's extremity in 70 per cent nitric acid for 15 seconds and immediately neutralizing it resulted in a burn which involved skin, subcutaneous tissue and muscle. The leg was rendered functionless within a few minutes and death invariably occurred in 10 to 15 hours. On the other hand, when such an experimental burn was immediately washed in water, a mild oedema of the foot developed, the leg remained useful and each of the rats survived. There was some late sloughing of skin, but healing took place without deformity.

A 50 per cent solution of nitric acid was tested for varying intervals up to 60 seconds. The rats which were immersed 45 seconds, whether neutralized or washed, revealed no striking difference; however, when immersed for 60 seconds, those which were neutralized died in about 18 hours, while those which were washed revealed only oedema, and all recovered.

Tests Conducted With Sulphuric Acid

Sulphuric acid acted quite similarly. Rats immersed for 15 seconds in 96 per cent sulphuric acid and neutralized showed extensive gangrene of the exposed tissue, while those which were washed revealed oedema and late loss of hair but no sloughing of skin occurred. Little difference was noted with hydrochloric acid except that its action on tissue is much less vigorous.

The sensory response of human skin was tested in three individuals to acids of various concentrations. There was invariably a sensory stimulation from 70 per cent nitric acid, 96 per cent sulphuric acid, 37 per cent hydrochloric acid and 99 per cent acetic acid in five to 15 seconds. The same acids in 25 per cent concentration failed to give any stimulus in the above individuals in three minutes and in no instance caused a burn. This is of importance, for it is an index of how promptly first aid treatment must be instituted in acid burns of various concentrations.

The difference in the severity of the burns treated by neutralization and by thorough washing may be due to the additional factor of heat of neutralization. If the animals treated by washing, heat of dilution can scarcely be considered because this was carried away by the water. The experiments showed conclusively that washing thoroughly with water was more efficacious in the treatment of an acid burn than neutralization.

Carbolic acid is occasionally the cause of an industrial burn. Unlike the acids just discussed, it is quite insoluble in water and can not be washed away. Phenol is rapidly absorbed through the skin and in cases where an extensive cutaneous area is covered with it death may occur promptly from its general toxicity. This is a genuine danger because carbolic acid has a slight anaesthesia effect upon skin and extensive application may occur and the importance of the situation not be appreciated until the individual collapses. Burns of this origin may be best treated by the liberal application of alcohol, in which it is very soluble. Another method of management is the application of sodium sulphate. This agent combines with carbolic acid and forms sodium sulphocarbonate (See note 5), which is non-toxic.

Alkali Burns

The action of alkalis on skin is due to their combining with the tissue elements to form alkaline albuminates or with fats to form soaps. They are also hygroscopic in action and this extraction of water from tissue further contributes to the necrosis. The compounds which alkalis form with tissues are quite soluble and accordingly deep penetration occurs.

In regard to the treatment of burns of this origin the question again arose as to the relative merits of washing in contradistinction to neutralization. This problem was subjected to various laboratory experiments. Fifty per cent solutions of sodium hydroxide, potassium hydroxide and 28 per cent ammonium hydroxide were investigated. It was found that the latent period was so prolonged that it was necessary to immerse the leg of the experimental animal one minute, then wait five minutes, giving a total contact of six minutes before proceeding with the treatment if a satisfactory burn were to be obtained. In those rats which were treated by neutralization with one per cent acetic acid tremendous disability of the leg with oedema and maceration of the skin resulted. The rats which were treated by washing revealed no disability of the extremity, there was no swelling, the skin was everywhere intact and the only evidence of the irritant action of the alkali was redness of the foot.

The long latent period of alkalis before burning actually takes place was checked on three individuals. Drops of the same chemicals were placed on the inner surface of the forearm and in no instance was there any sensory stimulation in a period of three minutes and when washed away with water no evidence of slightest irritation remained. This is of importance in first aid work, for it allows a sufficient interval to institute treatment and a serious burn may be averted.

Lime Burns

Burns due to lime are of considerable importance because of its widespread use in the industries. Such accidents generally occur during the process of slaking, and the lesion produced is both a heat and a chemical burn. Calcium oxide may be placed on dry skin, and no irritation results;

the same may be said of calcium hydroxide, which is not a very active alkali. During the process of slaking the factor of heat is introduced. The heat of solution of a single gram of calcium oxide is 18,330 calories.

To test the duration of this heat liberation a thermometer was placed in a beaker containing about five grams of calcium oxide, then water was added. In two and one-half minutes the temperature rose to 98 degrees centigrade and at the end of one hour had fallen to 35 degrees centigrade.

In addition to this heat evolution when activity has once begun on skin there is the avidity of calcium oxide for water. Burns of the eyes are perhaps the most serious except the occasional instance where a workman falls into a vat of slaking lime. A burn in this situation is particularly distressing because of the deposition of calcium salts in the cornea, which causes opacities. Barkan and Barkan (See note 6) have described a very satisfactory method of handling such injuries. They advise holding the eye open and irrigating thoroughly. Later if opacities occur the calcium deposit is removed by dissolving it in a neutral solution of ammonium tartrate.

Cyanide Burns

Cyanide burns are of relatively great frequency because of its use in electroplating, making coal gas, photoengraving, in dyeing, printing cloth, making phosphoric acid from bones and extracting gold. The action on skin is similar to that of alkali. The lesion most frequently seen is a dermatitis or an eczema-like eruption of the skin of the hands, arms and face. Occasionally a serious burn is caused by splashing of cyanide which is being fused. It is this group which is of particular interest, because of the danger of absorption. The lethal dose of potassium cyanide is three to five grains while that of hydrocyanic acid is only one grain.

A few months ago one of your members requested an opinion about the management of such an injury and the advice given was prompt debridement or complete excision of the burned area. In view of the fact that excision of the burn is not always practicable a number of methods of slowing absorption were tested.

It was first determined that the application of potassium cyanide on an open lesion in a rat caused death in two or three minutes. In order to produce an experimental burn similar to that of fused potassium cyanide a steel spatula containing some of the salt was heated and then applied to the thigh of an anaesthetized rat. A dry hard black eschar formed which tremendously slowed absorption but death invariably occurred in about 12 hours. Sollman recommended oxidizing agents when potassium cyanide was taken internally. It was found that hydrogen peroxide and sodium thiosulphate had no protective action and death occurred as promptly as in the controls. An alkaline solution of ferrous sulphate, although it did seem to form ferro-cyanid, did not prevent death. A 20 per cent solution of potassium permanganate dropped upon the burn, protected in 40 per cent of the rats.

It was then decided to try to form a thiocyanate by dropping ammonium

polysulphide upon the burn. This was done in a number of rats and in every instance gave complete protection against absorption of the cyanid radical. This observation has distinct possibilities as a first aid method of treatment of such burns, for it permits time for the industrial physician to make a decision about the indicated therapy. Should the burn be an extensive one less haste is necessary in preparing to do a complete excision, of if the burn involves only a small cutaneous area such a radical procedure might be avoided.

Sodium Burns

An accident which occurs in the chemical laboratory with relative frequency but rarely in the industries is that due to metallic sodium. When sodium comes in contact with water it reacts violently forming the hydroxide. Occasionally the sodium bursts into numerous pieces and splashes upon the skin of the laboratory worker. It immediately adheres and extracts water from the skin and burning continues until there is no more water available. This alone causes a serious lesion and the highly concentrated sodium hydroxide which is formed continues the action set up by the sodium.

It seems possible to stop this violent activity if some inert material could be found which would form a coating over the sodium and break the contact with water. When a beaker was half filled with water and a small piece of sodium dropped on it the sodium floated on the surface and reacted vigorously. If liquid petrolatum was then poured into the beaker it floated on the water as a layer and raised the sodium from the water and all activity ceased. This was then tested in anaesthetized rats and it acted similarly. After this it is quite essential to remove the sodium mechanically and then wash away all the sodium hydroxide which has been formed.

Phosphorous Burns

It is true that white phosphorus has been largely replaced in the industries, but burns of this origin still occur in chemical laboratories. When phosphorus comes in contact with skin it adheres, and ignition occurs. Immersion in water immediately extinguishes the flame, but upon reexposure to air ignition again takes place.

Walton (See note 7) described an ingenious treatment for burns of this origin. He observed that copper sulphate combined with phosphorus forming inert copper phosphid. He advised the use of a one per cent solution for a period of three minutes, during which time the phosphorus turned black in color. The small granules were then removed, mechanically or by irrigations, and the lesion was subsequently treated as a burn of any other origin.

With the exception of chromium compounds the metallic salts which are most frequently the cause of burns are silver nitrate, copper sulphate and zinc chloride. The importance of zinc chloride as a source of burns has been emphasized by McCord and Kilker (See note 8) who observed 17

cases in workmen employed in the preservation of wood. They found that all gave a history of some previous injury to the skin.

The typical lesion was a small opening in the skin, usually corresponding to the size and shape of the antecedent injury. The adjacent skin appeared normal but on careful examination was found to be readily removable. Upon its separation the underlying tissue was found to be white and bloodless. In each of the ulcers observed a central mass of necrotic tissue sloughed away. The treatment consisted of sodium bicarbonate which was thought to form innocuous zinc carbonate. Although the exact action was not known the treatment was effective.

Chromium Burns

Workers in dyestuffs, photoengraving, steel manufacture and tanning of leather, are subject to chromium burns. Chromic acid, which is usually the source of such burns, is a powerful caustic because it combines the action of a metallic oxide, an acid and a strong oxidizing agent. The typical lesion or "chrome hole" is well known and need not be described. In addition to this local action absorption may take place and result in a fatal issue as described by Major. (See note 9.)

It has been repeatedly observed in the tanning industry that after complete reduction of potassium dichromate the workmen handling the hides which are impregnated with chromium hydroxide rarely develop the characteristic lesions. Because of this observation sodium thiosulphate has been used to treat the early cases and lead acetate for those in which extensive damage has already occurred in an effort to form insoluble lead chromate.

The problem was investigated in animals. It was first learned that dipping the leg of an anaesthetized rat into a 100 per cent solution of chromium trioxide was fatal in about 12 hours from absorption through essentially intact skin.

Experiments were then tried removing a piece of skin and applying crystals of chromium trioxide and potassium dichromate. The results again were uniformly fatal. Sodium thiosulphate was applied to such lesions but was absolutely without effect upon the outcome. Insoluble lead and silver chromates were formed on the lesions but this likewise was ineffective. It was then decided to test the toxicity of chromium hydroxide on such a lesion and in these instances the animals survived.

The problem then became one of forming the less toxic hydroxide on the lesion. Ammonium polysulphide was tested by pouring it upon lesions which had been treated with either chromium trioxide or potassium dichromate crystals. This resulted in adequate protection in the dichromate rats and protected 60 per cent of the rats treated with the trioxide.

From this study it would seem that a satisfactory treatment of existing chromium ulcers would be with a few drops of ammonium polysulphide in an effort to convert the chromic acid into the less active tissue irritant, chromium hydroxide. This must be tested out clinically before its acceptance.

So far, in this discussion of chemical burns, only the immediate prob-

lem of getting rid of the primary irritant or rendering it inert has been dwelt upon. The question may be asked as to the method of choice in the subsequent management. This is of relative unimportance, compared to the disposition of the original irritant.

It has been our custom to treat the minor chemical burns with some bland ointment. In the more extensive alkali and acid burns involving an entire arm or a leg in which hospitalization has seemed desirable, either tannic acid compresses or a spray has been used until complete coagulation of the tissue devitalized by the irritant has taken place. The involved area has then been exposed to air and left undisturbed until healing was complete or until the patient could be made ambulatory, at which time some bland ointment was applied and the closed method of treatment adopted.

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THE CHAIRMAN: The discussion on Dr. Davidson's paper, which was without a doubt very interesting. I think we will limit to a treatment of chemical burns such as occur in the industries which you men represent and best methods of procuring first aid for those burns.

MR. DE BROS: I want to compliment Dr. Davidson on a most excellent contribution and I want to ask him two questions. I'd like to have him tell us whether he has explained in his own mind the relative difference in the effectiveness of flushing the acid or caustic out of burns as against the neutralization method. That is question one, and the other question I'd like to ask is this: in the case of, let's say, strong acids, will the relatively greater effectiveness of flushing with water decrease as the period that elapses between the application of the acid and the flushing increases? In other words, as I understand his experiments, the flushing was applied, I think, 15 seconds after the acid burn. Now, two things may happen in industry. We probably have a very much longer delay in many cases before water can be applied even where we have emergency shower baths. We have what I take as an equivalent condition in its effects in the acid burn with mixed acid, strong mixed acid, where the presence of the sulphuric acid in the mixture tends to take up the fluids and maintains the strength of the concentration of the nitric acid so long as the sulphuric acid

remains at strength. That is the principle of nitration and the value of the sulphuric acid in the mixed acid used in nitration. Evidently there you have a maintenance of the strength of the burning agent which you do not have to the same degree in the pure acids, either nitric or sulphuric, and I suppose in other words you are burning with a more concentrated solution, you have a deeper and thicker, faster burn. What effect then has the lapse of time on the efficiency of these two methods of treatment?

DR. DAVIDSON: In regard to the explanation of the difference between water and neutralization, I don't know of any explanation except in the neutralization of burns you have two factors, first due to the chemical irritant, and in the second instance you have the additional factor of the heat of neutralization which is liberated during the process of treatment. I know in the early experiments, instead of using sodium-bicarbonate, we used sodium-carbonate in a beaker that would hold 500 or 600 cubic centimeters. There was enough heat liberated from the small amount of acid on the skin of the animal actually to heat the beaker. Whether that is the explanation, I don't know.

Relative Efficiency of the Water Treatment

In regard to strong acids, as the duration of contact increases will the efficiency of water decrease? I am not in a position to say. Of the less concentrated acids as the interval increases the water is just as efficient. For instance, with the 50 per cent nitric acid, where we increased our time increment up to 60 seconds, at the end of the 60 seconds washing was still efficient in preventing a serious burn and preventing death, while with the same time interval in the neutralized rats, death occurred. Of course, long contact with strong acid does irreparable damage before treatment is begun. Does that answer your question?

MR. DE BLOIS: I'd like to ask one thing more. In neutralizing, was it the same mechanical procedure as in washing, would it simply require immersion in the beaker?

DR. DAVIDSON: It was immersion in the beaker, also some mechanical stirring, because it is impossible to anaesthetize a rat for more than a minute and a half or two minutes. During the neutralization in the beaker the anesthesia wore off and there was a stimulation which caused movement of the leg. It is of interest, a thing I didn't mention in the paper, that as the anesthetic wears off and we approach the point of primary anesthesia as when a person is just going to sleep, immersion of the rats in the neutralizing agent causes a sensory stimulation which is demonstrated by kicking. If an animal treated the same way is immersed in water the same stimulation is not seen.

MR. DE BLOIS: There was more in the neutralizing method?

DR. DAVIDSON: No, in the one case the animal reacted more energetically and in the other I did.

MR. KEPNER: Mr. Chairman, may I ask Dr. Davidson how long a time

from the time of these burns to men that you have shown were they given hospital treatment? How many hours or minutes?

DR. DAVIDSON: Which do you mean?

MR. KEPNER: The clinical burns.

DR. DAVIDSON: The time interval on those varied tremendously. All under 24 hours, practically none under five or six hours. Most of them had first aid treatment. A large compress, usually boric acid, had been used previously.

MR. KEPNER: They had first aid treatment?

DR. DAVIDSON: Yes.

A. L. ARMSTRONG (Eastman Kodak Co., Rochester, N. Y.): I think I can answer Mr. De Blois' question. We had two burns very similar, one where a fellow was entirely covered with acid and he dove into a tank and came out with nothing but his shoes and belt on. We had a similar burn a year later where a man didn't get to water for perhaps a minute and a half. That man lost one eye and he is scarred horribly. Although he is living, the one arm is a little stiff and the neck, the skin in here pulls the eyes, although they have grafted skin under the eyes and have made a pretty good job of it now. Those fellows both had the same strength of acid. The one fellow didn't even need first aid treatment, he came out with nothing on. The neutralization of water, I suppose, did that.

The Shower Bath Not Considered Very Efficient

M. G. MILLIKEN (Hercules Powder Co., Parlin, N. J.): I would like to ask Dr. Davidson whether he thinks the efficiency of the ordinary shower bath, if he is familiar with the shower we have in the chemical industry, would be equal to the washing given to the leg of the rat? You speak of an "energetic" washing. I am just thinking whether we should not hold our men at the shower and do more work with the shower bath before we send them to the first aid, whether you think that would accomplish equivalent results.

DR. DAVIDSON: Mr. Milliken, I don't think the shower bath is very efficient. If it is a burn of a hand or an arm, I think the best thing that can be done is to hold it under a running tap. We have immediate contact and flushing of water. If you get under a shower bath with your clothes on there is a long period before the water can actually get through the clothing, especially if the man is working with clothes on that are all full of oil. In some instances I doubt whether water would penetrate at all. Although I'd be more inclined to think if the man were held at the shower bath and an effort made to remove his clothing that the ultimate burn would be of much less intensity than if time were lost transporting the man from his work to some remote part to the first aid station.

MR. FELLNER: Of course, in answer to Dr. Davidson's remarks regarding the shower, it depends a great deal upon the construction of the shower. If Dr. Davidson has in mind a shower with a circular ring with small holes the action of the water would be kind of slow

before it would penetrate the clothing. But an inch and a quarter or inch and a half pipe line equipped with a quick opening valve, giving a strong impact of an inch and a quarter of water will penetrate just as rapidly as your tap, and more so, because it will have a greater volume of water, a splashing of water on the part immediately and that is the kind of shower, as I understand it, that is in use in most chemical plants for that purpose.

CAPTAIN G. R. G. FISHER (Illinois Manufacturing Association, Chicago): Mr. Chairman, I wanted to ask Dr. Davidson whether the tests made with strong acids and alkalies on rats, on account of the hair, wouldn't it be less intense than on the skin of an individual?

DR. DAVIDSON: I should think that is true except that on the paw there is no hair. The hair would be protective, and even though the rat is protected still we got these results.

DR. C. W. MUEHLBERGER (University of Wisconsin): I wonder whether Dr. Davidson's experiments are exactly in accordance with our present therapeutic measures of treating burns? I think it is at present the practice to flush an acid burn out first with water and then to use a mild alkali, very mild, so the reaction is in a negligible quantity, and to flush with water and use a mild acid. The heat of reaction would also be negligible. What I would be interested in is some data as to whether or not the neutralization of the last traces of acid which certainly must remain in the tissues, by using very small amounts of alkali would not hasten the recovery of the burn after the flushing out with the water?

Experiments to Determine One of Two Things

DR. DAVIDSON: Dr. Muehlberger's suggestion is a good one. In these animal experiments we are trying to find out one of two things: we are trying to find out whether neutralization is an effective method in contradistinction to mechanical removing by water. We have gone to extremes here to absolutely separate the one clinical method from the other. What you suggest about thorough irrigation first, that is effective but not always done. In many of the first-aid kits you find that there is the bottle of alkali there to be used immediately or the bottle of diluted acetic acid or vinegar to be used immediately. The actual washing may be done at the first-aid station but in many instances the neutralization with an acid or alkali is already done.

In regard to your question whether it is necessary to neutralize, the residual alkali or acid still present, I can't say that I can give you a direct answer, but from our experimental animals we found washing alone has been efficacious and we haven't gotten burns; however, there still may be acid or alkali present but not in sufficient concentration after vigorous washing to cause tissue necrosis.

MR. WHITING: I think many of us will recall that last year Dr. Boos sold us very thoroughly on the principle of neutralization and you remember how he criticised the medical fraternity. Dr. Boos was rough on doctors but Dr. Davidson is certainly rough on rats.

Now, it is a very practical point Dr. Davidson brings out that by thoroughly rinsing with water which is universally available we can eliminate the chemicals from the burned areas. And as the Doctor just said, his animals that were merely washed didn't develop later burns. That seems to be the complete answer to the necessity of neutralizing. It apparently is not necessary if you thoroughly wash the subject and that is a very nice practical point for us to apply in our plants, because if we have exposure to both acids and alkalies we are never sure the men will use the right neutralizing wash that is demanded in the emergency. If water is the answer, as it appears to be, it is a big help to us.

Another point to recall is this: Dr. Boos mentioned neutralization under another condition, the neutralization of fumes in the respiratory passages, nitrous fumes with ammonia fumes; and Dr. Davidson doesn't go into that question. He knows you can't flush the lungs and therefore he told me personally he was entirely satisfied with the neutralizing technique of the lungs. He also keeps away from the eye burns which is another story.

Origin of the Tannic Acid Treatment of Burns

There is one thing I want to say because I am not a doctor and medical etiquette does not prevent my stating it as it does prevent Dr. Davidson. The tannic-acid treatment of burns was originated by Dr. Davidson. It is a new method and I think you are thoroughly convinced, from looking at the mugs on the screen there, it is an effective method. My own company has taken it up. My own medical director, when he got the reprint of Dr. Davidson's original paper, thought so much of it that he immediately decided to adopt it on any serious burn case. We have one case right now, of extensive electrical burns that is getting along very nicely under tannic-acid treatment. I would like to get into the record the exact reference to the original technical paper of Dr. Davidson which appeared in "Surgery-Gynecology and Obstetrics," in August, 1925. If the rest of you butt in on your doctors as much as I do you should get the reference and make your own doctor read it and be convinced of the real merits of the tannic-acid method. It is, of course, not a matter of first-aid but of hospital technique.

THE CHAIRMAN: Dr. Davidson, have you found that the use of tannic acid as a secondary treatment for such burns as nitric acid burns and alkali burns was very good in all cases?

DR. DAVIDSON: As I said in the paper, it is only to be used in the extensive burns which could be treated by the open method. In most of the acid and alkali burns tannic acid does cause a coagulation of protein, but if you treat it with boric acid, any of the ordinary compresses, or treat it with ointment it is but a matter of a very short time until there is tremendous masceration of the tissue. If you remove the irritant, as we think we have done, then use tannic acid; instead of having the soft mascerated surface, we have a surface which is

dry, absolutely impervious, is insensitive and is a definite protection against bacterial invasion. And if we then leave the surface alone, healing takes place beneath this covering. My experience with tannic acid, however, is not as extensive as with some of the older treatments, but the results have been satisfactory.

THE CHAIRMAN: I'd like to hear from Dr. Shoudy of the Bethlehem Steel Company.

DR. SHOUDY (Bethlehem Steel Company): Mr. Chairman, I with the rest, have listened with much pleasure to Dr. Davidson's paper. So far as the treatment by flushing goes, we have done that in the last five or six years, insisted on it, although some men said you ought to neutralize. I can say the results of the few cases we have had on humans was the same as Dr. Davidson has had with rats. It consisted of, first, absolute flushing, then the follow-up treatments. If you get into discussion of treatments recommended, you must consider that Radman has just brought out a treatment of novocaine and adrenalin, and then consider tannic-acid treatment and then listen to the claims for various ointments and you won't know where you are.

In Minor Burns the Closed Method Most Economical

A gentleman said, "Go home and get your doctor to do something." Let your doctor read Dr. Davidson's paper but let him use the treatment which in his judgment is best as the burn comes up. I can say every burn will not be able to be treated by tannic acid, some will have to be treated otherwise, and the various treatments that we have had by the men that have treated the burns, I am sure, have been found to be good. Let your doctor read the paper, yes, by all means. So far as the larger burns are concerned, the burns that require hospitalization, the results that are to be obtained from tannic acid are not disputed, but for the small burns coming up in the plant where the man has to go back on the job, I can say some of those have not gotten good treatment by tannic acid. To you men who have to go back from the standpoint of first-aid, to tell them something, I think one of the biggest things you can carry back is that all the burns from the chemicals and acids should be flushed and flushed and flushed with tap water.

DR. DAVIDSON: May I say a word? In no instance have I suggested using tannic acid in the minor burns, except for its analgesia property.

DR. SHOUDY: I don't want them to go home and say that.

DR. DAVIDSON: In minor burns I am convinced the closed method of treatment, regardless of what you use, is, from the employer's standpoint, the most economical and most satisfactory for everyone concerned, including the employee. In discussing chemical burns today I have said for only those extensive ones should tannic acid be used and, as soon as hospitalization was no longer advisable, that then the closed method should be used. I agree with you heartily but I don't want anyone to think that I am advising tannic acid on the minor burns because I am not; other methods are more practical.

MR. WHITING: May I ask Dr. Davidson to state the primary purpose in mind in very extensive body burns from any source whatsoever, the primary purpose of saving lives?

DR. DAVIDSON: Two primary reasons. First of all, saving of life. Most pathologists agree (although there are some that hold out), that there is a poison, an actual toxin formed in any devitalized tissue of the body regardless of the origin, (even in a crushed leg or a crushed muscle.) For that reason so much traumatic shock was seen during the war. In burns the condition is quite analogous. You have devitalized tissue and when the protein material breaks down into primary and secondary proteoses you have something tremendously toxic. The idea of tannic acid is to precipitate the protein and the secondary proteoses and in that way lessen absorption and hope there would be a few cases that previously died that would recover because of diminishing the absorption. That was the primary purpose of the work.

Most Scarring of Burns Due to Secondary Infection

A secondary consideration is that which I have shown here today. As a result of that original idea, we found out by making this impervious layer we formed a protective layer which was not readily invaded by bacteria. Most of the scarring by burns is due to secondary infection. Very often, if you have a denuded surface, if you put a piece of adhesive plaster across it the epithelium will grow out under it. It forms a bridge or scaffold for the new skin to grow out. In tannic acid treatment of burns the same thing holds. Your black insoluble covering acts as a bridge and if there is any epithelium around the hair follicles or sebaceous glands it grows out and in that way you get less scarring.

Those are the two things which we have been working on; first, the toxæmia and secondly, the minimum disfiguring.

MR. MEDALLIA (By-Products Coke Corp.): There have been so very many valuable comments made and Dr. Davidson's paper was so good, can the members of the Chemical Section get a re-print of this entire proceeding this morning ahead of the regular proceedings of the Congress? The regular proceedings of the Congress don't reach us until many months, I believe, and we could do as was done in the Metals Section, get this paper out within a few weeks at the close of this Congress and by each member paying for as many pamphlets as he wants.

THE CHAIRMAN: (Interposing) I will answer that question as soon as we get through with the discussion here.

I want to hear from a gentleman from the United Lead Company. Mr. Wettstein has a peculiar type of burn at his plant. I think he can obtain some information here.

T. F. WETTSTEIN (United Lead Co., Keokuk, Ia.): Dry lime dust and calcium carbide dust—men would be working in the dust and get it adhering to the skin. Of course, when they perspire it will form a lime burn. Very often, however, the dust would be dry and especially

in the winter time when there would be no perspiration, after the men are off the job they wash with water and go home and sometimes during the night an itching would take place. It might become a skin burn. The next morning they would appear on the job with a nicely started burn which would probably become infected. So we provided each man with a small bottle of ordinary vinegar and a sponge and immediately after he finishes work, when he washes up, before he applies water he swathes his neck, wrists and ankles with vinegar. In the winter time when he is likely to go out with damp skin into the cold and get his skin raw, chapped and rough, it might crack and make the burn worse; so we provide cold cream, ordinary cold cream, which he uses to keep his skin soft. We found in that way we have almost entirely eliminated lime burns due to dry carbide and lime dust, which up to that time were very troublesome and in some cases caused infection.

THE CHAIRMAN: Can anyone give us any further information as to how to treat a burn of that type—such a burn as Mr. Wettstein just spoke of.

DR. COLCORD: I can't give any further information on that but I don't feel quite satisfied to go away without knowing Dr. Davidson's treatment for burn to the eye. He stayed away from that and I don't know why. If the rest feel as I do he leaves us curious. If he leaves that out we assume he has some other way of treating the eye than simply washing out with water.

Discussion of a Burn of the Eye

DR. DAVIDSON: I am sorry you raised the question, or subject.

A burn of the eye is something entirely different from a skin burn. The conditions are different, you are dealing with an organ which has no protection whatever except tears. Your skin is covered with a horny layer which is resistant against chemicals. We showed that by putting 25 per cent acid on the arm and having nothing happen in three minutes. Regardless of how carefully you wash, there is an oily secretion on the skin which is inert chemically and prevents reaction with skin.

Now in the eye, there isn't any protective horny layer, you are down to vital cells which may be damaged by your chemical irritant; your protective mechanism is tears. I am not an eye man but in this work in the control animals in which we wiped away the chemical, invariably the animal would scratch the area after we wiped it off and would get some of the chemical on his front paws and later it would wash its face and an eye burn resulted. Not knowing much about eye pathology, I got one of the men in the hospital interested and he is now following along and using the same technique that I used and his results to date have been quite similar. His name is Dr. K. W. Cosgrove. I'd like his name to go into the record because, although I am responsible for his taking up this problem, I want him to get full credit when his results are published. Of course, he has had to use much less concentrated chemicals in an effort to avoid complete destruction of the eye.

By using more diluted acid and alkali than I used, he has found he can reach a concentration of acid and a time increment where neutralizing will cause a steamy cornea, and washing does not form a steamy cornea. It seems to hold for the eye just as well in the case of acid and alkali burns as it does for the skin. The difficulty he has experienced is to get a record, a photographic record, of an eye and he has been working on that for quite a while. We are now using a microscope to get a pictorial record that will illustrate his work.

MR. KEPNER: Dr. Davidson, in those pictures you showed of men badly burned, what was the treating of the eyes, were they treated the same way that you mentioned for body burns? I noticed in two or three of them the eyes were first entirely closed but the final picture showed they were in good shape.

DR. DAVIDSON: When a man is burned from an explosion he immediately shuts his eyes and practically the complete intensity of the burn is on the eyelids. The conjunctiva may show a first degree burn but in many instances not even that. There might be a slight redness of the cornea. In the cases shown on the screen, I shouldn't say any of them had actual damage to the eye proper. Practically the entire burn was limited to the lids and in those cases we used tannic acid right up to the eye. We would pull the lids apart and thoroughly flush out all the pus and after that you put in olive oil.

Relative Merit of Olive Oil and Castor Oil

MR. FELLNER: In regard to chemical burns to the eye, I would like to repeat what I have so often advocated: flushing of the eye with water over a tap or drinking fountain immediately after the chemical enters the eye. In our experience at the Monsanto Chemical Works during my last year of tenure of office, our oculist repeatedly assured us (we referred every case of eye injury to the oculist after attending to it at the first-aid room) he has assured us since we inaugurated this system of flushing the eye with water that he had practically no work to do after the case reached him.

CAPTAIN FISHER: Is olive oil preferable to castor oil?

DR. DAVIDSON: I don't know the relative merits of the two.

THE CHAIRMAN: Can anyone answer Captain Fisher's question, whether olive oil is preferable to castor oil which is so commonly used in the treatment of the eye?

MR. RIEDERER: I do know we always use olive oil, containing five per cent carbolic acid directly in the eye; while I believe the castor oil would become rancid in spite of the five per cent carbolic acid and consequently is not so beneficial. I have used olive oil with five per cent carbolic acid and put it directly in the eye. I thought the doctor was crazy when he first told me to use that but I found it was a remedy.

THE CHAIRMAN: I think Dr. Davidson has proved conclusively that washing all acid and alkali burns vigorously with water is the one best method of treatment immediately after the burn.

In connection with this, we might take up a little discussion as to the best methods for placing showers and means of washing burns in chemical plants. I think Mr. Rice might be able to tell us a little about what his company is doing in that connection.

THE SECRETARY: What I know about showers in chemical industries is very limited. We have made a practice of making use of our drinking fountains. The only objection I have to that is, where you have a man seriously burned you must expect shock, most drinking water fountains are connected up to coolers and I don't consider it advisable to use very cold water for the eye.

Our clinical experience has been along the same lines as Dr. Davidson's up to a certain measure. We make use of an immersion for acid burns and alkali burns, five or 10 degrees above body temperature to assist in taking care of shock. You can keep a man in an immersion of water, if you want to use some acetic acid, use one half per cent of acetic acid in it, the effect of which would be negligible. A man was burned in the legs with very hot caustic liquid. He filled a drum of the liquid and the right leg was seriously burned which if he recovered would have called for an amputation. In getting away from the scene of the accident he fell on his back and this case terminated seriously for the man. The occasion for that was that too large an area of his body was covered. The immersion treatment was applied and everything was done to save the life of the man but from the start we knew there was nothing to be done as far as his life was concerned. We went through the technique but nothing could be done. I am sorry I have no experience in showers.

Practical Experience With Quick Opening Showers

MR. KEPNER: We have been using quick-opening shower baths around our acid areas for a number of years. It is a quick-opening valve. You merely step on it and the water immediately flows. The pipe is about an inch and a half and there is a regular deluge when the man gets on. We have placed those around very, very close to all our tank filling stations and other places where a man is liable to come in contact with acid. Yet, not so long ago we had an accident, which might have been very serious—a man was fixing an acid pump and in some manner it blew up and the man was deluged with acid. The shower was probably 200 feet away and instead of running to the shower he jumped into a fire barrel which was nearby and pulled off his clothes and began rubbing himself very thoroughly and he kept washing and washing and finally all his clothing was pulled off him and the first-aid man threw a blanket on him and later he was sent to the hospital and three days later he was back at work.

Our physicians always instruct the workmen to thoroughly wipe off the acid before you get into the water. If you don't you are going to have a real serious burn when the water comes in contact with oil of vitriol or mixed acids. We have been very successful, we have

had a number of burns, but we haven't had a serious burn from acid or caustic for the past four or five years.

MR. ARMSTRONG: The gentleman just spoke of wiping off the acid—I would like to ask whether he has ever attempted to wash off a solution of oleum?

MR. KEPNER: That is what I mean, they have oleum and oil of vitriol. Take anything to wipe it all off.

MR. ARMSTRONG: Our experience is that if you get water on and get it on right sudden within 30 seconds, why a man can be covered, his clothes can be drenched in oleum which is probably the worst burning acid there is, and with no bad results at all.

THE CHAIRMAN: We will have to close the discussion on this particular topic now.

In connection with papers delivered at this Congress, if anyone desires any number of copies I think the Council will go to the expense and print those copies for them, although they do it at a loss. The Council, as you know, has not very many funds and it is quite expensive to print individual copies of all these papers. Unless we can get an order for several hundred or at least a hundred for a specific copy I don't think the Council would go to that expense. I would suggest that if you want a paper, go directly to the man and in most instances he will deliver a copy.

Stationary Platform for Unloading Tank Cars

REPRESENTATIVE (Seaboard By-Products Coke Corp.): I wanted the discussion and I thought if the chairman of the Chemical Section would write a note to each one who attended the session asking how many copies they wanted you will receive order for sufficient copies to cover the expense of the meeting. The discussion on papers and on the other matters that have come up is what I mean. I believe there isn't a company here that wouldn't want 100 or 200 copies of that for their men.

THE CHAIRMAN: Surely.

The remainder of the meeting I am going to throw open for discussion. Any problems that you want to discuss at this time will be perfectly in order.

I have several inquiries here concerning a few problems. One of them is: "Would like information on type of tank car unloading platforms." Is anyone here familiar with unloading platforms?

MR. ARMSTRONG: Is that a stationary platform?

THE CHAIRMAN: Stationary platform for a tank car unloading.

MR. ARMSTRONG: You mean something to be built on the tank car?

MR. NICKEL: That was my question. We have tank cars coming in with various size domes, some with no domes, some with hand rails, some with partial hand rails, some grab rails, and you know. I am looking for ideas to see if we can find something that is better than we have at the present time.

MR. ARMSTRONG: The best stunt I know of, although it doesn't work out so well in the winter time, is a platform which will slide in or out against the dome which will take care of the different size domes on a counter balance so after the car is placed the man can walk right out and his weight will pull it down and you can hook it down. You can have one on either side and push them up. Those placed at your regular unloading and picking up stations work out very satisfactorily. You can have them four feet wide and if you have them on each side you can run a rail across so it is practically impossible for a man to fall off the car. I imagine that is your problem, I know it was ours, especially in the winter time.

MR. KEPNER: We have exactly the same situation as our friend from DuPont here and we have a regular draw-bridge effect from the top of our tank cars to our filling tanks. It is so connected that you go up the steps to your tank, your filling tank, and you just merely push it over. The weight of the man, as he says, makes it fall. In fact it is a little heavier than what the ordinary weight of a man would be and when he steps off he has got to pull it in order to let it raise up, always giving the cars clearance. It keeps all the snow off and it is very, very practical. We use them on our filling tanks. It drops right down on the rail.

MR. ARMSTRONG: You can get by the regulation of the eight feet clearance because the platform comes up, it is hinged and it drops down against your tank car.

THE CHAIRMAN: The rest of the questions that we have will have to be deferred at this time and we can advise the people that want the information by mail or at the Council office.

I will now ask the chairman of the Nominating Committee to submit his report.

REPORT OF THE SECTION NOMINATING COMMITTEE

A. L. WATSON (Chairman, Nominating Committee): Mr. Chairman, your committee respectfully submits the following nominations for officers and members of the Executive Committee for the Chemical Section for the coming year.

Chairman, S. E. Whiting. And the committee recommends that three vice-chairmen be selected for next year instead of the usual one; without entering into further details in regard to that, it was felt there were very good reasons for such an arrangement for organization and the following names have been submitted for vice-chairmen: C. E. Rice, E. C. Rogers, and Dr. Leonard Greenburg.

For Secretary:

C. F. Whittemore.

Members of the Executive Committee:

M. F. Crass, L. A. De Blois, Dr. H. E. Howe, I. V. Kepner, S. H. Kershaw, J. L. Kistner, H. L. Miner, Dr. C. L. Reese, A. L. Watson and J. S. Shaw.

News Letter Editor: E. W. Spencer.

THE CHAIRMAN: You have all heard the report of the chairman of the Nominating Committee.

(Motion was made and properly carried to adopt the report of the Nominating Committee.)

THE CHAIRMAN: I might say a few words in connection with the work that has been done over the past year in this particular Section. Several things are outstanding on which I will talk. One is the completion of the Benzol Poisoning report by Dr. Winslow's Committee and the commencement of work on the Spray Coating Investigation. One other important work that was undertaken this year was to get out material for a chemical monograph. We have at present, I think, about eight or nine papers that will be included in a chemical monograph which will be submbitted to the American Chemical Society. This work is being done at the suggestion of Dr. Howe.

I want to congratulate the new chairman, Mr. Whiting.

MR. WHITING: I ought to express surprise but instead of that I move we adjourn.

THE CHAIRMAN: I want to take this opportunity upon vacating the chair to express my appreciation to the members of the Section and the Executive Committee for their splendid cooperation that I have received in my work during the past year. I wish the incoming chairman success in his undertaking.

ADJOURNMENT

Chemical and Rubber Sections Joint Meeting

October 26, 1926

A. L. WATSON, Acting Chairman,
Hooker Electro-Chemical Company, Niagara Falls, N. Y.

THE joint Session of the Rubber and Chemical Sections of the National Safety Council was held in the Henry II Room of the Statler Hotel, Detroit, Michigan, on Thursday morning, October 28, and convened at 9:55 o'clock, Mr. A. L. Watson, Hooker Electro-Chemical Company, Niagara Falls, N. Y. presiding.

THE CHAIRMAN: Mr. Graef, of the Rubber Section, has been detained for a short time. The chairman of the Chemical Section, Mr. Kistner, asked me if I'd proceed to get the meeting under way, as I am supposed to have some familiarity with the two topics under consideration this morning.

This Benzol Report, as most of you know, is the result of about three years of work by a special committee of the National Safety Council, of which Dr. Winslow of Yale University has been chairman. The Committee has done an excellent piece of work and is making a real contribution to industry in submitting a report which is so extensive and well done.

Without further comment we will ask Dr. Winslow if he will proceed.

THE NATIONAL SAFETY COUNCIL STUDY OF BENZOL POISONING

C.-E. A. Winslow, Professor of Public Health, Yale School of Medicine,
New Haven, Conn.; Chairman, Committee on Benzol of the
National Safety Council.

The Committee on Benzol¹ was organized as a result of a discussion of the hazard involved in the use of the solvent in question which was presented at the 1922 National Safety Congress held in Detroit. The work of the committee was made possible through the appropriation of \$5,000 by the National Bureau of Casualty and Surety Underwriters; through the assignment by the Surgeon-General of the United States

¹C.-E. A. Winslow, Chairman; Leonard Greenburg, Vice-Chairman; W. S. Paine, Secretary; H. Bradshaw, J. W. S. Brady, A. C. Fieldner, C. F. Horan, L. E. Weber, J. M. Weiss.

Public Health Service of Dr. Leonard Greenburg to work on the problem for almost a whole year; through the loaning of professional personnel for shorter periods by the Massachusetts State Board of Labor and Industries (Mr. John R. Dexter) and by the Hood Rubber Company (Dr. J. N. Shirley); and through assistance or materials furnished by the Aetna Life Insurance Company, by Dr. N. B. Herman of Johns Hopkins University, by the Yale School of Medicine and by the Weirton Steel Company.

Progress reports of the committee were presented at the Buffalo Safety Congress in 1923, the Louisville Safety Congress in 1924 and the Cleveland Safety Congress in 1925, the final report of the committee was published last May as a pamphlet of 128 pages for the Chemical and Rubber Sections of the National Safety Council, by the National Bureau of Casualty and Surety Underwriters.

Before considering in detail the conclusions of the committee it seems desirable to point out two points in regard to its activities which seem to the writer to be of somewhat more than passing significance.

Points in the Activities of the Committee

The first point which may be noted is that we have here a somewhat exhaustive study of an industrial poison hazard which has been conducted primarily by and for an organization representing industry itself. It is true that the United States Public Health Service, the Massachusetts State Board of Labor and Industries and the universities have generously cooperated in the task. Yet the initiative for the whole study has come from the Safety Council, a group of industrialists federated for the safety of the worker on the ground that the human element is a primary factor in production; and the fact that this body with its long and splendid record of achievement in accident prevention should have now definitely entered the allied field of industrial poisoning is cause for profound satisfaction. In Europe the whole program of industrial hygiene is essentially a governmental one. In the United States, on the other hand, a major part of what has been accomplished for industrial safety and sanitation has been accomplished by the initiative of broad-minded employers of labor. The benzol study is a new demonstration of the readiness of industrial leaders to learn the facts and then to apply all available knowledge to the promotion of health and efficiency.

Next, I would call your attention to what I believe to be a second somewhat notable fact about this investigation—the method by which it was conducted. Nearly all previous work on industrial poisons has been of what may be termed a qualitative type. It has dealt with a relatively small number of instances of poisoning which have come, one by one, to the notice of physicians, and such cases, from the nature of the situation, have been as a rule of a more or less aggravated type. In this benzol study there has been for the first time a conscious

and definite effort to pick out a representative group of apparently normal workers in a given industry and to make a quantitative study of:

- a. Mechanical conditions affecting a possible poison hazard.
- b. Analytical data indicating the degree of atmospheric pollution by the poison in question, and
- c. Physical findings including delicate chemical microscopic and physiological tests suitable for the detection of latent and incipient damage to the human body such as threatens the subsequent development of active clinical disease.

Since the benzol study was made, two other investigations in this country have been conducted along essentially similar lines; the work of the United States Public Health Service on tetra-ethyl lead, and the work on spray coating by the Pennsylvania State Bureau of Labor and by the Committee on Spray Coating of the National Safety Council. These three studies, all involving the principles outlined above, seem to embody a relatively new and highly promising contribution to the technique of industrial hygiene.

With these preliminary remarks we may proceed to a summary of the main conclusions reached by the benzol committee, while the body of supporting evidence must be sought in the full report of the committee itself.

Summary and Conclusions

Chemistry of Benzol. Benzol or benzene (C_6H_6) is a colorless liquid, boiling at about $80^\circ C.$, obtained from the distillation of coal tar and from the strippings of coke oven gas. It is highly insoluble in water, slightly soluble in alcohol, and completely miscible with ether, acetic acid, acid, carbon disulphide and a large number of organic substances. There are many substances commercially known as "benzol," some of which contain benzene while others do not. All of them are, of course, to be sharply distinguished from benzine which is a petroleum product (a mixture of C_6H_{14} and C_7H_{16}).

Benzol was discovered by Faraday in 1825 in the liquid produced by the compression of illuminating gas obtained from certain oils. In 1865 Kekule announced its structural formula. Mansfield studied its commercial production from coal tar in 1849 and 20 years later Caro Clemen and Engelhorn patented a process for its recovery from illuminating gas. Only, however, with the work of Carves, of von Hussener and of Brunck on the production of benzol from coke oven gas, between 1884 and 1887, did this substance come to play a really important part in industry.

Industrial Uses of Benzol. The commercial uses of benzol grew gradually and steadily from 1890 to 1915; but the development of benzol production during the war in connection with the manufacture of

^{80.2°} is the usual figure given in the textbooks; but it may be noted that a sample of very pure benzol analyzed for the Committee showed that 70 per cent of the material came off between 79.5° and 79.9° . The International Critical Tables prepared by the National Research Council give 79.6° , which seems undoubtedly correct.

explosives led to an increase in the manufacture of benzol which has in turn opened the way for a rapid broadening of the field for the commercial uses of this substance.

In considering the practical problem of the use of benzol in industry it is important to remember that two very distinct types of processes are involved. In such industries as (a) the distillation of coal and coal tar in the production of benzol, (b) the blending of motor fuels, and (c) the chemical industries, including oil extraction, dye and dye intermediates, manufacture of paints, varnishes and stains, and of paints and varnish removers, benzol is used in large quantities, but the very nature of the industry demands that it be kept in a closed pipe line system, any openings representing a loss of valuable vapors, making the system an inefficient one with a correspondingly large financial loss.

In the second group of processes represented by the use of benzol (a) in the rubber industry, (b) in artificial leather manufacture, (c) in sanitary can manufacture, (d) in dry cleaning, (e) in connection with the handling of paints, varnishes and stains, benzol is employed chiefly as a solvent or a vehicle and as a part of the process it must be removed so as to leave the originally dissolved substances in place. The method of removal of the benzol is usually to permit it to evaporate; in most cases this is done cold; in some cases, however, the compound may be warmed, a procedure which naturally removes the benzol with greater rapidity.

Benzol Exerts Three More or Less Major Effects

Toxic Action of Benzol. Benzol introduced into the body (which in practice ordinarily occurs as a result of the inhalation of its fumes) exerts three more or less distinct major effects. It plays the part of an anesthetic or narcotic leading to dizziness, faintness, and coma. It is at the same time, however, a nerve irritant, producing characteristic spasmodic movements, and actual damage to nerve tissue. Coma and death may also result from this neurotoxic action as well as from the narcotic action of benzol. Above all, however, this substance possesses a definite and specific destructive power for the blood cells and those organs which produce these cells.

Acute Benzol Poisoning. As in the case of many other toxic substances used in industry, benzol poisoning exhibits itself in two quite distinct forms, acute and chronic,—according as exposure is brief and intense on the one hand or moderate and prolonged on the other.

Occasional instances of acute benzol poisoning may be found in medical literature extending back to 1862. In our review of the literature for both Europe and America we have obtained record of over 100 cases of acute benzol poisoning, of which about half were fatal (excluding a series of Russian cases complicated by hysteria).

Acute benzol poisoning generally occurs in one or two ways: either (a) by the sudden discharge of vapors through the failure to regulate a condensing apparatus or through the occurrence of a leak in piping in

the vicinity of stills and other forms of chemical apparatus; or (b) by the entrance of workmen into tanks or other confined spaces in which benzol has been stored or used.

The common symptoms of acute benzol poisoning are (a) dizziness, faintness and drowsiness, culminating in unconsciousness and coma; (b) pallor of the face and cyanosis (blueness) of lips and finger tips; (c) feeble and rapid pulse; (d) breathlessness and a feeling of tightness in the chest, sometimes culminating in immediate death from respiratory paralysis; (e) visual disturbances, with nervous excitation, tremors and convulsions, and more rarely mania or delirium; (f) reddish spots on the skin and internal surfaces due to small hemorrhages in the tissues; and (g) where the substance has been taken in by the mouth, symptoms of acute gastro-intestinal irritation.

Death May Occur Quickly or Be Delayed

Death may occur within five minutes after exposure or the patient may apparently recover and succumb several days later. There appear to be marked individual variations in susceptibility to benzol; and the effects of a given atmospheric condition may probably be increased by vigorous muscular exertion, as suggested by the fact that a man first rendered unconscious by the inhalation of benzol vapors may often recover while those overcome while engaged in rescuing him may die.

The treatment of acute benzol poisoning involves, first of all, prompt restoration of the respiratory function by artificial respiration.

Chronic Benzol Poisoning. Chronic benzol poisoning, resulting from continuous or repeated exposure to benzol fumes in concentrations too low to produce marked narcotic effects is of course a condition much more obscure, and much more likely to be overlooked, than is the acute poisoning discussed above. It is particularly likely to occur in the second group of industries alluded to above, in which benzol is used as a solvent and to a greater or less extent evaporated into the air of the workroom. Chronic benzol poisoning was first described by Santessen in workers in a rubber factory in 1897, and in this country by selling in 1910, as occurring in the coating room of a tin can plant.

The more commonly observed symptoms of chronic benzol poisoning may be summarized as follows: (a) general systemic disturbance as evidenced by headache, dizziness, weakness, loss of appetite and loss of weight; (b) pallor, shown by blood examination to be due to true anemia; (c) marked reduction in white blood cells (revealed of course only by microscopical examinations; (d) bleeding from nose, gums, vagina and bowels with the development of purplish spots caused by small hemorrhages within the tissues; (e) sore and spongy gums and burning of eyes and throat; (f) shortness of breath and tightness of chest; (g) sometimes, abdominal pains, nausea and vomiting; (h) sometimes, slight tremors, visual disturbances and abnormal sensitiveness to touch, rarely convulsions and delirium; (i) rarely, rashes and skin eruptions.

Detection of chronic benzol poisoning in its early stages with prompt removal from exposure generally leads to complete recovery. If the case of chronic poisoning be a severe one, however, certain of these symptoms may persist for a long time after exposure has ceased; and nearly one in five of the cases reported in the literature has ended fatally.

Effects of Benzol Upon the Blood Cells

Of the three general effects produced by chronic benzol poisoning—narcotic, neurotoxic and blood-destructive—the last is the most universal and the most characteristic. In the very first stage, there may be a slight increase in white blood cells but this is really due to a destruction of the white cells in the circulating blood, over-balanced by the compensatory production of more white cells by the blood-forming organs (the lymph nodes, spleen and bone marrow). This condition is exceedingly transient, however. Very shortly the blood-forming organs themselves are injured, particularly in respect to their power to produce the special kind of white cells, known as polymorphonuclear leucocytes and lymphocytes. The total white cell count falls rapidly, producing the condition known as leucopenia. The tissues which produce the red cells of the blood are less readily affected and a normal or increased red cell count may persist for some time, parallel with a great decrease in white cells. Ultimately, however, the blood-forming organs are so seriously damaged that the number of red cells also falls off, producing a pronounced anemia.

A decrease in the white cells of the blood is therefore the first indication of early chronic benzol poisoning and the effect is so familiar that benzol has been used therapeutically for the treatment of diseases characterized by an excessive concentration of white blood cells. Our studies indicate that a fall from a normal value of 7,500 to 9,000 white cells per cubic millimeter of blood to 5,600 or less may be taken as a fair index of the presence of this disease. Of course, other conditions than benzol poisoning may cause leucopenia, but with a history of exposure to benzol and in the absence of symptoms of certain acute communicable diseases or of certain other industrial intoxications which may rarely be associated with leucopenia, the diagnosis may be made on this basis with reasonable accuracy. This reduction in white cell count generally precedes any other symptoms of benzol poisoning and may therefore exist in persons who would be considered normal by the ordinary clinical tests.

The seriousness of benzol leucopenia is emphasized by the observations made by a number of investigators that resistance to pneumonia and other bacterial infections is greatly reduced by such a condition.

Extent of Benzol Poisoning in American Industry

In order to gain some idea of the extent of the benzol hazard in American industry we sent out a questionnaire in 1923 to a group of 324 industrial establishments which, from the nature of their products, might be

expected to use benzol. Of these establishments, 140 replied; and of the 140, 84 were found to be making use of this substance in greater or less amount. The largest amounts of benzol were apparently used in the chemical industries, in the can-seal industry, in the rubber industries, and in the manufacture of artificial leather, but in the chemical trades the material is generally used in enclosed processes and the number of employees exposed is small.

From the results of this questionnaire and from our subsequent 1924 field studies we collected a list of 15 fatal and 83 non-fatal cases of benzol poisoning occurring during the years immediately preceding. Out of 23 establishments in which 10 or more persons were exposed to benzol, 11 or nearly half reported cases of poisoning, while of six plants in which 50 or more employees were exposed, all but one had had poisoning cases.

During the last year of our work we made no attempt to extend this survey of the extent of the benzol hazard; but at least seven fatalities from this cause were brought to our attention during the first nine months of 1925; and during the five years ending June, 1925, there were in the state of Ohio, alone, 29 cases of benzol poisoning, so clear and obvious as to receive the benefits of industrial compensation.

It is therefore clear that the hazard of benzol poisoning in American industry is a serious one and constitutes one of the major problems of industrial hygiene.

Field Study of Actual Conditions in Industries Employing Benzol

In order to determine the actual extent of the benzol hazard under various industrial conditions, we selected, after a preliminary survey of industrial establishments, 18 workrooms in 12 different plants for further intensive study. Most of these were rubber factories of various sorts, but dry cleaning, sanitary can manufacture and artificial leather manufacture were also included.

The workrooms were studied from an engineering standpoint, with regard to the conditions under which the benzol was used and particularly the type of exhaust ventilation provided; and analyses of the air were made under both summer and winter conditions, to determine the extent of the resulting contamination of the atmosphere. For air analysis, we used the charcoal absorption method which gave us, not benzol alone, but the total content of solvent vapors. For convenience, however, the results have been expressed in terms of benzol. Whether other solvent vapors were actually present or not is of course indicated in each instance.

With small amounts of benzol in use and with no ventilation, or general ventilation only (which our studies indicate is wholly inadequate to cope with the benzol problem), we found average concentrations of 100 to 1,360 parts of benzol per million parts of air. With large amounts of benzol in use, under similar conditions, we found average values from 220 to 1,800 parts per million. On the other hand, in plants using large amounts of benzol but with enclosed systems or local exhaust ventila-

tion, we found averages only between 70 and 500 parts per million. The plant which had the most efficient systems of local exhaust gave us average values lying between 70 parts in summer and 90 parts in winter.

It appears from this study that some of the workrooms investigated at times approached the concentrations of benzol which have been found to cause acute poisoning (Lehmann states that 4,700 parts may produce confusion in half an hour and we found 2,640 parts in a compound mixing room and 4,140 parts in a dry cleaning establishment). Five of the 18 rooms gave average figures above the value of 550 parts which Legge found associated with clinical poisoning. On the other hand, with efficient local exhaust ventilation, and careful management of all details of the processes involved, it seems sometimes possible to use benzol in coating and mixing rooms and in sanitary can manufacture with an atmospheric pollution amounting to less than 100 parts of solvent vapors per million parts of air. Our next step was to determine whether this degree of protection was sufficient to avoid danger to health.

Extent of Early Benzol Poisoning as Determined by Clinical Tests and Blood Examinations.

The crux of our problem was the examination of workers exposed to benzol under various industrial conditions, using the white blood cell count as our index of early benzol poisoning. We were ultimately able to make tests of this kind on 81 workers in the 18 workrooms discussed above; and we found that 26 of the persons examined, or 32 per cent, showed clear evidence of blood cell destruction, as evidenced by a white count below 5,500 (or in one instance a borderline white count of 5,800 with a very low red cell count). In 17 instances the white count was below 5,000, in 10 instances below 4,000, and in three instances below 3,000. In only 10 instances, however, was the red cell count below 4,000,000. Control examination of some 50 workers not exposed to benzol failed to show any such abnormal blood pictures as the accompanying summary of blood findings discloses.

In only nine cases out of the 26 was it possible to obtain a fairly complete medical examination; and of these nine, five gave a history more or less clearly suggestive of chronic benzol poisoning (including two or more of such symptoms as headache, dizziness, pallor, loss of appetite, digestive disturbance, spongy gums, nosebleed).

The results of these blood examinations are distinctly disconcerting. Not only did about one-third of the 81 workers exhibit clear evidence of early benzol poisoning, but, what was still more serious, the evidence of poisoning was clear even with good exhaust ventilation and low atmospheric contamination. In the group of workrooms using large amounts of benzol without local ventilation, 10 out of 19 workers gave a positive picture; in the group of rooms where only small amounts of benzol were used without local ventilation 11 out of 36 workers were positive. In the group using large amounts of benzol but with local exhaust ventilation, only five out of 26 workers were positive.

Thus, local exhaust ventilation reduced the proportion of workers affected from nearly one-half to less than one-fifth; but even one-fifth remains a pretty high figure. Unfortunately we were unable (after repeated efforts) to make blood examinations in the can factory coating room which gave the best analytical results; but in a coating room with

Summary of Blood Findings on Examination of Workers Potentially Exposed to Benzol

Group	Room	Local Ventilation	Average Benzol in Air p.p.m.		Blood Findings No. persons examined		No. positive
			Summer	Winter	ex-	amined	
I-A	150 B	—	100	—	9	—	2
Small amount of benzol	60	—	150	—	1	—	0
No local ventilation	27 A	—	110	—	2	—	1
Low benzol content in air							
I-B	27 B	—	700	—	2	—	0
Small amount of benzol	59	—	150	210	9	—	1
No local ventilation	61 A	—	130	210	12	—	6
High benzol content in air	61 B	—	1360	580	1	—	1
II-A	78 A	+	70	90	0	—	—
Large amount of benzol	150 A	+	90	—	1	—	1
Local ventilation	75 B	+	100	—	3	—	1
Low benzol content in air							
II-B	91	+	180	400	5	—	0*
Large amount of benzol	50 B	+	—	430	3	—	1
Local ventilation	50 A	+	—	500	4	—	1
High benzol content in air	75 A	+	130	330	10	—	1
III	78 B	—	340	—	1	—	0
Large amount of benzol	23	—	—	—	6	—	2
No local ventilation	83	—	620	—	9	—	6
High benzol content in air	95	—	1800	—	3	—	2
Total					51	—	26

* 3 clinical cases, 1 fatal since tests were made.

local ventilation, showing only 90 parts of benzol in the air in summer, the single worker exposed proved positive; and in a mixing room in an artificial leather factory, with only 100 parts of benzol in the air in summer, one out of three men proved positive.

We are forced to conclude that the control of the benzol hazard (except where the substance is used in completely closed systems) is exceedingly difficult; that in practice, systems of exhaust ventilation capable of keeping the concentration of benzol in the atmosphere below 100 parts per million are extremely rare; and that, even when this is accomplished, there remains a decreased, but substantial, hazard of benzol poisoning.

Conclusions in Regard to the Use of Benzol in Enclosed Systems

As pointed out above, benzol is used in industry under two more or less distinct sets of conditions. In the manufacture of benzol from coal and coal tar, in the blending of motor fuels and in the chemical industries, the solvent is necessarily handled in closed containers and pipe systems. Here, chronic poisoning is unlikely to occur and the chief hazard arises from acute poisoning due to carelessness in the cleaning of tanks, breaks in the apparatus, and similar accidents.

With regard to this type of process, it seems certain that with proper care in construction, maintenance and operation the use of benzol can be made sufficiently safe to warrant its employment. It is true that fatal accidents have occurred, and will no doubt continue to occur, in such processes, just as such accidents occur, and will continue to occur, from the use of steam boilers. The danger is, however, in both instances a controllable one to be met by careful attention to safety provisions and not by the abandonment of the use of the substance or device in question.

The chief measures of protection which should be enforced in industries of this type are:

- a. Regular and systematic inspection of apparatus to insure against breaks or accidental leakage.
- b. The greatest possible care in freeing tanks or other receptacles which have contained benzol from all traces of the substance before they are entered for cleansing or repairing.
- c. The protection of workers entering enclosed spaces liable to contain benzol fumes by the use of positive pressure air helmets or hose masks; and the conduct of all such work by teams of two or more men who are familiar with the dangers involved.

Conclusions in Regard to Use of Benzol as a Solvent

In the rubber industry, in artificial leather manufacture, in sanitary can manufacture, in dry cleaning and in the use of paints and varnishes, benzol is employed as a solvent or vehicle under conditions which, almost of necessity, permit more or less evaporation of the solvent into the atmosphere. Here, there is relatively little danger of acute benzol poisoning, but very great danger of chronic poisoning, arising from prolonged or repeated exposure to the fumes.

In order to minimize such hazards as far as possible, there are two general types of precautions which should be taken, tending respectively to decrease the degree of exposure and to detect and control incipient poisoning in its earliest possible stages.

1. To diminish exposure, enclosed processes should of course be used wherever possible, and whenever containers are cleaned or apparatus repaired, the special precautions discussed in the preceding paragraph dealing with acute poisoning should be observed. Wherever employees are likely in the course of their work to be exposed to benzol fumes, as in the ordinary solvent and evaporative processes or in handling the products of such processes, they should be protected by the most effective local exhaust ventilation designed according to the following general principles.

(a) Where benzol is evaporated at room temperatures, air removal by local exhaust ventilation with down draft is recommended, although in certain enclosed processes direct ventilation (from the enclosure) with upward draft may be indicated.

(b) Where localized heat is applied in the evaporation of the benzol, hoods or enclosures should be provided with up-draft local exhaust. This

draft should be sufficiently intensive and applied so closely to the point of origin of the evaporating benzol as to insure the complete removal of all of the benzol before the heated surface is removed from the hood or enclosure. This recommendation deals with specific processes where sufficient upward air movement is created by the heated surface to overcome the natural density of the benzol vapor.

Masks and respirators should not be relied upon to protect the worker against ordinary routine exposure to benzol fumes, since such devices can not be made efficient without at the same time making them too uncomfortable to be worn continuously.

2. To detect incipient benzol poisoning at a stage when its effects can be minimized, it seems essential to the committee that all workers to be employed in processes where exposure to the fumes of this solvent is involved, should be given a thorough medical examination before employment and re-examined, with systematic blood counts, once a month thereafter. In addition to this routine re-examination absence from work should be promptly followed up by some person conversant with the symptoms of benzol poisoning; and the employees themselves should be made familiar with the symptoms which are most likely to occur.

No worker should be employed in a benzol process who shows signs of:

- a. Organic disease of heart, lungs, or kidneys.
- b. Hemorrhagic tendencies.
- c. Anemia or any unusual blood picture.

Any worker who, on re-examination, shows any of the following symptoms should be promptly excluded from benzol exposure and transferred to some other department of the industry.

- (a) Hemorrhages from the mucous membranes of the nose, mouth or other organs.
- (b) Decrease of more than the following amount from the employee's normal blood picture (normal conditions will be obtained from previous examinations of the individual employees).
 - (1) White cells, decrease of 25 per cent; but in no case should an employee with a white cell count of less than 5,000 be continued in benzol processes.
 - (2) Red cells, decrease of 25 per cent.
 - (3) Hemoglobin, below 70 per cent.

(Note: Reduction in white cells is the most important condition to be noted.)

Relative Toxicity of Benzol and Its Higher Homologues

In view of the grave hazards involved in the industrial use of benzol we next proceeded to an experimental study of the relative toxicity of certain of the higher homologues of benzol in the hope that if such substances proved less dangerous they might be substituted in at least certain industrial processes."

4. This Laboratory study was conducted with marked ability and success by Dr. J. J. Batchelor of the Yale School of Medicine, Research Associate to the Committee.

The results reported in the literature of the subject are somewhat conflicting, probably because of the uncertain composition of the materials used by certain workers and of the lack of clear discrimination between the various types of toxic action produced. In general, however, the more careful work has suggested that benzol is more dangerous than its higher homologues.

Our own investigation was conducted with adult white rats which were kept on a standard diet and subjected to preliminary study to determine the normal range of variation in the blood count of each animal. The substances used for our tests were four in number, pure benzol (boiling point 80 degrees). (See Note 2.) Toluol (boiling point 111 degrees), Xylol (boiling point 139 degrees) and Hiflash Naphtha (boiling point chiefly between 165 to 185 degrees). The influence of these solvents was studied in three different ways, by intraperitoneal injection (direct introduction into the body cavity), by subcutaneous injection (under the skin), and by inhalation in a chamber specially arranged so as to make possible a close control of the proportion of solvent in the atmosphere.

The method of intraperitoneal injection involves sudden exposure to a relatively intense effect of the injected substance. With benzol, all animals receiving as little as .5 c.c. per kilogram of body weight showed marked symptoms of a definite toxic action exerted primarily upon the central nervous system, manifested by tremors, twitchings, loss of equilibrium, lack of response to stimulation, and extreme weakness. With doses in excess of 1 c.c. per kilogram of body weight the temperature of the animal dropped from 3 degrees to 8 degrees below normal. At times paralysis of the extremities was practically complete. The animals always recovered from doses up to 1 c.c.; but 2 c.c. per kilogram of body weight always proved fatal.

In Animals That Recovered Blood Cell Counts Not Affected

It is of special interest to note that in the animals which recovered neither the white nor the red blood cell counts were materially affected. This is in accord with conclusions from the clinical study of human cases which indicates that acute and chronic benzol poisoning are quite distinct phenomena and that acute benzol poisoning which is due to violent irritation of the nerve centers and consequent asphyxiation, falls entirely to produce the effect upon the cell content of the blood which is characteristic of chronic poisoning.

The other three solvents studied, xylol, toluol and Hiflash naphtha, when injected intraperitoneally, showed a wholly different picture. Xylol up to 0.75 c.c., and toluol up to 0.75 c.c. per kilogram of body weight produced no symptoms whatever except slight apathy. Hiflash naphtha in doses of .5 c.c. produced some limpness and paresis and a lowering of body temperature. In larger amounts all these three substances produced deranged equilibrium and weakness, culminating in loss of power of movement and ultimately in complete narcosis with fall in temperature, but the effect in the case of toluol and xylol was

relatively lacking in the symptoms of toxic stimulation of the nervous centers and was of the nature of a narcosis, rather than of a nerve-irritation.

In view of the fact that the present study was concerned mainly with chronic poisoning, we have laid chief stress upon our subcutaneous injections. Here, doses of 1 c.c. per kilogram were injected under the skin of the abdomen or back (mixed with equal parts of olive oil to decrease local irritation and delay the rate of absorption). Injections were repeated daily for a period of four to 22 days. This mode of treatment leads to a gradual absorption of the injected substance, entirely comparable with what occurs in human cases of chronic industrial poisoning.

Effect of Injection of Various Solvents

Daily subcutaneous injection of v. c.c.
per kilogram of body weight¹

Solvent	Average reduction				Intraperitoneal injection. Lethal dose
	Average No. of injections	Average loss in weight	White cells	Red cells	
Benzol	13	26	91	28	1.25-2.0 c.c.
Toluol	16	6	0	5	1.25-2.0 c.c.
Xylol	10	3	0	10	2.0-2.5 c.c.
Hiflash naphtha	11	4	0	5	2.5 c.c.

¹ Five of the animals treated with xylol received two instead of one c.c. per day.

In the case of benzol it caused obvious constitutional symptoms, including apathy and weakness, loss of weight, and twitchings and tremors, indicating a toxic effect upon the central nervous system and culminating in death when the injections were long continued. The white blood cells were promptly affected, the red cells more slowly, as in human clinical experience, and ultimately white cells almost disappeared from the blood.

On the other hand the animals treated by subcutaneous injection with toluol, xylol and Hiflash naphtha showed no constitutional symptoms whatever, aside from slightly lessened activity and slight loss in weight. The white cells were not permanently affected at all and the red cells suffered only a slight and transient reduction. The relative effects of the four solvents studied are summarized in the accompanying table showing the "Effect of Injection of Various Solvents."

Finally, our inhalation experiments brought out the relative effects of the four solvents with even greater clearness, as summarized in the table showing "Effect of Inhalation of Various Solvents."

We see from this table that when animals were exposed for 18 to 20 hours a day for seven days to high concentrations of the four solvents, toluol and xylol were more toxic than benzol, since 1,600 parts per million of the former solvents proved fatal while 2,440 parts of benzol did

not. This is due entirely to the narcotic influence of the solvents in question and is in accord with the general fact that narcotic action often increases with added methyl radicles. On the other hand, toluol and xylol, even in this extreme concentration, are almost without effect on the central nervous system or on the blood-forming organs, both of which are seriously damaged by benzol.

In concentration of 1,000 parts per million or less the severe narcotic effects of xylol and toluol are practically absent and in such dilution the superiority of these substances as compared with benzol is most obvious. Even 460 parts of benzol damages the blood-cell forming organs to such an extent as almost to eliminate the white cells from the blood

Effect of Inhalation of Various Solvents

	High Concentration ¹			Moderate Concentration ²			Low Concentration ³		
	Change in wt., cells Per cent	Reduction in white cells Per cent	Symptoms	Change in wt., cells Per cent	Reduction in white cells Per cent	Symptoms	Change in wt., cells Per cent	Reduction in white cells Per cent	Symptoms
Benzol	-28	63	Marked, neurotoxic	-14	81	Moderate	-15	91	Prac. none
Toluol	-21	0	Narcosis, Death	-3	13	Slight	+1	15	None
Xylol	-10	9	Narcosis, Death	-3	8	Slight	+3	4	None
Hiflash naphtha....				-10	12	Slight	-2	9	None

¹Benzol 2440 p.p.m. Toluol 1600 p.p.m. Xylol 1600 p.p.m.
²Benzol 815 and 1035 p.p.m. Toluol 1100 and 1250 p.p.m. Xylol 980 p.p.m. Hiflash naphtha 567 p.p.m.

³Benzol 460 p.p.m. Toluol 620 p.p.m. Xylol 620 p.p.m. Hiflash naphtha 312 p.p.m.

and causes 15 per cent loss in weight; while concentrations of 1,000 parts of toluol and xylol produce only slight effects either upon cell count or upon the weight of the animals.

It is this latter condition which is of importance from the practical standpoint of industry, since with their relatively high boiling points toluol and xylol would never be present in concentrations of over 1,000 parts except as a result of some temporary accident and, if they were, their irritant action would serve as an immediate and automatically effective danger signal.

Desirability or Replacing Benzol as an Industrial Solvent by Other Related Substances

Our field studies have thus indicated that the use of benzol as an industrial solvent is attended with health hazards which can only be avoided by the provision of elaborate local exhaust ventilation and by the maintenance of a comprehensive system of medical supervision.

On the other hand, our laboratory investigations make it clear that certain of the higher homologues of benzene, such as toluol, xylol and Hiflash naphtha, are relatively free from the special hazards which attend the use of benzene itself. These substances, in large doses, are

even more powerful narcotics than benzol, but their low volatility and marked odors make it highly unlikely that they will occur in workroom air in sufficient concentration to produce effects of this sort. On the other hand, they are almost wholly lacking in those specific destructive effects upon the nerve tissue and, above all, upon the blood-forming organs so characteristic of benzol. Under ordinary conditions of use, and in any concentrations in which they would be likely to occur in workroom air, these substances appear to be relatively harmless.

We would therefore urge that the serious attention of manufacturers now using benzol should be given to the possibility of substituting one of these, or other relatively harmless substances wherever the conditions of a given manufacturing process make it possible to do so.

General Discussion Following the Benzol Report

THE CHAIRMAN: I am sure all you gentlemen will agree that this report of the Benzol Poisoning Committee is a very valuable contribution to industry. It indicates the very wide possibilities of the future work of the National Safety Council. We sometimes feel that our efforts along the lines of accident prevention have almost come to an end, but when we hear a report such as that presented this morning, it certainly shows us that there is a much wider field in accident prevention than most of us may have appreciated. There are many subjects of this sort which could be undertaken. Of course, it costs money and the Council would necessarily have to raise extra funds to carry on similar investigations along other lines.

I want to take this opportunity to thank Dr. Winslow publicly for the very great interest he has shown and the excellent work he and the other members of his committee have done on this investigation into the hazards of benzol.

Now we are going to throw the meeting open for discussion and I am sure that there will be a number of questions you would like to ask Dr. Winslow. He has covered the subject very briefly; I don't know that it was mentioned, this report has already been published by the Council and copies are available at the headquarters offices.

DR. J. S. MILLARD (Goodyear Tire & Rubber Co.): May I ask Dr. Winslow if you mix benzol one-half with gasoline, is the danger reduced one-half or more?

DR. WINSLOW: I haven't any definite evidence on that point. I should think it would be merely a matter of the amount of benzol present. That is, I should think the reduction would be in approximate proportion. Possibly Dr. Smythe has some views on that. If you mix gasoline with benzol would the reduction in the hazard be approximately in proportion?

DR. H. F. SMYTHE (University of Pennsylvania): I don't think it would. You must take into consideration the boiling points or vapor pressure of the two substances. Benzol being the lower vapor would come off in larger amounts; and you must take into consideration, further, that in mixed vapors, where you have the two substances in liquid, it

doesn't necessarily apply that you get them in the same proportion in vapor. We have had them more in the spraying study than in the benzol study. The lacquer solvents are legion. The high boilers meet with low boilers.

Now Dr. Winslow spoke of the intoxicating action of the toluol. Even though that is a fact and does introduce a hazard there, yet the hazard is not as great in proportion when you substitute these higher boilers for benzol because they won't come off in such great amount in the air. In the liquid you'd get the intoxicating action, of course, but not in the air. The higher boilers in lacquer we were working with do not come off until the material sprayed gets into the drying room.

THE CHAIRMAN: Is that question answered satisfactorily?

DR. MILLARD: We dilute benzol and we have always felt safe in diluting it one-half. I am not quite clear as to the answer to my question. We have equal amounts of benzol in two rooms. In one it is diluted one-half and in the other it is pure.

DR. WINSLOW: You mean equal amounts in the solvent? It would certainly depend on the amount of benzol in the air, and I should think the amount of benzol in the air, other things being equal, would be approximately the same. I don't think the gasoline would affect it, in other words.

Amounts of Benzol Would Remain Similar

DR. MILLARD: Would there be just as much benzol in a room that had 1,000 gallons of benzol and 1,000 gallons of gasoline as in another room that had 2,000 gallons of benzol, both rooms being of equal size?

DR. WINSLOW: I should think there would.

THE CHAIRMAN: Are there further questions on Dr. Winslow's report? Are there any questions on the benzol Poisoning Report? If not, we might have time after Dr. Smythe finishes his report on spray coating to open up this question again. In the meantime if you think of any questions you'd like to ask of Dr. Winslow on benzol why you can just bear them in mind.

Encouraged by the result of this benzol investigation the Council undertook an investigation of spray coating. Perhaps a good many of you are familiar with the investigation which was conducted by the state of Pennsylvania into the hazards involved in spray coating and that investigation, of course, was conducted only within the state of Pennsylvania. Consequently it was felt as a result of the findings of that investigation that there was a need for a national investigation involving industries, perhaps, that were not included in the Pennsylvania one. Consequently the National Safety Council organized a special committee, of which Dr. Winslow was again made chairman because of his excellent work on benzol, to investigate this subject. All summer there has been an exhaustive field investigation under way under the direction of Dr. Smythe of the University of Pennsylvania

and Dr. Smythe is going to make an informal report this morning on the result of that work.

Report of the Committee on Spray Coating

(Dr. H. F. Smythe, who had been engaged by the Committee on Spray Coating to study the problem during the past summer, then made a brief informal report on the progress of his investigation. It was requested by the chairman of the committee, Professor C.-E. A. Winslow, of the Yale Medical School, New Haven, Connecticut, that no formal publication of any results should be made at this time until the committee as a body has had the opportunity to study and carefully analyze the data at its disposal. Professor Winslow promises that a report of the committee will be forthcoming during the summer or early fall. Meanwhile any inquiries in regard to the progress of the work should be addressed to him.)

ADJOURNMENT

Construction Section

New Officers of the Section

CHAIRMAN: E. C. HARDING

Ferro Concrete Construction Company, Cincinnati, Ohio.

FIRST VICE-CHAIRMAN: C. H. ALMSTEAD

Patent Scaffolding Co., New York City.

SECOND VICE-CHAIRMAN: J. F. CONNER

The U. G. I. Contracting Company, Philadelphia, Pa.

THIRD VICE-CHAIRMAN: J. W. DALZELL

Ferro Concrete Construction Co., Cincinnati, Ohio.

SECRETARY: J. WILSON ROBINSON

Everett Winters Company, Detroit, Mich.

Committees

POSTER: WM. F. TUBESING, Chairman

Wm. F. Tubesing Company, Milwaukee, Wis.

PROGRAM: J. W. DALZELL, Chairman

Ferro Concrete Construction Co., Cincinnati, Ohio.

STATISTICAL: J. WILSON ROBINSON, Chairman

Everett Winters Co., Detroit, Mich.

MEMBERSHIP: J. F. CONNER, Chairman

The U. G. I. Contracting Co., Philadelphia, Pa.

ENGINEERING REPRESENTATIVE: F. A. DAVIDSON

American Safety Device Company, New York City.

EXECUTIVE COMMITTEE (The Officers and)

COL. D. H. SAWYER

Associated General Contractors of Amer., Inc., Washington, D. C.

W. F. AUSTIN

W. E. Wood Company, Detroit, Mich.

F. L. HURLBUTT

The Patent Scaffolding Co., Detroit, Mich.

October 26, 1926

W. F. AUSTIN, Chairman

President, W. E. Wood Company, Detroit, Mich.

THE Construction Section of the National Safety Council was called to order in the Reception Room of the Book-Cadillac Hotel on Tuesday Morning, October 26th, 1926, at 9:45 o'clock, by Mr. W. F. Austin, chairman.

CHAIRMAN AUSTIN: Gentlemen, the first business on the program is the report of the officers. Inasmuch as your chairman's report is scheduled for the last item on the program we will forgo that and will listen to the report of the secretary, Mr. J. Wilson Robinson, of the Everett Winters Company, Detroit, Michigan.

REPORT OF J. WILSON ROBINSON, SECRETARY, AND ALSO CHAIRMAN MEMBERSHIP COMMITTEE

As secretary of this Section and also chairman of the Membership Committee, this report is a combined report of these two closely related offices.

Your Executive Committee held one meeting this year, namely on November 5, 1925, in Detroit at which time all of the committee were present except three.

The following problems were recognized as the immediate and pressing problems of the Construction Section:

1. The problem of selling the executives of the member companies on accident prevention work.
2. The problem of keeping them sold.
3. The problem of increasing our membership and selling the idea of accident prevention through the use of voluntary codes before legislative codes are forced upon us.

I shall endeavor to answer these in their reverse order as the first and second are very closely related and dependent on the third. It was recognized from the beginning that to put on a campaign for new members was out of the question, as there has been a very apparent lack of success attending all efforts to secure new members either by correspondence or mass appeal at meetings.

To conduct such a campaign would require a person's full time; in other words, the crying need of the hour was a full-time secretary, one thoroughly acquainted with the construction industry and its accident problems. From a financial standpoint this was out of the question as it would require an appropriation of approximately \$10,000 per year.

I did not feel entirely discouraged, however, as there was still work to be done before a successful direct result campaign could be launched.

If you will go back to the years 1916 and 1917 you will recall how a deluge of propaganda was broadcast throughout the country, educating and preparing the minds of the people for our entrance into the World War. Likewise, our immediate problem was a problem of broadcasting and creating a "Safety Conscience" in the minds of the construction industry. Before any product is put on the market for the consumer, an extensive advertising campaign is put on for the purpose of educating the minds of the people and preparing the road for the actual selling campaign.

Looking at it from all sides I believe that more has been accomplished this past year in awakening this safety consciousness than has ever been

accomplished before. Let us see what has been done and what the results are.

In the December, 1925, issue of *Forbes* there appeared a three-page article on accident prevention work, as carried on by the Bell Telephone Company of Pennsylvania.

In the *American Contractor* of October, 1925, there appeared a very timely four-page article by the general superintendent of the Turner Construction Company on material hoist accidents.

Several articles by our chairman, Mr. Austin, appeared in various magazines during the past year.

I prepared and had published six articles of two to three pages, in the *American Contractor*, the *Constructor* and *Building and Contracting*. Several of these were re-printed in A. G. C. sectional magazines and I could go on and name a dozen or more articles published on this work.

Likewise, the editors of our various engineering and building journals did their part not only in publishing these articles but by lending their pens to the cause. The following are a few of the editorials appearing this past year.

Further Details of Published Safety Articles

In the *American Contractor*, November, 1925, appeared a half column editorial on safety work and its result in cash dividends.

In the *Engineering News Record*, July, 1926, appeared a half column editorial referring to the work done by the Detroit contractors and the action taken by the Texas branch of the A. G. C.

In the *American Contractor*, January, 1926, appeared a half column editorial on progress made in safety education in Milwaukee and Detroit.

In the *Engineering News Record*, September, 1926, appeared a full column editorial on safety work among contractors, stating that "In no very great time the constructor, who was no agency for systematic accident work is going to be handicapped in his competitive race with constructors who have."

In the *Bulletin*, August, 1926, appeared a full column editorial commenting on the Safety Forum organized by the New York Building Congress to decrease accidents in Greater New York and referred to the New York Department of Labor report that in the state of New York 1,300 industrial accidents occurred each month and in the year 1925, 374,000,000 industrial accidents occurred to which the Building Construction Industry were the biggest contributors.

We must take cognizance of the efforts being put forth by organized labor through state legislation, and its far reaching results.

The Building Trades Unions in Newark, New Jersey, have organized a safety committee on every good sized building job. These committees have been linked up through the city and inspections are made by the unionists to see how the job safety work is progressing on every operation.

An editorial in the *American Contractor* commenting on this action said: "Undoubtedly such work is legitimate activity on the part of the

unions. The unions are undoubtedly doing the right thing in instituting efforts to eliminate accidents, since so many contractors have not given this work the attention it deserves." It went on to sound the warning that "If the contractors do not assume the initiative in such work their position of leadership will be undermined to the extent that the work will be carried on through other agencies."

As another example, the Bureau of Inspection of the Department of Labor and Industry of Pennsylvania has notified the contractors of that state that the number of accidents on building operations during the first three months of 1926 increased 26 per cent over the same period last year, and last year the increase amounted to 18 per cent over the year previous. The various Bureaus of Inspection in Pennsylvania have been instructed to have inspectors spend a large portion of time looking over the jobs of contractors.

In the last general election in Missouri, organized labor submitted by initiative petition a very radical compensation act which was defeated because of a very sharp campaign on the part of the Associated Industries of Missouri.

There recently appeared in the *American Contractor* a full column editorial on the situation in California where a contractor must take out Compensation Insurance or make a \$20,000 bond deposit with the state, according to a state law that became compulsory last year.

There is the handwriting on the wall. It is aparent that the contractors who have failed to interest themselves in this sort of activity will have only themselves to blame if they find that their employees have stepped in and are doing some dictating.

Growth of the Section During the Year

We must take this fact into consideration, that through our efforts to awaken the safety conscience of the building industry of the country through the numerous articles and editorials appearing in the builder magazines we have no doubt also sown the seed to some extent in the minds of organized labor. It would be fool-hardy for us to think they would overlook such an opportunity as our own acknowledgment of our failure to cope with this problem of the hour in the building industry. Now that the seed has been sown there is but one thing left to do and that is, rise to the occasion, cultivate the seed already sown and reap the benefits therefrom before we are forced through further drastic employers' liability legislation to follow instead of lead.

Commenting on the Construction Section of the National Safety Council, the *Engineering News Record* in a half page editorial states that "For eight years a little group of contractors have gathered at the yearly Safety Congress of the National Safety Council and kept going the Construction Section of that organization. The Section has grown gradually in membership and activity; still in view of the urgency and importance of accident prevention in construction, the membership is pitifully small. It contains only a handful of real workers for the Section and the Coun-

cil. Indeed, it would be discouraging if we were compelled to believe that their meager representation in the Construction Section of the National Safety Council was truly indicative of the progress of safety thinking and accident prevention among constructors. We need not believe this. There has been in these eight years since 1918 a revolution in the attitude of the construction business towards accidents."

The number of members in this Section, September 25, 1925, was 78.

New members added during the year, 17.

Memberships cancelled during the year, 9.

Net increase in members, 8.

Total number of members to October 9, 1926, 86.

Net increase over last year, ten per cent.

This does not tell all the story. During the past year I have received numerous requests from contractors all over the country for data on accident prevention work, showing us that the seed we have been sowing is going to be cultivated in some sections of the country at least.

Poster and Statistical Committee Reports

CHAIRMAN AUSTIN: I believe it has been the custom not to take formal action on the reports of these meetings. We will proceed to hear from the Committee on Posters.

J. M. DALZELL (Ferro Concrete Construction Company, Cincinnati, O.): I think it is pretty well conceded that posters on safe practices are good things on a construction job.

During the year your Poster Committee has formulated some 32 scenarios for posters. Only a very small proportion of those have been published. However, the scenarios that have been prepared are still in the hands of the National Safety Council and undoubtedly will be used.

This year there have been published 22 Construction Section posters which have appeared in the NATIONAL SAFETY NEWS.

CHAIRMAN AUSTIN: We will hear the report of the Statistical Committee by its chairman, Mr. C. H. Almstead.

C. H. ALMSTEAD (Patent Scaffolding Company, New York City): While I have nothing new to report, so far as statistics are concerned, I would like to thank the members for their splendid cooperation. I believe there are something like 36 concerns reporting this year, 13 more than in 1924, and 27 more than in 1923.

As in previous years, handling material and falling objects caused the greatest frequency of accidents. There were approximately 700 accidents, causing 7,000 lost days.

Falls from scaffolding and lattice caused the greatest severity, and 76 accidents caused 32,000 lost days. But I don't think we ought to be alarmed. We have more members concentrating on sending in statistics. I feel sure that, even though our figures are high, we ought to spend more effort upon getting at the real cause and eliminate these hazards. I think when 1927 comes around all members should be 100 per cent, so far as reporting their statistics are concerned.

CHAIRMAN AUSTIN: Some uniform method of keeping tabulations of statistics upon accidents is one of our important problems. It forms perhaps the proper basis for intelligent safety work, and I think that the Section would do well to undertake, in so far as possible, to keep records of accidents on construction work, which can be prepared and tabulated.

Mr. Robinson gave you a consolidated report of the Membership Committee with his report of the secretary.

I will now appoint the Nominating Committee: Mr. F. W. Herbert, Mr. Leo Woodke, and Mr. Wm. F. Tubesing. You will please bring in your report tomorrow morning.

We have with us, gentlemen, one of the youngest contractors in Detroit, a man whom we all love, a contractor who has had longer years of experience, I think, than any but one. Perhaps, Mr. Albright and Mr. Misch have been engaged in construction work actively in Detroit approximately the same length of time. At the same time Mr. Misch is one of our youngest members, one most highly thought of, and one who enters into all of our activities with remarkable zeal. Mr. Misch is a real honest-to-goodness contractor, he builds buildings, and he will welcome you to this meeting at this time.

ADDRESS BY OTTO MISCH, PRESIDENT, DETROIT BUILDERS' ASSOCIATION, DETROIT, MICH.

It is a pleasure and a privilege to give the Construction Section of the National Safety Council a welcome to Detroit.

No city in the country has been as much interested as has Detroit in the development of the Construction Section since its organization in 1918.

I can sincerely say that it is gratifying to leading contractors of Detroit, the general contractors at least, to note that within the past few months certain other sections of the country threaten to run us a close race in action on the prevention of accidents in the construction industry.

There has been a growing interest among the contractors, but with few exceptions it was simply a preliminary thought. That thought is now beginning to crystallize into definite action on a large scale. For instance, in May of this year the Associated General Contractors of Texas, one of the greatest states in the union, adopted a group insurance plan, and while insurance is not accident prevention that insurance plan carried with it a state-wide plan for the prevention of accidents.

Now, gentlemen, I just want to say a few words in regard to your convention. I honestly and sincerely feel that the work you have undertaken to do is just as important as anything that a human being could undertake. I make this statement without fear or favor. I sincerely believe that your efforts, if successful, are the most laudable from any angle, because the saving of life and limb is undoubtedly everybody's first duty.

If our efforts in prevention of accidents are the means of saving only one life or one injury, I believe that these efforts will have been well

repaid. Therefore, I hope you all realize, and I believe you do, that your undertaking in the prevention of accidents is unquestionably the greatest; and in order to get this idea across to our fellow contractors, we must of a necessity, urge, plead, beg or threaten to get them to fall in line and do all they can to save life and limb.

I want to thank each and every one of you for leaving your business to come from far and near to attend this convention, which proves to me that you all have your heart in the right place.

I also wish to say a few words in regard to your chairman. I personally want to congratulate him in so far as his work is concerned in the prevention of accidents. I have the highest regard for him, not only as a man but also as an executive. I have heard many favorable comments in regard to his ability. Only recently I had the privilege to be present at a meeting where the president of the General Builders of the U. S. A. gave us a talk and he very emphatically stated that if we had such a man at the head of the accident prevention bureau, as he called it, we would get the results we are trying to accomplish. At the same time he mentioned that such a man would necessarily have to give up all of his time to this important job, and I personally know that this is impossible for your chairman. Therefore, I again want to thank him and I feel that the whole convention is indebted to him very greatly.

As it is customary to turn over the keys of the city to a convention, in your particular case I feel that this would not be advisable because you are safety men. I hope that your stay in our city (called the dynamic city of the world) will be of great benefit and that when you go home, you may have the satisfaction of knowing you really have done something worth while.

Before I close, last but not least, your secretary should not be overlooked in so far as being recognized for his good work. He certainly has been faithful and efficient 100 per cent. It is no more than fair that this convention should recognize such services.

I again wish to thank each and everyone of you and I sincerely hope that your deliberations will be of the greatest benefit, not only to yourselves, but the contrary at large.

CHAIRMAN AUSTIN: The next thing on our program, gentlemen, is the privilege of listening to another contractor, Mr. Neal D. Harris, president of the Toledo Chapter of the Associated General Contractors. As I say, Mr. Harris is also a contractor and his remarks probably will be from a very practical standpoint.

CURTAILING ACCIDENT COSTS

Neal D. Harris, General Contractor, Toledo, Ohio

This subject surely ought to interest everybody connected with the building industry. In the face of the mounting number of accidents in all branches and the increased cost of carrying proper protection, the problem needs careful study.

Why I should have been selected to handle this subject, I am at a loss to know, as I am and always have been by comparison a small operator. However, I have had a most marvelous record of never having had a man killed or seriously injured on any work during the 27 years of my contracting.

I account for this principally because of the fact that my operations have never been so numerous that I could not give them a great deal of personal supervision. Then, too, you all know safety comes only as the result of eternal vigilance.

In agreeing to say something on this subject, I said that I should confine myself more particularly to what the Industrial Commission of Ohio and the Ohio chapter of the Associated General Contractors are doing along these lines. The Industrial Commission of Ohio has had in operation an accident prevention division, known as the workshop and factory department, for a number of years. Last year, it was thought, there was room for still further development along these lines, so a division of safety and hygiene was started, with T. P. Kearns as superintendent and D. F. McMurchy as safety engineer.

It has been my pleasure to hear both of these gentlemen on several occasions tell what they are endeavoring to do to prevent accidents. Accident prevention is a self evident fact in the lessening of costs as well. It is the purpose of this division to survey every construction project of major proportions and fill out a report sheet. This sheet of recommendations made from the results of the safety engineer's survey is submitted to the constructor.

Too Close to the Problem to See Its Hazards

It is the belief of Mr. McMurchy that often-times a contractor or his engineer is too close to his problem to see its hazards as well as a man trained to look for them. It would seem that if this program is followed, accidents should be materially lessened.

The Ohio branch of the A. G. C. has arranged a series of meetings so that men interested in this work can be brought together. It is hoped that through these meetings there will be brought about a more thorough understanding of problems of this nature. Our last meeting was held in Dayton, Ohio; the next is scheduled for Cleveland.

I believe it good practice after each accident to acquaint all men working on the job with its cause and have them told by the superintendent in charge who was to blame and how to avoid similar accidents in the future.

Costs can only be materially lessened by reducing the number and severity of accidents, and this can only be brought about by more intensive education in accident prevention and the exercise of greater precautions.

The first approach to the problem of safety should be from its humanitarian side; we should all want to reduce the number of accidents so

as to lessen the loss of life and suffering of those injured and the hardships to the dependents.

Costs should be secondary and only should be considered as a good business means to the greater end.

CHAIRMAN AUSTIN: We will at this time, gentlemen, devote ten minutes to the discussion of any questions which Mr. Harris' paper or talk brought to your minds, bearing in mind that this is a national problem that we are considering.

OTTO MISCH (Detroit General Builders' Association, Detroit, Mich.): It seems to me that if we would all familiarize ourselves with this form it would be of very great advantage to everybody. If I am not mistaken what we all particularly have in mind is to prevent destructive legislation on accident prevention problems. At least what we are trying to do is prevent accidents voluntarily and not have anybody come and say that we must do so and so. And if you follow out these suggestions on this safety instruction you will prevent that.

Get Thoroughly Acquainted With Conditions on the Job

The thing to do is to familiarize ourselves with the conditions on our jobs and put in as much time as we can—I mean the chief executive of any concern—in trying to educate our employees, our superintendents and foremen in preventing accidents. That will pay you very, very well, and this form is a thing that strikes me very forcefully. If we would get these printed and put them on our jobs and let the men follow this thing out, you would never have any laws in your state forcing you to do certain things.

MR. HARRIS: I just want to correct one impression; the compulsory part of our safety requirements is set forth in a bulletin which is called "Specific Requirements for Building and Construction Work." But this work under Mr. McMurchy is not compulsory; it is along the line of help; he surveys the job, makes out his recommendation, and hands it to you to make the corrections yourself, for your own protection.

D. F. McMURCHY (Construction Engineer, Ohio Industrial Commission, Columbus, O.): In order to clear up any uncertainty about these survey blanks of which Mr. Harris has just told you, the Industrial Commission of Ohio has in the last year instituted a division of Safety and Hygiene whose duty it is to investigate and prevent industrial accidents in all industries. They attempt to do that first by taking the claims presented to the Industrial Commission for compensation and from these claims they get the information as to how the man was injured; where he was injured, something of his social condition, his age and family, his wages and all the details pertaining to the accident that the report contains; and in that connection I might add that some of them are rather meager in their information. They take these claims, code them and compile their statistics from them, and give this information to the technical branch of the division. The technical branch is composed of, safety

engineers who are not technical graduates, but who have had long years of experience in their respective lines, and there are three technical graduates who have more or less had experience in their respective lines.

There is a force of six safety engineers and four special investigators. The investigators' duties are to supplement the work of the safety engineer. He confines his activities to the making of these safety surveys. The division of safety and hygiene is purely an educational proposition. Its recommendations are not mandatory. While they use the safety codes of Ohio, of which there are eleven now, the construction code being one of them, they use those codes as guides for this inspection and make their findings, or record their finds on these inspection sheets, or survey blanks, as we call them.

A survey blank has listed on it the various locations of accident hazards and as the inspector, or investigator or safety engineer makes his survey of the plant, he notes down under the various headings the conditions that he finds hazardous. At the completion of his survey he makes a sheet of recommendations, that if complied with will eliminate these hazardous conditions.

The Inspector Turns in His Recommendations

The division of factory inspection of which Mr. Harris spoke, is the mandatory side of the Ohio law. They have the police power to issue orders which have the force and effect of law. The division of safety and hygiene doesn't have that, nor does it attempt to use that authority, but it feels that it can reach the employer and employee alike, much more easily by moral suasion than coercion, thinking it easier to lead a man than to drive him.

I will be pleased to send any of you copies of the construction survey blanks if you so desire.

MR. ALMSTEAD: I would like to ask whether such survey is made at more than one stage of the job? We have one at the inception of the job, the foundation, then we have other hazardous conditions existing as the job goes along, so there should be more than one survey.

MR. MCMURCHY: In view of the fact that we only have three men on construction work in the entire state, we can not hope to get over every job as often as it should be surveyed, but in the larger cities, in Cleveland and Cincinnati (that doesn't cast any aspersions on Toledo and Dayton), our man in the northern part of the state makes his circuit as frequently as he can, and revisits the job just as often as he can get to it.

WM. F. TUBESING (President and Treasurer, the Wm. F. Tubesing Company, Milwaukee, Wis.): In our state this year we are under experience rating. Experience rating means that if your reports for the last five years have been such that your number of accidents has been greater than some other firms, you are likely to pay twice the rate of compensation that the other contractor does who has been taking care of his safety work. So you can see from Mr. Harris' talk that it is very important for you men all to get right after safety. If you don't do it

you are going to have a law in your state like we have and then you are going to be up against it.

Here in Detroit, through the General Builders, they have foreseen these things; they have been ahead of them, and as a result are already enjoying the tabulations, and if experience rating does come, are going to be at the forefront.

So I take this opportunity of urging you all to take it home to your various cities, to get busy and help us all you can.

CHAIRMAN AUSTIN: The time is up, gentlemen. We had two questions sent in. Mr. Warfield, Supervising Engineer of the Hartford Accident and Indemnity Company, may I ask of whom you were asking this question?

MR. WARFIELD: I was addressing that to the committee in general.

CHAIRMAN AUSTIN: "What disciplinary measures are taken to enforce safety rules and regulations?"

That question would be answered differently in different locations. In Detroit it is a matter of contest, a matter of friendly contest, and a matter of record as between one member of the association and the other. The poor record penalizes the good one, and the natural desire on the part of each member is to keep his record as good as possible. Those are the only measures we take. In other states there are others.

MR. WARFIELD: What I inferred there was what disciplinary measures on the job, on the particular work, not necessarily among the members of the committee.

Riding on Hoists Must Absolutely Be Stopped

CHAIRMAN AUSTIN: In Detroit only in very exceptional instances is there a discipline exercised. In the matter of riding on hoists, we have finally gone the limit of posting notices on the job and issuing instructions to the superintendent that riding on hoists must absolutely be stopped, or as a penalty the superintendent and the engineer both lose their jobs. That is about the extreme limit that we have gone in disciplining our men here in Detroit.

We have another question from Mr. Hurley of the Detroit Edison Company, "What is the best practice for inspection of chains, and chain falls?" Can anyone answer the question?

If not, I will be glad to refer that to the National Safety Council, and they will consult their records and their membership and get the very best answer possible for you, Mr. Hurley.

C. P. FISK (New Jersey Zinc Company): I might say that we are going through that very thing in Palmerton, and the American Chain Company has some pamphlets that they will gladly send, that are of some help in that very thing.

Our inspection division has made a study for six or eight months of what other concerns are doing and the opinion varies from no inspection at all to inspection once a month.

R. MCKINLEY (General Builders Association, Detroit): I might add that in Detroit we try in the construction industry to discontinue or discourage the practice of using chain slings wherever possible, and we have found that the cable sling is far more satisfactory than the chain.

We have also found that chains, especially where they are used on construction work, are subjected to a lot of undue stress and strain, and we find where they are lying around a job for a long time that superintendents and various men in charge of the work are very lax in seeing to the inspection of the chains, and seeing that they are annealed properly.

I therefore think that on construction we ought to get away from the chain sling wherever we possibly can. Of course, where you are lifting steel material or stuff of that type sometimes it is necessary to use them.

CHAIRMAN AUSTIN: The question was not as to the use of chains, but the best practical method of inspecting chains, assuming that you have to use chains sometimes.

MR. HURLEY: Where we are compelled to use chains we have adopted an inspection which is generally conducted by the rigger on the job or someone who knows chains; and the main thing that we look for is, in examining the links, to see if they are stretched out of shape, or have started to pull. We do that at least once a month—that is compulsory where we are using chain slings. Where we find that the links are drawn into a lock we immediately discard the chain, because it is a plain indication that some unnecessary stress has taken place and the chain is no longer good for heavy work, or can no longer be trusted. In addition to that we try to have the chains annealed at least once every three months, where we use them, on steel work.

A Plan for the Inspection of Chains

N. H. LORETZ (Louisville Gas & Electric Co.): We have recently adopted a plan in our construction department and we inquired of some of the foundries and steel mills as to the best plan to inspect chains. We have adopted the plan of when we buy a new chain of any description to measure it off in three-foot lengths and at each three feet we make a notch with a chisel, so that we do not injure the chain in any way, but it is noticeable. We don't use chains a great deal, as a steel mill would, and we don't have any set time for inspection, but we inspect them as often as we deem it necessary; and they have given us the idea that whenever this chain wears or stretches one-third of one link, that chain is discarded. We do not try to take out a bad link and put in another, or anything of that kind, but we discard the chain wherever it yields to the extent of one-third of one link. We find that is about the shortest and best solution of test in chains.

CHAIRMAN AUSTIN: Mr. W. S. Smith, Safety Engineer, the Mutual Liability Company of Milwaukee, will address us on "Putting the Job in Order"; and Mr. Smith, I understand, has recently been made manager of safety activities for the Milwaukee Association of Commerce.

PUTTING THE JOB IN ORDER

**Walter S. Smith, Safety Engineer, Mutual Liability Company,
Milwaukee, Wis.**

All the great undertakings of the world's history were first conceived in the imagination, so I believe it follows that any great success in making the world safe for humanity must first be conceived in the imagination of the people who are to do this noble work.

Each of you has an ideal—and constantly you are working toward it. You conceive in your imagination just how things ought to be.

We like to flatter ourselves at times into believing that we are a civilized race of beings. Yet when we scan the list of terrible accidents that presents itself yearly, we may conclude that after all we are not so much superior to the uncivilized savages.

The savage kills with whatever weapon he may have at hand, for the mere pleasure, the thrill of killing.

We have no desire to kill. We would get no pleasure or thrill from it. Yet the records show that we do kill through carelessness, and carelessness is a most terrible weapon. But we are not discouraged. The star of hope shines brighter every day, and it is because men like you, by your untiring efforts along safety lines, are adding lustre to that star.

Putting the job in order is a very simple-sounding title but full of significance. Order is said to be Heaven's first law.

Let us see what can be done about putting a job in order. First of all, before we can have a building there must be a dream. Someone must pass his ideals through the alembic of his imagination.

But unless he couples definite action with his dreams, nothing will come of them.

After the dream comes the plan. There is much going over and checking of the plan. Why? Because stress and strain must properly be figured. No building can endure that has not safety for its foundation stone.

The specifications call for certain materials and as a rule good quality is demanded.

Then comes the selection of the men to do the work.

Do we carefully check the men who are to go on the job? I don't think so. Generally we are too eager to get the work started to find out if they are careful men, or just careless louts who will endanger other men on the job and thereby put our safety work in jeopardy.

The man who risks his life unnecessarily is not fearless. He's just foolhardy. He's a menace to any construction job.

To test men by an elaborate psychological plan very likely would be out of the question—at least, for the present. But a simple test might be devised that would help wonderfully.

Perhaps you men have done something along that line.

Do you remember the story of the merchant who wished to hire a

careful clerk? He tried out a number of boys by asking them how near they could go to a curtain, with a lighted candle.

One said he could go within six inches. Another said a foot, while a third said he wouldn't go near it at all, but would maintain a *safe* distance. The last-mentioned boy got the job.

Our old friend of pioneer history, the scout, Davy Crockett, said: "Be sure you're right! Then go ahead."

And it strikes me that Davy would have made an excellent safety man. He had an abundance of nerve but he kept it always under control.

He always kept his eye on a tree behind which he could hide if an unfriendly arrow came his way.

You see, he anticipated the accident. I like that word "anticipate" because it means to preclude or prevent by prior action. It means to forestall and to have a previous view.

That's what we're trying to do with safety in construction—trying to anticipate the accidents and forestall them by proper methods.

But a man can not anticipate an accident unless he has imagination—unless he can picture the circumstances that might combine with existing hazards to produce the accident.

Where hazards exist there should be no such word as "tomorrow." Knock them on the head today.

The Contractor Who Wanted His Foremen Disciplined

I got a telephone call a while ago from a carpenter contractor. He said, "I want you to come out and give my foremen hell about safety." So I went out. I'm always glad to get an opportunity to give anyone a chance to make good.

All it needed was a few minutes of personal talk with each foreman to change his attitude toward safety. I believe I made each one see his personal responsibility. I brought danger right home to him.

When I saw that these foremen allowed their men, when building scaffolds, to drive nails straight in, thereby subjecting them to a straight pull, I didn't think of contributory negligence. I thought of manslaughter. And to see those nails driven only part way in so that it would be easy to get hold of them when the time came to take the scaffold down, made the offense first degree manslaughter.

There is an old saying that "to save time is to lengthen life." That's fine. But I want you to change that slogan to read: "To save time safely, is to lengthen life."

Men want to be happy. They want to laugh and to enjoy life. So let's take that word apart and change it from ~~manslaughter~~ to "man's laughter." Then we'll all be happy.

When I see a workman on a job making a ladder and using for the stringers pieces that are as full of knots as lumber possibly can be, I scarcely can control my wrath. Two of the ~~hardest~~ things with which we have to contend are stupidity and indifference.

I saw a workman doing this on a job. Outside on the fence was a big safety placard stating that all were working for safety. But in my opinion that ladder cancelled safety on that job.

I've looked over quite a number of blue-prints, but I never saw one with the word 'Safety' on it.

Perhaps this wouldn't look so bad on a blue-print:

1. Use only strong, rugged ladders.
2. Make all scaffolds safe.
3. Guard all floor openings.
4. Don't leave tools lying where they may fall and injure someone below.
5. Use only first-class cables on hoisting apparatus.
6. Keep the job clear of protruding nails.
7. Safety is a part of this contract and every man on the job must carry out its provisions

I hope some day to see blue-prints of that kind.

Several years ago my company sent me to supervise the wrecking of a flour mill that had burned. You can imagine the hazards—protruding nails, everything slippery with wet grain, charred planks, and timbers.

The Dangerous Job Calls for a Hard-Boiled Attitude

I questioned the men as to their experience. Two young, physical giants were in the crew. I asked these two, who were brothers, if they had ever worked in high places. One replied: "My brother and I painted crow's nests on battleships during the war." That was assurance for me so I sent them to the highest and most dangerous places. Both were single men. You may say, "What has 'single' to do with the matter? Well, in Wisconsin it costs some insurance company \$5,800 when a married man is killed. It costs \$1,200 when a single man is killed. It may be hard-boiled to look at things in this way, but it's practical."

Have you ever noticed how pigeon-toed men seem to stumble a good deal? Then why put them to work on scaffolds where they may stumble and fall?

This brings up the question of physical condition. Making medical examination a condition of employment, I believe, will have great effect in reducing accidents. Would that not reduce the chance of a workman being attacked with a strangulated hernia?

The city in which I live has a Turners' society with a large membership. These members are trained to perform numerous physical feats. They become experts in equilibration. I believe it is a fine thing. And with this equilibration comes dexterity and agility. A person so trained is likely never to have an accident. His body is readily responsive to his active mind. He keeps out of trouble and does not get in his own way.

Perhaps this is looking a long way ahead, but I believe it would be

quite a factor in accident reduction to have training of this sort. Maybe we ought to encourage it.

Mentality tests for foremen are coming. If a foreman was given a number of illustrated hazards with the request to show "what's wrong with this picture," if he couldn't show a fair average, why, it would indicate that he was deficient in observation and certainly not a man to be entrusted with any safety supervision.

Just how safety should be handled on a job is quite a problem. If it's everybody's job, it is likely to be not well done.

There should be someone on a job of any size whose duty it is to see that safety rules and practices are carried out.

He should be deeply interested in safety and should know the state safety laws and see that they are not violated.

I believe special safety bulletins tacked up in conspicuous places are a great help.

Safety meetings of all those who act in a supervisory capacity, ought to produce good results.

Here's a good slogan to go with the work: "Eternal vigilance is the price of safety."

We are not so unwise as to believe that all accidents can be done away with. But we do believe they can be very materially reduced.

One of the foundation stones upon which our nation rests is the right to life, liberty and the pursuit of happiness.

No Man Can Be Happy Who Is Disfigured or Maimed

No man can be completely happy who is disfigured or maimed. And his life is his most precious possession. Let's all strive to help him keep it.

Perhaps you would like my idea of what other things go to make up a good safety man.

Well, I'd say he was just a Boy Scout grown to manhood.

He loves his fellow men. He tries to do a kind act every day. He says, "I'll do it," not "Am I supposed to do that?"

He has strong initiative. He believes he is in this world to do good, not merely at Christmas time, but all the year round. He doesn't expect to be thanked for all the good he does. If you find such a man, don't let him get away. He'll help you to reduce accidents.

Let us remember that it is thought that will put the job in order—thought will make the job safe for men—your thought and my thought—your imagination and my imagination—our ideals, desires, our continuity and efficiency.

In order more thoroughly to impress upon your memories the necessity for the work of safety, I wish here to show a picture.

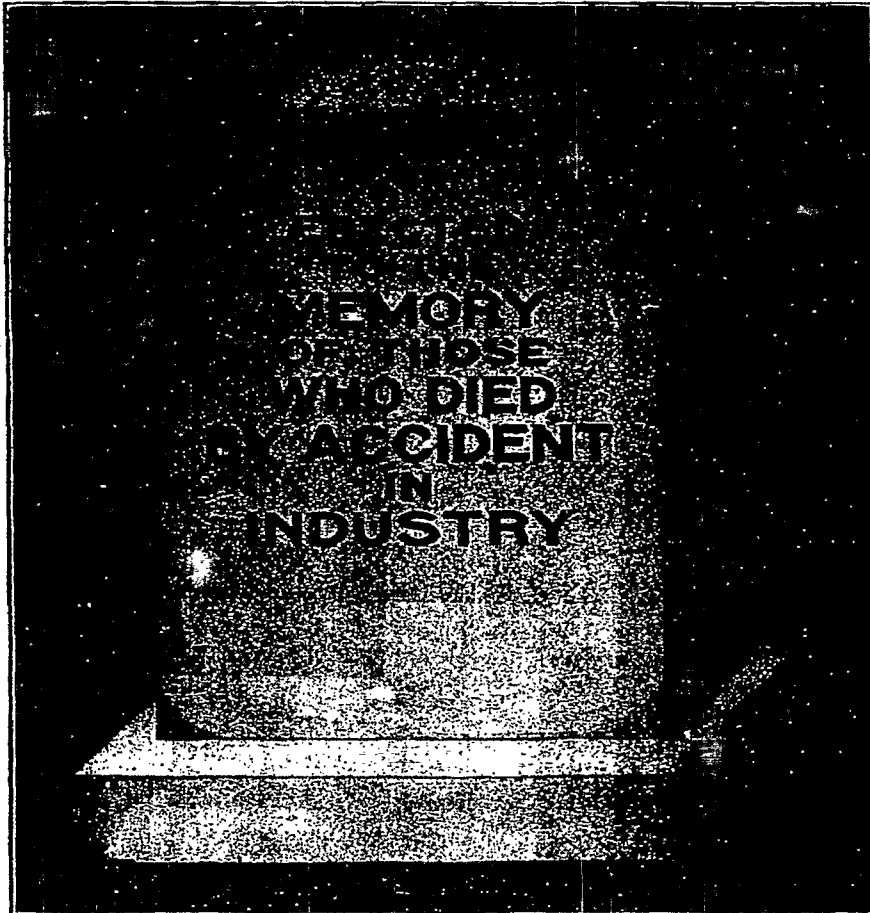
This monument represents the deadly work of thousands of ladders—ladders with loose and crooked rungs.

It represents poor cables on hoisting apparatus.

It represents the floor openings that should have been guarded but were not.

The harvest of poor material—the rotten, poorly-erected scaffolds are here.

In imagination, I can almost hear those thousands of victims of care-



They Ask Us to Teach Safe Practices to Employees

lessness crying out to you and to me, begging us to *think* and to *warn* and to be *sure*!

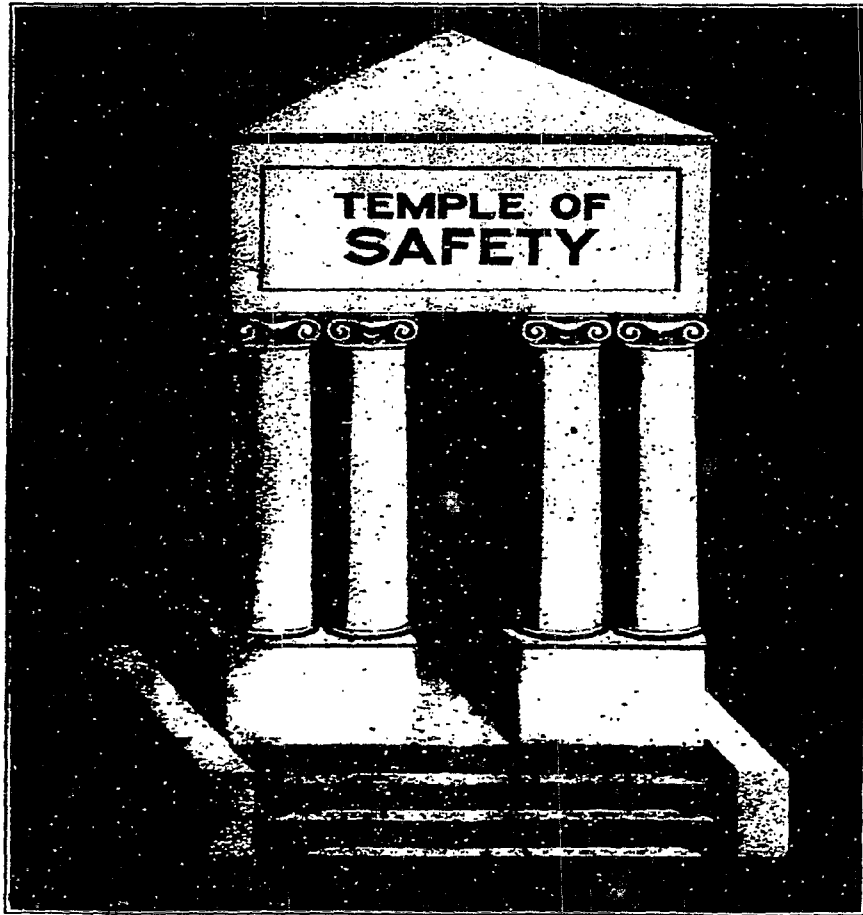
Asking us to teach safe practices for our own good and the good of others.

There ought to be a bright side to every picture and I believe there is to this one.

The safety movement had its inception in the imaginations of a few sturdy souls who were trying to work out an ideal.

They have handed down to us a splendid heritage, asking us to carry on the ideal that has now become a reality.

We shall build, men, a new type of memorial—a new type of monu-



Each Person Has a Portion of This Temple to Build

ment—one that shall be a constant inspiration to mankind. It shall be called the Temple of Safety.

This picture is but the germ of the idea. You and I will make the excavation. You and I will carry the stone.

Our ideals shall be the foundation and the corner-stone.

Our thoughts shall be the mortar to hold together the brick and the stone.

They shall be the strength of its steel beams.

They shall be the rivets that shall hold them firmly together.

And it can be done!

Every accident prevented will be a block of marble for its walls.

Every life saved will be a pillar to give it strength.

And whether we build this temple in reality, or only in the ideal of our dreams, we shall make the world a happier and safer world in which to live.

CHAIRMAN AUSTIN: I am sure I speak for all of you gentlemen when I say that Mr. Harris and Mr. Smith have very ably presented these topics and we thank them.

Now we have a few minutes for discussion of any questions which Mr. Smith's paper brought to your mind.

The Experience of a Contractor in New York City

MR. CRAWFORD (New York City): If there are no questions I would like to say something on this question of safety. I wouldn't think that I had done anything if I didn't say something about safety here. You know I am from the big city. I haven't come here to ram the big city down your throats, but we are the city of big things, and we are awfully small on safety—awfully small.

In the building industry, of course, we have many men going around. We have inspectors galore. Some superintendents whom I meet tell me that it would take the time of a man who did nothing else but look after the inspectors who come on the jobs. Now some of you superintendents know that is true.

A year ago there was a safety forum started in New York on construction work. I don't know how it is, but I have never heard anything more of that safety forum. I gave my name to the secretary, offered my assistance to do anything, to give my time, but I never heard any more about it. Maybe I was rotten when I got up and spoke, nevertheless I am a safety man, and I am going to keep on being rotten and if I keep on long enough I will be good.

I am a bridge man, I am a working man, I am a shop man; and, fellows, I make my appeal to you not as a safety engineer or an inspector; I make it to you as a bridge man, one of the boys on the job who does the work.

I want to tell you that when I worked on the bridges and on the steel work I never thought of safety, but since I got charge of the construction inspection work of my company and have access to the accident records, and I see the number of accidents that happen and how they are caused, it makes my heart stand still when I think of the things I used to do. I shudder at the things I used to do, and I am going to tell you men that the man on the job has a heart, if you will go after him. Every man has a heart, be he iron worker, blacksmith or banker; he has a heart.

and if you go after him in the right way you will touch that safety spring.

It has given me a great deal of interest to go after the causes of these accidents and study them and try to find a solution for them, to combat this evil.

I started this way (I wish you fellows would make note of it, take it away with you.) I started, first of all, by making up a plan to be pursued in combatting accidents. I took 12 superintendents, I submitted the plan to them, and in about three months—you don't convert the superintendent to safety in one day—in about three months I had every one of them converted to safety, all of them going hard at it. I then proceeded to talk to the men, got them all around me and I talked to them. I made up "Ten Commandments" which they had to live up to, and the superintendent saw to it that they were lived up to. He formed a safety committee on the job and if there was anything wrong on that job, any dangerous hazards, somebody got hell. That is just the plain truth of it.

It Was Easy to Sell the Idea of Safety

When I got them around me and appealed to them, appealed to them as a worker, it was the easiest thing to sell these men on the construction job the safety idea, much easier than it was to sell it to the men on the job. Maybe that will surprise you, but it was.

Here are the results I got inside of a year—I will let you fellows be the judges whether it was good work or not. Some of you who are contractors might be interested in this: inside of a year we had reduced the lost time ratio more than half, and the number of accidents more than half, and our operations were about twice as great as they were the previous year.

Do you think that is a good record? I do. And not in any time during that campaign did I submit a physical recommendation, I simply put it up to the men to see that this safety work went over. I encouraged competition among the various superintendents, and, say, they are all pulling to get on top. I get more suggestions from these men—I ask them for suggestions, and I get them. It is only the man in the field who knows, who can give you suggestions. These are the men you have got to go after; these are the men who get hurt. Go after them, appeal to them, show them that you want to take the sorrow out of their lives; show them what happens to them if they do get hurt, and in that way you will get them.

Now, Mr. Chairman, if the secretary of the safety forum is here, I would like to say this: that the safety forum in New York has got to be more active. Call a meeting; make it important; get everybody there; see if we can not get volunteers—volunteers who are real safety men, that is the thing—you have got to be sold on this idea yourself. Be a crusader in saving lives, that is what you men are, and that is what I am, and I am proud of it, and I will go anywhere at any time to help along this work.

Let me tell you how these men got interested: if you were to ask a man on a construction job or a foreman on a construction job, and even a superintendent, to write an article on safety, how much response do you think you would get? You wouldn't get a whole lot, I know. But after six months, when we got this thing going and got results—that is the thing you have got to go after, results—in six months I asked every superintendent, every foreman and as many men as I could, to write an article on safety, and the response was 100 per cent. The articles were written in their own language, and were understood by them. We got an article from every one of them and we got an article from many of the men right on the job, men you would not think could sit down and write a line about anything. They had been sold on safety and they wanted to do what little they could.

If these men will do it why can't everybody? Why can't we all go up and help them along? Men, they look to us to do it, and if we show them the way they will follow us.

I have data galore that I could show you and tell you about, but it would take too long here.

Now if I can be of any assistance to any man in putting the safety campaign across, take my name and address and write to me or come and see me. I know there are some of you fellows in the audience who will not get up and ask a question, but if you have a man's name and address you will write to him. I will do anything possible to put this safety work over, and as an iron worker I am making my appeal to you; get right back of it and shove it over. You can!

CHAIRMAN AUSTIN: I am sure we all appreciate Mr. Crawford's spirit—Mr. W. E. Crawford, care of the General Accident Insurance Company, 100 Williams Street, New York City.

Handling the Statistics on Construction Accidents

CHESTER WRIGHT (Wright & Kramer, Niagara Falls, N. Y.): Why does the Statistical Committee feel that the names of the contributors to their data should be kept secret? It seems to me that if we get a value from competition among groups of employees we could get value from competition among the contractors who report to the Statistical Section. I am a contributor to that data and I would be very pleased to have anybody know where I stand, and I would like to have my competitors know.

MR. ALMSTEAD: That is a thing entirely governed by the National Safety Council, and some members perhaps don't want their statistics known.

CHAIRMAN AUSTIN: Perhaps the committee which worked very diligently and very faithfully for a long while in formulating the statistical arrangement for our Section, so that it would tie in with the United States Department of Labor Bureau of Statistics, had some erroneous ideas in regard to that, but as I remember at that time the committee felt that in spite of their very best endeavors, the plan offered did not put the reporting members on absolutely the same basis.

Of course the purpose of the statistics is to put them on as nearly as possible the same basis, but I think all of you gentlemen realize that there is a difference between operators, contractors who handle jobs say up to \$100,000 and constructors who handle jobs from \$500,000 to \$2,000,000 or \$3,000,000. There is a differential there that is very hard to take care of in the matter of reporting statistics. We have run into that in the National Safety Council in the matter of awarding trophies.

The American Railway Association had to face that problem in awarding the Harriman, or the Hill Trophy for the best record; they had to differentiate as between railroads, Class A are different from other, smaller operators. In other words, the cold figures are not always true indications of the relative results, and I think for that reason the statistical committee thought that it would be well to keep the identity of the reporting members confidential, together with the reluctance on the part of some of us to have our statistics made public at all times.

There are years when some of us would feel very proud of our record, and then there are other years when we wouldn't feel so proud perhaps.

Your question is entirely fair and in the last analysis perhaps your feelings in the matter are entirely right. The National Safety Council, of course, has always undertaken to consult the feelings and wishes of the members in all of these matters, and in this particular matter they did decide that the identity of the reporting members would be kept confidential in making this report.

Executives of Companies in Three Classifications

COLONEL D. H. SAWYER (Secretary, Associated General Contractors, Washington): I haven't anything to say with reference to those two papers, although I heartily support everything they contain.

I do want to make a little statement with reference to the Associated General Contractors. That organization, as you probably know, is the mouthpiece of the general contractors, and a good many of us heard within the last three or four years that the organization has been more or less apathetic in its treatment of the subject of accident prevention.

I think there has been some justification for those charges; I think there is a little justification in the room this morning. I know very few people here, but as I look the crowd over it seems to me that we have some contractors around the table and around the fringes, but by and large possibly more of you people represent insurance companies and the building departments of great manufacturing institutions. We are disappointed that there are not more contractors in the organization. The secretary's report of the total membership after 15 years of effort, of 83, is disappointing to me, and it must be disappointing and possibly a matter of chagrin to the other contractors in the audience.

There must be a reason for it. Either the membership department of this division is lax in its methods, or else the general contractor is not fully cognizant of the necessity for accident prevention measures.

We had a meeting of the Executive Board in Kansas City and during

the sessions the privilege of the floor was given to Mr. Harvey, the local director of the National Safety Council. During his discussion he had recourse to the statement that within his own observation the executives of companies fell into three classifications with reference to accident and prevention work: there was the man that he called the scoffer, and the man who speaks possibly with derision of any methods that are destined to prevent accidents; the man who probably is obsessed with commercial pursuits and has not given recognition to those things which contemplate a better understanding of the conditions of the men, and the means to ameliorate conditions that face them. The second classification was the man who was sold on accident prevention work, but through lack of initiative had not put his beliefs into operation in his own organization. And the third classification was the man who was sold on the idea and went to work on it. Certainly Associated General Contractors does not fall into the first class, probably today it is in the second class. But tomorrow it is going to be in the third class.

An Avalanche of Problems and Difficulties to Solve

Please understand that the Associated General Contractors is about one-half as old as the National Safety Council. Your program states that this is the 15th Annual Meeting. Within 15 years, an organization, if it continues in business, has found itself, but it has to go through the trying period of organization and financing and membership and things of that kind before it does find itself. The general contractor of the country is a peculiar individual. He has been a solitary figure in American business life, who has hesitated too long, we think, to join with his fellows in studying the things that perplex him and the difficulties that occur.

When the organization was founded, very quickly an avalanche, almost, of problems and difficulties and enterprises was forced upon the staff for consideration and starting on the way to better conditions. It has taken some time for the Associated General Contractors to find itself, to absorb that program, to arrange its finances, its personnel and its committees to treat all of these subjects. The demands of one of our members, or group of members, have been insistent on some things and we have had to recognize those and attack the difficulty that they presented.

Something like three or four years ago a man named Austin came before the Executive Board and broached the subject of accident prevention in terms which were easily understood; and he almost issued a challenge to us to get busy and do something in accident prevention measures, otherwise forces in the construction industry would no longer remain inactive. He has been aided and abetted by others in Detroit. At that Kansas City meeting that I spoke of, Mr. Austin's presence in Philadelphia precluded his being with us; but he sent along a man by the name of Otto Misch, and he gave us a good time; and Mr. McMullen

has given us a good time. And so I say through almost the individual efforts of this group of contractors here in Detroit, the Associated General Contractors, as an organization, is getting up to speed in accident prevention work.

What does that mean? Is it an idle statement or is it something that we will give life to, and not disappoint this movement? We propose to do this: to employ a man within the next few months who, in collaboration with the National Safety Council, will devote a large part, if not all of his time, to inculcating ideas of accident prevention in the various chapters of the Associated General Contractors. Those number something like 80 and our membership is in 45 states, I think.

The contractor never does a job twice in the same place, the men who work are often transients who expect to be on the job only a few hours or days; none of those men work today where they did yesterday; none do today what they did yesterday, the scenery is continually shifting; so please understand that there is a distinction in educating those men as well as foremen and superintendents to the things we are talking about. In factory procedure, where a man is steadily on the job week in and week out and month after month, his work is more or less routine. Of course, routine work has its handicaps, men become careless; but even so in the factory it is probably easier to discover the means which should be employed to prevent injury to life than it is in the construction operation, which is extra hazardous, and where the operation continually changes.

Cooperation With the National Safety Council

I don't say that in extenuation of general contractors, by any means, but it is a practical thing that should be given consideration, and we will do the best we can in trying to adopt a procedure entirely satisfactory to the National Safety Council. It would be surprising if the ratio of losses in construction industry eventually could be compared to those of many other lines in American industry. I don't think we should be deceived in comparing accidents, and visit too great a charge on the construction industry, when we discover that their accidents apparently are out of proportion to other branches of American business.

Throughout the last three or four years we have never had a board meeting or a convention where the subject of accident prevention has not been stressed by capable speakers. Through that slow process of education our members have finally become concerned over it and we expect to get actively into the work. It is our purpose within the next few weeks to prepare a manual, possibly entitled "Accident Prevention in the Construction Industry," which will be a guide to chapter officials and contractors across the country inaugurating means for accident prevention. We hope to elicit the active collaboration of the National Safety Council in the preparation of that volume. With that will go practical suggestions as to how to start the thing going.

In conclusion, I simply want to fasten in your minds, if I can, the

fact that the construction industry, we believe, at least as represented in the Associated General Contractors, is fully awake to the possibilities of accident prevention work, and proposes to pursue it.

CHAIRMAN AUSTIN: Mr. Sawyer, I certainly am gratified that you took the opportunity to say what you have said. I know that the Construction Section is very highly gratified to learn that such an organization as the Associated General Contractors is going to get into safety work, because we know that it is one of the biggest things, and one of the best things, that the Associated General Contractors can do. I can not refrain, however, from putting you right on one or two points.

The National Safety Council is 15 years old, but the Construction Section of the National Safety Council is just eight years old. It wasn't until 1918 that six individuals, in St. Louis, interested in construction, got together and organized the Construction Section of National Safety Council; so that, just exactly as has been the case with the Associated General Contractors, a slow process has taken place in the Construction Section and these eight years of activity have been devoted almost entirely to an awakening of proper interest on the part of those engaged in construction in safety work, to really make a start; and some of the boys who have been in the Section the entire eight years have at times felt discouraged. Our activities and results should not be measured by our membership in the Construction Section.

We are highly gratified at the increase in interest generally that is being shown all over the country in accident prevention work by constructors and those other agencies in the construction industry, and are particularly gratified at the determination on the part of the Associated General Contractors to take up this work.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The second session of the Construction Section of the National Safety Council was called to order by President Austin on Wednesday morning, October 27, at 9:40 A. M., in the Reception Room of the Book-Cadillac Hotel, Detroit, Michigan.

CHAIRMAN AUSTIN: The first item on the program this morning is the election of officers. We will hear the report of the Nominating Committee, of which Mr. Hurlbutt is chairman.

MR. HURLBUTT: Mr. Chairman, Mr. Woodtke arrived and we were able to get together and present a slate to you which we think is representative of the Section. For Chairman we suggest Mr. E. C. Harding, of the Ferro Concrete Construction Company, Cincinnati, Ohio; for First Vice-Chairman, Mr. C. H. Almstead, Patent Scaffolding Company, New York City; for Second Vice-Chairman, Mr. J. F. Conner, Safety Supervisor of the U. G. I. Contracting Company, Philadelphia, Pa.; and for Third Vice-Chairman, Mr. Dalzell, of the Ferro Concrete Construction Company; for Secretary, the present incumbent, Mr. J. Wilson Robinson, of the Everett Winters Company, Detroit, Michigan.

MR. HARRIS (General Builders Association, Detroit): I move the nominations be closed and the secretary be instructed to cast the unanimous ballot for the election of the gentlemen as named.

The motion was regularly seconded and unanimously carried.

PRESIDENT AUSTIN: The slate as presented by the Nominating Committee is declared elected.

We are very sorry of course to be obliged to report that Mr. Harding has been detained in Cincinnati by illness in his family. He intended to be here up until the last minute, and we are disappointed in not having him here.

In Mr. Harding's absence I will ask Mr. Almstead to take the Chair.

C. H. ALMSTEAD: Mr. Chairman, I would ask that you continue in the chair which you so ably filled yesterday morning, and I am sure the rest of the members feel the same way.

CHAIRMAN AUSTIN: I was in hopes that I was going to be relieved, Mr. Almstead, but if it will be of any assistance to you I will be glad to continue with the program this morning.

MR. ALMSTEAD: I will appreciate it very much.

CHAIRMAN AUSTIN: For the reason, gentlemen, that sickness has made other inroads on our expectations, this morning, Mr. Chewning, of the U. G. I. Contracting Company, of Philadelphia was, as you see by the program, slated to deliver an address or paper to us on "Why Everybody Should Lend a Hand in Safety Work. But unfortunately he has been detained and at the same time has done us the honor to send Major Lamphire to take his place on the program. I am quite sure that the

Major will fill Mr. Chewning's place in a very able manner, and we will hear from Major Lamphire at this time.

COLONEL LAMPHIRE: Mr. Chewning, our Vice-President, prepared this paper and meant fully to be here to read it, but he was taken ill Monday and was unable to leave yesterday, so he sent me to substitute on the program.

WHY EVERYONE SHOULD LEND A HAND IN SAFETY WORK

**W. L. Chewning, Vice-president U. G. I. Contracting Company,
Philadelphia, Pa.**

There are two main reasons why everyone should lend a hand in safety work.

First: It is the humanitarian thing to do.

The human being has a great variety of ambitions and objectives but they all may be summed up in these two—to live and to be happy. Anything which operates against either of these is contrary to the interest of mankind. Accidents destroy life and cause unhappiness. I cannot do better than repeat the comments on accident prevention by J. E. Davidson, past president of the National Electric Light Association, as follows:

"I do not view accident prevention from the standpoint of dollars, but from that of 'sense'—humanitarian sense. I had occasion to visit a power plant in a small Nebraska town recently, and I was introduced to a young man—a fine looking chap—who was minus both of his hands. The accident which brought him this great misfortune could easily have been prevented by caution, officials told me.

"When you meet a man like that, the millions of dollars in savings, the result of accident prevention, becomes a secondary reason. His blasted life is more important to him, his family, our industry, and the Commonwealth, than all the money we can save by eliminating accidents. But nevertheless, there is an enormous saving of money that is to be taken into consideration.

"Accident prevention will not only pay good dividends in money; but, more important, it pays dividends in lives saved, tragedies and misfortunes avoided, happiness assured."

The second main reason for lending a hand in safety work is because accidents cost money. They also cause loss of time, but in industrial operations time is money. From the records of one of the larger construction companies, I find that the cost of insurance against accidents is approximately 1.09 per cent of the total cost of the job. In other words, when we invest a thousand dollars in plant, \$10.90 of it is used for paying the cost of accidents which occur in its construction.

And this does not include the cost of time lost by and demoralization to workmen not directly involved in the accident. This cost can not be determined and therefore its extent is unknown; but I have no doubt

it is a close second to the one shown on the books. It is evident that, from a strictly selfish standpoint, it is to the interest of each man, from the president of the company down to the sub-foremen in charge of workers, and even more to the interest of the workers themselves, to reduce this cost of accidents, because the lower the cost of work done by the company, the more work it will be called on to do and therefore the greater will be its need for the employee's time. Also, lower cost means more money available for higher salaries and wages.

The reasons why everyone should lend a hand in safety work are so apparent that it is unnecessary to spend your valuable time discussing them. I am therefore going to depart somewhat from the theme covered by the title of this paper and say a few words about the causes of Construction Accidents, and suggest some means of reducing their frequency.

Reliable statistics indicate that the accident frequency rate is higher in construction than in any other of the larger industrial groups, and there are unquestionably very good reasons why this is so. It is undoubtedly true, however, that had the same efforts to prevent accidents been applied to construction as have been given to other industries, a much lower accident frequency rate would have been reached.

Accidents in construction work have been increasing at such an alarming rate in the state of Pennsylvania that early in 1926 all the safety inspectors of the Pennsylvania Department of Labor and Industry were called off from other work and assigned to construction jobs for an indefinite period, in an endeavor to eliminate as far as possible the physical hazards common to construction operations.

Fatal and Non-Fatal Accidents in Pennsylvania

The report of the Pennsylvania Bureau of Statistics for the first three months of 1926 states that there were 31 fatal and 3,128 non-fatal construction accidents in Pennsylvania alone.

These are typical of construction accidents in other states and are listed according to causes as follows:

Causes	Fatal	Non-Fatal
Falls of Persons.....	9	723
Handling Objects	0	685
Falling Objects	4	344
Stepping Up or Striking Against Objects.....	1	299
Hand Tools	0	292
Motor Vehicles	5	144
Hot and Corrosive Substances.....	0	133
Machinery	1	120
Miscellaneous Causes	0	100
Cranes and Derricks.....	6	92
Cars and Engines.....	2	56
Hand Trucks	0	40
Pumps, Compressors and Prime Movers.....	0	26

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Elevators	0	23
Explosives and Explosions.....	1	19
Horse Vehicles	0	15
Electricity	1	11
Water Craft	1	3
Boilers	0	2
Transmission	0	1
	31	3,128

We have become very proficient in the designing and installation of safeguards and in the elimination of hazards generally in factories and production plants where stable conditions hold for long periods of time; but anyone who has come into intimate contact with construction operations can not fail to realize that safety work as applied to that branch of industry presents difficulties which are probably greater than those to be met with in any other field. It is practically impossible to eliminate hazards such as nails in loose boards on the ground, and unguarded edges of platforms and elevated floors, but in spite of these conditions, I believe that more accidents on construction work are caused by unsafe practices than by unsafe conditions.

Need for More Careful Supervision of Men

It is difficult to stop such practices as throwing form lumber and other construction material over the edge of an upper floor without being sure there isn't some one in the yard who might be struck, careless climbing and walking on scaffolding and unfinished floors, inserting the head in the construction elevator shaft to see why the elevator doesn't appear when signalled for, and the use of inferior lumber as braces or supports for lifting tackle.

It will be noted that the three major causes of accidents in the table above, falls of persons, handling objects and falling objects, accounted for 62 per cent of all the fatal and 56 per cent of all non-fatal accidents. This is of peculiar significance and shows clearly our greatest need is unquestionably for more careful and intelligent supervision over the men on the job. Among those usually employed on construction work, and especially in the unskilled class of labor, are to be found workmen who have neither the intelligence nor the initiative to be careful or to guard themselves against hazards arising from conditions that change as the work progresses. There are also over-confident workmen who will take undue chances, as well as inherently reckless men. These two classes need special supervision and training, if retained.

Carelessness and unsafe practices can be reduced only by the most intensive educational program and by securing the cooperation of the foremen and especially the workers. The ideal condition is reached when we have trained the worker to the attitude where he protests against working in a gang with an habitually careless man.

The ordinary safety inspector, who has been trained in the detection

and removal of unsafe conditions and makes occasional visits to the job, can not alone accomplish this educational program of elimination of unsafe practices. He can not be with each thoughtless man all the time and furthermore, the man soon forgets the cautions given by this inspector. On the other hand, with a man constantly coaching him and drawing unsafe practices to his attention in a forceful way, the unsafe man, by degrees, reaches the frame of mind where it becomes natural for him to do his work in the safe way.

The ideal inspector, for this purpose, is the man who, having been a worker and a foreman, knows from experience the workman's weakness and his point of view and talks his language and whose opinions are respected by the men we wish to reach. In the ranks usually will be found such a man, with ambition and a strong influence over his associates and capable of development. His interest in safety work will be easily developed.

Safety Must Be Sold on a Fair Basis

Let us have periodic meetings of the foremen with these inspectors, and offer weekly or monthly rewards to the gangs with the best accident records, and keep a daily record of each gang posted where the men may watch it. Get the foreman to feel his responsibility for the record of his gang.

William Feather in *Nation's Business* for July says:

"The 100 per cent American believes in the doctrine of selfishness, although he is often ashamed to admit it, a fact which leads him into bleary sentiment when he undertakes to define service. The American idea is that every man is out to promote his own interest and he has discovered that the best way to do this is to make himself useful to others. In the ratio that he helps others he will prosper."

The idea of safety must be sold to the men on an entirely fair basis. It must be put to them that as they benefit so also does the company benefit. It should not be put on the basis that it is all done for them. They know it isn't. The best results can only be obtained by having the men with you. It is decidedly a cooperative proposition, not only between the men and the company, but between the individual workers themselves. It is a matter on which everybody can, and should lend a hand. The men are willing. They don't want to get hurt themselves, and they don't want their fellow workers to get hurt. The desire for self-preservation is there. All they need is guidance and education along lines of safety.

Hoping to be of some assistance to you who are undertaking to reduce construction accidents, I offer a pamphlet, published by the company with which I am connected, entitled "Suggestions for the Safety and Welfare of Persons and Property During Construction Work."

CHAIRMAN AUSTIN: My attention has been called to the fact that I have made the usual mistake of the man who has never been in the

army.. In introducing Colonel Lamphire I introduced him as Major. I am glad to make that correction, Colonel, and I apologize. We certainly are thankful to you for coming this distance and presenting this paper which contains so much valuable information.

LEO D. WOEDTKE (Fred T. Ley Company, Springfield, Mass.): I noticed, Colonel, in your remarks that you made reference to rewards for the best gangs, for the jobs having the best record. Have you had any experience in the matter of rewards, and can you tell me what the rewards consisted of?

COLONEL LAMPHIRE: I think I had better ask Mr. Conner to answer that question; he is starting to organize that program.

J. F. CONNER (U. G. I. Contracting Company, Philadelphia, Pa.): I would say that we have done nothing along that line just at the present time, but we have it in mind.

MR. WOEDTKE: The reason I raised the question is that that gets to be a very sharp thorn in the side of a safety man in the construction game. After you have gone the usual paces for five or 10 years you get pretty hard-boiled. I have never been able to solve that, but I got to the point after coming to the last safety convention, that when I got back home we cut out all contests and rewards; and we have been conducting for one year a contest between the company and the men, instead of the men in groups among themselves.

What to Do When the Enthusiasm Begins to Weary

We experienced, in greater Boston, a number of contests for six months at a time, 21 groups of gangs of linemen competing against each other. We gave them dinners and banquets and knives and forks and medals and pencils that cost us \$4 and \$5 each, and it got to the point that I found they were very much calloused.

I do agree, though, that the contest idea is all right for a while.

The National Safety Council has recently issued a pamphlet on contests and I have been watching for the appearance of that with quite a bit of interest. I often wonder just what we can do in the construction game to reward the job or gang on the job who maintains a better safety record than all the rest. It is done in industry where the people are housed within four walls. It has been going on for 10 years or more.

We get to the point where we are dealing either with union or non-union labor, it doesn't matter much, except that the union labor element watch this a little more closely and the question comes up continually after you have plugged along and gone through all the a, b, c as to what reward if any ought to be given to the superintendent, or the superintendent plus his foreman, a straight time man, or beyond that to the gang on the job, for maintaining a better job than the other.

I think it is something that we have got to face, especially those of us who have been doing safety work for five years or more—there comes a time when the ballyhoo gets worn out and the men get a little bit fed up on safety propaganda, and they begin to wonder what is in it for

them. I noticed when you made reference to award, your company had apparently reached about the same conclusion. If it isn't imposing on your time, Mr. Chairman, if there is anyone in the room who has had any experience with the reward idea in the construction safety work, I should like to hear about it.

COLONEL LAMPITE: I want to say that the thought is injected into the paper solely for the purpose of getting some discussion on that point.

MR. CRAWFORD: I might say something along that line. If you have a number of jobs, pit them against each other, have competition. Where you have a job with 100 or more men, go to the men at the beginning of the month, tell them what a great thing this safety is; what they are going to derive out of it by working safely; what they are going to get out of it if they get hurt, and give them a pennant at the end of each month and see how many they can get during the year.

I have found that worked very successfully.

Men Are Eager to Know Their Gang Safety Standing

I want to say on some work that we did in Philadelphia, where we worked for a number of months with as many as 250 men on the job, we had the shanty plastered over with pennants which the men had won, and those fellows certainly did warm up to the work. I never went over the job but I was asked, not once, but many times, by nearly every man who came in contact with me: "How about the pennant this month, do we get it?"

That is something that they all work for, it goes over. At the end of the year, if you have a number of superintendents, get a prize for the superintendent who has the best record and maybe a second prize for the second superintendent. In that way I think you will get results; but once you start to hand around something to each and every individual, there is somebody on that job who is not going to get it and that fellow sows a little seed of discontent. Make them all work for one thing—that pennant.

MR. TUBESING: Mr. Chairman, last evening I put up a proposition to the contractors assembled at the meeting. I said that as soon as the A. G. C. is ready to have all its chapters go to the mat on this safety proposition, I would put up a cup for which the chapters could work. I think if the chapters go into this work in that spirit that you won't have to give the men anything, and you won't have to give the companies anything, but you will have this local chapter working to win this cup.

Out in Wisconsin this year we had three of the largest paper industries in the state tied for the cup which is to be given. They have gone through the whole year without an accident in an industry that has one of the biggest hazards in the state. I believe the contractors can do the same thing, and if all the chapters of the A. G. C. go into this safety proposition we will have some contest, and I am sure there will be enough spirit so the men will go into it and fight for it just like the fellows in the paper mills.

MR. WOEDTKE: The Electric Railway Section has given a great deal of thought to this question of rewards and they have been divided among themselves for the last four or five years. Some of the street railways are giving bonuses. When I spoke of rewards, I thought the Colonel had in mind something of material value. Some of the street railways give money in the form of a bonus, or they give vacations with pay, and things of that sort. I didn't know but what some of you fellows got to the point where you were considering that.

It is my personal opinion that that is treading on dangerous ground, that no man should be paid for safeguarding his own life. I would hate to see the time come when any members of the Construction Section would offer a monetary reward to a superintendent, foreman, time-keeper, skilled or unskilled laborer. It is their duty to take that precaution to preserve life and limb.

P. H. BROWN (Niagara Falls, Canada): I am glad Mr. Woedtke brought that up. It is hard to see why a man should be paid for protecting his own life or the lives about him. For years we have been urging that the men get the greater part of the benefits out of this safety work and in offering them rewards we certainly sell the idea that the company is expecting something of them for the company, whereas the reverse is true.

I would like very much if we might be polled on that to see whether any real benefits have been derived from offering rewards. We find that when we put it up to the men from the standpoint of business that safety is a part of our business, and every man who doesn't conform to our standards in that way isn't a part of the organization.

Sometimes the Reward Idea Can Be An Evil

SECRETARY ROBINSON: While I was in Pittsburgh about a year ago, I was inquiring how safety work was handled in some of the mills, and this reward proposition was one that struck me as an evil, due to the fact that it is handled in this way: the foremen and superintendents in the mills are paid a bonus at the end of the year, that is, on the basis of the least number of accidents, lost time, and so forth, and they even go so far, as I know of in one instance that was called to my attention where a man had been injured and sent to the hospital, they allow a certain number of days. After a certain number of days it is charged against him. They went to the hospital, got that man out of the hospital, brought him down from Milwaukee and kept him sitting in a chair there in order that he would be on the job. A case like that is certainly working against what we are trying to accomplish.

CHAIRMAN AUSTIN: One of the difficulties in the award system for accident prevention in our industry would be to set up a yardstick by which to measure the records. We have found in Detroit that the nature of the job, the size of the job, the location of the job, and all of those things make it necessary to set up a differential in trying to set up a contest. In other words, all of the work we have can not be measured by the

same yardstick. Of course when you commence to make allowances in a matter of contest you open up a realm of possibilities that is quite extensive.

Mr. MISCH: I don't quite agree with the brother to my right. I think you should give just a little recognition to the superintendent, at least on a job, not necessarily dollars and cents, but some sort of a recognition; at the end of the year you might hand him a box of cigars or something like that and give one or two little prizes. But you ought to start some sort of a contest?

Mr. WOEDTKE: May I say a word in self-defense on that matter? This may sound hard-boiled but it isn't; it is just plain straight from the shoulder business. The superintendent's value to a construction firm should depend upon his production, on his cost, and on his safety record. The minute you talk safety record you talk insurance cost. The Colonel quoted what it costs, the average cost, for insurance. Your insurance costs are tremendous, and it is up to the superintendent as an individual, or as a class, to produce as low a cost for insurance as it is possible for laying brick or putting up forms or sticking in a sewer or whatever the work may be in hand. And I believe it is the superintendent's duty to be just as responsible for his insurance cost record, which means his accident record, as his production record or cost record on the job, and he can be rewarded by increase of his salary, being kept on full time where other men are let go in the winter, and in a hundred and one ways.

Cost of Accidents Continually Before Superintendents

When bonus is given to superintendents for cost of production record or something of that kind, they single out the men who have had the most to do in making that year successful, and at that time their safety record comes in. We keep a record sheet all year, then they get a summary twice a year. At the end of the year they are shown where they stand. We don't wait until the year is over. Every month our cost department lets them know where they are heading, on the cost, and our production department lets them know where they are on production, and the same is true of the accident record.

I have known of cases where some of our superintendents fell by the wayside because of their safety record; and others have gone up the ladder. From being put on small jobs with medium pay, they have climbed up and they have done that on their safety records.

CHAIRMAN AUSTIN: We will proceed with the program. We have a telegram from Mr. Eigel to the effect that he is not able to be with us on account of sickness, but we are fortunate in having Mr. Tubesing of Milwaukee, who has a copy of Mr. Eigel's paper and he will address you at this time.

MR. TUBESING: Mr. Chairman and gentlemen, it is too bad that Stanley can not inject his personality into his paper. I know I won't be able to, but I will read it and I hope you will pass that by.

HOW MILWAUKEE IS PUTTING THE SAFETY MOVEMENT ACROSS

S. H. Eigel, Manager, Milwaukee Chapter, Associated General Contractors, Milwaukee, Wis.

Surely one way in which Milwaukee is putting the "Safety Movement" across is the fact that I have been sent to this Congress. Not because I have been sent, but because enough interest has been displayed to send anyone who can come here and be inspired and learn from you gentlemen the great work which you have undertaken, and which you are carrying out so successfully.

I have the pleasure of representing the Milwaukee Chapter of the Associated General Contractors of America, and I attended the Executive Board Meeting of that body recently at Kansas City where ways and means are being earnestly considered to place accident prevention as a foremost activity in the construction industry. Now, that will eventually aid Milwaukee in putting the safety movement across in the construction industry. It will push out much further this great humanitarian activity of accident prevention, which is at this very moment giving 85 chapters in the A. G. C. food for thought and inspiring them.

There is in this city of Detroit the General Builders Association, which is the Detroit Chapter of the A. G. C., a body of men who have developed a plan for reducing accidents to a minimum, and while it is essentially and primarily a great humanitarian movement on their part—as a secondary consideration it is instrumental in saving considerable money for the contractor and produces increased efficiency among building workers. Now that is also aiding the Milwaukee Chapter of the A. G. C. considerably in putting the safety movement across.

About a year and one-half ago the Detroit Chapter of the A. G. C., Messrs. Austin, Wallbridge, MacMullan and several others, very generously came to Milwaukee and met with our Milwaukee contractors for the purpose of showing us the way in which to put into effect a detailed plan of accident prevention; and Milwaukee is thankful to these gentlemen for helping to start an accident prevention campaign in the construction industry, and helping Milwaukee put across the safety movement.

We have since then appointed an Accident Prevention Committee. This committee in its early stages functioned rather slowly. This committee has had a number of meetings and accident prevention has taken a very much more important part on our monthly meeting program. Our committee has prepared a series of bulletins, some of which have already been placed on every contractor's job. Monthly letters have been sent to the foremen and superintendents. We now have under consideration a comparative data chart listing accidents monthly. But perhaps of greater importance than that is the fact that our committee is reaching out, earnestly seeking ways and means to better our local conditions in the construction industry. Our committee meetings are being more regu-

larly conducted. Our entire interest is becoming more pronounced, and eventually we hope to measure up to a very high standard of results.

We need help and we are looking for it.

If you can stretch your imagination and view with me the panorama of Milwaukee's safety movement you will agree that Milwaukee's efforts are well directed and carefully detailed. To dwell on this subject without giving due credit to the originators of Milwaukee's safety movement would be perpetrating a gross injustice to the fathers of it. We cheer the Milwaukee Association of Commerce in their splendid, unceasing activity in behalf of humanity and may the echo of this cheer resound to the far corners of our country.

An Inspiring Picture of the Milwaukee Auditorium

Picture, if you will, Milwaukee's auditorium—with a seating capacity in the main arena of three thousand—and again visualize an attendance which occupies every seat, sending its overflow into the balconies, aggregating an attendance of over 5,000 foremen. On the stage is a personnel of 19 committees consisting of 128 members, all serving in a voluntary capacity. There were also numerous captains of Milwaukee's industries. This will give you a fair idea of the interest displayed at every monthly meeting of the Foremen's Safety School, directed under the auspices of the Milwaukee Association of Commerce.

Upon entering the auditorium you are welcomed by the music of a fife, drum and bugle corps—or some band of one of Milwaukee's numerous industries—all safety workers, men who set aside their own pleasures and help tremendously in the work of safety.

Someone has well said, "Safety with a Smile;" Milwaukee says, "Safety with Music."

This vast assemblage of foremen safety workers, all with the thought foremost in their minds of helping their fellow workers, gathers every month in the Milwaukee auditorium, from December to June, and are inspired by speakers of qualified ability who carry a message with a "Punch" along the lines of safety and efficiency, creating in the minds of the foremen a realization of their responsibility.

Safety along these lines may be termed "Inspirational." To inspire stimulates action, and its effects are written boldly on the right side of the ledgers of our industries.

Our picture is not complete. You have yet to behold the detail of safety work. This splendid array of safety foremen, before receiving inspirational messages from professional speakers, convene in 40 sectional meetings, divided as follows: woodworking, foundry, sheet metal, packers and tanners, electrical, building construction, machine shops and all trades. Each section has its committee and chairman, and its own meeting room under the same roof in the auditorium. In these sectional meetings the problems of each trade are carefully considered. Speakers are chosen who know the problems affecting the several trades, and clearly analyze to the foremen the pitfalls and dangers with which they are confronted.

A short period of time is allowed for discussion. The sectional meet-

ings convene at 7:45 p. m., continuing until 8:30. The general meeting in which all sections congregate convenes at 8:45 and adjourns at 9:30 p. m. To carry out this very complete program means the enlistment of 47 speakers.

The Safety Division of the Milwaukee Association of Commerce was organized in 1920 and is the outgrowth of the Safety Sanitation Committee of 1913. A few comparative figures will show our progress. The Foremen's Safety School was organized in 1920 with an enrollment of 78 leading companies and 750 foremen representatives comprising the various sections. Its growth has been tremendous, and today we are proud to tell you that Milwaukee is "Putting the Safety Movement Across with a Bang." The registration shows an enrollment of 288 leading companies and 5,606 foremen representatives. An increase of 210 companies and 4,756 foremen representatives.

You gentlemen who are serving in an executive capacity will readily realize the very great amount of detail which is necessary to successfully carry out an undertaking of this nature, including the numerous committee meetings and the earnest and sincere effort of the management and its staff.

All of the foremen are given attendance cards with the meeting dates on them. These cards are checked by a committeeman, at each sectional meeting and at the general sessions. Foremen who have attended faithfully are given diplomas, stamping them as workers in a great humanitarian movement of which they may well be proud.

I am not able to furnish you with a great array of statistics as to the extent Milwaukee's safety movement has prevented accidents and aided safety; but on the other hand, through Milwaukee's splendid effort, the work of safety last year was carried through over 8,000 foremen to the homes and to the job, and to practically every nook and corner of our city; and by the city's example safety enthusiasm was carried into other sections and communities.

The Milwaukee Record of Industrial Casualties

But Milwaukee has a record of industrial casualties, as follows: 1923, 89; 1924, 73; 1925, 58. The last shows a decrease of 34 per cent over 1923.

In addition to the Foremen's Safety School, the Milwaukee Association of Commerce developed its great work in 1923 and organized a First Aid School, enrolling at that time 117 companies with 650 representatives. In 1926 its operation enrolled 178 companies and 1,786 representatives, with an average attendance of 725, showing an increase of 44 per cent. The school meets on alternate Thursdays and provides definite practical instructions in first aid, sanitation, health, hygiene, and similar subjects.

Addresses, demonstrations, lantern slides and pictures comprise a large portion of the lectures. A banquet is tendered to all graduates and this year there were in attendance 550 earnest first aid workers.

A very necessary aid in the prevention of accidents and safety is a Fire Prevention School. Our Association of Commerce organized an efficient and systematic school to cope with this red demon. It was organ-

ized in 1924 with an enrollment of 50 companies and 650 representatives. The year 1926 swelled the registration of enrolled companies to 128 and 1,605 representatives.

The school meets on alternate Tuesdays with an average attendance of 750. It provides practical, non-technical instruction in principles and practices of fire prevention by means of addresses, demonstrations, slides, motion pictures and exhibits.

It is well to say a word in connection with Milwaukee's activities in the Fire Prevention Week campaign, conducted throughout the nation. Incidentally there are distributed about 320,000 pieces of literature; speakers are furnished to the various civic, fraternal and business organizations, and to all public and parochial schools, radio stations, etc. The cooperation of 100,000 homes and 2,400 industries is enlisted through home and industrial inspection blanks.

Fire alarm instruction to all industrial employees through the cooperation of Milwaukee's Fire Department is provided. In recognition of its accomplishments in fire prevention, Milwaukee has received sixth honor place among first class cities competing in the annual Fire Waste Contest.

Accomplishments of the Safety Schools

A comparison over a three-year period shows remarkable strides in the service and accomplishment of Milwaukee's Safety Schools, as follows: 1924, 308 companies, 4,559 representatives; 1925, 577 companies, 6,982 representatives; 1926, 588 companies, 8,997 representatives.

In addition to the activities described which safeguard life and limb and aid in the protection of our homes and industries, we have seasonal campaigns against the hazards of Fourth of July, Christmas and our Dry Cleaners Campaign.

It would be quite unfair if I did not dwell for a moment on the association created here in 1925, to further the activities of the Wisconsin delegates to the National Safety Congress, known as the "On Wisconsin Association" of the National Safety Council. We sincerely believe that the "On Wisconsin Association" will acquire great credit by spurring on activities in accident prevention in the construction industry. As I understand it, Bill Tubesing has been partly responsible for it, and Bill is a construction man, and we look to him for ideas in developing the best that the construction industry can contribute along the lines of accident prevention.

CHAIRMAN AUSTIN: One of the criticisms of our industry that we hear quite often is that we do not tie in to the civic movements. There isn't any reason why local groups of contractors should go off in a corner by themselves somewhere and undertake to solve their accident problems. There isn't any reason why contractors shouldn't be just as vitally interested in public safety and in fire prevention in their communities as manufacturers. We are all hoping for the time when the construction industry and those engaged in it will find more time to

enter into these civic activities along broader lines and get away from a feeling of self-sufficiency, particularly in this matter of accident prevention. There isn't any reason why a tie-in between local safety councils in our large cities and the construction industry in those cities should not result beneficially to both.

P. J. PRUITT (Birmingham Safety Council, Birmingham, Ala.): I would like to know if the Milwaukee Safety Council gives the contractors who are members of the Council and who participate in your industrial school there, any kind of periodic safety inspection, either weekly or monthly?

Problem of Safety Inspections in Birmingham

If there are any others here in the same boat I wish they would throw something into the pot for consideration. The A. G. C. Chapter in Birmingham has asked us for membership and requested that we furnish safety inspection, put a safety engineer on the job, or something like that, and we are turning that matter over now to see what we think is the best thing to do.

MR. TUBESING: In our state the thing is probably a little different than yours, in that the state and the city have the inspectors who come around and tell us just exactly what we have to do. But we are going at this thing in a different manner now. We don't want all this inspection. We want to do it ourselves, and we want to follow the Detroit Chapter's ideas of having a well-regulated working unit that goes out and not only does the inspection at the beginning of the job, but as soon as something happens they are right there to find out all the details. So probably you didn't get your chapter right, probably they aren't after the fact that you should have a whole staff in the shop, but they are probably going to create it.

MR. PRUITT: They expected us to do something of the kind if we thought it was practicable, and I would like to know, also, what the Milwaukee Council gives the contractors in the way of a service.

MR. TUBESING: I think Stanley made it plain here. You see, the Association of Commerce has been functioning for a long time. The Milwaukee Chapter for the last three years has had a section in this association known as the Construction Section. I have been the chairman of the Construction Section these last three years and we are just about finding ourselves; in fact, we come to these meetings, and every time we leave here we go back with some new idea we attempt to drive home.

Last year I got back to Milwaukee and said to them, "The Association of Commerce is all right, but what we have got to do is get Austin with his gang to come up here some night and sell our fellows." That was what we did. We got them, as stated in the paper; they came over and we got all of our principal contractors to the meeting and then we had Detroit tell us just how they did it, in spite of the fact that we had this whole big safety organization. The contractors need this work

and your chapter—anything that you can do. I don't know how big you can organize, but everything that you can do to help your chapter down there is going to be just one more help to this safety movement. The very fact that you have come to this meeting shows us that you are interested.

CHAIRMAN AUSTIN: If I understand the situation, Mr. Pruitt, the main thing that the Milwaukee Council has done for construction is to set up the machinery through which these foremen's schools are conducted, along with foremen's schools for manufacturers, foremen's schools for tanners and other foremen's schools.

Gentlemen, we will now have the pleasure of listening to Mr. McMurchy, of the Ohio Industrial Commission.

CHECKING PLANS FOR SAFETY

D. F. McMurchy, Construction Engineer, Ohio Industrial Commission,
Columbus, Ohio

The subject assigned me is one on which two comprehensive papers have been given previously, namely Mr. Kershaw's paper before the Ninth Safety Congress in 1920, entitled "How to Check Plans and Specifications for New Buildings and Equipment," and Safe Practices Pamphlet No. 53, "Checking Plans and Specifications for Safety," which is an enlargement on Mr. Kershaw's paper by the Safe Practices Committee of the Council.

The meat of these papers is contained in "check lists" which furnish clues as to the location of various common accident hazards, and although not all-inclusive, they contain a great number of leads by which a safety engineer may locate the hazards of his particular industry. To enlarge further on these lists would be to add the special hazards of particular industries which would be, in a great or less degree, uninteresting to those of us not particularly concerned with the hazards of industries other than our own.

In the construction industry these lists are less applicable than in others, due to the progressive and varied nature of construction work. A set of plans may be checked for the method of constructing a given project but the job superintendent generally erects his equipment as needed, much of which is temporary and must be guarded each time it is erected. Therefore, on construction work, the safety engineer's field lies largely in educating the workmen and in guarding the hazards as they appear, whether in temporary structures, such as scaffolds, or in the uncompleted permanent construction such as vertical openings. There is but little advantage to be gained from a check of the plans and specifications of the structure by the safety department of the contractor, as generally his hazards are easily detected as the work progresses and are just as easily guarded.

The contractor, then, is concerned, in a safety sense, with the hazards he creates and over which he has direct control. He has little voice in the preparation of the plans and specifications of the projects he con-

tracts to build. The greater value of a safety check of the plans lies outside the construction field.

The various states and municipalities through their building departments have been checking building plans for safety since their inception. They are guided by laws which cover only the more evident hazards affecting group safety and loss of life or property by fire in buildings of a public character. These departments generally are inadequate to handle the volume of work required of them and the codes, where such are in effect, are in most cases very lenient in their requirements pertaining to safety of the individual.

Except in cases of very apparent error the strength of the structure is rarely checked; to do so on every set of plans submitted would occasion a force of engineers prohibitive in size and requiring more time than would be tolerated by the owners. As a result the plans when checked receive an inspection for the more evident fire and accident hazards such as type of construction, number and location of exits, size and material of walls and other items affecting the safety of groups in case of fire or panic; but the hazards of a less evident nature are not checked nor in all cases are they provided for in the building codes which must be used by the building departments as guides for inspection.

The Designing Engineer To Be Also a Safety Engineer

In view of the paucity of adequate inspection facilities on the part of government and possible inefficiency brought about through changing administrations, this work, if done at all, falls to the safety department of the concern for which the structure or layout is designed. The safety engineer detecting the more common hazards can use known methods of guarding them. He may be able to foresee conditions which might prove hazardous which have never been encountered previously and may even devise adequate guards for them but he can not be expected to find all such conditions nor is he in a position to suggest radical changes in design or operation to eliminate hazards, unless thoroughly trained, because of the technical problems involved.

Mr. DeBlois, formerly of the Dupont company, who was acting chairman of the Ninth Congress at which Mr. Kershaw gave the paper referred to above, in discussing this paper, presented a very significant thought. Realizing that our work is educational and our field practically unlimited, including not only the plants in operation but extending to the drafting rooms where such plants are created, he visualized the designing engineer of the future as being a safety engineer as well.

Such a combination, it seems, would be ideal from a mechanical guarding standpoint, as known hazards would be guarded before they enter the field of operation as integral parts of the machine, structure or plant. Further, the designing engineer, trained also in accident prevention, is better able to eliminate the inherent hazards of industry which are now stumbling blocks for safety engineers. The designing engineer, having been thoroughly trained in the technical phase of his industry and well informed of the accidents which have occurred

therein, is in a better position to change his design or operation to eliminate the hazardous operations and guard others. He is also in a better position to foresee hazardous conditions which have not been encountered previously and devise means for their elimination.

As to the economy of such a program, none can gainsay that more efficient guards can be provided at less cost at the time of manufacture than when attached or applied as an after-thought or as the result of safety check of the plans and specifications after they are completed from an engineering or design standpoint. While it might be said that the safety check is made during the preparation of the drawings, or at any rate before actual construction begins, would it not be a more nearly ideal condition if safety were incorporated in the machine, structure or plant design during the preliminary stages rather than to apply it, insofar as safety is then applicable, after the drawings are completed?

"The New Leadership in Industry"

I was intensely interested in an article appearing in the September issue of *Survey*, being an excerpt from Sam A. Lewisohn's recent book, "The New Leadership in Industry." Mr. Lewisohn, talking on "Management," regrets the fact that engineer graduates of technical schools are given to the industrial world with an excellent technical education, well prepared to handle almost any situation from a technical standpoint, but sadly unprepared in developing the human beings who will later come under their supervision or direction. He deplores the fact that financial and technical problems are too often given the place in the sun, subordinating human organization and other phases of efficient production as of less fundamental importance. Lastly he urges that more management be taught in the professional colleges that society in general be benefitted.

Mr. Lewisohn might well have inserted the words, "Accident Prevention" in the instances in which the term "Management" is used in the last few paragraphs of his article and presented as sound an argument. Few of the technical schools of the country today graduate engineers with even a passing education in the prevention of accidents. The subject of safety is one of the vital constituents of the human side of business which must be considered if true efficiency is to be had, but as yet is touched upon but lightly in most engineering schools.

A report of the Committee on Safety Education in Engineering Colleges of the American Society of Safety Engineers, presented to the Congress in Cleveland last year, was the basis for a pamphlet, "Accident Prevention and the Engineer," published by the Council, which gives, under the subhead, "Practical Methods," a list of colleges and universities giving safety instruction to their students.

Of these perhaps Pennsylvania State College is foremost, in that it has inaugurated a safety course as part of its engineering extension curricula, reaching a large number of extra-mural students who are actually in the production field as executives or workmen. The safety courses

on the campus involve lecture courses on safety subjects, the discussion of safety laws and codes, the theory and practice of compensation insurance, the compilation and analysis of statistical records, sanitation, health, safety inspection, and insurance ratings. Dean A. E. Holbrook, who originated the course, states that 32 class periods devoted to the above topics do not by any means exhaust the subject nor the student's interest. In the design courses the student is taught the design and application of guards on machines. Lighting and ventilation are studied in relation to plant layout and design. The electrical engineers are given a full period for the discussion of safety and practically all departments of the School of Engineering have courses so arranged that the students may become familiar with the fundamentals of safety.

This represents a significant step in the right direction, to the ultimate elimination of many accident hazards so that humanity in the future may profit by past experience; however the work is only started. A complete course of safety instruction should be incorporated in every engineering school today. The engineers have given us practically every comfort and convenience, in a material sense, that we enjoy, but in so doing have created conditions from which arise 23,000 deaths, 570,000 accidents involving a time loss of four weeks or more and 3,000,000 no-time-lost accidents every year in the United States, according to the results of a survey given in "Waste in Industry." These involve a time loss of some 50,000,000 days and a loss in wages alone of \$1,184,000,000.

The Effect of Accidents Upon the Homes Incalculable

This does not and can not include the heartaches and suffering attendant to these injuries—the effect of these accidents upon the homes and families of these injured workers; this loss can not be reckoned in dollars. Surely, gentlemen, this is a problem of sufficient size to warrant the attention of our educational institutions, yet so little is being done toward the elimination of this unjustifiable waste! A check of the plans for safety, where facilities for such a check are to be had, is certainly productive of good results, but is not the problem one which requires and deserves investigation and revision from both engineering and safety standpoints to a much greater degree than is possible through a safety check?

Let us then think of an engineering curriculum in which the student engineer is given a background of economics and sociology, insofar as these subjects bear upon his profession, so that he may better grasp and more fully appreciate these problems, the solution of which rests in his hands. He is given training in compilation and analysis of accident statistics, workmen's compensation legislation, safety regulations, etc. He is informed of the accident situation in his chosen branch of the profession, giving as much time to inherent hazards as the course will permit. He is taught the design and application of guards so as to include them as integral parts of the machine, structure or plant he is later to design. He is given sufficient training in management and in-

dustrial relations to better coordinate his organization in the event that he is to fill an executive position in the future.

An engineer who receives this instruction, along with his technical training, not as elective subjects but as requirements for graduation, has then a fair conception of his responsibility. If the engineer created the hazards, the engineer must eliminate them, to the end that all men may live to enjoy the fruits of their labor. Then, if ever, will the problem of accident prevention resolve itself into a matter of human engineering—educating the worker in the safe operation of the ideal machine in the ideal plant. When both are accomplished we can see the beginning of the day when our accidents are not counted in thousands, but in hundreds or less.

An Old Sacrificial Custom in Construction Industry

CHAIRMAN AUSTIN: I am sure we all appreciate Mr. McMurchy's interest in coming here and presenting this very enlightening paper; and while he was reading I was reminded of one of the meetings we had last winter at which our building commissioner of Detroit made an address, and particularly of his closing remarks. He called attention to the fact that as late as the Seventeenth Century, and in no less a country than England, it was customary to make a human sacrifice and bury the body under the corner of the structure to insure stability. And he called attention to the fact, of course, that the mere statement of that to any audience in this time of ours and in this advanced civilization would strike horror into their hearts and souls, and that the first reflection of almost any human being would be to say that it was horrible, barbaric, awful. He closed his address by saying that the strange thing about it is that the construction industry is making the same sacrifice today that it did in the Seventeenth Century.

MR. PRUITT: If I may say this, I don't feel like a member of this Section, exactly, but I have a suggestion to make to you and the rest of the gentlemen, for consideration about the papers that have been read here today and the discussion. The speeches and discussions will be available in a large book about the size of the *World's Almanac*, but not many persons get that book. I think the community councils buy them, and some few companies, but the average person who attends the Congress doesn't get it. I think, though, there have been some mighty fine things said here this morning that would be of interest to all of us, and I wonder if it would be possible for the officers of this Section to see that certain parts of this, or the best parts, are mimeographed and made available to those who have registered here for these sessions. I know that I would be greatly interested in having 15 or 20 of those copies to give to the A. G. C. contractors in Birmingham, that is, those who are members of the chapter.

CHAIRMAN AUSTIN: I think that we can make arrangements for the distribution of the proceedings of the Construction Section through the people interested in those proceedings.

MR. PRUITT: So far as we are concerned, any nominal charge that will be made we will be glad to assume for our part.

CHAIRMAN AUSTIN: I think that can be made through the National Safety Council. I will take it upon myself to see if it can, and if it can we will do the necessary thing.

MR. CRAWFORD: For the benefit of those from New York who possibly do not know it: the New York University has a safety course this year, for the first time. I think this is a mighty good time to put this safety work over. You fellows, I feel, are all enthused; you have come distances to attend this Congress. I appeal to you men, don't forget it, don't forget what you have heard here, broadcast it; be a good broadcaster, that is the stuff that we need. We keep too much of this stuff to ourselves. Broadcast it, let the men know what you are doing, what you have come down here for, and take them back something.

Contractor Should Be Selected for Safety Influence

MR. KARSNER (Pittsburgh Plate Glass Company, Kokomo, Ind.): I am not connected with the Construction Section but I always manage to sit in one or two Construction Sessions. It means a whole lot to an industrial plant when there is an outside contractor if he is connected with an organization that is interested in the safety movement. We do missionary work in our plant every day and if we get a small contractor into the plant who makes no effort to protect his men he does more harm to our safety program in the short time that he is in the plant than we can do good in several months by the example that he sets. I think that any manufacturer who has a contract to let should consider the contractor from the standpoint of the interest he takes in safety, for the benefit of his own safety program.

CHAIRMAN AUSTIN: I think all the contractors here will agree with you perfectly, if you can just get the manufacturers to coincide with you on those views then we will all be happy.

MR. SPRINGER (Detroit City Gas Company, Detroit): I want to add my word to the last statement made. As a maintenance foreman in the plant, who has to cooperate with the contractors who are doing work in the plant, I find I have lost more weight, my nerves have gone to pieces more, at the work of the contractors in those plants than anything I have ever had to deal with. The contractors certainly can do a lot in promoting safety work there, about a gas plant where we have the hazards to deal with.

We rarely have fires occasioned by our own people; practically never do we have a contractor in but we do have one.

A contractor has to pick up his men in a short time to get the work done, he picks up the best men he can get available in the neighborhood where he is working; we realize that. We have maintained in our particular plant a very good accident record, so far as the city is concerned; considering the number of employees, we have the best record of any gas plant in the city. We have first aid men and we have a man who

is after that work all the time, looking those things over, but whenever there is a contractor, or especially where there is a sub-contractor, and two of them get together, we put every man available on his toes to keep track of the conditions there.

MR. CARMICHAEL (Hazel-Atlas Glass Company, Washington, Pa.): I must say that you fellows are very fortunate here in having a Congress of your own. Six of us are here representing the Hazel-Atlas Glass Company and we have dodged around here trying to find something that has to do with the glass industry, but we haven't found it. I will say that these papers here, particularly the last one, have appealed to us, not from a contractor's point of view but from the standpoint of industry, and we have gathered quite a bit.

Now a word about our local congress in Washington County, Pa.

We have a class numbering about 300 and we are meeting within the next few days to plan our winter campaign. We work in conjunction, too, with the Pittsburgh District. We sit down to a banquet in Pittsburgh with 2,000 men, it is a great Congress, but we are very glad to be here in connection with this contractors' conference.

MR. SMITH (Pullman Car Works, Chicago, Ill.): It seems to me that you have an ideal arrangement there to educate your contractors, these chapters, if each of them would have a form to report their accidents on, for instance. This man who looked down the elevator shaft—that could easily enough have been boarded up so he couldn't have got his head in there.

I also know of an accident not long ago where they were building a structure that happened to come up to the alley where the power lines went through, and one of the men got in contact with a line and was killed. Such accidents as that could be sent around to all the members of this chapter showing how accidents happen and how they could be prevented. That could be taken up with the electric company and those wires guarded where your contractors are working.

SECRETARY ROBINSON: For the benefit of those who are not acquainted with the Detroit method, I might say in connection with the point brought up by the last speaker, that in our quarterly meetings that we hold here with our superintendents and foremen, one part of our program which we always adhere to is to have a report made on the most serious accidents that occurred during the past three months, which is complete in every detail as to how the accident happened, and so forth. That is done with the idea of giving the men on the job, the superintendents and the foremen, all this information so that they may avoid a repetition of such accidents in the future.

We also keep in touch with the public writing commission in Detroit when new jobs are started. We see that men are sent out and superintendents are instructed as to taking care of existing power lines, and so forth, that are adjacent to this new work.

ADJOURNMENT

THURSDAY MORNING SESSION

October 28, 1926

C. H. ALMSTEAD, Chairman
Patent Scaffolding Company, New York City

The third session of the Construction Section of the National Safety Council was called to order at 10 o'clock, Thursday, October 28, 1926, in the Reception Room of the Book-Cadillac Hotel, Detroit, Michigan, by the First Vice-Chairman-elect, Mr. C. H. Almstead, of the Patent Scaffolding Company, New York City, who acted as chairman.

CHAIRMAN ALMSTEAD: Members of the Construction Section, unfortunately your newly elected chairman, Mr. E. C. Harding, General Superintendent of the Ferro Concrete Construction Company of Cincinnati, due to illness in his family, is unable to attend.

We always like to know just how the fellow in direct charge of construction operation feels about accident prevention; so it gives me great pleasure to introduce our next speaker, Mr. A. G. Butler, General Superintendent of Construction, of the Louisville Gas & Electric Company, Louisville, Kentucky.

**SAFETY AND EFFICIENCY IN DAM AND OTHER
CONSTRUCTION**

A. G. Butler, General Superintendent of Construction, Louisville Gas and Electric Company, Louisville, Ky.

The demands of a growing city for prompt, continuous and satisfactory gas and electric service, call for an extensive and very thorough type of construction work.

Louisville, a city of 311,000 population, is served with gas and electricity by the Louisville Gas and Electric Company which is under the supervision of the Byllesby Engineering and Management Corporation. Since this property was taken over by the H. M. Byllesby Company in 1913 there has been continuous construction work on power houses, substations, gas plants, gas holders, office buildings, storehouse buildings, garages and all of the property necessary for maintaining service to meet the exacting demands. This construction organization has never been under 50 men and now numbers about 2000.

Much of the construction work is done in plants which are in operation and a great deal of it is done regardless of weather. It is for that reason more hazardous than the general run of building work, but to offset this we have the advantage of being able to plan our work so as to keep at least the nucleus of a large organization steadily employed.

All of the construction work, such as foundations, tunnels, conduit lines, wrecking, concrete work, structural steel, smoke stacks, pipe work,

machinery setting, machinery moving, railroads, electrical work, etc., is done with our own forces. A great deal of the electrical work is done in stations that are alive. Continuity of service is the first consideration so that construction work is done at all hours, much of it in hours not meant for man to work in.

We, as a public utility, are subject to supervision not known in private business. We must be prepared at all times to justify every dollar invested so that when rates are fixed they will allow a return on that dollar. For that reason we must secure full value for each dollar. Each dollar must begin earning as soon as possible, so speed is important. High speed, whether it be with automobiles or on construction work, is not conducive to safety of life and limb.

From 25 to 40 cents out of each dollar we spend on construction work is for labor. You have all experienced the cost of training a man for any work, and no doubt you have experienced the cost of attempting to do work with a man not well trained. If a man is off on account of accident or for any other reason, it is sometimes necessary to do work with men not so well trained, and this is expensive. It is not only expensive, but it increases the danger of accident to the man not properly trained and to his fellows. In addition to the loss of a trained man, if his lost time is caused by accident we are penalized sooner or later by the insurance company. So you can see, if proof is necessary, that we are forced to look to the safety of our men.

Sketch of the Safety Organization

We continually have this subject before us in one form or another and attempt to have it always before our superintendents, foremen and workmen.

The operating company has a safety committee that meets monthly and is composed of the heads of departments. Accidents and methods of preventing accidents in the future are discussed by this committee.

On our construction work we have a safety man to keep on the lookout for hazards; to keep the question of accident prevention before the foremen and the men by word of mouth and by the bulletin board, and to investigate each accident that does occur. Every time I visit a job I take up some form of accident prevention with the superintendent and with the foremen.

No cost is spared to keep the construction plant safe. This means not only safety to the men but continuous operation of the plant. A great many of our foremen have attended the Foremen's School held periodically under the direction of the Louisville Safety Council. We have had schools in first aid work and on one or two occasions this has been the means of saving a life that might otherwise have been lost before a doctor could reach the scene of accident.

The slightest scratch or bruise is reported as an accident, but, strange as it may seem, the more serious ones happen on work that is considered not particularly hazardous. We have more accidents than we like to

have but we are continually preaching safety and at times it looks as though we are making progress. In the last two years we have had as low as one lost-time accident in a month with over 300 men employed. Our frequency rate has been as low as one accident per 1,000 man days and as high as 3.95 accidents per 1,000 man days.

I believe that it is generally accepted that the best accident prevention work can be done through the foremen. This, of course, after the job has been well planned and properly equipped. If foremen can be secured who are true sons of Martha and "Wary and watchful all their days that their brethren's days may be long in the land" and these men are properly trained to think and work safely, there will be little to do on safety work or accident prevention, and efficiency, so far as the payroll is concerned, will take care of itself.

The very nature of construction work is such as to cause peaks and valleys in employment. With sufficient foresight and by carefully planning the work in advance, a great many of these peaks can be cut off and the valleys filled up.

A Great Power Plant at the Falls of the Ohio

We are now building a 108,000 horse power hydro electric plant to develop the power at the falls of the Ohio River at Louisville. The dam is to serve both for navigation and for power purposes and is being built as a contract by the Byllesby Engineering and Management Corporation under the supervision of a corps of engineers of the U. S. Army. The project will total approximately ten million dollars and is being carried on as one job.

The working season in the river is short and uncertain, and for that reason when the river permits work must be carried on continuously 24 hours a day and seven days in the week. Surprising as it may seem with the rapid expansion necessary for this work, neither the frequency rate nor the severity rate on accidents has increased materially. In fact in the months of May and June when this expansion was taking place there was a decrease.

The same careful study was given to the construction layout on this job as was given to the economics of the project and the design of the permanent structure. These studies covered a period of nearly two years and all of the different possibilities of handling the work were considered. The studies included even methods of handling visitors safely.

Of course, we were fortunate in having a rather large organization ready for this work and probably this has been the greatest factor in the prevention of accidents.

CHAIRMAN ALMSTEAD: I am sure we have all enjoyed hearing the wonderful progress made by the Louisville Gas & Electric Company, and in the hope that there will be some questions we will set aside ten minutes for discussion.

H. W. HEINRICH (Travelers Insurance Company): I agree so heartily and so wholly with the thoughts so ably presented by your speaker that

I can not refrain from supporting his arguments with the more or less limited experience of our own company.

I recall that one of the things he brought out very forcibly was that it was unnecessary to have any further incentive to carry on accident prevention in the construction work than existed in his explanation of the necessity for training men, the delays incidental to accidents, and other incidental costs of that kind.

I think that it may interest your speaker and others to bring this point out: that while it is true you do not need any other incentive than perhaps the humanitarian incentive, nevertheless if there is a business incentive that exists in addition to the humanitarian incentive, so much the better, and it will help us to get quicker and better results in accident prevention.

Cost of Accidents to Employer Can Be Closely Gauged

There is another incentive. That is the direct cost to the employer of accidents in the construction industry. Based upon an experience covering thousands of construction risks, including dams, steel constructed buildings and miscellaneous construction work, the cost of accidents can be measured very, very closely by this comparison—the cost to the employer is exactly four times the cost to the insurance carrier. Now if in your own experience you happen to recall that your accidents have run to the extent possibly of \$5,000 per year, which the insurance carrier has paid, you may make up your own minds that your own cost included in your overhead paid out of your own pockets as employers has been \$20,000 a year.

Now that has been proved again, as I say, from a limited point of view, but I would not dare say it unless I felt that it was pretty close to being an average statement for all types of accidents. On the average your cost is four times the cost that the insurance carrier pays, and that cost is tied up in construction work largely by property damage. When things go wrong, whether it is on a building, or what it is on, if an accident occurs property damage is tied up in that. The compensation cost may be \$5 or \$10 for one man injured to a minor extent; but the cost to the employer when something like that happens, first of all is in property damage, second in the delay in carrying on the job, third perhaps in forfeits or lack of bonuses for not keeping the job up on time; and having to train men, time of the foreman, time of the superintendent, all put together, all added up, amounts to four times the cost to the insurance carrier. This is a business incentive to do accident prevention work.

Just one more point, your speaker also mentioned this: that to hit at the crux of the accident prevention situation you must get at the foremen. That is true, I agree with him heartily; the foreman is the key to the accident prevention game from our experience in construction work. But it isn't enough just to say that the foremen can cure the situation, and then proceed to talk generally about safety organizations,

about educating the foremen, about doing this, that and the other thing. Suppose you had a specific thing to do that would cure the situation through the foremen, what would that one thing be that you could lay your hands on? In other words, how can you make the foremen cure the accident prevention situation in construction?

Then, too, there is a specific answer from another limited point of view, but it has worked; it is working now in dozens of huge construction jobs; and that is the principle of holding the foreman directly and personally accountable for all accidents that happen under his supervision. You couldn't have failed to be impressed by the fact that out of the whole bunch of accidents shown by the speaker three were due to falling material and a whole host of others due to slips, falls, stumbles and other miscellaneous and minor accidents, some of them serious and costly, of course, but largely the little minor accidents.

Those are the things that in general experience are causing the losses in construction work, and they are controllable by the foreman and by holding the foreman personally responsible and accountable for what goes on. He can be held fairly accountable for even the tom-fool unnecessary exposure accidents; the accidents that are due to ignorance and carelessness, those can be controlled by the foreman. It is too long a process to explain why, but I make that statement as the result of an experience of our own company and it is working in construction jobs now.

MR. AUSTIN: I would like to ask Mr. Butler what the basis of measurement of lost hours is. For instance, how many lost hours are counted for a death?

Status of the Construction Safety Code

MR. BUTLER: On the same basis as the National Safety Council, 6,000 man days, 60,000 hours.

MR. PARIS (General Builders' Association, Detroit): It didn't seem to me that Mr. Butler's nomenclature of accidents was true to the classifications that we use here, and that have been generally used. I wonder if that is so or if it would mess up his figures too much if they might be made so.

MR. BUTLER: No, we took that from statistics of the operating company as a basis of comparison with theirs. It could be switched over without much trouble.

CHAIRMAN ALMSTEAD: Mr. Keefer is here from the Council and wishes to make a short announcement.

W. DEAN KEEFER (National Safety Council): During recent months I have been impressed with the number of articles that have appeared in your various trade journals referring to safety and I think it is a fine tribute to this Section that trade journals are beginning to recognize your efforts. A great deal of space has been devoted to the discussion of the Construction Safety Code, some of these statements, however, are somewhat misleading so your chairman has asked me to explain briefly the main points about the code.

For some years, individual states throughout the country have been adopting and enforcing safety regulations applying to all sorts of industries. This is working a hardship on those employers operating in two or more states, for they are forced to comply with a different set of regulations in each state, so one reason for the organization of the American Engineering Standards Committee was to formulate standard codes for state adoption and enforcement, leading to national uniformity. In addition, the codes of this organization are suitable for voluntary adoption and enforcement by the individual concerns in the industries for which these codes are prepared. Fifteen safety codes have been completed and 45 others are under way.

Ten Years Behind the Times in Safety Work

When a Construction Safety Code was first suggested about four years ago, the American Engineering Standards Committee asked the National Safety Council to undertake sponsorship. We agreed and organized a code committee including 27 men representing six different interests; the manufacturers of equipment, employers, employees, insurance company representatives, governmental and state representatives, and independent experts; the last named group comprising the representatives of engineering societies, and the National Safety Council.

This committee has criticised and revised four drafts of a Construction Safety Code, but we have now come to the conclusion that the construction industry is about 10 years behind the times in safety work, and that it is undoubtedly necessary to do considerable educational work among construction company executives before they will be willing to give any reasonable consideration to the whole subject of accident prevention in general and to any safety code in particular.

Fortunately, the Associated General Contractors of America has expressed its willingness to add a paid man to its staff to promote accident prevention among its members. This is a big step forward and certainly we should congratulate the A. G. C. upon that splendid undertaking. We have considered the work this man will be called upon to do, particularly as it relates to the code. His big job will be to call on individual contracting companies and get them to undertake organized accident prevention work; not to sell them a set of rules and regulations, but to influence them to undertake a real organized effort to prevent accidents.

This man will have an exceedingly difficult job, and the officials of the A. G. C. feel that we would complicate the situation if we were to set up two objectives instead of one in the minds of the construction executives. If we proceed with the immediate development of a code, the A. G. C. will be asking construction executives to organize for accident prevention, and simultaneously the Construction Code Committee will be asking the same executives to consider the voluntary adoption and enforcement of a set of rules and regulations.

The National Safety Council, as sponsor for the code, has therefore

accepted the recommendation of the A. G. C. to postpone immediate action on the code pending an evaluation of the work of the A. G. C. safety man.

This agreement, of course, does not at all commit the American Engineering Standards Committee to any definite line of action. We must realize that there are many people and many interests desiring the immediate formulation of a Construction Safety Code, and if this opinion prevails in the A. E. S. C., it may be necessary for the Safety Council to withdraw as sponsor, permitting the adoption of some other procedure to bring about the desired result.

MR. CONNER (U. G. I. Contracting Co., Philadelphia): I would like to ask Mr. Keefer what is going to be done by the A. G. C. in reference to taking care of the promulgation of a state code? Should we not in the light of this delay that is going to be experienced in the promulgation of the American Standards code, approach the state departments and request them to hold off until we get the results of this other action?

MR. KEEFER: I don't believe that is within our province. The National Safety Council tries to keep out of legislative problems and discussions. Perhaps the state of Pennsylvania is considering the promulgation of a state code for the construction industry. There will be state hearings and those of you who operate in Pennsylvania will be given an opportunity to appear before the committee that will formulate the code to criticize and amend the suggested rules and regulations. If you have an organization of Pennsylvania contractors, I imagine that will be the organization through which you will want to work.

Accident Prevention Is a Matter of Education

MR. AUSTIN: Mr. Chairman, I would like to make a few remarks. In the first place I don't think the question of uniformity between states is important at all. Maybe some of the other gentlemen who operate in different states would feel differently about it, but I don't believe it is an important consideration in this matter. We have different laws in different states; we always will have. When corporations go from one state to another they know of certain things they have to do, and to acquaint themselves with the particular requirements of the safety code or industrial accident commission is just one of the numerous things that we have to do, and probably always will have to do. So I don't attach the importance to uniformity that some others do. In fact, I take the opposite view.

To a very great extent, just in so far as the construction industry is nationalized, just so far the construction industry is going to suffer. I do not believe in nationalizing to the extent that has been done in the past, and I don't believe in nationalizing in such a detailed document as a construction code.

It so happens that accident prevention in the construction industry is not a matter of legislation at all; it is a matter of education, and those of us who believe thoroughly in that fundamental principle think it a

grave mistake if the legislative feature of the problem is emphasized and the educational feature submerged. We want very much to see the construction industry awakened to its responsibility in this matter to the extent that they will enter upon a voluntary, educational, cooperative, accident prevention program before a legislative compulsory program is thrust upon them by outside interests.

MR. BUTLER: I might add a word to what Mr. Austin had to say about legislation. I question very much if it is possible to prevent accidents by legislation. It is a question that each contractor has to work out for himself. It is a responsibility that is laid on him, and it is just as much of a responsibility as getting the work done. All the legislation in the world will not prevent accidents.

MR. McMURCHY: I agree with Mr. Austin and Mr. Butler that you can not prevent accidents by legislation. I don't think the purpose of any code is to do that. The A. G. C., fine organization as it is, in order to maintain its individuality and its high place in the industry, must of necessity limit its membership to the more ethical contractors. Now it can not be said that all the work is done by A. G. C. contractors. If it were the problem of accident prevention might be a different proposition, because I believe the A. G. C. is awakening to an appreciation of moral responsibility to the workers. If all contractors were aware of their responsibilities in accident prevention, the code would be the most unnecessary thing in the world. But there are some contractors, not members of the A. G. C., who do not realize their responsibility in this matter, and in order to protect themselves the labor side has asked for state regulation as a means of combating negligence on the part of employers generally—not all employers, thank goodness, but of those who otherwise won't make any provisions for the safety of their men. It is questionable what good it does. In Ohio it does some, as evidenced by the cooperation secured by the division of safety and hygiene. We present the thing not as policemen, not from a coercive standpoint at all, but we use codes as guides for our inspectors in educating the employer and the employee alike to the hazards of their industry.

CHAIRMAN ALMSTED: We come now to the last paper on our program and it gives me great pleasure to present our esteemed former chairman to you, Mr. W. F. Austin, president of the W. E. Wood Company, of Detroit.

PROGRESS OF THE CONSTRUCTION SECTION

W. F. Austin, President, W. E. Wood Company, Detroit, Mich.

The progress of the Construction Section can not be measured by membership. All movements of importance, and particularly those national in their scope, require time for their maximum development. The Construction Section of the National Safety Council was organized in 1918 at the Congress in St. Louis, with less than a dozen constructors in attend-

ance, but these were sincere and determined to see our industry take its rightful place in accident prevention work.

For eight years our Section has been struggling (and the word is used advisedly) to interest the construction industry in accident prevention and to build up the Section to a point consistent with the magnitude and importance of the industry. This has been a slow process for numerous reasons. The construction industry is difficult of organization, and methods are changed and improved rapidly; there are frequent changes in personnel; and the work fluctuates in volume and exposure. These and other factors combined seem to make accident prevention in the construction industry more difficult than in some other industries.

It seems to me, however, that the principal difficulty has been that in all the United States there is only a handful of construction men who have devoted any great amount of time personally to the national phases of this work. To some extent we have been struggling along as a "Nobody Responsible Club." Most of the constructors of the country, because of the lack of organization, have been too busy with their own problems; constructors have been the "football" for every other element in the industry, so none have been in a position to give accident prevention the time and thought it requires.

Construction Section to Have a Paid Secretary

About a year ago some of you gentlemen, who have been active in this section for years, deliberately and thoughtfully came to the conclusion that until we could secure a man who would make accident prevention in the construction industry *his job*, and devote his whole time to this work, our Section would be standing still, if not actually losing ground. So, at your suggestion, your chairman presented this matter to the Executive Committee of the National Safety Council and was given a very sympathetic and encouraging reply, with the result that we now have a full-time, paid secretary for the Construction Section.

Surely, we are justified in feeling proud of our accomplishment and thankful to the National Safety Council, our parent body, for their encouraging assistance. But I can not refrain from sounding a note of warning. Through the employment of this Field Secretary, we must not permit ourselves to lie back and imagine that all of our problems are solved. Safety in the construction industry is too complicated and too big a job for one man to tackle single-handed, and if any success at all is to attend the efforts of our secretary, he will need more cooperation, more assistance, and more work from us than we have ever displayed before. The eyes of the safety world are focused upon us; we dare not fail; we must succeed.

Everything is in our favor. The construction industry, through the efforts of the Associated General Contractors of America, is organized and beginning to take its rightful place in the life of the nation. It is unqualifiedly going to promote accident prevention as a result of action taken by its Executive Board which met at Kansas City early in October.

The trade journals, including the *American Contractor*, the *Engineering News Record*, and the *Constructor*, are pounding away in an effort to awaken constructors to their responsibility in this matter. Progress is being made slowly but surely, and this is largely through the efforts of this Section. More general interest has been shown, and more actual active work has been accomplished in our industry along the line of accident prevention in the past year than in all preceding years combined, and those of us who have had the success of this Section at heart are gratified.

With the full-time secretary for your Section, supplemented by the continued good work of you members, and stimulated by the insistent demand of the public, the press and the government agencies, there are almost unlimited possibilities ahead of us. There is no reason why the Construction Section of the National Safety Council should not be the largest, the strongest and the most active of all the Sections. The construction field presents the greatest possibilities for the reduction of accidents, and now that we are assured of the cooperation of the Associated General Contractors, and the very tangible help of the National Council, there is no reason why we should not continue on to greater things than any of us have yet dared to anticipate.

Continued Interest Asked for the Section Work

In conclusion, I bespeak your continued interest in the Construction Section, to the end that we may yet enlist the industry to such an extent as in time to avoid an avalanche of hasty legislation and restrictive measures which are questionable in effectiveness as far as a reduction of accidents is concerned, and to the further end that our industry may enter upon this work voluntarily on the basis of cooperation between employee and employer, along educational lines of sane, reasonable, and common-sense prevention methods, which we know will result in maximum efficiency and develop all of the possibilities.

I wish to thank the members of the Section (and particularly the members of the Executive Committee) for their generous support and response to every call made upon them, and I shall always look upon the past two years of service as chairman of your Section with a great deal of pleasure and satisfaction.

CHAIRMAN ALMSTED: Mr. Austin has covered his subject so well that I am somewhat reluctant to hold a discussion.

On behalf of the Section I want to thank the officers and our good friend Mr. Robinson who has worked so hard, for this splendid cooperation to make our sessions a great success.

On behalf of the Section I personally want to thank the General Builders of Detroit and others for their splendid hospitality. We have enjoyed our visit here and I can assure them their hospitality is very sincerely appreciated.

To our retiring chairman, I offer my personal and the Construction Section's heartfelt appreciation of his wonderful achievements in making

the Section what it is today. His sincere leadership has instilled in us the spirit of cooperation which makes me believe that we are not standing pat but sure-stepping. I know we will have his assistance in the many knotty problems which will be presented to us during the coming year. Gentlemen, I move we give a rising vote of thanks to Mr. Austin.

..(The Section gave the rising vote of thanks amid loud applause.)

ADJOURNMENT

Electric Railway Section

New Officers of the Section

CHAIRMAN: R. W. EMERSON

The Cleveland Railway Company, Cleveland, Ohio.

VICE-CHAIRMAN (MOTOR BUS OPERATION): A. W. KOEHLER

The Milwaukee Electric Railway & Light Co., Milwaukee, Wis.

VICE-CHAIRMAN (INTERURBAN TRANSPORTATION): H. K. BENNETT

United Electric Railways Co., Providence, R. I.

VICE-CHAIRMAN (URBAN TRANSPORTATION): E. K. EASTHAM

United Railways of St. Louis, St. Louis, Mo.

SECRETARY: J. J. CONNORS

The Tennessee Electric Power Company, Chattanooga, Tenn.

Committees

PROGRAM: SAMUEL H. REID, Chairman

Bureau of Safety, Chicago, Ill.

POSTER: J. E. STOTT, Chairman

Georgia Power Co., Atlanta, Ga.

MEMBERSHIP: W. H. BOYCE, Chairman

Pittsburgh Railways Co., Pittsburgh, Pa.

PUBLICITY: BUELL W. NUTT, Chairman

The Safety Equipment Service Co., Cleveland, Ohio.

RECOMMENDATIONS: A. L. HODGES, Chairman

The Brooklyn City Railroad Co., Brooklyn, N. Y.

COOPERATING WITH CLAIMS ASSN. A. E. R. A.: G. T. HELLMUTH, Chairman

Chicago, North Shore & Milwaukee Railroad Co., Chicago, Ill.

ENGINEERING REPRESENTATIVE: CLINTON D. SMITH

Beaver Valley Traction Company, New Brighton, Pa.

October 26, 1926

A. W. KOEHLER, Vice-Chairman

Superintendent of Accident Prevention, The Milwaukee Electric
Railways & Light Co., Milwaukee, Wis.

THE meeting convened at 10:00 o'clock in the Adam Room of the Hotel Tuller, Detroit, Michigan, Mr. A. W. Koehler, Superintendent of Accident Prevention, The Milwaukee Electric Railway & Light Company, Milwaukee, Wisconsin, presiding.

VICE-CHAIRMAN KOEHLER: We regret, gentlemen, that our worthy chairman, Mr. Hellmuth, has urgent business which has made it necessary for him to leave very suddenly and go back to Chicago. So in his absence, I shall attempt to take his place.

It is therefore my privilege as Acting Chairman, to greet you and bid you welcome to this first meeting of the Electric Railway Section of the Fifteenth Annual Congress of the National Safety Council. It is very gratifying and inspiring to find so large a number of men in the electric railways present at this meeting. I recall distinctly when the Congress was held in Boston we had just a bare handful, and in the few years that have elapsed since that time this Section has grown to where we now have a very much larger number of enthusiastic members.

I realize that you didn't come here to listen to a long-winded speech from the chairman and you are not going to get it. We are going to get down to business right away and try to make this meeting just as interesting as we possibly can.

It has been suggested that we call upon each man to rise and give his name, his town, and his connection, so that we may all have an opportunity to look him in the face, know who he is, and break the ice. (This was done.)

Mr. R. C. Bush, of the Boston Electric Railway Company of Boston, has requested that he be permitted to make an announcement at this time.

Introduction of Groups Meriting Recognition

R. C. BUSH (Boston Electric Railway Company, Boston): I welcome this opportunity to introduce to this assembly a group of 14 men from the Boston Elevated Railway Company, who came here to attend this convention. The names of these men are Mr. Carroll Finn, Mr. Paul Reitchell, Mr. George Auld, Mr. Oscar Thorpe, Mr. Chester Landers, Mr. Godfrey Gwinneath, Mr. Alfred Johnson, Mr. Leo Lennon, Mr. John Walsh, Mr. John Dwyer, Mr. John McKenna, Mr. William White, Mr. George Pratt, and Mr. Harlow Miller.

All of these men have earned the right to be here by their own effort. Briefly, I will explain how these men happened to be chosen out of a group of 9,000 employees.

Last year a series of printed lectures was sent out to every employee in the Transportation Department, with an announcement that at the end of the tenth lecture any, or all, of the employees in that department could take an examination on the context of those lectures. There were many men who took those examinations and their papers were carefully corrected by two sets of officials, one from the transportation department and the other from the legal and claim department. It was the unanimous opinion of both these departments that the men here today are the men who passed the highest marks and had the best safety records during the preceding year, and they are therefore entitled to be here.

VICE-CHAIRMAN KOEHLER: Will the gentlemen from the Boston Electric Railway Company please stand?

(The men arose and were applauded.)

MR. BUSH: I have also been requested to announce that the Milwaukee Electric Railway and Light Company has eight men who also deserve the right to be here by some peculiar effort on their part. Mr. Charles Johnson, Mr. John Sack, Mr. William Geiszler, Mr. Edgar W. Boldt, Mr. H. Rendler, Mr. Nathan Buckspan, Mr. William F. Keller, Mr. E. B. Schley, I believe those are all. That is another sizeable group of men who have been sent here by the company as its representatives. I feel sure that they will be well repaid for coming here.

VICE-CHAIRMAN KOEHLER: Will the gentlemen please arise?

(The men arose and were applauded.)

SECRETARY EASTHAM: Mr. Chairman, I believe one of the first companies that sent any of its platform men to a National Safety Congress is the United Railways of St. Louis. While our delegation is not so large and while they are not selected for individual merit but through the operation of their car sheds, which in turn win the right by merit of reduction in accidents, I would like to state that we have three from the United Railways of St. Louis. These men are Mr. James, Mr. Walker, and Mr. Hacker.

VICE-CHAIRMAN KOEHLER: If those gentlemen will stand up that will complete the introductions.

(The men arose and were applauded.)

U. B. BAILEY (Nashville Railway & Light Company, Nashville, Tenn.): I want to state that the Nashville Railway and Light Company has one man who has just been taken off the platform to be here. His name is Mr. A. C. Totty. (*Applause.*)

Reports of Section Officers and Committees

VICE-CHAIRMAN KOEHLER: Now that we have all been properly introduced, we will proceed with the regular order of business. The first thing on our program will be reports of the officers and committees. Owing to the absence of our chairman, Mr. Hellmuth, our secretary, Mr. Eastham, probably has something for us and I will call on him.

SECRETARY EASTHAM: I am not prepared to make any report for Mr. Hellmuth. I took lunch with him yesterday just before he had to leave, and he said that he felt that things would go right along under the leadership of Mr. Emerson and Mr. Koehler.

I would like to say for Mr. Hellmuth, however, that my contact with him throughout the year, his efforts for this Section, have shown that we have never had a chairman who has given any more wholehearted industry and intelligence to the work of the Section than Mr. Hellmuth. He has called a number of meetings throughout the year of different committees, the Program Committee and others. He has gotten the committee chairmen to do valiant work. I haven't the figures before me, but I think it will be found that the membership of this Section has been considerably increased in net during the past year. Many plans have been discussed as to what shape our activities should take.

During the course of the year between our annual Congresses, we attempted to get out a news letter and we got out about six or seven of them. I think that while we are gathered together this time that there should be some expression from the membership as to whether news letters are worth while or not. I know I found in getting up those news letters that after the first half dozen of them I had about run out of ideas, and while I tried to get the ideas of you gentlemen, I wasn't very successful.

Now if we are to continue news letters during the next year, I would like to impress on the membership that it is up to them to help whatever secretary they may have during that year. The secretary himself can't get you out a news letter of real interest to all members, which will touch on the vital problems that we safety men have to meet, unless we get your ideas; and you'd be surprised at the few letters and replies that come in from a membership of something like, I believe, 150 or more, with reference to the work that all of us should be vitally interested in.

Letters Read From Busy Corporation Executives

VICE-CHAIRMAN KOEHLER: I wish to say that our secretary, Mr. Eastham, has also worked hard and faithfully during the past year, and much of the success of the Section is due to him. His efforts have been untiring and he has done a worth while job, and I wish to take this occasion to thank him.

Our next order of business is the appointment of the Nominating Committee. Mr. Hellmuth has appointed as chairman of that Committee Mr. S. H. Reid, Mr. Glenn Shaw, and Mr. H. M. Kiser. Their report will be made at one of the later meetings.

We will now call on the chairmen of the Committees and will ask that they make reports of their activities. Mr. Samuel H. Reid, Bureau of Safety, Chicago, Illinois.

S. H. REID: We have met with a few disappointments in the program this year in that those who consented to write certain papers were prevented from doing so by reason of other emergencies arising. The first of those I have reference to on our program this morning is Mr. James P. Barnes. He was to have read the first paper this morning and just a few days before the time of the convening of this Congress he notified us that it would be impossible for him to be present. However, sometimes a disappointment is followed by something that is equally satisfying. Mr. Barnes has sent to us Mr. Neil Funk and another gentleman from his company, Mr. Powell, whom most of you know, and they are to discuss the subjects on the program this morning.

The work of preparing a program for a congress like this entails considerable work and I want to take this opportunity to thank those who have consented to write papers and have promptly sent them in.

Just to show you how some of the folks are interested in the National

Safety Council in general, and the Electric Railway Section in particular, I have two or three letters that I want to read to you.

"I thank you for your kind invitation to attend the annual Safety Congress at Detroit, October, 25-29. I will be glad to do so if conditions permit at that time, as I know it is a very valuable and interesting occasion. If I can not go, however, others of our officials will attend.

"Wishing your every success in the Congress, I am yours very truly, Charles W. Chase. Gary Railways."

Here's another from the Georgia Railway and Power Company: "I am in receipt of your letter of October sixth in reference to attending the National Safety Congress at Detroit. Glad to advise that we will have six delegates at this convention. We feel that the National Safety Council is doing a very essential work and that the company will be fully repaid for sending those delegates to the convention."

I have another letter from perhaps the busiest railway executive in the United States, so far as I know. He is president of the Chicago Rapid Transit Company, the Chicago North Shore and Milwaukee Railroad, the Chicago South Shore and South Bend, the Public Service Company of Northern Illinois, and some others. He is Mr. Britton I. Budd.

"I have your letter of October sixth inviting me to attend the annual Safety Congress at Detroit October 25-29. I shall be glad to keep this in mind and if at all possible will try to attend."

I want to say that Mr. Budd is well represented at this Section. There are numerous others here from prominent men who have shown their interest in this work by sending delegates, but I will not take your time just now to read them.

Report of the Chairman of the Membership Committee

VICE-CHAIRMAN KOEHLER: Mr. John J. Connor, chairman of the Membership Committee.

J. J. CONNORS (Tennessee Electric Power Company, Chattanooga, Tenn.): Mr. Chairman, I took the electric railway directory and checked that against our present membership. I found that out of some 800 companies in the United States 150 did belong to the National Safety Council, and by an intensive campaign of soliciting the other 650 companies we did manage to get 16 new members. I believe it is proper at this time to extend our welcome to these new members. I want especially to mention the Birmingham Electric Company of Birmingham, Alabama, a large company, which has come into the fold during the past year; the Portland, Oregon Company with 3,500 employees is now a new member, and I would suggest, Mr. Chairman, that we recognize any representatives of those companies. I notice Mr. Prabson is present. I would like to have him stand up and get acquainted.

(Mr. Prabson arose and the members applauded.)

VICE-CHAIRMAN KOEHLER: Is Mr. Young here of Portland?

(Mr. Young was not present.)

VICE-CHAIRMAN KOEHLER: Mr. Paul Hodson, Safety Engineer, East St.

Louis & Suburban Railway Company, East St. Louis, Illinois. Mr. Hodson is chairman of the Poster Committee and I will ask him to prepare to give us his full report.

PAUL HODSON: This is always the committee that has the long story of grief to hand out. If any of you are prepared to cry with me, get ready. The Poster Committee is always in my estimation the hardest committee to get any action out of. The idea of the Poster Committee is to solicit ideas from member companies, and that was some job. Mr. Connors tells me there were 150 members, but from answers to my correspondence I found about 15.

Suggestions of the Poster Committee Chairman

Now I didn't come to reprimand or even suggest that, but I do wish that during the coming year that you men who are interested in safety and interested in poster work would assist your chairman of the Poster Committee in preparing pictures, cartoons, or other features which might go well in our posters. We all use the posters, we want them, but we feel that the other fellow ought to make them. Now I know that a good many of you men have valuable ideas. If you can't draw the idea or have a photograph of it taken, write it down and send it in to the chairman of your Poster Committee and it will be his job to see that it is put into some sort of a picture.

I especially want to commend about 10 of my good friends for the valuable assistance that I have received. We have been in a position to supply at least two definite electric railway posters each month, but now that our Electric Railway Section is bigger than it has ever been, we should have at least four.

VICE-CHAIRMAN KOEHLER: I will now call on Mr. G. H. Shaw, chairman of the Publicity Committee.

G. H. SHAW (The N. O. P. & L. Co., Akron, O.): I have not prepared any special report. I found that being chairman of the Publicity Committee of this Section is some job. It is not a one-man job or a committee job. I just wanted to suggest that during the coming year that articles be contributed from various members who have accomplished something worth while. They may possibly have used some new method which would be of great interest to others. I think that these ideas should come unsolicited and I know they would be a great help to the Publicity Committee during the coming year.

VICE-CHAIRMAN KOEHLER: Mr. H. K. Bennett, safety manager of the United Electric Railways Company, Providence, Rhode Island, has something to say to us of the cooperation of the Claim Division of the A. E. R. A.

H. K. BENNETT: That report will be necessarily brief. As indicated by the committee, it was to pave the way perhaps so that the Claim Division of the A. E. R. A. will be in closer touch with the National Safety Council, and help the Membership Committee of the Electric Rail-

way Section. Mr. Scott, President of the National Safety Council, addressed the Claim Division at the convention in Cleveland two weeks ago, and I believe that is going to pave the way for a closer connection between the two bodies and will also increase the membership.

It was sort of a feeler when Mr. Hellmuth and I got together one day, and both being most interested, of course, in A. E. R. A. we thought it possible that through such a committee there might be closer cooperation. We have paved the way for that and we look for greater success in the years to come and in the Congresses that are going to be held in the future.

VICE-CHAIRMAN KOEHLER: Is Mr. Melvin Bridges in the room? (Mr. Bridges was not present.) We will proceed then with the next order of business. The subject "Accident Prevention—Why and How from the Standpoint of the Executive" was to have been presented, as you have already been told by Mr. James P. Barnes. Mr. Neil Funk and Mr. Powell are here prepared to handle that subject for us, and I take pleasure at this time in introducing Mr. Neil Funk of the Louisville Railway Company, Louisville.

ACCIDENT PREVENTION—WHY?

Neil M. Funk, Louisville Railway Company, Louisville, Ky.

I want to apologize. I dislike very much to start these introductory remarks with an apology, but Mr. James P. Barnes, who is connected with the company I represent, was so anxious to be at this convention that he did not tell us until train time that he would not be here. We received a wire that he could not possibly be here and so he asked Mr. Powell and myself to discuss the subject he was to have presented.

We will handle it extemporaneously in this way: I will handle the "Whys" and I will let Mr. Powell handle the "Hows," and if he takes any of my "Whys" or I steal any of his "Hows," as long as we are in the same company we will have to make it up anyhow, so no one's feelings can possibly be injured.

Now, to speak extemporaneously to men who have come as far as you have is a great responsibility. I did feel a little awkward this morning, but when the platform men were introducing themselves, somehow or other it seemed to inspire me. I wish I could live up to the inspiration I feel in my heart in seeing these men here.

My work has been practically, totally, I should say, in talking to platform men. I love them. They have accepted our program better and all our property better than anyone else outside of the main executives. I have always said that you need not worry about the rank and file when it comes to putting over a safety program. They are the first men who respond to this great civilizing influence that has come into our lives, so now I feel at home.

My subject is, "Accident Prevention—Why?" I will leave off "from the executive standpoint," if you please. First, accident prevention on a safety program put a soul and heart into industrialism. The most remarkable thing about history to me, from the beginning of time up until just a few years ago, is how cruel we have been to each other. History recounts men as individuals, not as people. It is a history of the Pyramids built by Pharoah at the sacrifice of hundreds of thousands of lives. Why? They were men, even as you and I, but sacrificed on useless things like a pyramid to extend one individual's immortality.

History is Filled with Disregard for Human Lives

Then Caesar, we have histories of Caesar, and there were men that were for Caesar and against him. Then Napoleon Bonaparte, and practically a large part of the history of France is the history of this individual, whose only ambition was to make France a Napoleonic kingdom. Then our Puritan forefathers arrived and they actually burned women at the stake and called them witches. They seared with red hot irons scarlet letters on the faces of gentle women. Then we come on down through the ages to the industrial period, and find that dollars had absolutely no ideals behind them.

I try to talk straight from the shoulder. We had practically an industrial civil war in this country. We had a class consciousness in free America and labor and capital fought each other as they would a common or a foreign enemy. We fought each other and we were both wrong: we fought each other to exhaustion and then we commenced to see the light. Sometimes it takes a crucifixion to make men see the light.

Then we began to say, "Why, these people who work for us are men. They have ambitions, they have families, they are entitled to a square deal." And then we quit burning them over unguarded furnaces for a dollar a day, and we realized that we must meet on a common ground. We started welfare associations, group insurance, and all sorts of things that were good; but these people were not convinced yet. To some of them we were like Greeks bearing gifts, and so finally we met on a common ground, and it happened at about the birth of the National Safety Council that we at last came together.

I believe nothing has done more to keep down the strife between labor and capital in this country than for the executives and the men to meet on a common, unselfish ground, for the high ground of saving human life and human suffering. Where yesterday our president, myself, and the other officers in our company knew only 12 or 14 men outside of the office, now there are over 1,000 in our organization whom we can call by name. We are coming in contact with our men. We have learned to love them and I do not believe that there is a man here today who would say that they haven't an affection for us.

My friends, there is another "Why." You know whenever someone does us wrong, generally we have wronged them, and you know there was a time once when big industries were not willing to play the game

always on the square and lay the cards on the table. You know as well as I that those were the days when we grabbed franchises, those were the days when our ideals were not high, and we had mostly water in our stock. Now we wanted to meet the public. The new spirit had been a spirit of honesty and helpfulness, but the people were not convinced, so we had to find a contact and we found the contact again through this unselfish program of accident prevention, which is one of the few questions that can not be debated nor controverted.

Therefore, today we talk to the public in this way: I know you gentlemen will excuse me if I mention personal things, because naturally, I know my own property better than any other. We talk to the public through the press on safety and we have been doing it for about four years. We have 22 billboards, eight by ten feet square. We have one of them electrically lighted over every property that we own and we blazon our messages from them. For instance, when St. Louis and New York fought for the world's championship, the same day that the series started we had on the 22 billboards in the city of Louisville, "The greatest World Series: Carefulness versus Carelessness." The one we put up before I left was this: "As in golf, concentrate while driving." Some of you golf players know what that means.

A Sincere Safety Program Influenced Public Opinion

That last sign might be a little highbrow, but we are trying to get a message of some kind across to those folks who are careless. We are not different from any other company. All of us, I say, were under suspicion and lots of us rightly so, but now through things such as that, through newspaper publications, we are convincing the people that we have met them on a common ground and that we are trying to prevent every accident we can in the city of Louisville, not only on our street cars but in our factories, or wherever else it may be. We had great trouble before in getting our rights, and every time we wanted anything there was bad feeling against it, because before we started the safety movement we had 400 lawsuits against us in the courts of Jefferson County. You can imagine what sort of antagonism that would create in a community, with juries every day constantly trying your cases and with able, eloquent lawyers appealing to the lower emotions of men. You can imagine how much sentiment there was against the company created in our courts through accidents. ?

Then we started the safety program and we advised the Claim Department to keep out of court as much as possible and today, in four years, we only have 22 lawsuits on our dockets in that court.

So, my friends, we have found this is another "Why" which is for accident prevention. We find that it has placed a new spirit in the heart of nearly every man that is with us. We find that where the boss on the track or the car house foreman used to feel like bullying the men, that there is now a different feeling, a feeling of comradeship. Why, I can remember the time and you can, too, when a man couldn't hold a job

unless he could whip every man in his gang. Those days are gone and they are gone forever, I hope, and nothing has brought that around more than the spirit of humanity that permeates an accident program, because those fellows have learned, are beginning to learn the foundation stone, the foundation of all real safety is, after all, "Do unto others as you would have others do unto you." You ask me on this program "Accident Prevention—Why;" and I say, "Accident Prevention—Why Not?"

VICE-CHAIRMAN KOEHLER: We are greatly indebted to our good friend, Neil Funk, for this stirring and eloquent address. I am sure that Mr. Funk's address has stimulated many thoughts. Doubtless there are many who would like to have the privilege of asking questions of Mr. Funk, and while those thoughts are still fresh in our minds, I think it would be an opportune time to ask them.

W. H. BOYCE (Pittsburgh Railway Company, Pittsburgh, Pa.): I would like to ask Mr. Funk what percentage of your gross receipts is paid out in the settlement of claims?

MR. FUNK: Four per cent.

MR. BOYCE: How does that compare with four years ago?

MR. FUNK: About seven and one-half per cent.

J. D. BARR (Pittsburgh Railway Company, Pittsburgh): Mr. Funk, do you have any safety meetings in your organization?

MR. FUNK: Mr. Powell and myself addressed last year 250 such meetings. We do not believe in bulletins. We believe that you must constantly talk and meet the men face to face.

A. L. HOGES (The Brooklyn City Railroad Co., Brooklyn): I would like to ask if there is any money incentive to the men or is it merely competition between the various depots?

Favors, Not Money Bonuses, for Safety Efficiency

MR. FUNK: We do not believe in money bonuses, although we believe in lots of individual awards. We have safety captains elected by the various properties. For instance, platform men have iron car houses, and the winning captain for the men whose car house shows the best record is our special guest at a banquet. Mr. Barnes, our president, is always present at that banquet. The captain's men are of course invited, and in addition to that we give him publicity in our papers, and not alone in our own little company publication but in our other papers; and in addition to that we present him with a complete new uniform, including the cap.

MR. BOYCE: I would like to know, Mr. Funk, on what you base the competition, whether on the number of car miles ridden, or the number of passengers carried?

MR. FUNK: I would like to answer that question, but Mr. Powell is taking that part of it.

J. J. CONNORS (Tennessee Electric Power Co., Chattanooga, Tenn.):

You mentioned something about selecting the most popular men in your organization; does that, Mr. Funk, apply to safety?

MR. FUNK: We have what is known as the "Conley" award. It carries \$75 in a gold prize, a beautiful medal, and trip to the American Electric Railway Association convention. He is selected by the president, the two vice-presidents, and the safety director. He is primarily selected because he has done more than any other member in the rank and file for the cause of safety. He is selected, too, because he has done more extra work and he has given up more of his time. Lots of times the men on our property organize these meetings themselves. We give them the privilege. The men at one car house will give a dance. They collect a dollar and a half from each member of that house. They will not let us contribute a cent, and the first thing they usually have at the dance and social is three speeches on safety.

J. M. LOFTIS (Pittsburgh Railway Company, Pittsburgh): These captains that are elected, how long do they serve?

MR. FUNK: Just one month. They are not eligible for a year if they win.

C. K. THOMAS (Chicago North Shore & Milwaukee Railroad Co., Highwood, Ill.): I would like to ask Mr. Funk if he used any of the rank and file of the employees to carry the safety message to the public?

The Rank and File Carry the Safety Message

MR. FUNK: We change our safety work every two or three months. We often use this plan at the safety dinner. For instance, the last time one of our motormen from the Portland car house made the safety speech for that particular car house, but frequently we take a man around with us. We have these little group meetings right on the property. We don't make the men come up to the office or go through any great inconvenience, and we frequently take a man that has shown an unusual interest in safety and can shoot it from the shoulder in a practical, straightforward way. We will take him around to talk to all the men on the property. We have met with great success along these lines.

HERBERT P. SMITH (Indiana, Columbus and Eastern Traction Co., Springfield, O.): I would like to state at this time, and I would like everyone present to know, that about three and one-half years ago our company considered starting a safety organization. I canvassed different organizations in different companies and then we took a delegation and went to Louisville. We studied the plan they had in force at Louisville and adopted that plan to apply to our property, and if there are any gentlemen here present that have no safety organization in their company, I feel certain they would do well if they would study the Louisville plan. We have met with very good success since we have had that plan on our property, and I can safely say that our accidents have been reduced 50 per cent in the last year and a half.

S. N. HENNINGFELD (Milwaukee Electric Railway & Light Co., MIL-

waukee): I would like to ask Mr. Funk whether anything is done to educate the men in your rank and file, for instance in the public schools?

MR. FUNK: We haven't done a thing along these lines. I know in some cities they go around in the various schools. We don't find our men responsive to that, and they would rather talk to the fellow on his property.

MR. HENNINGFELD: Do you find it advisable or necessary to put the first-aid equipment on your cars for the platform men to use in case of public or personal accidents?

MR. FUNK: We do not do that. I guess, however, it depends altogether on your experience with first-aid men. We have had some rather unfortunate experience. For instance, a man with a broken limb should not be moved, and we have had some of these first-aid fellows move them. All of our stuff, first-aid stuff, is in sight, but we do not emphasize first-aid any place except in the power house and in the shops. We are just a little afraid that the man on the road might do something that isn't right because he is not experienced. We don't want our platform men to do any first-aid work. We teach them a little respiratory, however, but outside of that we would rather they would not try any first-aid treatment.

VICE-CHAIRMAN KOEHLER: The discussion is very interesting and I wish it might go on indefinitely, but we have some more speakers on our program. I will now ask Mr. Powell if he will not tell us about "Accident Prevention—How?"

ACCIDENT PREVENTION—HOW?

G. B. Powell, Superintendent, Transportation, Louisville Railway Company, Louisville, Ky.

The "Why" section of this subject has been so thoroughly and vigorously presented by my esteemed colleague, Mr. Funk, that should I even mention it to you in my feeble way would be to waste your valuable time.

Having fallen heir to this place on the program by the forced absence of one who is a leader in his community in safety work, I ask your indulgence for the few crumbs you shall receive when you had every right to expect a feast.

My interpretation of the subject "How" in accident prevention is "how to prevent them" and even to presume that I am casually or remotely acquainted with all the "How's" in this connection would be to expose my ignorance, because there are as many ways "How to prevent accidents" as there are flappers in Detroit, flivvers in America, or oysters in the Delaware Bay. So my few remarks shall be confined to how we have prevented accidents on the property with which I am connected.

I shall leave out safety devices, education of the public, traffic control and all the other wonderful advancements made the past few years under

the able leadership of the National Safety Council, and tell you about one which is the cream of the lot, the very foundation upon which rests the whole structure of accident prevention on your property or mine—"Cooperation," cooperation of the entire force. Gentlemen, there is no substitute for it. Education, technical or academic, four wheel brakes, and collapsible, folding, disappearing steps fade entirely out of the picture when under the control of men who do not cooperate with those about them.

Recently my attention was attracted to the fact that a college graduate drove his car into a telephone pole at 60 miles per hour, and the floral designs were beautiful; while near my home a bus with four wheel brakes went over a 200 foot embankment, producing one order for the undertaker and the sale of one cork leg.

The Record of An Accident Prevention Campaign

Cooperation can be obtained, but it will not start at the bottom. Those at the top of the organization must be sold first and sold so thoroughly that they will spend their time, money, authority, influence and every facility at their command to weld together a force, working as one unit, for the prevention of accidents because they know in their hearts it is the right and the big thing to do. To wait until safety devices have accomplished the desired result is too indefinite a postponement, likewise, it will be some time before pedestrians are forced to take refuge on elevated sidewalks, all trolleys be placed underground or automobiles legislated to the rural districts. So the big thing to do right now is to produce men who can and will prevent accidents under present day conditions.

A campaign to develop this idea was started on our property five and one-half years ago and we know that results have been produced. Committees, meetings, posters, bulletins, contests, prizes, every known means was used to bring to the individual the knowledge of his importance and responsibility in the accident prevention machine we were building. For the benefit of those who may be technically inclined, I submit the following figures as proof. The average miles operated per accident for the whole system in 1921 was 2,004; in 1922, 3,323; in 1923, 3,380; in 1924, 6,389; in 1925, 7,432; and for the first nine months of 1926, 9,903.

These records show results and of course must be kept as markers to guide our way, but we believe that the changed attitude of the force as a whole shows more clearly the success obtained. When you see an old employee finish his day's work and then spend hours of his own time assisting a buddy who is new in the game; when you see meetings of the local Safety Council packed with your own employees who lose their sleep to attend, and when you see in the actions of their daily life that the standard of morality and citizenship has been raised, then you need not fear to compile comparative records.

When the cooperative spirit has been developed to the point where

the whole force, or at least the great majority, are pushing the program along by their concerted efforts, we found it necessary to prevent lack of interest, by keeping constantly before our employees the object, "Accident Prevention." This we have done by division contests, which produce friendly rivalry, and by keeping the records, "Miles per accident," posted daily at each division, showing the progress made in an imaginary race from Louisville to California, or a trip around the world, etc.; changing these often enough to keep the interest of all centered on the main objective.

In conclusion, allow me to say, give me all the safety devices the brains of mechanical engineers can produce, give me legislation which will help untangle the present traffic blockade, give me the benefit of our splendid Safety Council; but with or without all these, if I succeed in the fullest measure in "How to Prevent Accidents," it will be because the whole force from the highest executive to the most humble employee realize the importance of this work and are willing to be keenly alive to the responsibility which rests upon each individual in this age of slaughter in which we live.

What Should Be Counted As An Accident?

VICE-CHAIRMAN KOEHLER: If Mr. Powell has sounded the keynote in this matter of accident prevention, and I am sure he has, many of us will have questions to ask him. Let us have a snappy discussion.

SECRETARY EASTHAM: I notice, Mr. Powell, you said that for the first nine months of 1926 you averaged 9,903 miles per accident. What do you count as an accident?

MR. POWELL: We count against a man everything as an accident which is a result of his carelessness or disobedience of a rule, or anything which he could have prevented whether it is his fault or not.

SECRETARY EASTHAM: We don't count as accidents automobiles that run into our cars.

MR. POWELL: If an automobile runs into the front end we presume our man should have seen it before he got there.

SECRETARY EASTHAM: That is what I wanted to get at. That is one of the things that this Section should do. It should have a system of reporting accidents that will be uniform for all companies, so when figures are given we may know just what they mean.

On the United Railways of St. Louis, our maximum number of miles per accident is about 3,200 miles, but that is based on every accident, miscellaneous or otherwise, whether the men are to blame or not. Compared with 9,000 miles that makes a very poor showing. On the other hand, if our accidents were brought down to your basis, I think it would be very similar to your own. I think we ought to get at that.

DR. C. P. SEGARD (Third Avenue Railway System, New York City): We are counting everything as an accident, whether it happens at the shop, on the track, electric department, or any other place, and we are getting about 1,300 miles per accident.

MR. POWELL: Dr. Segard, there is such a multitude of ways of keeping accident records. Mr. Eastham pointed out that of course our method would not compare with his, and it also would not compare with yours. We separate the various department accidents. I was speaking of the transportation department, that is, the operation of the cars. Our shops, power house, and tracks are kept in a mechanical group, and that of course can not be compared with yours.

G. H. SHAW (Northern Ohio Power & Light Company, Akron, O.): I would like to ask, Mr. Powell, if in 1921, 1922, and 1923 you sub-divided your accidents at that time?

MR. POWELL: We sub-divided at that time, but perhaps not quite so closely as we do now, but we are charging accidents against our men now that we would not have charged at that time, because now we feel we might be too lenient and hinder the progress of prevention of accidents.

Akron Counts Every Unusual Disturbance An Accident

MR. SHAW: I might say with my company that we charge everything as an accident, even though it is a street disturbance and does not involve the company itself, its employees, or its property; if it is an unusual occurrence, a collision of two automobiles, it is reported as an accident. This brings our record to about 3,000 miles.

MR. POWELL: I would like to say right here, for the benefit of all, that we don't think that is fair. That is why we don't count it if two automobiles run together on our streets at Louisville near our cars. It is reported, however, and we are prepared to defend ourselves if that man says we hit him, but we do not think of counting that against our men.

H. K. BENNETT (United Electric Railways Co., Providence): Is there any discontent among the men for chargeable accidents? That seems to be one of the most delicate questions to be arrived at. One man might have an accident today and might be charged with it, and another man might have a similar accident and he might not be charged with it.

MR. POWELL: We find that the policy we have dates back a long time, as Mr. Funk said in his speech. There was a time when perhaps 99 per cent of the men on the property had no use for the transportation superintendent, and I didn't blame them. But we have built up a system of confidence so that there is very seldom a question as to when an accident should be chargeable or not, and when the question does arise, the men themselves and their safety captain, and perhaps the local committee, will come down and have one of the finest safety meetings that you have ever seen in the office of the director of safety, and they will all leave with the case settled one way or the other. We don't fear that at all.

W. F. HANNA (United Railways of Baltimore, Baltimore): How do you deal with boarding and leaving the car accidents?

MR. POWELL: Those cases must have substantiating evidence that the car was standing still. There are some cases where people fall from a standing car and there are a few of those that are not counted against

our men. However, with the gates and doors that we have on our cars, mostly all boarding and leaving accidents are chargeable accidents.

E. K. MILES (New York State Railways, Syracuse): What has been your experience with the so-called blind accidents?

MR. POWELL: There has been a decrease in blind cases, or unreported accidents, due to the fact that the discipline for unreported cases is quite severe. I am not taking credit for the accident prevention campaign curing that condition, but there has been a reduction over the past four years.

H. E. MASON (General Engineerings & Management Corp., New York): I would like to ask Mr. Powell who determines whether the accident is chargeable or not? Does a man know that it is charged against him and then does he have any appeal?

MR. POWELL: The director of safety classifies the accidents each morning and I might state, in that connection to back up our assertion of cooperation, that he does so in the transportation office and the man himself has a perfect right to appear personally if he thinks the accident is not charged correctly. We have had so little of that, it is absolutely negligible.

MR. FUNK: I would like to answer that question about blind reports a little fuller. At all times we are talking to our men of that and we are trying to educate them to know that there is nothing more disastrous, or more like a Benedict Arnold, than the idea of not reporting an accident. It is a matter of educating them by talking to them, and I believe that is why we have less blind reports now than we did formerly. Through educational methods and through speaking to the men personally we have gotten them to realize the importance of reporting accidents. We have made them realize that that is one of the unforgivable sins in our program.

A Fall in the Car Is Charged Against Motorman

N. BUCKSPAN (M. E. R. & L. Co., Milwaukee): I would like to ask whether an accident involving a passenger falling in a car, regardless of whether the car is moving or standing still, would be an accident charged to the rear or front end?

MR. POWELL: The falling in a car is a classification we have charged against the motorman, because we assume that he made a rough start or stop. It is quite a delicate question you call on me to decide, because if the car was standing still the question would be, how long? He might have made one of those down stops and just about the time he stopped the party fell down. All of our falling in cars is charged against the motorman for the rough handling of the car.

JOHN L. FAHEY (Scranton Railway Co., Scranton): In Mr. Funk's remarks I understood him to say that their lawsuits four years ago were 400 and today they have been reduced to 22, and the percentage paid four years ago was seven per cent as against four per cent today. How were

those 378 lawsuits disposed of, by amicable adjustment or action in court?

MR. FUNK: We settled those cases and got on the right sort of footing and had to start all over again. We cleaned it all up. We got the claim department to realize that even if it were not our fault, where there was a child with a leg or an arm off, that that child must be provided for, and we have found that we can settle eight or 10 time more claims now than we did settle, and still save money by keeping out of court. We have gotten to look at the human side of the proposition.

MR. FAHEY: None of your accidents were settled in court?

MR. FUNK: We used to fight everything, but now we settle everything.

A. L. HODGES (Brooklyn City Railroad Co., Brooklyn): I would like to ask Mr. Powell since the inception of this campaign, whether or not you have received the cooperation of the public in that you get more witnesses to accidents now than you got before?

MR. POWELL: There is not so much change in the public of Louisville as there is in our own employees, but it's safe to say that it is 10 times better than it was before we started this campaign.

Car Men Stay or Leave on Their Individual Records

W. J. ROUNTREE (Georgia Railway & Power Co., Atlanta, Ga.): My question may become better at a later time. I want to get new experience on it. Do you use in the education of your employees statistical methods to any extent?

MR. POWELL: No, sir.

RALPH M. READE (Quebec Railway, Light Heat & Power Corp., Quebec): I would like to ask whether you charge up every accident to the individual man and does that accident go on his record?

MR. POWELL: The men in my department, motormen and conductors, stay or leave on their records. Our accident department has absolutely succeeded by reason that out of 900 motormen and conductors, 875 of them believe in what we are doing.

A. J. VAN BRUNT (Public Service Corp. of N. J., Newark, N. J.): Mr. Chairman, I don't want to ask a question. I know the two fellows very well and I want to say that they are doing good work down there. I do want to say that it is very desirable that the committee you appoint to attend to that matter get in closer touch with the Claims Association of the American Electric Railway. An effort has been made to establish a bond of that kind. If it continues and we can systematize our methods, we will be almost as successful as Louisville. Unless we do systematize our methods (and that we haven't is plainly evidenced by the questions that have been asked), we are not working together. We are not getting the results we should get.

Some of their methods would not be entirely applicable to my organization, for instance, but many of them would, and if we can all work along the same lines we are going to get results. But we can't unless we work with the Claims Association of the American Electric Railway.

We have just heard that all claims used to be fought and now they are settled. I don't know the percentage we are working on, but I should imagine it to be about 50.

One more thought and I am through. The day has gone by when we are using the plea of contributory negligence. You might just as well forget it, and if you are not ready to forget it now you are behind the times. That is demonstrated very clearly in almost all the states by the fact that no matter how badly a man is injured in any mechanical claim the consumer pays for it. The railroads have got to do that thing in years to come. I plead for standardization of our methods of keeping our records of our accidents.

R. M. READE (Quebec Railway, Light, Heat & Power Corp., Quebec): I would like to ask Mr. Powell how many of their motormen go through the year without an accident, that is, what percentage of those men have no accidents?

A Life Saver's Club Started in Louisville

MR. POWELL: We have started in Louisville in the Courier Journal, one of our largest newspapers, a life saver's club. To be eligible for that club you must be a motorman or a driver of a public vehicle and run through the entire calendar year without an accident. We have approximately 900 trainmen, 600 of whom are motormen. Last year we had 175 life saver motormen without an accident of any kind.

E. J. KREH (Pittsburgh Railways Company, Pittsburgh): I would like to know about what percentage of reports are chargeable and what percentage are not chargeable?

MR. POWELL: I haven't the percentage figures. More than half of the reports are not charged, however, due to the fact that a large number of reports are things which do not happen on the cars. Our men report everything that occurs on or near the car and necessarily there are a large number which are not accidents, as far as we are concerned; so more than half of the reports which come to my desk each morning are not charged.

DENNIS C. KING (Pittsburgh Railways Company, Pittsburgh): Is there any way to get rid of these demerits when you get rid of these reports: If there isn't, doesn't a man automatically expel himself from the company in a short time?

MR. POWELL: We don't believe in the demerit system. We keep an individual record of each man with dispensations on one side and accidents on the other, and if a man has a chargeable accident and he has a previous good record we feel like he is naturally ashamed of himself and nothing is said to him. If, in a short time, he has another chargeable accident, he pays a visit to my office and we have a nice talk about accident prevention and I try to determine in my own mind whether he has lost interest or not; and then it is put squarely up to him, the fact that if he remains he must create a better record. I have had numerous cases

of men who have had three chargeable accidents within 30 days and then haven't had any more for over a period of six months.

VICE-CHAIRMAN KOEHLER: I would like to say that we have just made a summary of the men in our company who have had no chargeable accidents for over a period of one year, and we found that 622 had been able to operate an entire year without a chargeable accident out of 1,594.

W. H. BOYCE (Pittsburgh Railways Co., Pittsburgh): In Pittsburgh, with our narrow streets and our numerous routes which traverse grades of seven and eight per cent and one route of 13 per cent grade, each year about one-third of the motormen and conductors who comprise that territory don't have anything charged to their record. We don't have any claims nor accidents of any kind. I would like to ask the gentlemen of Louisville if they have anything that approximates this condition. We have one division that will run, say, four to five times as many thousand car miles per accident as another division, due to the difference in the type of territory served, one of them running through open territory and another through very heavily congested territory. How would you pit car house against car house in a case of that kind?

MR. POWELL: Very fortunately, sir, our divisions in that respect are fairly evenly divided. We don't feel that there is very much difference in conditions under which they operate. We had some cases where the car house made a poor record for two or three months, and when those conditions do arise we concentrate our efforts on that division; and we therefore have been able to bring a car house from the bottom to a 100 per cent record with no man of that car house having an accident within a month.

Honors for Safety Efficiency Given in Birmingham

T. G. BRABSTON (Birmingham Electric Co., Birmingham, Ala.): I don't know whether I am in order at this time to mention something of what we are doing in Birmingham, but I believe it might be of interest to the members here. We have a system of handling this accident business in Birmingham on an individual basis rather than on a division basis. For the individual man we have what is called a distinguished service class, based on six months periods. The man who has no accidents goes forward each six months. To the man who has an accident we not only charge the accident to him but also the amount that has been expended by the claim department on account of the accident that he has had, regardless of whether we considered it chargeable or not.

In the transportation department about 50 per cent of our men, of which we have 600 in the platform service, qualify each six months, a little more or a little less, for these various distinguished service medals or buttons. They go from bronze for six months to gold for two years and longer. For the first six months of 1926 we had 256 men. I believe, who qualified, and out of that number, 40 of them had gone three years and a half without an accident and without having anything charged up

or expended by the claim department on account of an accident in which they might have been involved.

This individual system on this problem overcomes conditions such as the gentleman from Pittsburgh mentioned, where divisions were not operated through an evenly distributed territory. We believe that the individual man gets a little edge on it if he happens to be in a dull territory. The men shift from line to line or move around so that one fellow has constantly got the edge on it for two or three years.

VICE-CHAIRMAN KOEHLER: The next thing on our program is a formal investigation of a grade crossing automobile accident. The personnel of the Inquiry Board consists of Mr. S. H. Reid, chairman, Mr. Ralph C. Bush, Mr. Robert M. Jeffries, Mr. R. J. Williams, and Mr. J. Harmon. If these gentlemen will now proceed we will be very glad indeed to listen to what they have to say.

A BOARD OF INQUIRY IN ACTION

A Formal Investigation of a Grade Crossing Automobile Accident

S. H. REID (Bureau of Safety, Chicago): In preparing this part of the program we recognize the difficulty of any sort of plan of investigation that would fit all of the properties represented in this Section. What we do today might not fit in an ideal situation like Louisville or some of the others that have been mentioned.

There are three or four types of investigations, or rather several purposes for which investigations are made. One is from the viewpoint of the claim department, in order to determine the legal liability in the event of an accident, and that is necessary and all right. Sometimes an investigation is made by the mechanical department in order to determine whether or not the equipment on the car involved was in first-class condition, and nobody can question the wisdom of that procedure. Sometimes an investigation is made by the operating department in order to determine whether or not there were any violations of well known and well established rules. Nobody can find any fault with that.

But it has been found that if we should go a little farther in investigations, whether these that I have mentioned, particularly the last two, are superficial or otherwise, it certainly is necessary to make an investigation in order to determine the cause of the accident, which may not be brought out in the kind of investigations already mentioned, and in order to apply the remedy for the prevention of a recurrence.

Now that is the purpose of the sort of investigation that we want to conduct this morning. The accident that is going to be investigated happened on a high speed interurban line, a double track, with trains operating in both directions every hour for the greater part of the day, which is perhaps 16 hours, and there were extras in between. The accident happened in this way:

A northbound train, a three or four-car train, passed a crossing and was met by a southbound train perhaps 600 or 800 feet north of the crossing. An automobile was approaching the crossing from the east and evidently did not see the southbound train. At any rate, he drove onto the track and was struck by the southbound train, resulting in death of one person and very serious injuries to two others.

That is the accident that we are going to consider for a few minutes this morning, and the first witness we have will be the motorman on the southbound train, Mr. C. K. Thomas. It is proper to announce that this is not the man who was the motorman of the train that was involved in this wreck. This is Mr. Thomas of the Chicago, North Shore and Milwaukee Railroad Company, a man of long experience as a motorman, as well as other duties to which he has been promoted recently.

Now, Mr. Thomas, you understand the purpose of this investigation. It probably has been investigated by the claim department in order to determine the legal liability of the company. It has been investigated by the mechanical department to determine the condition of the equipment. Now the purpose of this investigation is to bring out, if possible, some of the underlying or fundamental causes of the accident, and determine if we can what may be done to prevent a recurrence. In order that our records may be clear, we will ask you to give your full name to the stenographer, your age, and the length of service on this road.

MR. THOMAS: My name is Chester K. Thomas, age 38. I have been with the road a little over seven years.

The Motorman Describes the Fatal Accident

MR. REID: Now, Mr. Thomas, with this understanding of the purpose of this investigation clearly in your mind and ours, we want you to tell the Board of Inquiry in your own way the details of this accident as you saw it and as you understand it.

MR. THOMAS: Well, we left Highwood about 11:09 in the morning and when we approached this crossing in Kennilworth it was about 11:40. As nearly as I can judge, about 800 feet north of the crossing I met a three-car express train and, of course, as soon as I passed the three-car express I saw that a Ford car ahead was standing on the east side of the crossing. It was moving very slowly, so I knew that the pilot light was already cut indicating that the wigwag was working and as soon as I got by the express I could see that the wigwag was working.

Then I started on the same rate I was traveling, which was about 35 miles an hour along there, and this automobile proceeded to move up slowly toward the crossing. When I got within 200 feet of the crossing the automobile darted forward and then I set the emergency brake with one hand and grabbed the whistle with the other, and just about this time I hit him with the front end of the car. The right part of the front end of the car hit the rear end of the automobile and knocked it over to the west side.

I ran about 300 feet further before I could stop. Jack and I came out

and we found the automobile laying on the west side of the track about 20 feet off the track. Two ladies were lying on the outside of the car and the driver was lying across the steering wheel, and apparently they were all unconscious.

MR. REID: In order that we may have this clearly before us, Mr. Thomas, you say that there was a three-car train going north and your train was coming south. Here is the street and here are the railroad tracks. After this train went north you observed when you were about 600 feet from the crossing an automobile approaching slowly from the east. Is that right?

MR. THOMAS: That is right.

MR. REID: Did you blow your whistle as you saw that car approaching?

MR. THOMAS: No, sir. About a year before this accident the company put out a bulletin stating that we were to refrain from blowing whistles in that locality except in case of an emergency.

Possibly the Motorist Was Confused by Passing Train

MR. REID: Taking into account the fact that this train had just passed the crossing, did it occur to you that this motorist driving west might be confused by reason of this train that he saw pass, thinking that the wigwag was running because of this train and might not be looking for any southbound train? Did that occur to you?

MR. THOMAS: I never thought of it. I didn't think anyone would be crazy enough to drive on the tracks with the wigwag running. Maybe I should have thought of that.

MR. REID: How much crossing of cars is there on that road?

MR. THOMAS: There is a lot of them.

MR. REID: Had you ever observed motorists doing the same thing that this man did on any other occasion?

MR. THOMAS: It is a common occurrence. You never know, a motorist is liable to cross in front of you any time.

MR. REID: In this case you forgot the circumstance about this northbound train.

MR. THOMAS: If you want to call it that. I never thought it had anything to do with it.

MR. REID: How far in that locality does a train have to go before the wigwag is cut out?

MR. THOMAS: About 200 feet out.

MR. REID: Shortly after he cut that wigwag out you cut it in?

MR. THOMAS: I cut it in about the same time he cut it out?

MR. REID: It is quite possible that this wigwag was wagging continuously from the time that it was cut in by the northbound train until after you passed.

MR. THOMAS: I suppose it was. I know it was cut in the first time I saw it.

MR. REID: You say you have been a motorman about 15 years altogether. Have you ever had any accidents previous to this one?

MR. THOMAS: I have had accidents, but this is the most serious one that I have had.

MR. REID: You say that a bulletin was issued prohibiting the blowing of the whistle. Were there any exceptions to be made to this rule?

MR. THOMAS: Except in case of emergency, we were instructed never to blow our whistles in any of those towns down there.

MR. REID: Who determines whether an emergency exists?

MR. THOMAS: I suppose that is a case of leaving it up to the motorman.

MR. REID: Did the superintendent who issued this bulletin ever discuss this matter with you, or did he just simply issue the bulletin and let you draw your own conclusions as to when an emergency existed?

MR. THOMAS: He never discussed it with me. The bulletin had been from service.

MR. REID: There was nothing ever said to you about what he might consider an emergency?

MR. THOMAS: No, sir, that was left up to the motorman.

MR. REID: Mr. Harmon, are there any questions you would like to ask Mr. Thomas?

The Accident Occurred in a Suburban Community

MR. HARMON: Mr. Thomas, did this accident occur in a small community?

MR. THOMAS: It is kind of a suburban district.

MR. HARMON: Is there any way in which you could advise me with reference to the villages and towns that have speed ordinances?

MR. THOMAS: The time table is all full of speed regulations.

MR. HARMON: Did you ever pay any attention to it?

MR. THOMAS: We are given a schedule to make and we have to make it.

MR. HARMON: I asked you if you paid any particular attention to it.

MR. THOMAS: Well, I can't say that I did any more than the rest of them. We try to get through these towns as carefully as we can and make time.

MR. HARMON: How far was this automobile from the crossing when you first realized that an accident was going to occur?

MR. THOMAS: When I first saw it it was about 60 feet away from the crossing.

MR. HARMON: How fast was it moving?

MR. THOMAS: About three or four miles an hour. I thought he was slowing down for the wigwag and that he was going to stop.

MR. HARMON: How did you come to make up your mind that that was the case?

MR. THOMAS: Well the wigwag was there, it was working, and I didn't think anybody would be fool enough to go ahead.

MR. HARMON: You have been a motorman 15 years and you have come to the conclusion that you don't think that the average automobilist driving a car approaching a crossing would proceed?

MR. THOMAS: It all depends on the circumstances.

MR. HARMON: Under these circumstances, didn't you have a right to believe that you should use a little precaution in this case?

MR. THOMAS: I didn't see why I should. He was going not more than three or four miles an hour when he made a sudden dart forward onto the track and when he was on the track I could not do anything.

MR. HARMON: Can you quote this bulletin the superintendent sent out with reference to what you should do?

A Bulletin That Limited the Blowing of Whistles

MR. THOMAS: Well, I don't know that I could quote it verbatim, but it stated that the motorman should refrain from blowing his whistle except in case of an emergency, and listed the towns where this should apply.

MR. HARMON: In this case you didn't think there was any emergency until it was too late?

MR. THOMAS: Yes, sir.

MR. HARMON: If a similar happening occurred at a crossing similar to the one where this accident happened and there was a bulletin issued whereby you were not supposed to blow your whistle only in case of emergency, would you now consider this an emergency case?

MR. THOMAS: Yes, sir.

MR. HARMON: Didn't it say in the bulletin that you should use great care by slowing down your train at a crossing similar in character?

MR. THOMAS: No, sir.

MR. HARMON: Would you now slow down your car?

MR. THOMAS: After an experience like that I think I would slow down. It taught me one thing, that I can't depend on an automobilist.

MR. HARMON: What kind of equipment were you operating?

MR. THOMAS: I was operating a circle car, wooden coach.

MR. HARMON: Light car?

MR. THOMAS: About 50 tons.

MR. HARMON: How far would it take you to stop a car running at that speed?

MR. THOMAS: It all depends on the circumstances.

MR. HARMON: If the car was in first-class condition.

MR. THOMAS: Well with everything working right you might stop it at 400 feet one time and 500 feet another. It is never the same in two cases.

MR. HARMON: On the day of this accident was your equipment in first-class order?

MR. THOMAS: It was working pretty good.

MR. HARMON: Did you test your equipment before you took the train out?

MR. THOMAS: I relieved another man. It is a rule to test it to see that the brakes are working.

MR. HARMON: The only thing you did then was to test those brakes, did you not?

MR. THOMAS: I tested them to see if they were working.

MR. HARMON: Did the brakes take a hold all right?

MR. THOMAS: Yes, sir.

MR. HARMON: Did you think you made a good stop under the conditions?

MR. THOMAS: As good as I could make.

MR. HARMON: In your judgment, what is a good stop?

MR. THOMAS: It all depends. I have made better ones on some roads, but that was a good one for that road.

MR. HARMON: Was this automobile a closed car?

MR. THOMAS: No, sir, it was a touring car.

MR. HARMON: Did it have the curtains up?

MR. THOMAS: All except one.

Close to Crossing When Automobile Was Observed

MR. HARMON: Did you observe what the driver of that automobile was doing before the accident?

MR. THOMAS: I didn't have time to look at the driver. I was looking at the car in general.

MR. HARMON: You can't remember seeing the driver of the car?

MR. THOMAS: You know I had a lot of things to look for there. I didn't even know whether it was a man or a woman driving it.

MR. HARMON: You say you were 60 feet from the crossing when you first saw the car?

MR. THOMAS: The car was 60 feet.

MR. HARMON: How far north were you from the crossing?

MR. THOMAS: About 700 or 800 feet.

MR. HARMON: How far were you north of the crossing when the emergency existed?

MR. THOMAS: I was about 200 feet.

MR. HARMON: How far south of the crossing did you run?

MR. THOMAS: I went about 275 to 300 feet.

MR. HARMON: I think that is all, Mr. Reid.

MR. REID: Have you any questions, Mr. Jeffries?

MR. JEFFRIES: You say you have been with this road seven years. Whom did you work for before you came to this company?

MR. THOMAS: Illinois Traction System.

MR. JEFFRIES: How long did you work there?

MR. THOMAS: Between eight and nine years.

MR. JEFFRIES: You have been operating a train 15 years?

MR. THOMAS: Yes, sir.

MR. JEFFRIES: How much rest did you have the night before this accident?

MR. THOMAS: I was off duty about 15 hours.

MR. JEFFRIES: How much sleep did you get?

MR. THOMAS: As much as I ordinarily get.

MR. JEFFRIES: How much rest did you get?

MR. THOMAS: You mean how long was I in bed? I was in bed seven hours, possibly a little longer.

MR. JEFFRIES: Do you think you did everything that was possible to do to avoid this accident?

MR. THOMAS: I thought I did at the time.

MR. JEFFRIES: Do you still think so?

MR. THOMAS: There was only one thing I might have done. I might have slowed down a little bit.

MR. JEFFRIES: How far were you from the crossing when you first saw this car?

MR. THOMAS: I was about 700 or 800 feet.

MR. JEFFRIES: Mr. Thomas, what was the reason that brought about this order prohibiting the blowing of whistles in these towns?

MR. THOMAS: I don't know just what it was, but I heard that the residents of those districts were sort of high-class people and they didn't like to be bothered with a lot of noise and they raised a kick about it, and so the company put out a bulletin preventing us from blowing our whistles.

MR. JEFFRIES: Have you observed that rule?

MR. THOMAS: Yes, sir.

Lack of Sympathy with the Safety Organization

MR. JEFFRIES: Do you have a safety organization in your company?

MR. THOMAS: Yes, sir.

MR. JEFFRIES: Do you ever attend any meetings?

MR. THOMAS: I attend them, but not regularly.

MR. JEFFRIES: Why not?

MR. THOMAS: You know we have other places to go once in a while.

MR. JEFFRIES: How often are these meetings held?

MR. THOMAS: Once a month.

MR. JEFFRIES: Do you attend every month?

MR. THOMAS: No, sometimes I have something else I want to do at time that prevents me from going there.

MR. JEFFRIES: How long do these meetings usually last?

MR. THOMAS: From a half hour to two hours, and once in a while they last three hours.

MR. JEFFRIES: What do they do at these meetings?

MR. THOMAS: Well the usual thing. There are two or three dozen fellows there and a bunch of company officials that do the talking and a fellow gets tired listening.

MR. JEFFRIES: Do you ever do any talking?

MR. THOMAS: Sometimes I do.

- MR. JEFFRIES: Are you active?
- MR. THOMAS: About as active as the rest of the fellows.
- MR. JEFFRIES: Do you think the meetings are a good thing?
- MR. THOMAS: Sure, if they are run right.
- MR. JEFFRIES: Well, why don't you attend more regularly?
- MR. THOMAS: Just as I told you, sometimes there are other things to do. My wife wants me to take her out once in a while. Then there are other meetings they want us to go to.
- MR. JEFFRIES: Do you belong to any lodges or other clubs?
- MR. THOMAS: Yes, sir.
- MR. JEFFRIES: Do you attend those meetings regularly?
- MR. THOMAS: Sometimes I get there and sometimes I don't.
- MR. JEFFRIES: You attend the lodge about the same as you attend the safety meetings. Have you attended any more meetings than in the past since the accident?
- MR. THOMAS: I like to go for one reason, I like to tell some of the boys what I think I learned as a result of this thing.

Lack of Understanding of the Word "Emergency"

- MR. JEFFRIES: In reference to that bulletin, Mr. Thomas, did it ever occur to you that if you didn't thoroughly understand when an emergency exists to consult somebody and find out?
- MR. THOMAS: Who are you going to consult?
- MR. JEFFRIES: Your superintendent.
- MR. THOMAS: Do you think he would know about it?
- MR. JEFFRIES: Who do you work for?
- MR. THOMAS: The superintendent.
- MR. JEFFRIES: Well he would know what to tell you.
- Now is it a fact, Mr. Thomas, that as you were watching that automobile, having in mind that an emergency did exist, that you would have blown the emergency whistle as that automobile approached toward the truck?
- MR. THOMAS: I would have blown it if I was aware that an emergency did exist.
- MR. JEFFRIES: The automobile was barely moving along; it wasn't stopped?
- MR. THOMAS: I thought it was stopped.
- MR. JEFFRIES: Do you think it was a good policy for a motorman to think at the front end of the car?
- MR. THOMAS: Well, I don't know what else you can do unless you want to slow down at every crossing you come to.
- MR. JEFFRIES: Has any man ever been penalized for failing to make the time when he tried to prevent an accident?
- MR. THOMAS: No, not on account of that.
- MR. JEFFRIES: If you had used that explanation in your delay report would you have been called about it?

MR. THOMAS: If you are a motorman you like to make the time and you don't want to be late.

MR. JEFFRIES: You know as a fact that it is the policy of the company to avoid accidents, regardless of speed, isn't it? You disregarded that.

MR. THOMAS: I wanted to get the trains over the road.

MR. JEFFRIES: You say the wigwag was working?

MR. THOMAS: I figured that the wigwag was working and that it was going to stop that automobile. I feel he should have had sense enough to stop.

MR. JEFFRIES: Then you wanted the automobile driver to do all the thinking?

MR. THOMAS: I figured that it was up to him to do a little of it.

MR. JEFFRIES: Don't you think you should have done a little?

MR. THOMAS: I did. I was thinking about the wigwag. I saw that machine and I thought he was stopping for that wigwag. That is what I had in mind.

MR. JEFFRIES: Hasn't the bulletin been reissued from time to time and wasn't there always in the last paragraph of that bulletin words to the effect that the motorman was to be allowed to blow the whistle in case of an emergency?

MR. THOMAS: It didn't say what an emergency was. That was left up to me.

The Automobilist is Not Always a Half-wit

MR. REID: Mr. Thomas, I just want to say a word with reference to what I said in the beginning of the investigation, about the purpose of this investigation. I am inclined to think that your attitude, the way you answered the questions that had been put to you, indicates that you didn't catch what I said about the purpose of this investigation. In other words, it looks to us as though you were trying to manufacture an alibi to absolve you from any blame in this accident. Now that is a matter that is entirely out of the hands of this investigating board. It is not our business to penalize anybody. It is our business to determine the cause of the accident and see what can be done to prevent a recurrence.

Now let me go back a little bit. Here is the train going north, a three-car train, and you met this train very near this crossing. Now let me ask you this: as an experienced motorman, don't you think that it is quite likely that an automobilist coming from the east, having seen this car clear the crossing, will quite likely think that it is all right to go across? Isn't that reasonable? An automobilist doesn't have to be a half-wit either to arrive at that conclusion.

MR. THOMAS: I never thought about this other train having the wigwag cut in. I see the point all right. I never thought about the wigwag having been running at the time.

MR. REID: What suggestions have you to offer as to how accidents like this could be prevented? Now, you must remember that we can't be all

over this property. We can't sit in an office in Chicago and direct the affairs of a large corporation like this and provide the necessary finances to operate the line and all of the other things that enter into it, and be on the front end of the car at the same time. Therefore, we have to depend upon such men as you to operate this car safely, and if you can't tell us how to do so, having had all these years of experience, where in the name of Heaven are we going to get this information! That is the reason we are questioning you, to tell us how this accident could have been prevented, or how a similar accident could be prevented.

Now give us the benefit of your experience as a motorman. Having been up and down that line for seven years or more, and working on other lines, you ought to be able to give us some suggestions. Now, let us keep in mind these two trains meeting near this crossing, keeping in mind this bulletin about blowing the whistle within the village limits, and just tell us what you think we ought to do to prevent this sort of an accident.

Suggestions to Prevent a Recurrence of Accident ;

MR. THOMAS: There are several things which can be done to prevent such an accident. One thing might be to move the cut-out for the wigwag closer to the crossing. Then the people would soon learn that if it didn't ring for quite a while after the train passes that the wigwag don't cut out right away. That prevented that particular fellow from looking up; he thought the wigwag was still working on the train going north.

Another thing would be, when you are passing another train, for the motorman, regardless of whether he is late or not, to slow down and make absolutely sure that there is nobody ready to cross. In this case I never thought of that. I thought that the signal was working for me and I never thought about the other train.

Another good thing would be that if there is any question in the motorman's mind about what is an emergency, he could forget the bulletin. I believe that is what I would do the next time.

MR. REID: We appreciate your coming here and giving us your views on the question. I am sure it is going to be helpful to us.

If no one has any further question to ask Mr. Thomas, we will excuse him.

MR. HARMON: With reference to the cut out on the bell signal, Mr. Thomas, do you know why those cut outs were placed so far away from the crossing?

MR. THOMAS: No sir, I do not.

MR. HARMON: Has it been your experience, or have you known of accidents where the cut out was right at the crossing and the moment the rear end of the car crossed the crossing the bell stopped ringing, and then after the accident the injured party, if he was able to talk, would say the bell wasn't working?

MR. THOMAS: That could happen all right, but I never thought about it.

MR. HARMON: Isn't it a fact that the reason the cut-out extends 1,800 feet beyond the crossing is if an accident should happen the train would stop within the range and the bell still continue ringing to show that the bell was ringing?

MR. THOMAS: It seems reasonable to me. I don't know whether that is the reason or not.

MR. REID: That is all, Mr. Thomas. We thank you.

We will next have the conductor on this train, Mr. Oliver. Mr. Oliver is the safety engineer of the Chicago, North Shore & Milwaukee Railroad Company.

In order that our records may be complete, Mr. Oliver, will you please give your full name, age, and length of service with the company?

MR. OLIVER: Jack Oliver, conductor; age 34; service nine years.

MR. REID: Now the accident that we are investigating today is one that occurred on this line at an intersection known as Kenilworth, where a southbound train hit an automobile, killing one person and seriously injuring two others. This happened in the morning at 11:40 o'clock. Now, you were the conductor on that train, were you not, Mr. Oliver?

MR. OLIVER: Yes.

MR. REID: I wish you would be good enough to tell this board what you know about this accident. You have been in investigations before and you understand the purpose of this sort of investigation. It is not to criticize anybody or try to get anybody in bad, or to have anybody disciplined, but to determine the cause in order that we may be able to prevent such accidents in the future, if possible. Will you just be good enough to tell the board what you know about this accident?

The Conductor Was Busy Collecting His Fares

MR. OLIVER: I don't know anything about the accident. I was working in the back end and about eight or ten passengers got on at Winnetka. I was having some argument with some bird back there about paying a dime fare. Finally I got tired of fooling with him and I walked up to the front end of the car and a fellow up there didn't have a ticket and I had to cut a seven cent duplex; then he and I got into a jam, and then just as I looked up I saw this black thing come out of the train and Jack hit him in the rear. Of course, Jack and I jumped out, took care of the injured, got all the witnesses I could, and that is all I know about it.

MR. REID: How long had Mr. Thomas been operating as motorman with you?

MR. OLIVER: We have been together for the last three sign-ups.

MR. REID: What length of time would that be?

MR. OLIVER: About a year and a half.

MR. REID: Have you ever noticed a tendency on the part of this motorman to recklessness in speed at dangerous places?

MR. OLIVER: No, I never paid attention to it.

MR. REID: Would you consider him a competent motorman?

MR. OLIVER: Yes.

MR. REID: As conductor of this train, what are your responsibilities?

MR. OLIVER: To get the passengers on and off the car and to collect the fares.

MR. REID: Do you feel that you are responsible in any way for the safety of the people that ride on the car?

MR. OLIVER: Yes.

MR. REID: We would like you to tell us just what your responsibilities are?

MR. OLIVER: I have got to collect the fares, see that the passengers get on and off the car, and that they don't get hurt.

A Little Lesson Upon Public Relations

MR. REID: What would the patrons of that line know about the Chicago, North Shore and Milwaukee Railroad except as they see that railroad through you?

MR. OLIVER: I don't know.

MR. REID: Are you in the habit of arguing with passengers?

MR. OLIVER: With some you can't help but argue.

MR. REID: Did you ever have any arguments with your motorman?

MR. OLIVER: No.

MR. REID: Do you consider him cool-headed?

MR. OLIVER: Yes, he's all right.

MR. REID: Do you attend safety meetings held on the property?

MR. OLIVER: Some of them.

MR. REID: What do you mean, some of them?

MR. OLIVER: Well, whenever I get up there in time to go in for a few minutes.

MR. REID: How often do they have these meetings?

MR. OLIVER: Once a month in Milwaukee and once a month in Highwood.

MR. REID: At which place do you attend?

MR. OLIVER: If I am in Milwaukee I attend there, and if I am in Highwood I go there.

MR. REID: What sort of a program do they have at those meetings?

MR. OLIVER: I don't know, they do too much talking.

MR. REID: Have you ever offered any suggestions as to how those meetings should be conducted?

MR. OLIVER: I sent in a recommendation one time and then I quit. They said something about it at one of the meetings but I wasn't there.

MR. REID: Then apparently you take just about as much interest in the safety work on your property as you do in the safe operation of your train. I mean so far as the education of your part of the work is concerned.

MR. THOMAS: They want you to go to safety meetings of the E. M.

C. A., union meetings, and other meetings. That is all there is—meetings.

MR. REID: Do you realize the question of human life is involved in this discussion?

MR. OLIVER: Yes.

MR. REID: Any questions, Mr. Harmon?

MR. HARMON: You say your safety meetings are not interesting?

MR. OLIVER: I have been to some that were and others that weren't.

MR. HARMON: Is that the reason you don't take an interest in the safety movement?

MR. OLIVER: They want you to go on your own time. Why don't they pay us if they want us to attend regularly?

MR. HARMON: Aren't the meetings for your own benefit?

MR. OLIVER: Partly, yes. It isn't all one-sided.

MR. HARMON: Did you ever have an accident on the rear end of your car?

MR. OLIVER: Yes.

MR. HARMON: What is the worst accident you ever had?

MR. OLIVER: I had a fellow fall off the rear end and break his leg. It was his own fault, though.

The Motorman Had Been in a Card Game Last Night

MR. HARMON: Did you notice any unusual action on the part of this motorman on the day of the accident, and was he acting normal?

MR. OLIVER: I thought he was all right, except that he was a little excited because he won five bucks in a card game.

MR. HARMON: Did he tell you that?

MR. OLIVER: He told everyone in the barn.

MR. HARMON: Was that the only conversation you had with him that morning?

MR. OLIVER: I asked him when we were going to get into Chicago.

MR. HARMON: How long did you remain in the front vestibule of the car?

MR. OLIVER: I wasn't in the front vestibule. I was in the front of the car about four seats from the front vestibule.

MR. HARMON: This was your regular motorman?

MR. OLIVER: I had him for three sign-ups.

MR. HARMON: Do you know anything about this bulletin that has been posted with reference to speed ordinances in towns?

MR. OLIVER: I know there is a bulletin that these fellows can't whistle through certain towns. It is not an ordinance, it is an order.

MR. HARMON: Why was this order issued?

MR. OLIVER: It was requested by the people in those towns because they did not want to be disturbed by the whistle.

MR. HARMON: How do the motormen take that bulletin?

MR. OLIVER: I never heard much jabbering on it. It looks as though they make them so they could hang something on the motorman.

MR. HARMON: Do you think that was a good bulletin?

MR. OLIVER: I don't know. You take those towns that come out with an order such as that. They want crossing protection and we have any number of those wigwags down there. They don't want any noise and yet they want protection. They want the guys on the cars to do all the protecting; they won't do any themselves.

MR. HARMON: You don't like those people in those towns very well, do you?

MR. OLIVER: They are not reasonable.

MR. HARMON: Do you ever think the passengers you are always arguing with are unreasonable?

MR. REID: Any questions, Mr. Jeffries?

MR. JEFFRIES: Mr. Reid asked you whether you thought the motorman was competent and your answer was that he was a good man?

MR. OLIVER: He is a good motorman.

MR. JEFFRIES: Do you think him competent enough to operate his train?

MR. OLIVER: Yes.

MR. JEFFRIES: Do you ever have any arguments?

MR. OLIVER: Not about operating.

MR. JEFFRIES: What do you argue with him about?

MR. OLIVER: About the world's series.

MR. JEFFRIES: You are on friendly terms with him.

MR. OLIVER: Yes.

MR. JEFFRIES: Do you think that you could contribute in any way to the promotion of safety on this road? Do you think you could do anything?

MR. OLIVER: Well, I think after this accident that I will probably attend more meetings and jump into some of this discussion that they talk about.

MR. JEFFRIES: You have plenty of time to attend these meetings.

MR. OLIVER: No, I don't have.

MR. JEFFRIES: What do you do with your time?

The Conductor Also Did Not Attend Safety Meetings

MR. OLIVER: We leave Highwood at 11:09 and our call time is 10:50. I have half an hour to get my lanterns and to get my trip slips, take a look at the car to see that it is cleaned of any papers, and then I have about ten minutes to slip into the meetings. Why don't they hold them when a fellow can get to them? Let them hold their meetings earlier in the morning.

MR. JEFFRIES: Do you do everything on your road that you should do for the benefit of the road and for the improvement of the service?

MR. OLIVER: I do all they pay me for.

MR. JEFFRIES: You are not underpaid, are you?

MR. OLIVER: Well, it is a good road to work for.

MR. JEFFRIES: Do you like to stay with this road?

MR. OLIVER: Yes.

MR. JEFFRIES: Do you ever have an idea that you would like to have another position with the road, a promotion or something?

MR. OLIVER: I never thought of that.

MR. JEFFRIES: Don't you think that if you offer a few suggestions and take an active part in these meetings that you might have an opportunity to get into a better position?

MR. OLIVER: I think you are right.

MR. JEFFRIES: How would it be for you to take an active part in the next safety meeting?

MR. OLIVER: That would be all right.

MR. JEFFRIES: I think you turned in a report with only one witness. What was the reason you didn't get any more witnesses?

MR. OLIVER: They wouldn't give me their names. I had plenty to do to take care of the people that were hurt.

MR. JEFFRIES: Don't you think that attitude of the three or four arguments that you had with the passengers had something to do with your not getting your witnesses?

MR. OLIVER: No. There was one man that I argue with regularly once a month.

A Suggestion About Conducting Safety Meetings

MR. REID: Mr. Oliver, we appreciate your coming out here. I trust that you understand the purpose of this investigation and that you are going to look at this effort that the Chicago, North Shore and Milwaukee Railroad Company is making to prevent accidents, in a different light. I hope you appreciate that you have some responsibility, not only with respect to the operation of the train you are on, but in helping to create a strong public sentiment in favor of accident prevention. Now, I say a strong public sentiment is very essential if you are going to help in reducing the accidents on this property. We thank you for coming out here.

MR. OLIVER: Can I make a suggestion? It is about this investigation that you fellows hold. Of course there are only a few of us that have been in it, and I think that the safety director ought to work up something like this and put it in a safety meeting. Sometimes I sit there for three hours and hear nothing but supervisors and department heads talk. Why don't you put up something like this at a safety meeting?

MR. REID: I think it is a good suggestion and we will recommend that to the safety department.

MR. OLIVER: Well, can I go back to the barn?

MR. REID: Yes sir, thank you.

If it were not so near 12:30 we would put the superintendent on the stand and interrogate him with reference to this bulletin that has been issued forbidding the blowing of the whistle in certain places, but I think we will have to dispense with that.

(The audience indicated that they wished the investigation continued.)

All right. Mr. Burke, we will ask you to take the chair. Mr. Burke is the superintendent of the Milwaukee Division of the Chicago, North Shore and Milwaukee Railroad, and as such he knows something about bulletins; he knows something about supervision; he knows something about what the men should do to prevent accidents, as shown by his good record. I don't know how much he knows about the attitude of the people in this community in regard to the blowing of the whistle. At any rate, we are going to find out what he knows about this bulletin.

Now, Mr. Burke, will you be good enough to tell us about this bulletin which was issued around the time of this accident?

The Public Is Quick to Criticize Whistle Blowing

W. H. BURKE: Some years ago when we started the effort of reducing grade crossing accidents we impressed upon our motormen the importance of proper crossing signals being blown, and the majority of our motormen took it very well and used plenty of whistle; but in these small suburban towns the public was ready to criticize the unnecessary noise that the interurban railway was making through the village. The city managers of these small villages got together and appointed a committee. The committee met the management of the company and requested that the whistle not be used while operating through one, two, or three of these small villages. It was necessary for us to meet our public relations and meet them right, and so we advised the people in these communities that some instructions would be issued to eliminate some of the nuisances, so-called.

A bulletin was issued on the unnecessary blowing of the whistle in these different towns named, and it stated that the whistle was only to be used in case of emergency. That would go on very well for a short period and then we would get some more complaints that our motormen were using too much whistle, so another bulletin would have to be issued calling their attention to the fact that there had been some complaints about the unnecessary blowing of the whistle and that the whistle should be used only in case of emergency. From time to time it was necessary to re-issue that bulletin. Even though we have had accidents at those crossroads and the management has met the city managers of these different villages and talked it over, yet we have been unable to get permission from them or get them to agree that we can use plenty of whistle through the villages.

MR. REID: Let me ask you this question: If you hadn't issued this bulletin about blowing the whistle and this man had blown his whistle back here, 600 feet, when he first saw this automobile coming from the west, and there had been a complaint from some of the citizens in this case, would you have reprimanded the motorman for blowing that whistle when he explained to you that he considered this an emergency?

MR. BURKE: No.

MR. REID: Would you have made any effort to explain to the citizens

of that community that the blowing of this whistle meant the saving of somebody's life? If there was a complaint made, would you have made an appointment to meet the city managers and lay the facts before them and show them the reason why it was necessary to blow the whistle and the good work on the part of the motorman in saving a life? Has that ever been done?

MR. BURKE: It has. Still it is a hard thing to get them to agree that the whistle is absolutely essential through those small communities.

MR. REID: Which do you think is the more important—a few minutes' sleep of some fellow that lives along here or the life of this fellow that is going over the crossing?

MR. BURKE: The life of the man going over the crossing. We are attempting in our safety program in our schools, in our civic organizations where we have motormen and other men, to put the message over to the public.

Bulletins Are Thoroughly Explained to the Men

MR. REID: Let me ask you another question. When you issue a bulletin of this kind do you explain to the men who get it, either individuals or in groups, just what is meant by an emergency and how they are to determine whether or not there is an emergency?

MR. BURKE: Yes. Probably the motorman and the conductor of this accident have said that they didn't get it at the safety meeting.

MR. REID: Are these things explained at the safety meeting?

MR. BURKE: Any bulletin is open for discussion.

MR. REID: But it is not discussed unless somebody asks a question with reference to it?

MR. BURKE: No.

MR. REID: Don't you think it would be a good idea to explain to the men just what is meant by such bulletins as this and others governing speed of trains, and so on?

MR. BURKE: I do.

MR. HARMON: What do you think of the attitude of these trainmen in this investigation?

MR. BURKE: I did not think very much of their attitude. The motorman is not a motorman anymore, and the conductor has since changed his attitude.

MR. JEFFRIES: Have you ever taken it upon yourself to check up on the men who attend these safety meetings? Have you said anything to Thomas or Oliver about attending these meetings?

MR. BURKE: It is a matter of record.

MR. REID: Thank you, Mr. Burke.

Now, my friends, one of the things an investigating board should do after an investigation of any kind is to arrive at some definite conclu-

sions. Now, it goes without saying that these conclusions had to be arrived at previous to the meeting because we could not take your time. Therefore, these conclusions have already been prepared beforehand, but our idea is that when an investigation of this kind is being made and the witnesses have been here, that the members should then get together and consider everything and arrive at some definite conclusions as to the cause of the accident and what might be done to prevent a recurrence.

Now, the conclusions that we have made may not be entirely in keeping with the testimony that was brought out by these three witnesses, but it will serve its purposes and give you some idea of what is meant by coming to some conclusion when you do investigate an accident. So I am going to ask the secretary to read these conclusions.

Conclusions of Board of Inquiry

1. The motorman should have taken into account the possibility that some motorist would take it for granted that it was safe to cross the tracks after the northbound train had cleared the crossing. When he saw the automobile approaching the crossing he should have recognized the existence of an emergency and therefore would have been justified in blowing the whistle and reducing the speed of the train. In this instance if it had been a fraction of a second later the accident would not have occurred.

2. When two trains meet so near a highway crossing the motorman should be on the alert, ready to blow his whistle and reduce speed if necessary in order to prevent an accident.

3. When complaints are made by village authorities or neighborhood authorities that there are times when the blowing of a whistle is necessary in order to save the lives of the citizens.

4. When operating officials issue such bulletins as the one involved in this accident they should take such steps as may be necessary to inform motormen just what is expected of them and what is meant by the word "emergency."

5. Thousands of people are killed annually at grade crossings. There is one sure and immediate remedy. That is for all motor vehicles to come to a full stop at all railroad crossings. No effort should be spared to educate the public with respect to this greatest of all hazards.

W. H. BOYCE (Pittsburgh Railways Co., Pittsburgh): Mr. Chairman, I would like to know if any representatives here can tell us whether on their property they give an explanation when a bulletin is issued for the issuance of that bulletin?

R. M. READE (Quebec Railway, Light, Heat & Power Corp., Quebec): In our company no man is permitted to take his car out unless he is thoroughly conversant with the bulletin that has been issued. He has to sign his name if he does understand it and if he doesn't understand it he applies to the superintendent to give him an explanation of the

bulletin in question. He is not allowed to take his car out unless he understands it thoroughly.

MR. BOYCE: We tell our motormen and conductors why a certain bulletin is issued.

MR. BURKE: In all our bulletins issued the first paragraph tells why it is used and underneath that, in the second paragraph, is the order.

VICE-CHAIRMAN KOEHLER: Gentlemen, this has been a most interesting demonstration. I know that you all feel as I do, greatly indebted to Mr. Reid and the other members of the board, and to the motorman conductor, and superintendent for this feature.

ADJOURNMENT

WEDNESDAY MORNING SESSION, OCTOBER 27

R. W. EMERSON, Vice-Chairman
General Manager, Cleveland Railway Co., Cleveland, O.

The meeting convened at 10:00 o'clock, Vice-Chairman R. W. Emerson, general manager, the Cleveland Railway Company, Cleveland, Ohio, presiding.

VICE-CHAIRMAN EMERSON: In the first place I wish to apologize for my failure to arrive yesterday morning in time to take charge of the meeting. I heard Mr. Hellmuth was unable to preside. I was in Canada and my train connections went bad, but I think this Section is very fortunate in having a man such as Mr. Koehler to step into the breach as he did. The enthusiasm, the pep, and the interest that we all got out of yesterday's meeting were due in no small measure to the manner in which Mr. Koehler handled the meeting.

The secretary has a communication which I will ask him to read at this time.

SECRETARY EASTHAM: The communication is as follows:

Members of National Safety Council,
Electric Railway Section.
Gentlemen:

In order to record ideas which may be suggested at any session of the Electric Railway Section conference, the 30 representatives of the Pittsburgh Railway Company meet for one-half hour after each session.

At the noon gathering, Tuesday, October 26, the favorable opinion expressed by many of the delegates was so spontaneous that it was suggested a minute be made in the official record concerning the value of the idea presented through the playlet, "A Board of Inquiry in Action."

This little sketch sparkles with safety thought and suggestions and tells the story in a manner new and interesting. It holds the interest of all present until the very end and gives each something concrete to develop on our respective properties.

It is resolved therefore that the members of the committee which

developed and presented the idea be commended for their successful effort; that the delegates be urged to avail themselves of the unique method and give it wide publicity as a recommended means of stimulating cooperation and in keeping interested both employees and executives in accident prevention work.

Respectfully submitted,

W. H. Boyce, Chairman,

Central Safety Committee of the Pittsburgh Railways Company.

VICE-CHAIRMAN EMERSON: I am sure we all appreciate the spirit in which the communication was sent and it will be made part of the record of this conference.

The first paper this morning is to be presented by John J. Connors of the Tennessee Electric Power Company, Chattanooga, Tennessee.

SUCCESSFUL METHODS OF SAFETY

J. J. Connors, Assistant Safety Director, The Tennessee Electric Power Company, Chattanooga, Tenn.

The ordinary methods of conducting safety work, such as bonus plans, awards and safety committees have all been used to good advantage by The Tennessee Electric Power Company in Chattanooga.

We do not claim to have reached a state of perfection in Chattanooga, but we have made great progress in safety work and accident prevention. The total accomplishments can not be accurately compiled, many advantages, such as improved morale, individual efficiency and public relations, are incalculable, but with the aid of a few tabulations and statistics I will attempt to show what improvement has been achieved in the way of reductions in accidents, and in cost of damage suits.

For several years prior to 1918 the number of accidents occurring on the street railway lines of Chattanooga and the resulting expenditures had been constantly increasing. The maximum was reached in 1918, when as a result of 2,793 accidents and held-over claims we expended \$152,604, or 17.7 per cent of our passenger revenue. Late in 1918 our safety first organization was founded and intensive accident prevention work actually started about the middle of October of that year.

A study of the records shows that the average cost of our claim department for the ten years preceding the organization of safety work was 12 per cent of the gross revenue earned. The cost of the claim department for the years 1919 to 1925 inclusive shows an actual saving of 6.68 per cent of the gross revenue, in the street railway division. Our safety first efforts reached their greatest efficiency in 1925. In that year only 2.95 per cent of gross revenue in the railway department was expended for accidents.

In my opinion, no methods of safety work can be successful without the whole-hearted cooperation of the platform men. The safety director must win and also merit the confidence of these men or no methods offered will meet with success. Considering the hazards existing on city streets today, it is my sincere belief that during each period of eight or nine hours that a car operator is on duty, he will undoubtedly save a human life.

With a 100 per cent increase of automobiles on our streets during the past five years, the problem of operating a street car safely has become extremely difficult. Also there is hardly a property that has not, because of public demand, increased its schedule speeds during this period. So the successful street car operator must possess a double track mind and a couple of switches and cross-overs additional, in order to meet present day conditions. The safety director's job is to keep the operator's train of thought on the track of safety, and all switches and cross-overs well lubricated with safety first methods.

Show the Operator His Daily Responsibility

A survey made during a nine hour run showed that the operator of the car actually prevented 35 and possibly prevented 516 accidents. The foundation for safety work must be laid on the front platform of your street cars, and any method formulated which does not consider the human factor can not be successful.

If you can increase the operator's stock of patience, if you can bring home to him the realization that he is truly a servant of the public as well as a non-commissioned officer of the company, if you can convince him that the only solid foundation for him is his safety record and if you can impress upon him that this safety record is the wedge that will some day open a breach wide enough for him to step down off his platform into a better position where his virtues will win their just reward, you are using successful methods of safety.

Let your operator know that you believe there are scores of people in your city who owe their lives to his alertness and watchfulness; also picture to him the results of a moment of thoughtlessness—perhaps a child crushed under the wheels of his car—and I can testify that he will respond to both thoughts.

How often do you ride on your street cars? When you go back home make a tour of inspection; ask some operator at nine o'clock in the morning about the operating condition of his car; you will probably be informed that he has not tested it yet.

Step on the front end of another street car and study the countenance of the operator. Perhaps he has a haggard look, denoting a sleepless night by the bedside of a sick wife or child. You will rise up in your seat as he barely misses the automobile that drives on the track from a blind intersection. The operator's body is on the car platform, but his mind is in the sick room which he left a short time before.

Board another car, and you may find this operator has a sullen coun-

tenance. You gasp as an aged passenger fumbles and grabs for hand strap or seat back, almost thrown down by the rapid acceleration of the car. Watch this operator as he passes children playing on the sidewalks, with never a thought as to whether or not they will dash upon the tracks. Anger is an ally of accident. Of course, the types of operators I have referred to are exceptions, yet they can be found on any property.

The new employee is a fertile field in which to sow the seeds of safety. Upon him depends tomorrow's accident record. Every platform man employed is sent to our safety department and there receives instructions on safe operating practice.

In the beginning of our safety work, employees were selected from different departments and banded together as a safety committee. Heads of all departments became ex-officio members of this committee. The committee has continued to function down to the present time, with meetings held once a month. They last but an hour; they are snappy and business like and are never allowed to become tiresome. In addition to the regular committee meetings, the entire transportation department meets once a month for exchange of safety ideas and to receive new suggestions for further improvement in their work. When a particular group or department appears to be slipping or lacking in enthusiasm, special meetings are the order of the day.

Safety contests are held regularly to create added enthusiasm, in fact everything is done to arouse the interest of the individual. The willingness of every single worker to make an effort to prevent accidents and maintain eternal vigilance is first solicited and then demanded.

Applicants for Platform Jobs Pass Rigid Tests

Careful selection of men is given great attention. Applicants for platform jobs are subjected to rigid physical tests. We assume that all accidents can and should be prevented, but this ideal condition will never be reached, due to man's failure in a crisis. The man of jumpy nerves and similar weaknesses is no longer added to the payroll. In this manner accident hazard is diminished at the source.

The recent abolition of the folding step has proved to be another improvement in accident prevention. With closed vestibules came the folding step and with the folding step came more minor accidents in boarding and alighting. We soon returned to the rigid step and similar accidents have steadily decreased.

Nor have we stopped with our employees; we have not failed to enlist the interest of the public in safety work. Various methods have been employed for this purpose. We have found that simple and inexpensive advertising gets the desired results, provided the material is pertinent to the subject and directed in the right channels.

A series of poster cards was placed in the cars; these cards embodied cartoons depicting various hazards of the motorist, pedestrian, careless child, etc. The cards were a combination of good, sound advice with a touch of humor and human interest. They were changed at intervals

and subsequently superseded with a set carrying simple safety slogans, unillustrated but printed in a variety of colors. Dash signs with safety texts are also used. The latest move in this direction is a series of signs warning against the danger of swinging or riding outside the cars. Still other methods of impressing the public mind with the need of safety have been promulgated through instructions to school teachers, public addressees and the distribution of literature among school children.

It seems that everything possible is being done to promote safety on our property today, and yet we know that there is room for improvement. We still have "accidents" that can and should be prevented. Maybe some day every employee will be vitally interested in safety work, every motorist and pedestrian educated to the value of "Safety First." Then and then only will we truly be able to say that we are using successful methods of safety, because these methods have borne fruit.

Figures on the Cost of Safety Campaigns

VICE-CHAIRMAN EMERSON: Mr. Connors has proved himself to be a versatile young man. He has not only given us a very inspiring talk but he has injected a sales talk on membership at this Safety Congress. At this time I want to commend Mr. Connors as chairman of the Membership Committee, for the very competent work he did during the past year. Mr. Connors reported yesterday that he had taken 16 new applications for membership in the National Safety Council in the Electric Railway Section. That is an increase of over 10 per cent in the membership of last year. It is a very excellent showing and I hope we can do as well or better during the coming year.

A. D. BROWN (New York State Railways, Syracuse): I would like to know, Mr. Connors, what safety organizations you have on your property and how much it costs the company to conduct this campaign?

MR. CONNORS: We have a safety organization and safety committees. In order to answer your question as to the cost of conducting this campaign, I am sorry I haven't the figures with me. I want to say, though, that we spent \$171,000 on this property in 1920 for claims and safety work; in 1925 we spent \$46,000 for claims and safety and \$14,000 of the \$46,000 was for safety work. I hope that answers your questions.

VICTOR T. NOONAN (Chicago Surface Lines, Chicago): Mr. Connors spoke of successful methods of accident prevention. In addition to organizing, Mr. Connors, in addition to commendation talks to the trainmen, one must in these days do something more scientific. I would like to know the method you use in investigating accidents, the methods you use in making inspections of hazards, and the manner in which you bring to the attention of the human organization the causes of accidents.

MR. CONNORS: We have organized a class in safety education. We take and analyze the operation of the motorman's job. A motorman

stops to take on a passenger. We analyze the operation he has to perform to take on a passenger and we bring out a blackboard and illustrate the operation. On one side of the blackboard we bring out the hazards or the way a passenger may be injured in boarding a car. I want to say that there are eight operations that a motorman goes through in picking up one passenger, and there are nine ways a motorman can hurt a passenger.

MR. NOONAN: Don't think for a moment that I am trying to pick at your paper. We have come here to learn something about accident prevention and the more we can pin this discussion down specifically (getting down to the question asked by Mr. Brown, which is very important), the more we will get out of it. I didn't get clearly what you said in regard to safety organizations in your company to prevent accidents. Organization is one of the principles of success of a safety engineer, and I would appreciate your telling us just exactly what you are doing, whether you have safety committees, just how often they meet, and what they discuss.

MR. CONNORS: We have safety committees. These safety committees do not inspect. We have an entire organization divided up into committees and sub-committees. In addition to that we have these schools. We have 15 men in each group, but not more, because if you take over 15 men, a man in the group may have an important idea that he wants to bring out and may be afflicted with stage fright, so I believe that that is the best way I can answer that, Mr. Noonan.

We are using safety committees. In addition to that we have a school of safety education where the platform men go through a course, one hour each day of the week, for eight hours, and the hazards of the various operations of the street car are brought out on the blackboard. The operation is brought out first and then the men themselves bring out just how they may have an accident in performing the various operations which do constitute the operating of a street car.

Reasons Versus Emotion in Teaching Men Safety

DR. C. P. SEGARD (Third Avenue Railways, New York City): I'd like to make a comment or two with regard to the talk that was given. I took the place of a conductor or motorman here in this audience today, as I have done in a number of street railways, and to me this talk on safety divides itself into two very large groups. One is the emotional group which is very transient and temporary, and if we talk from the emotional side to the conductors and motormen you will find it will last just about as long as it is given.

The side of reason, a little bit colder perhaps, but one that will last considerably longer, is the better way. In the safety talks that I have listened to on various street railways, I find that when reason is presented to the men perhaps 90 to 95 per cent of the talk will last a good many times longer than when we assume the emotional side,

and lastly, may I say this: 'psychology has recently come into the realm of science and has passed out of the realm of philosophy. May not accident prevention do the same thing?

MR. CONNORS: I would like to answer that in a way. It depends altogether upon the audience. In Tennessee where the people are emotional, I find that the best way to get under the skin down there is to picture those things. We have a population of 99 per cent native born and that is a condition you don't have in New York. Our talk wouldn't suit at all before an audience of New York platform men.

A. L. HODGES (Brooklyn City Railroad Co., Brooklyn): What is your labor turnover, Mr. Connors?

MR. CONNORS: Sixty-five.

MR. HODGES: That is something we don't have in New York or Brooklyn.

Appeal to a Man's Heart When Talking Safety

MR. FUNK: I don't exactly want to ask Mr. Connors a question; I want to agree with him and disagree with the gentleman who was talking against appealing to a man's emotional side. I believe as my friend, Mr. Connors, does, that there are lots of things you can talk about from a scientific standpoint. I think that safety is a question after all of human engineering. I believe if we are going to put this thing over as we want to, we must talk to a man's heart rather than his head. I come from south of the Mason-Dixon line too; but I don't know that that has anything to do with it, at least I don't think so. Perhaps I am prejudiced like Mr. Connors, but I know that you can talk scientific things to the men in the ring and those are the things that don't last long, but picturing these tragedies as my friend, Mr. Connors, did this morning, I believe those are the things that stick in the men's hearts, and I don't care whether they live south or north of the Mason-Dixon line.

J. HARMON: What part do the heads of the various departments take in the safety work?

MR. CONNORS: They are all active. The general superintendent down to the platform men attend our safety meetings. In our organization the general superintendent is a man of pretty high station.

A. D. BROWN: (New York State Railways, Syracuse): I'd like to ask Mr. Connors if in holding a safety meeting the men are paid for their time and if their expense is considered part of the accident prevention campaign? Also, I'd like to ask about the zero day proposition, if the zero day is based on no reports sent in. We ask our men to send in reports of things which the men may or may not be responsible for. It may be an accident occurring near the street car line or it may be something when the car was standing still. It is merely a matter of chance in those cases and not a matter of judgment.

MR. CONNORS: We have a bonus system. This bonus is distributed at quarterly periods. At the end of every three months the bonus is

paid. A man that misses a safety meeting has one dollar deducted from his bonus amount, and this was brought about by a unanimous vote of all the employees. They used to say, "Bill Jones only attends a few meetings and he gets as much bonus as I do." So they decided to deduct a dollar from the man's bonus for every meeting he was absent from, this dollar to go into the pot and be divided among the men that attended the safety meetings. We get about 90 per cent attendance at our meetings.

In regard to the zero days; I came across a report before I came here where the trolley rope broke and the pole hit the main wire and a report was made out of this occurrence. That would eliminate a zero day.

Another report that came to my attention recently showed the operator of a car was waiting for a man to come down out of a flat and one of these signal lights had the man blocked. The man fell coming down the steps and a report was made on that. That would eliminate a zero day.

In regard to the question whether the men are paid for their time when attending a safety meeting, we do not pay them for attending these meetings. In fact, as I stated previously, there is a penalty for not attending. If a man misses a safety meeting and if the bonus during that period is \$18 he only gets \$17, and the extra dollar goes back into the pot and is divided between the entire group.

Points of the Bonus System Are Brought Out

R. M. READE (Quebec): I'd like to ask if medical expenses are included?

MR. CONNORS: That is separate.

E. K. MILES (New York State Railways, Syracuse): I'd like Mr. Connors to explain briefly what the bonus system is?

MR. CONNORS: I could not do it briefly. We put aside \$1,500 for each one of the three-months periods, and if our accidents run over what they did last year for the same period, \$10 is deducted for every accident over the corresponding period of last year; and if the accidents run less, \$10 is added to the \$1,500 for any accidents less than the same period of the preceding year.

S. W. HENNINGFELD (M. E. R. & L. Co., Milwaukee): I'd like to ask Mr. Connors whether there are any prize awards or contests in this safety work. I don't believe that just commending the men on the work they do, or calling them down for work they don't do, hits the average man on the platform or on the bus, and I want to ask Mr. Connors if there is anything else they do?

MR. CONNORS: There is quite a bit of competition among the bosses. We have a contest on among our five divisions and the division superintendent who leads during any one year with the greatest miles per accident gets a trip to the National Safety Congress. We happen to

have Mr. Bailey here as the man who won both the 1924 and 1925 contests between the divisions.

W. F. HANNA (United Railways, Baltimore): During their talks to the men, do they inform the men of the status of accidents?

MR. CONNORS: The first order of business of our meeting is to let the men know just how they are doing. In other words, we have these charts posted around where the men can see them. These charts are kept up from day to day. About 8:00 o'clock in the morning the entire personnel will know how many accidents we have had. We have got competition between the day and night men on each division, and it is especially keen on account of the bonus system.

W. J. ROUNTREE (Ga. Railway & Power Co., Atlanta): I want to ask Mr. Connors if there has been any increase in the blind claim reports after installing or beginning this bonus system?

Reports and Suggestions to Safety Committees

MR. CONNORS: Yes, but it is not alarming. The only way I have found to gag blind claims is on a percentage basis. In Nashville, six per cent of the report are blind claims. In Chattanooga, only one per cent. One out of every 100 is a blind claim and that is increased from about three per cent before the competition to six per cent at the present time. I don't feel that six per cent is a very alarming rate.

W. F. HANNA (United Railways, Baltimore): Do you have a system of reports and suggestions for the safety committee?

MR. CONNORS: We have suggestion boxes all over the property.

MR. HANNA: Are your meetings open for discussion?

MR. CONNORS: Yes, we try to get the platform men to talk. In a mass meeting I find that an inspiration meeting is the best thing, but you get some real suggestions on safety work in these groups of 15 men in the safety education schools. I have learned more about safety since I started that school than I thought I ever would know. That one plan, I believe, is the best thing we have to show results—the safety education school.

J. W. OLIVER (Chicago, North Shore & Mil. R. R. Co., Highwood): Who does the talking at your mass meetings?

MR. CONNORS: I do. I think it is mighty hard to get them to talk at a mass meeting. I find the best way to get those men to talk is in small groups of 15 each.

MR. OLIVER: Last year we tried out a plan on our property. We hold our meetings with all the employees. All employees are asked to attend, and last year in the Transportation Department we had 42 papers presented by the men on the job. One I recall was by one of the switchmen. He has been on that job for the last four or five years. We got him to get up on his feet and tell us about the hazards of coupling and uncoupling cars and we got more out of that than anything I know of, and after the meeting he came to me and he said, "This job of mine is more important than I realized. After I sat down last

night, before coming to this meeting, I tried to dope out what I was going to tell the fellows; and I learned more about my job last night than in the six or seven years I have been with the company."

We had 42 such papers, including a debate as to the operation of the day and night lines. I wondered if your men took any particular part at meetings?

MR. CONNORS: I just want to say this, when you start to analyze a man's job this is what happens: You tell a platform man that he has eight different jobs to perform in taking on one passenger and there are two things going to happen. He is going to say you are a liar or he is going to ask for a raise. Now, gentlemen, this is what happens. I get up there with a blackboard and go to analyzing a man's job and then he is going to find out that he has got a great big thing there and didn't know he was doing so many different things. I can't break this job into small parts and bring out the operation and get the details before the men. He sees it through his own eyes and he takes a pride in what is brought out. I feel it is one of the best methods in analyzing a man's job.

J. L. FAHEY (Scranton Railway Co., Scranton): Is there any penalty for the failure of the men to make the reports in the case of blind accidents?

MR. CONNORS: Yes, if a blind claim does come in that report counts as two accidents against this man's record. In other words, he cuts his bonus to two-thirds.

Methods of Disciplining Refractory Employees

MR. NOONAN: Talking about the reports, there is a difference of opinion here in the room as to these reports. I would like to know what you would call a report in your company? If a person loses a dozen eggs or sits down on a case of eggs in a car, does that come in an accident report?

MR. CONNORS: Everything is considered an accident with us. Even in the case of where the rope breaks, a conductor makes a report of that.

MR. NOONAN: I see; you call everything an accident.

J. M. LOFTIS (Pittsburgh Railways Co., Pittsburgh): What are the methods of disciplining on your property?

MR. CONNORS: We suspend the men. That is the best and most successful method of safety. If a man strikes an automobile and there isn't any doubt about negligence on his part, he is suspended.

MR. LOFTIS: Going on the theory you advanced in your talk what you tell the man about the good things he does, don't you believe that you can get away from suspending a man on that same theory?

MR. CONNORS: I do, but the superintendent of transportation doesn't.

MR. LOFTIS: No employee of the Pittsburgh Railways Company has been suspended since December 31, 1925, and our results are very gratifying. Our accidents have been cut down, our unreported accidents have been cut down, and on the whole we think it is the best system

that we ever tried out. Of course it is young yet, but we have got great confidence in it and that confidence comes through the confidence of the men, and we believe it is one of the best ways to prevent accidents.

VICE CHAIRMAN EMERSON: We will now have election of officers for the ensuing year and I will call on Mr. Reid for his report.

S. H. REID: In making up this report, the committee recognized the fact that we have three various, separate, and distinct problems confronting this part of the industry, or this Section. One is the bus transportation which is comparatively new, another is the urban or city transportation, and still another is the interurban transportation. All three of these have their separate and distinct problems, so we are recommending at this time the election of three vice-presidents, in keeping with the other Sections which have found it necessary to do that; one to have charge of the motor bus problems, another the urban problems, and another the problems confronting those who operate interurban systems.

REPORT OF THE NOMINATING COMMITTEE

For chairman your committee recommends Mr. R. W. Emerson, vice-president and general manager of the Cleveland Railway Company, Cleveland, Ohio.

First vice-president in charge of Bus Operation, Mr. A. W. Koehler, superintendent of accident prevention, The Milwaukee Railway and Light Company, Milwaukee, Wisconsin.

Second vice-president in charge of Interurban Transportation Problems, Mr. H. K. Bennett, safety manager, United Electric Railways, Providence, Rhode Island.

Third vice-president in charge of Urban Transportation Problems, Mr. E. K. Eastham, safety director, United Railways of St. Louis, St. Louis, Missouri.

For secretary, Mr. J. J. Connors, safety director, Tennessee Power & Light Company, Chattanooga, Tenn.

VICE CHAIRMAN EMERSON: You have heard the recommendations of your committee, what is your pleasure?

J. H. Cox (Cleveland Railway Company, Cleveland): I move the nominations presented by the committee be accepted and they be declared elected.

(The motion was duly seconded and carried.)

VICE CHAIRMAN EMERSON: The chairman will assume his duties tomorrow. Today he is the vice-chairman substituting for Mr. Hellmuth. I am very sorry that Mr. Hellmuth can not be here to see the wonderful results of his year's work as chairman of this Section. He has been untiring in his efforts and has done wonderful work. I have had a good deal of correspondence with Mr. Hellmuth. I know of the correspondence he has had with others, and it is regrettable that he can

not be here today to see the culmination of his efforts in behalf of this Section.

R. M. READE (Quebec): May I ask Mr. Connors if the men have given the bonus system their full and hearty cooperation?

MR. CONNORS: I would say about 90 per cent have. Of course you will have this condition sometimes where a man feels like he is unjustly charged with an accident, and of course he is going to be puffed about it, but I feel it is well worth the money spent on it.

MR. READE: For the information of all here I would like to say that the company which I represent joined the National Safety Council in 1913, so we have been members now a considerable number of years. We started the bonus system and all our men are organized 100 per cent. They asked to discontinue it and we have done so, and any reduction that they may have in accidents we have given back in free uniforms. We have got the cooperation of all our men and we gave them all free uniforms after 15 months of service. Further than that, if they made a greater reduction in accidents we gave it back to all of them in pay. We increased their rates. We have made a very great success.

In 1913 our accidents cost seven per cent of our gross earnings and our gross earnings were about \$450,000. Today we are running over a million and our accident claims, including mechanical expenses and legal expenses, are about .75 of one per cent, and I call that magnificent cooperation from organized men.

VICE CHAIRMAN EMERSON: We will now go on with the next paper, prepared by Mr. T. G. Hamilton, assistant general manager, Chicago South Shore and South Bend Railroad, Michigan City, Indiana; he is not able to be present with us today and Mr. Reid will present his paper.

HARMONIOUS RELATIONS BETWEEN EMPLOYEES AND MANAGEMENT AND THEIR EFFECT UPON ACCIDENT PREVENTION

T. G. Hamilton, Assistant General Manager, Chicago, South Shore & South Bend Railroad, Michigan City, Ind.

The unique prosperity of the United States has assumed such widespread interest, if not outright envy, in a world greatly impoverished by war that in recent years this country has been the objective point of scores of foreign commissions, groups of distinguished industrialists, economists and labor leaders.

With their fellow countrymen no doubt wondering from where their next meal is to come, let alone how they can manage to amortize their war debts, our visitors find it extremely difficult to reconcile this prosperity with the present financial plight of the rest of the world. They are at a loss to explain our exalted living standards, widely diffused happiness and industrial harmony.

They are conducted through our great steel mills, taken down into our coal mines, whisked about on our fast railroad trains and formally initiated into the complexities of our industrial structure. They are permitted to mingle freely with the workers in the front line in order to learn their attitude toward their employers.

The visitors are shown silent, efficient machines performing in a twinkling and with no perceptible effort the enormous tasks which once required the joint and arduous labor of hundreds of men. Instead of hosts of human toilers, crushed in spirit and health by long hours and back-breaking drudgery, they find a mere handful of skilled, healthy and contented workmen guiding and directing these giant, inanimate servants of mankind. They learn incidentally, too, that steam and electric power development has given every man, woman and child in our nation the equivalent of 50 ever-willing slaves.

Industry Is Organized to Give Men a Fuller Life

Their guides explain to them that the wholesale introduction of machine tools and power has not only caused our national output to soar to an unprecedented height, but has also increased the capacity of the individual worker employing them, many times over. They are shown that one of our largest automobile factories today produces 12 cars a year, per employee, as against two cars ten years ago, while a shoe worker turns out eight pairs of shoes each day, as compared with four pairs a day ten years ago. It is further impressed upon them, that volume production has materially reduced the unit cost of manufactured articles and that the greater profits, which naturally accrue, have inevitably drawn up the wages of labor after them, so that man today lives a fuller and richer life. His circumstances are immeasurably superior to those of a man of 100 or even 50 years ago. He has become a consumer. The more he gets, the more he wants. To supply his demands, the busy factories roar with industry and the utility companies are enriched by his opportunity to secure the conveniences and luxuries of life. That high wages have a very direct bearing on the nation's buying power with the result that comforts, leisure and luxuries are diffused among our people as they are among no other peoples of the earth, readily becomes apparent.

As these factors, which, at first, seemed to defy answer, are gradually unfolded to our foreign observers, it is probable that the most lasting impression of all is their discovery that the feeling of mutual responsibility and common interest on the part of American employers and employees is ever increasing in strength. They are quick to agree that in the recent strike, British coal miners were butting their heads against the stone wall of economics when they expected to squeeze higher wages from their employers by restricting the output of fuel. It is obvious to them that in America wages are not arbitrarily fixed by employers, but by the rate of production.

The invention of the steam engine and other early types of modern machinery and the advent of the factory system in the last few decades of the eighteenth century, decreed the end of the so-called "Cottage" industries, when virtually every man supplied, by his own efforts, the entire needs of his family. Industrialism required larger amounts of capital than a single individual could ordinarily provide.

Hence, a day soon arrived when industrial undertakings became a co-operative affair; each group contributing a certain part to the whole of productive effort. Some contributed savings, others inventive genius and executive brains, while still others entered the combine by giving of their time and physical efforts. The division of tasks multiplied as time went on and the former owner or manager, clad in apron or overalls, who once worked side by side with his men, inspiring them to better workmanship, found the increasing complexities of his business no longer permitted him actually to "work at the bench." Abstracted by other duties he began to lose touch with the personalities and problems of his men. The breach between employer and employee grew; the rift widened. The influx of new racial and national viewpoints due to immigration; the growth of the printed word with newspapers and periodicals flinging ideas into the uttermost reaches of a working population; changes in living conditions due to urban congestion and changed standards of living; the evolution of a highly complex social order out of one which had been relatively simple and homogenous—all of these subtle influences wove a curtain, not merely of misunderstanding, but of non-understanding, between employer and employee, each becoming an impersonal, unfeeling creature in the eyes of the other. As a consequence of these misunderstandings, pride of workmanship and efficiency slumped all along the line. The amount and quality of individual effort returned for every wage dollar expended was found to be in close mesh with individual attitudes, viewpoints, ideas and motives.

Recognition of the Importance of the Worker

More recently, however, this relationship has undergone a considerable change. Ownership no longer exercises the domination it once had over management, and the relative pressure of profit has somewhat relaxed. The best minds now are agreed that the door has been found in the plan, recognizing and admitting the importance of the worker to the whole scheme of things. He is recognized as the middleman between capital and machinery, for no matter to what stage of labor-saving efficiency we may bring machinery, it is short of what it was created for unless the man who operates it is possessed of equal efficiency. Thus, waste of materials, supplies, overhead, time, supervision and power has its primary source in human factors and the coordination of these factors lies in intelligent, informed and efficient management.

At the same time executives are beginning to realize what an indispensability to success is the loyal cooperation of their men. Labor is being taken more and more into their confidence. Employees are en-

couraged to buy stock and become partners in the business, thereby acquiring a more personal interest in its financial success. Through employee representation plans, labor is given a large voice in the management; more attention, in turn, being given to the welfare of the employee. Short-sighted is the management which does not realize that courteous and efficient employees offer the greatest assurance of success. In the public utility business the customer's impression of the company is received almost entirely by the treatment accorded him by the employee. In the customer's eyes, the employee is the company.

Without the loyal cooperation of trainmen and other employees in daily contact with the public, any permanent success in the electric railway business or any other public utility business is an impossibility. In spite of all the mechanical devices which may be employed to assure good service, the success of the company hinges primarily upon the good or ill will incurred by its emissaries to the public. Again it is the human factor—the tap root of which, among other things, means getting back to first causes in human beings. It is as important to know men as it is to know machinery. You can get little out of either unless you understand them, not only in their relations to each other, but to the operations they are to carry out.

Extreme Care Used in the Selection of Men

It is the policy of the company I have the pleasure to be connected with, to use extreme care in the selection of its men. It is our tenet that "As ye hire so shall ye reap." All applicants must not only furnish suitable reference, but they must satisfactorily establish their various connections for ten years previous. Hearing and vision tests are very rigid and medical examinations are given in an attempt to closely estimate the character of disabilities which would be apt to result in lost time. It is impressed upon him at the time that courteous, obedient service without accident is his duty, and that carelessness will not be tolerated. He is told that accidents do not happen haphazardly, but are caused, and that there is an underlying reason back of every accident. Often there are many factors not apparent at the time and place of the accident that have some bearing on the cause. But a study of accidents shows almost indisputable evidence that individual carelessness plays a prominent part.

In what way is this true? The best way to explain is to take an example. John Doe is a motorman. His superior has continually thwarted the men's demand for improved working conditions. John is disgruntled and discouraged. The management has been indifferent toward him and his needs. What more logical result of this policy than that he should be careless of the company and its interests? It is a consequence as inevitable as the appearance of the can opener among a household's culinary articles after the honeymoon is over. As a result John's frame of mind—his attitude—has grown bad for safety and favorable for acci-

dents, and, with his thoughts on his grievances instead of on his work, he bumps a car ahead of him or runs past a red block.

A myriad of similar illustrations might be given, but they would be merely cumulative—cumulative of the eternal truth that as men would be done by so must they do; not the gold plated policy of short-sighted capital and short-sighted labor, but the increasingly popular and always workable policy of justice born of love and begotten by the Golden Rule.

ADJOURNMENT

(NOTE: A full report of the Joint Luncheon meeting of the Electric Railway Section with the Public Utilities Section, Wednesday noon, October 27, will be found with the complete report of the Public Utilities Section, on Page 659, Volume II, of these Transactions.)

THURSDAY MORNING SESSION

October 26, 1926

The meeting convened at 10:00 o'clock, Chairman Emerson presiding.

CHAIRMAN EMERSON: The first thing this morning is a communication from the secretary. I will ask Mr. Eastham to read the resolution which he has.

SECRETARY EASTHAM: The resolution is as follows.

"WHEREAS the Chairman of this Section, Mr. G. T. Hellmuth, was called away on the first day of the Congress on urgent business and has not had the opportunity of seeing the culmination of his year's efforts in the splendid meetings of this Section, the most largely attended and enthusiastic the Section has ever held;

NOW BE IT RESOLVED that the Electric Railway Section expresses its deep appreciation of the untiring and well directed efforts of Mr. Hellmuth during the past year; that this resolution be made a part of the permanent record and that a copy of same be sent Mr. Hellmuth."

CHAIRMAN EMERSON: Gentlemen, I suggest that we adopt this resolution by a rising vote.

(The resolution was adopted by a rising vote.)

H. K. BENNETT (United Electric Railways Co., Providence): Mr. Chairman, may I offer the suggestion that instead of delaying the communication by letter it be sent as a day letter?

CHAIRMAN EMERSON: It is a good suggestion and we will follow it.

The first paper on this morning's program will be by Mr. J. A. Van Osdal of the American Electric Railway Claims Association, Indianapolis, Indiana.

CROSSING ACCIDENTS

**J. A. Van Osdol, American Electric Railway Claims Association
Indianapolis, Ind.**

In the problem suggested by this topic are three primary factors, the "way", the "vehicle" and the "individual", neither of which can be overlooked in any attempted solution.

Means of communication and transportation have always been influential in the development of any country. We think we are safe in saying that the most important physical factors in developing and unifying this nation are its means of communication and transportation.

In response to the demand for improved highways, stimulated by the rapidly developing use of the motor vehicle and encouraged by the lure of "Federal Aid", we find most of the states fairly launched upon a program of highway construction that was not dreamed of 20 years ago.

While the construction program has been and still is being rapidly prosecuted, it has not been able to keep pace with the increase in the number of vehicles which seek to use the way; with the result that the dangers incident to the use of the "way" have been many times multiplied.

The problem of the present is how to make our highways render the maximum of service consistent with public convenience and public necessity, and in these requirements is included the all important element of safety.

In considering the vehicle that is most often involved in these crossing accidents, we naturally turn to the motor vehicle. Probably no phase of accident prevention presents greater difficulties than the one that deals with the automobile. The diversity of interests encountered and the fact that practically every law or regulation looking to safety in this particular field impresses the individual upon whom it is intended to operate as an encroachment upon his personal liberty, serve to make progress in the direction of safety extremely difficult. This is especially true when the class to be restrained is composed so largely of persons of immature judgment, or of little or no responsibility. The question, however, is not the elimination of the automobile, but how to make its use as safe as possible.

Accidents have become so frequent that they cease to impress the general public. They mean but little to those not involved. It is only when we learn of some happening where a dozen or more lives have been snuffed out in a single accident that we are much impressed. Isolated happenings are not impressive.

In trying to evaluate the result of accidents we are mindful that there are certain factors entering into the value of a human life that are very real to those immediately concerned, but which are too intangible to be measured in terms of money; nevertheless, there are certain recognized standards by which the economic value of human life is estimated

at \$10,000. Accepting this figure as a fair average, we may approximate the economic loss which this country sustains annually in accidental deaths. Take 1924 for illustration. That year the deaths in the United States due to accidents were 85,000, representing an economic loss of \$850,000,000. Of these 17,500 were due to automobiles. This was at the rate of one every 30 minutes from this cause alone.

The rapid increase in the number of automobiles challenges the attention of any one who gives even passing attention to this question. The report of the committee on statistics made in February of this year, to the National Conference on "Street and Highway Safety" shows that the registered automobiles in the United States have (speaking in round numbers) come up from nine million in 1917, to practically twenty million in 1925.

From the report of the committee on Highway Safety made in March of this year, we quote the following:

"Nearly twenty million motor vehicles are upon our roads and highways. Our country was not laid out for this unexpected discovery. Our roads have to be rebuilt and our streets reconstructed. The whole of our traffic situation has to be reviewed and reorganized."

The committee on statistics in the report first referred to, said in reference to the showing made by certain tables set out in that report: "It is clear from the statistics given in the two preceeding tables that the advent of the motor car into the industrial and social life of the United States has added greatly to the complexity of traffic movement on our streets and highways. Unless its operations are properly controlled the toll of death and injury will continue to increase during the coming years."

Statistics Quoted from the Hoover Conference

The committee on statistics in its report made in February this year, to the Hoover Conference, shows that the fatalities on highways in 1924 were 23,291; at the recognized ratio existing between casualties and fatalities, this means over 600,000 casualties; and expressed in money, a loss of over two hundred thirty millions of dollars, to say nothing of the property loss entailed in these casualties.

This country was shocked and ready to respond generously with measures for relief for those who so recently suffered from the Florida tornado, but we venture the statement that if the facts were known, the actual loss in life and property from that storm would appear almost trifling compared with the loss resulting annually from highway casualties in this country.

It comes back to what we said a moment ago, it takes the cumulative force of the many fatalities which are involved in a single casualty, to impress us.

In 1924 and 1925, three times as many deaths resulted from the automobile as from diphtheria, and nine times as many as from typhoid.

The Hoover committee, in its February report says that during the eight years from 1917 to 1924 inclusive, there has been a constant increase in fatalities assigned to automobiles, and they have formed a constantly increasing proportion of the total number of accidental deaths.

Lest we despair at the enormity of the task presented, we should at this point, take note of some of the facts embraced in the report of the above-named committee, that are encouraging. Thus, taking the nine-year period ending with the close of 1925, the ratio of automobile fatalities to the number of registered automobiles has steadily declined, though the ratio appears to have remained stationary during the last two years.

While the totals of automobile fatalities have steadily mounted and still are mounting, due to the increasing number of those vehicles, we should note that in 1917, the automobile fatalities per 100,000 automobiles registered was 182, but, gradually declining to 100 in 1925.

Turning from the automobile for the time, let us see what there is on the other side of the account.

The number of fatalities caused by railway grade crossing accidents, by street car accidents, and by horse-drawn vehicles all declined.

That committee also found encouragement in the reduction in automobile accidents in some of the large cities and concludes its report with a recommendation which should give heart to those who have labored to increase the influence of the National Safety Council. I quote the final recommendation of that committee.

"On the whole, and considering the record from every possible angle, the committee feels justified in the conclusion that the safety movement and safety education generally are beginning to produce results in the traffic field, where progress has been much slower than in the field of industrial safety. The battle is not yet won, however. Merely to record a reduction in the rate of increase in automobile fatalities is not sufficient. Fatal accidents in other forms of traffic accidents are declining. They should decline still further. The number and rate of fatalities in automobile accidents should also be reduced. There must be no lessening of intensive effort until this needless loss of human life has not only been checked, but has been reduced to the smallest possible proportions."

Since the conclusion of the whole matter is how to remedy this situation, we shall take a few minutes to suggest certain of the conditions and certain measures for relief, that very naturally suggest themselves.

The Grade Crossing

While the grade crossing is not the scene of all of the accidents of this class it is the place where a great many of these tragedies are staged, and while they can not be entirely eliminated so long as we have the crossing at grade, their number can be greatly reduced.

Grade crossings can not be entirely eliminated until the general public

acquires a higher appreciation of the duty which rests on it in this matter, and is willing to bear a larger share of the expense which such an undertaking involves. Wherever a railroad is involved it seems exceedingly difficult for the public to see why the expense of grade separation should not be borne entirely by the railroad. The public is making a greater use of the highway today than ever before, with an ever increasing volume of traffic that moves over the highways in motor vehicles with a speed equal to that of a freight train, greatly increasing the hazard of highway travel and railroad operation.

Hence, the demand that the public should take its share of this increasing burden is a very reasonable one. Any plan which could possibly be adopted for grade elimination, or even their substantial reduction, would require years to carry out and involve a vast expenditure of money that must come from somewhere; but the establishment of new grade crossings where it is practicable to avoid them, and the clearing up of the view at existing crossings is receiving more consideration at the hands of railroads and public authorities than formerly and this is real improvement.

An enlightened and healthy public sentiment is quite essential.

Law Observance

Law enforcement and law observance go hand in hand in this country; you can't have one without the other.

Laws designed to regulate or abridge habits and customs which have become fixed with the people are apt to be looked upon as invasions of what we are pleased to call personal liberty and the difficulty of their enforcement is because of this popular, though erroneous opinion. This trait of human nature is probably most manifest when the law is designed to regulate the individual in pursuit of his own pleasure.

Laws which undertake to tell the individual how, when or where he shall drive his vehicle, how he shall travel on or across the highway, when to stop and when to go, what precaution he shall take for his own and the safety of others, are usually resented by those upon whom they are intended to operate; and that individual, in convincing himself that the law is wrong, entertains the same false notion of personal liberty that the one does who resists temperance laws, health laws, and other like police regulations. He resists the law because he sees in it an attempt to abridge his personal liberty, although in both cases the law is meant for his benefit, his safety and his well-being, as well as for the general welfare. He sees in it only an interference with his immediate comfort and pleasure and he seeks some means by which he can evade it. It is easy to get an exaggerated idea of personal liberty because we naturally think in terms of self. If we can impress the popular mind that personal liberty ends where the general welfare begins, law observance will be more common and law enforcement less difficult.

In all this, public opinion is a determining factor and legislation must not keep too far in advance of it, for if laws are enacted before there

exists a demand for them and before the people are prepared by education, to receive and support them, they become dead letters. Hence, an enlightened public opinion is of first importance. Let us repeat, respect for the law is the strength of the law, and respect begets obedience. Wise laws backed by public opinion command respect and are easy of enforcement.

But let us not at this juncture deceive ourselves with the idea that these accidents now under consideration can be wholly prevented by any sort of laws or rules which operate only to regulate the conduct of the individual. We can not absolutely regulate human inclination or human judgment by legislative enactment or judicial decree, but we can influence them by a course of wise and persistent education. To that end, systematic accident prevention should become a part of our national life.

A Campaign of Education Necessary

The influences which operate to educate the public will, at the same time, educate those who are charged with the immediate duty of enforcing the law. Courts and police officers will be found responsive to it.

The program adopted to carry on this work of general education must be sufficiently comprehensive to reach all classes, and sufficiently practical to arrest the attention of the man of affairs. This program must be applied constantly; we must not expect its accomplishment with a single effort. Knowledge is not attained with one lesson, rather it is "line upon line, precept upon precept, here a little and there a little." The methods by which the public can be sufficiently attracted to this program to insure real interest and a desire for its accomplishment are numerous and must be varied to suit conditions.

Thus far the effort to make safety popular has been exerted in the urban centers, but before we can bring all the people to the proper appreciation of this work, and before we can expect a healthy public sentiment so general as to insure law observance and law enforcement, the rural side of the problem must receive attention. That is a field practically untouched up to this time and while results must not be looked for as quickly as in some industry where instruction, inspection and supervision in safety work are matters of daily routine, rural life stands ready to respond with community effort whenever it can be made to see the need of it, and how to do it.

While the schools are a very efficient agency in carrying on any educational program, we must not lean too heavily upon that institution; we can overdo at this point. Hence a word of caution:

Don't Overload the Schools

Here let us say that by whatever method you endeavor to interest the schools care must be exercised not to add a new study to an already heavily loaded curriculum or you may fail entirely.

Commercial interests have long since sensed the value of the schools as an advertising medium, and teachers and school officials are constantly on guard to prevent certain interests from imposing upon the schools, and through them, upon the public, promotions purely commercial and in no sense essential to the cause of education.

The difference between the use of the schools for commercial purpose and their use in teaching safety is that the former is not essential in the education for which our schools are created, while teaching principles that protect human life is.

Never did society afford such facilities as now for popularizing any worth-while cause. Such civic organizations as Rotary, Kiwanis, Exchange, Lions, Chambers of Commerce, commercial clubs, and the many other organizations that stand pledged to useful service, easily supplement the work which the schools can do in putting this cause before the public. Such a program will undoubtedly have the support of the pulpit and the press.

CHAIRMAN EMERSON: Mr. Van Osdol, we are certainly indebted to you for this fine, enlightening paper. It is very encouraging to find that you can see a ray of sunshine on the horizon.

In asking for discussion on Mr. Van Osdol's paper, I'd like to call on Mr. H. A. Rowe, Chairman of the Grade Crossing Committee of the Electric Railway Association.

DISCUSSION OF MR. VAN OSDOL'S PAPER

**H. A. Rowe, Chairman, Grade Crossing Committee,
Electric Railway Association**

I don't know exactly what to say after listening attentively to Mr. Van Osdol's most illuminating paper upon this important grade crossing question. He has gone into it very intelligently, given a great deal of thought and study to it and presented it to you in a most admirable way. It seems almost a sacrilege upon my part to try to add anything to what he has said. But possibly because I have been interested in the grade crossing question for a number of years, it might not be amiss for me to say a few things.

Mr. Hellmuth, your chairman, asked me to say a few words to you because of my position as chairman of the Committee on the Prevention of Highway Crossing Accidents of the American Railway Association. Most of us are familiar with some of the work of this committee through our poster system, the booklets we have issued from time to time, the stickers we put upon our letters and the various other means we have used to attract public attention to the serious problem before them.

We recognized a number of years ago, back in 1921, that there was need for definite organized work upon the part of the railroads in the education of the public to their responsibilities for grade crossing acci-

dents. You know we are all self-preservationists to a certain extent and those of us who have been unfortunate enough to be attached to claim departments of our railroads, as well as to our safety departments, have sometimes felt pretty sore over the way the 12 good men and true have treated us, as far as grade crossing accidents are concerned. Possibly our self-interest actually does to a certain extent help in getting something organized and that same self-interest will affect you as well as it does us.

But apart from that, I can honestly say that it has been the purpose, the thought, and the desire of the American Railway Association to act principally from a humanitarian standpoint, to recognize the seriousness of the problem, try to do our duty as men, and having done what we can it is our duty not to rest exactly upon our laurels but still to press onward with the work, and that is what we are trying to do.

Railroad Men Must First "Clean House"

Mr. Van Osdol laid particular stress upon the obligations of the public, and of course it is far from my purpose to lessen that effect in any way whatever. But first it occurs to me that we must go at this problem with clean hands. We have no right as railroad men to go to the public and say to them "Men you must do this or you must do that or something else," if we haven't first done our full duty ourselves. We have got to be fair and decent in this matter and we have got to recognize our own short-comings openly and frankly and willingly, and we have to find ways by which we are going to improve our own short-comings, if we can.

The first thing you have to do on this grade crossing question is to clean house. We have here the statement made by Mr. Van Osdol and it is true, that the very highest percentage of all these accidents comes from the fault of the public; but there are occasions where our own men are at fault and we know it. It is our duty to train our men, to so impress our men that we are sincere and earnest in this question of life saving at crossings, that we must expect from them 100 per cent of their duty every minute of the time; and we must find ways and means by persuasion, education, by discipline, by any other means that come to our command to get our employees to do their full duty every time.

Now we can't stop at that. Our corporations have responsibilities and we must be open and frank about our responsibilities as corporations. If we have a situation which we know in our hearts can be improved from a business standpoint, from a construction standpoint, from a warning standpoint, or from any other standpoint that will give the traveler upon the highway a better opportunity to protect himself, then I say to you that is our primary duty, to so put our property in condition that we can and have a right to expect something from the other fellow.

Of course your problem is somewhat different from ours in many respects, but we on our steam railroads make annual inspections of our crossings to find out whether there has been an unusual growth along our right of way. For instance, we find out whether our crossing flanges have been maintained in good order, whether our crossing flanges are of sufficient width, whether the approaches to our crossings are fair and properly passable. In other words, we go through that situation and find out what we can do that will improve the local situation. When I say we do that, I don't mean to say that it is done on everyone of the 250,000 crossings in the country, but to a substantial extent on the more busily traveled crossings and to a real extent at the less traveled ones also.

I say to you that we also try to put up such signal systems as will give the public reasonable warning of their approach to a railroad crossing; and there are places where you gentlemen are confronted with the same situation, and with signal devices and various other means of protection you can afford some additional opportunity to the traveler on the highway to protect himself.

I think we ought to go into those things most thoroughly and with an open mind and not be afraid to spend those few dollars which are necessary to improve our situation. We have adopted a sign for highway marking so that we have a specific and distinct primary marking for steam railroads alone, which will show, and always have it so that the traveler will be able to see from what direction a train may come. Now that little scheme will be an additional aid. It may open a line of thought and suggestion to you as to something which you may be able to do to meet your specific problem. I am assuming, of course, that you have your interurban as well as your urban situation to look out for.

The Big Task Is to Educate the Public

After you have gone into that situation very thoroughly as far as your own properties are concerned and as far as cooperation with municipalities is concerned, you then have the problem of endeavoring to educate the public with whom you come in contact; and there, gentlemen, is the big task that is before you. When we started out five years ago to endeavor to educate the public on that line we commenced the work with a great deal of fear and trepidation. We were uncertain as to whether we were not going to get a boomerang, whether the thing wasn't going to come back upon us with such fearful force as to demand almost universal elimination of grade crossings, which you know are installed in all of our transportation systems.

But the very enormity of the problem was our strongest defense, and the public has recognized that it is a problem too vast to be set aside lightly, too vast to be overlooked by any corporation, or the corporations of the country, and one in which they have a definite co-interest

and responsibility. So that this very thing which we feared, has reacted to our advantage rather than to our disadvantage; and it may be that you will have some problem in your local situation that you fear will have a reaction undesired by your corporation. Look the matter squarely in the face, go at it with the intention of saving human life and put your human life element above the cost of the change that may be desired. You will find that you have taken the right attitude, as far as a human proposition is concerned, that your public will very shortly come along with you, and will not demand too much from you. It will demand that which we ought to give and that which you ought to be willing to give, but don't be afraid of the problem, gentlemen, simply because it looks too big in the beginning.

You can not go into a proposition of educating the public and expect them to produce results by the simple giving of a talk, by the simple publication of this, that, or the other thing. You have got to realize that the education of the public is a very slow, tedious, painstaking, discouraging proposition. You have got to recognize that you can't get results right away. You may not show results for a long while, but by consistent pounding of the same thoughts with certain modifications, and presenting them in a new way, but pounding and pounding, just as the little drop of water will gradually wear away the stone so will you overcome your difficulty in time.

Follow the Plan of the American Railway Association

I don't mean to say by overcoming this difficulty that you are going to eliminate all of your grade crossing accidents and your street highway accidents. But I do say that you are going to make a wonderful impression and in time you are going to bring them down to the minimum, which is after all what we might expect from such precaution.

I don't know just what you have done in the past, but it would seem to me that you have an opportunity to do much the same on the general principles as the American Railway Association has done. We have in our association a permanent committee on the prevention of highway crossing accidents. That committee functions year in and year out, and it is not for the purpose of making addresses, it is not for the purpose of making an oration, if you wish to call it, or a special report at any one of our conventions or to the National Safety Council. It is for the purpose of carrying on a daily work, a work of publicity throughout all of the years, and to have in mind that they have a continuous problem before them.

Each year we endeavor to interest the public by developing a different type of poster with a different slogan, always bearing in mind our slogan which a man from Canada can always pronounce—"Cross crossings cautiously." Several of our newspapers have said the thing can't be done, but it can be done and we can get people to think straight about a complex phrase like that; and the probabilities are that they

are going to think straight as to their actions when they come to our railroad crossings; at least it is upon that we are working.

I would recommend to you, if you have not already done so, that you establish a permanent committee; that you expect from your own permanent committee definite results; that you cooperate with that committee and give to it your full support, back it up by its publications, publish them everywhere. See that all the suggestions they make, whether you like them or not, if they are intended for the common good, are pushed out consistently to the public that you are trying to reach; and I believe that we can get enough publicity in this proposition that the time will come when we shall be satisfied with the labor that we have performed, or at least feel that we are accomplishing something in the wonderful work that has been done by this Council in endeavoring to save human life.

We believe that we have made our little impression upon the country, we believe that the attitude of the public today is different from what it was six years ago towards our railroads. You may not have exactly the same problem, though you have your local problem, which is hard enough to contend with, I appreciate; but by consistent pushing of a good work upon which you are honestly embarking and in which you are endeavoring to do your full duty, it will sooner or later have its effect. I commend to you then, gentlemen, that you establish such a committee if you have not one already.

I trust you will pardon me, Mr. Chairman, for time I have taken, but I want to leave with you one thing. I feel that this organization is going to be wonderfully helpful to the American Railway Association, if you do something on the line which we are doing; and together we can get the automobile to do something on somewhat similar lines, and with that we are going to reach the dawn of the day that we all hope for.

Automatic Lights and Bells Are New Dangers

CHAIRMAN EMERSON: Thank you very much, Mr. Rowe. We appreciate your coming here today and giving us such an inspiring talk.

MR. NOONAN: There has come with the grade crossing problem what I call a new danger in connection with the installation of automatic lights and bells at crossings. The danger is increased or decreased according to the number of tracks. If you have a one-track crossing, of course it is not so dangerous. I find that many roads are now putting automatic bells and lights at crossings, and they are making one of two mistakes. They may make the time from the moment a train approaches until it gets to the grade crossing so short that it isn't always possible for a truck or an automobile to get across, in my opinion, securely and safely.

The other extreme is to put the time of the connection between the approaching train and its arrival at the grade crossing so far back that the public have become aware of it and won't wait.

I am not talking theory, gentlemen. I have looked into it very thoroughly. I have got the figures and I find that trains are approaching grade crossings in congested places inside the territory limits of cities at 50, 55 and sometimes 60 miles an hour, and they seem to believe that a red light and a bell are sufficient. What happens to the automobile driver? He approaches the crossing, he has read all about the grade crossings in congested places inside the territory limits of cities become familiar with the bell and he says, "This is fine! I'm safe," and he proceeds to cross.

Now if it is a one-track crossing it is all right but if it is 10 or 12, as we have in some of our large cities, I am going to tell you that a train approaching at 55 to 60 miles an hour and striking the crossing 13 seconds after the bell rings, is too darn close a margin to save human life, in my opinion. I don't believe that any red light or any warning bell will ever accomplish its purpose unless we have a sensible reduction in the speed of trains, plus the bell and the light.

MR. ROWE: I think the gentlemen has a local problem in mind that ought to be handled properly by the local people, the municipalities and the railroads themselves. I think the principles of boulevard stops in some of our cities which control the stoppage by a red light should apply to our railroad crossings. We have in many of our major cities what is known as the "boulevard stop" and you need no police enforcement because the average driver is observant of the fact that he must stop at that certain street. Sooner or later, when that same individual sees the same light at a railroad crossing, he will not proceed unless he knows it is perfectly safe to do so.

You will recognize that in treating a matter from a nation-wide standpoint with 250,000 crossings to consider, that I am not in a position to speak of the merits of any individual crossing or whether the protection is simple or ample, but if you have a local situation I think it should be taken up locally and the necessary protection afforded at that crossing.

CHAIRMAN EMERSON: If there are no questions that any gentlemen would like to ask Mr. Van Osdol with reference to his paper we will proceed with Mr. Carrow's paper. Mr. Carrow is Supervisor of Safety, Pennsylvania Railroad System, Philadelphia, Pennsylvania.

EDUCATING THE PUBLIC AND EDUCATIONAL WORK IN THE SCHOOLS

**T. H. Carrow, Safety Supervisor, Pennsylvania Railroad System,
Philadelphia, Pa.**

It seems that somebody has to be a martyr in every cause and for some reason or other I know of no man that has ever been placed at the end of programs as much as I. I have no criticism of it, but I am willing to be the goat if anybody can follow such distinguished gentlemen as Mr. Van Osdol, Mr. Herbert Rowe, and Mr. Victor Noonan.

I am almost in the position of the German fellow I heard of a long time ago (and it hadn't occurred to me until this morning), who had a bakery business that was going on the blink, and he also had a dog. He was meditating about his troubles one day when he came upon the dog sitting by the fire perfectly happy.

"There you are," he said, "you don't have to worry about when you eat, you live contentedly and when you die that is the end of you. I am in an awful lot of trouble and when I die I've got to go to hell yet."

I should have liked to have given this question more thought. It isn't that I haven't given it thought, but it is my observation that it doesn't matter how much you know about a subject; if you are to present it intelligently to an audience of this type, it ought to receive a great deal of time and preparation before presentation. I have done the best I could with it, but I have had on my shoulders quite a lot of business. I had intended to look over a few issues of newspapers without regard to the date, and select a text from the daily items that appear before our breakfast every morning, but I slipped down here this morning and got a haircut that was very much overdelayed and I found exactly what I wanted.

Accidents Due to Lack of Appreciation of Danger

"Two men killed as automobile overturns, their wives die; driver loses control, car skids and is upset." That is my text. This case has been tried before all of the lower courts and up to the present time the verdict has been rendered at least partially against the plaintiff, the plaintiff being the railroads in this case. It seems to me we have got to take the proposition from an entirely different angle than what we have done heretofore. I was particularly impressed with Mr. Van Osdol's observations regarding the enactment of laws before people are educated enough to accept them, and how can we expect the public to obey with willingness laws they don't know or appreciate the reason for when they are enacted?

Nearly everybody thinks when he reads accidents like that which appeared in my paper, and which appear every day, that it is carelessness, criminal carelessness. Now I hesitate to say that it is not carelessness, because if I did somebody might make a beautiful newspaper story out of it, and it would go to the four winds of the earth, that highway crossing accidents are not due to carelessness. In my judgment, the fact that is as equally important as carelessness is failure of the pedestrian, the average automobile driver, the average person who is causing these accidents, to appreciate the dangers and the difficulties and the death-dealing qualities of vehicles on the highways.

If that is the case, it seems to me we ought to proceed on some definite line of attack. If it isn't due to carelessness, it is a reflection on any man's intelligence to say that criminal carelessness is wilful carelessness, as a preacher down in Maryland said. There is something more important to emphasize than mere carelessness. Your children don't

commit depredations because they recognize the fact that it is wrong; they are aware of it, but are not impressed with the thing that they are doing.

Now I want to illustrate that point. I was taking a trip from Pennsylvania on one occasion. My good friend, Dr. Housman, one of the brightest chemists in the United States, owns 14 automobiles and has been driving them ever since they have been made pretty nearly. He is a very clever driver, a man with very little physical strength but a very keen mind. He can drive his automobile in an expert way and has me beat a mile. He can drive almost as well as my wife can. We were going 35 or 40 miles an hour. His wife and mine were sort of flinging out death warnings every once in a while. He really was driving too fast for me to feel comfortable.

The Psychology of Contact With a Fatal Accident

He came to a crossroad and he saw a terrible wreck, a couple of people mutilated. What happened? He immediately slowed down and maintained a reasonable rate of speed for a long time. What is the psychology of that? What is the explanation of it? Was there something missing in Dr. Housman's mind that caused him to fail to realize at the time that he was driving at a dangerous speed?

How many of us here, for example, have had near accidents that have caused us to pause, that have caused us to hesitate, that have made us more careful? I was once driving down the road about 25 miles an hour and a lady who had no resources except three children that were too small to work, had stopped on the road to put up her rain curtains in a Ford car. A gentleman with a Dodge came along. His car was not under control and he went into us. We turned turtle with my wife and a friend inside, and by the grace of God we were saved. Since that day I never pass a man without more precaution than I did before that date.

Why was it necessary for me to have my life almost lost before I was impressed with the danger that I am constantly in when I am driving an automobile? Simply because I hadn't been instructed and because I hadn't been educated in the proper method of driving an automobile.

Knowledge is power, but knowledge isn't power until it is put into use. We don't need so much to be taught as to be reminded. All of us here have knowledge enough and intelligence enough to accomplish a great many things in our lives that we hadn't done, but we lack that particular thing that gives the impetus to carry on and do it; and that, gentlemen, is the thing that I am undertaking to emphasize here.

We want knowledge to be transformed into action so that the great bulk of these automobile drivers and pedestrians will realize what they are doing, and I can say this—God knows what would happen on the streets and highways of the United States if the automobile drivers were half as careless and negligent and stupid as the boneheaded pedestrians. We need to educate them on both sides. We want something put into effect that will make driving an automobile safer.

Take these obvious precautions that ought to be taken, such as slowing down. I hope before the convention is over that something may eventuate regarding this question, the question of slowing down. It seems almost incredible that a person with a bright light shining across a railroad track where the view is obtuse in both directions wouldn't slow down when he knows it. Looking in both directions—just the ordinary common sense of the situation—would suggest that any man would do that, and listen for the whistle, or the bell, or the locomotive.

It would seem to be even more obviously necessary, when one train is passing, to wait for another train to get out of the way if it happens to be coming in the opposite direction. Yet it is the disregard of those simple precautions, not anything that is obtuse, not anything that is covered up in mystery, not anything that we need to go to a technical college to learn, but it is just those simple precautions that people fail to exercise that are responsible for 80 or 90 per cent of the accidents on the streets and on the highways, and particularly at the railroad crossings, which are now amounting to nearly 23,000 fatal injuries and 600,000 non-fatal injuries a year.

Crossing Elimination Is Only a Fool's Dream

What is the remedy? My good friend spoke about a crossing elimination. I'll have to add that crossing elimination is a fool's dream. We are not going to stop eliminating crossings as long as we are in progressive America. But we can eliminate some, and if the people will get together and do their damndest we can eliminate more than a comparatively few crossings every year, and I think that people are waking up to that fact.

What is the other remedy? To teach 30 or 40 million drivers of automobiles to use ordinary common sense and the precautions that are suggested by common sense; and I am right here to tell you, friends, that when you consider what a terrible job the electric railways have in teaching Mr. Motorman to be safe, the magnitude of teaching 30 or 40 million drivers of automobiles safety is something stupendous. And for that very reason I think we ought to attack the problem in the most practical, common sense way that our intelligence will direct, and furthermore we ought to back it up by reasonable laws, not by this nonsensical idea that some seem to have—that you can legislate people into Heaven by enacting a law.

I don't believe in that so much. If we didn't have a single law enacted for 50 years the American people wouldn't be any worse off at the end of that time. I sometimes think that if through some magic we could wipe off every single law on the statute books we would be better off. Aside from some few isolated cases, it is my contention that we don't need many more laws; but we want something to start with that will back up a campaign of education and instruction that will tend to restrain people from doing the things that they are doing to cause these accidents that we are daily reading about. And in order to make my

point clear as far as railroad crossings are concerned, what we want is something to induce people to stop, look and listen, meaning to stop when it is necessary to stop.

What is the significance of all of these stoppages at crossings? I am a statistician, and you know that statisticians can lie, and liars can be statisticians, and it doesn't make any difference whether I am accurate or not. I have traveled as much as 600 or 700 miles in a tour in an automobile. It is my judgment if you start from Detroit today and go to San Francisco, then back to Baltimore and Washington and over here that the total time that you would lose at highway crossings by using common sense precautions would not exceed one hour. The time it would take you would be 130 days. That is an awful squandering of time, if you think of it. I don't believe people who are as intelligent as we are will resent being told that they don't waste time if they stop at crossings.

Now I am going very readily to my conclusion. How are we going to start about this thing? In the first place I want to draw an analogy here with which you are all familiar. I wonder if you realize that 10 to 15 or 20 years ago the matter of checking and educating, instructing, guiding, and directing locomotive engineers and motormen on the street cars was in a very embryonic stage. We had progressed very, very poorly in this direction. In 1910 the great Pennsylvania Railroad inaugurated a system of surprise checking, now called efficiency checking. The people who did this work were called gum-shoe artists and the men who undertook to carry it on for the railroads were looked upon with a degree of scorn by the men in the rank and file. What is the result? We have gotten to a point on all the railroads where we make check upon check on our 3S units. We have a man on every unit, in some units two or three, to be constantly doing nothing but checking.

We Can Not Always Be on Our Toes in Efficiency

Now why was that necessary? Why is there something in the character of the human mind that makes it impossible for everyone of us to be on our tiptoes to perform our duties right, unless someone is checking us, unless someone is prodding us, unless there is an urge to do it?

Now the same way that we have checked locomotive engineers and street car motormen, changed to suit the situation, has to be applied to the drivers on the highways and at grade crossings and everywhere else. Speaking about reckless drivers, for example, what is the difference between a man that goes into an alley at night and shoots you down and a fellow that recklessly drives you down with an automobile? Why, there is this difference: that the criminal who shoots you with his gun is congenitally wrong; there is something wrong with his ethical and his moral nature; but the man who runs you down with an automobile is frequently just as fine a character as any man in this room, and perchance the vast majority of them would restrain themselves if this method that I am going to come to right now were introduced.

Now the accident record is bad. It is woefully bad. I'll say to you if we are having 25,000 fatalities and 600,000 injuries on the streets and highways and at grade crossings, we would have 10 times that many if every time that every driver did a thing that was a potential cause of an accident, an accident actually followed.

Now, here is my proposition; it is a big job, it is a simple job, it is a job that I think you and the steam railroads, the National Safety Council and everyone else ought to undertake. We ought to start out with a proposition of making a universal check of the things that are done that result in accidents all over the United States. The state of Pennsylvania, from which I come, for example, ought to set aside a week, and every other state in the Union and every other city in the Union. My proposition is subject to elaboration or cutting down, or anything. All I want to do is to get away with the principle. A universal check, with 100 to 500 men on the streets and highways to check up reckless driving and tabulate the results. These articles that appear in the daily newspapers about people that are killed and injured would make not one-half the impression which would be made by a combination of the results of all the states in the Union setting aside one week or one day for a universal check.

Only Three Per Cent of People Wilfully Careless

That seems a rather incredible thing, and I will withdraw that proposition and submit to you definitely the details. All that I want done, all that I suggest here today, is to emphasize that people don't recognize the dangers with which they are confronted. They don't recognize what to do with respect to accident prevention and we must first,—like the railroad companies make checks on their engineers, like the trolley companies make checks on their conductors and on their motormen—make checks on the drivers; and after we have tabulated the information, broadcast it to the four winds. I believe if we can only start out in some simple way, it doesn't matter whether we get 48 states or six, if we can take some specific locality and combine the results of a check in that locality with others, and then proceed on the basis of the situation, I know it is going to help.

I made a check on the highway crossings and I found that only three per cent of the people were criminally careless or wilfully careless, at highway crossings. Now if the great majority of us are reasonably careful, another proportion a little more careful, then a very small proportion exemplify carelessness. It seems to me if we can fortify ourselves with that fact, there is no legislative body in the United States that wouldn't come across with that protective legislation which is necessary.

I trust that this intelligent audience will have the sympathy with me that ought to arise from undertaking to suggest and unravel so broad a proposition, and in conclusion I will say that as chairman of the Safety Section of the American Railway Association, if there is any way at all

that we can cooperate with you to put across this accident situation at grade crossings in a better light, and if we can help in any way by our cooperation, we will only be too glad to do it.

I will say for your chairman, as chairman of the Safety Section of the A. R. A., in being asked what my budget will be for next year, I have doubled the amount that we are going to spend for publicity on grade crossing accidents; and I haven't any doubt in my mind that the railroads and the trolley companies ought to spend five times as much for publicity and education in respect to highway crossing accidents.

Statistics Help to Visualize the Crossing Problem

CHAIRMAN EMERSON: I think it is very evident why Mr. Carrow is placed on the tail end of the program wherever he goes, because it is one way of holding the audience.

E. J. HARRINGTON (Cleveland Railway Co., Cleveland): What percentage of new crossings are being installed over the number of crossings that are actually eliminated?

MR. CARROW: That information is available from the Interstate Commerce Commission. I can only say that the number of new ones is greater than the number eliminated. I recently returned from a southern trip and there is absolutely a network of railroad crossings in those southern states, just as they are in this state, and there is no doubt that the question of railroad crossing elimination is merely child's play even to talk about.

MR. VAN OSDOL: I was very much interested in what Mr. Carrow suggested as one remedy. I don't know whether you are familiar with the report made by the committee on statistics at the Hoover Conference, but they have stressed very strongly, Mr. Carrow, the very proposition that you have presented to this meeting; and I want to supplement what you have said by recommending to the chairman of this Section that no more helpful measure can be adopted than to cooperate with the agencies that are gathering statistics along the very lines you have discussed. We have got to visualize this thing and you can't do it in one way. It won't do to say, "Oh, statistics are dry!" Statistics are facts, but whenever you can put the human element into statistics you will make them interesting, as you have done.

The point is this: I was very much surprised a short while ago in trying to get some statistics from the automobile association in my own state upon observations and checks that they had made with reference to operating automobiles on highways, and I found they had none. I had to go to other sources for the information that this association ought to have been especially interested in obtaining. They don't know a thing about it. They pay no attention to it. The whole purpose of that organization seems to be to make it as pleasant and as unobstructed for the driver of the automobile as possible. They don't think beyond the point of their own pleasure and look for no responsibility.

I would recommend along the lines of Mr. Carrow's suggestion, that this Section can't do a more effective thing in this year's program than to keep in touch with the Hoover Conference Committee that is going to undertake the checking for the purpose of obtaining the very information that you have recommended.

MR. NOONAN: I would like to go back a moment to the remarks that I made before Mr. Carrow spoke. We are here talking about prevention of accidents at grade crossings and I am not talking about generalities. I am talking about a specific danger—a specific danger which is not difficult to correct because some roads already have seen the light, and in addition to the automatic bell and the light they have reduced to a reasonable speed their trains. Now wherein comes the distinction in large cities? Mr. Rowe did not answer my question. As an officer of the American Electric Railway Claims Association he ought to be permitted to answer it. With that new hazard, that new cause, the railroads themselves ought to be interested in the elimination of that danger, because every time they strike a bus, or a street car, or an automobile they must face the cost.

Mr. Rowe made one very good suggestion which caught my fancy instantly. I don't recall in all the years that I have been attending these Electric Railway Section meetings—and I have been attending since 1913—that any officers from the American Electric Railway Claims Association have appeared on our program on grade crossing accidents.

A Committee Suggested on the Grade Crossing Problem

Mr. Rowe made a suggestion that we have a committee. Now out of this discussion, gentlemen, I want to see action, and I am going to move the chair that this group appoint a committee on the grade crossing problem to work with the committee of the American Electric Railway Association. I take it for granted that here in this room are operating men, division superintendents, and even trainmen who must take street cars across not only one track but 10 or 12 every day. Knowing from my own experience the great care used by the street railways, the constant cautions they are putting before their motormen and conductors, and knowing how faithfully they watch those crossings, I am not going to add any remarks that might be unpleasant; but knowing the check-ups that we make at the grade crossings in Chicago, we know the conditions that some of those crossings are in, and those conditions are similar to the conditions found in many small cities.

I want to say that I don't think it fair to put all the responsibility on the shoulders of the motormen and the conductors, on the heads of division superintendents or on the railroad managements, because I say here now, gentlemen, that a speed of 60 miles an hour, or 55, inside the city limits of any city is too dangerous and there is one remedy for it and that is that it should be reduced. I don't favor going after the steam railroads with clubs, because the steam railways have done a great work to conserve life on property and on their trains. I believe that we should

get more from the steam railroads through friendly contact, but I would predict for Mr. Carrow that if that particular system of safeguarding crossings with bells and lights, plus fast operation, is carried on at crossings where there are six, eight, or 10 tracks, wherever we meet next year some bus or street car is going to be caught in a death trap.

I wouldn't take this floor unless I thought this was very important. Two years ago I stood a lone figure in Cleveland in the Congress Hotel where I brought this same matter up before 300 or 400 steam railroad men. I pointed out to them the hazards of grade crossings in the city of Chicago, where we have had lives lost and where our property had been struck by a train—and you know what those wrecks are. Our trainmen had done everything possible, everything humanly possible to safeguard their passengers and crew.

Remove the Obstructions That Hide a View of Danger

My motion is that we have a committee to take this up with the American Railway Association; and I go further, gentlemen, and say that I think that our group here and the American Railway Association committee and the Steam Railroad Section, which is doing wonderful work, ought to sit in together for a day. One of the difficulties of safety work here is that you men do not come in contact with the safety engineers of the steam roads.

CHAIRMAN EMERSON: I am going to ask you just to defer that motion for the time being. Mr. Carrow has another meeting he wishes to attend. Are there any other questions anyone wishes to ask him?

MR. FUNK: I don't want to take any unnecessary time, but there is one thing about this grade crossing situation that sort of nauseates me. I agree with all these gentlemen have said, but here is the thing that I am talking about, that is, grade crossing campaigns. I have toured a good deal about the country and you can talk about safety devices, you can talk about lights, bells, and gates and all that. I am for them and we must have them. But it seems to me it is especially easy to tell a fellow, "All you have to do is stop and look." When he does stop to look he can't see on account of the obstruction.

I went to a sectional safety convention recently and they talked about grade crossing accidents. We inspected a railroad crossing of one of those railroads that is always talking about preventing grade crossing accidents, and there on both sides as far back as you could see was foliage of trees, shrubbery, fences, billboards, everything on earth to keep a man from using the best safety device he has—his eyes. I think as long as we are talking about cleaning up this thing, let's get our inter-urban people especially interested in making a survey of those crossings. What is the use of telling a man to stop and look and then shut off his vision? Let us go home and make a little, sensible common sense survey of what we are doing along those lines.

CHAIRMAN EMERSON: We have a telegram here from Samuel E. Johnson, district manager, Public Service Company of Northern Illinois, West

Chicago, who regrets very much not being able to be here. He has prepared a paper on "Mechanical Protection." In his absence, Mr. Eastham will present his paper.

MECHANICAL PROTECTION

Samuel E. Johnson, Secretary, Safety Committee, Chicago, Aurora & Elgin Railroad, Aurora, Ill.

It is necessary in presenting this subject to ask you to look back a few years to the origin of our country. I ask you to remember that on a day in July, 1776, this country of ours was founded on the expression of certain fundamental principals. The representatives started with a declaration of things that were to be objectives of the new government, and you will remember that these were Life, Liberty, Equality and Happiness.

Notice that among those ideals was Life. When your forefathers said, "We establish a man's right to Life" they meant his protection. They might also have meant his protection at grade crossings.

I read an article a short time ago which stated that, "As a matter of history railway grade crossings have been the subject of legislation co-incident with the opening of lines of railroads since the first. Massachusetts in 1835 passed a law reading as follows:

"And if the Select-men of any town wherein any turn-pike, highway or town-way so crossed by any railroad is situate shall be of opinion that the foregoing provision (crossing signs) is not a sufficient security to the public that gates should be erected across the railroad and that an agent should be stationed to open and close the said gates; the Select-men may request said railroad in writing to erect said gates."

I believe the first real form of mechanical crossing protection was when our ancestors built drawbridges over moats surrounding their castles. That, at least, made crossings safe, since they removed them when not in use.

About 35 years ago steam railroads conceived the idea that some sort of audible warning was necessary at their grade crossings to warn pedestrians and vehicles of the approach of trains. Electric railroads did not take up the idea until some time around 1900.

The first forms of crossing protection were indeed very crude and a great many consisted of nothing more than a bell mounted upon a cedar post at the side of the roadway. These crude affairs served their purpose and were perhaps the beginning of the education of the traveling public to depend on a warning device at grade crossings instead of relying upon their own senses and judgment to protect them.

Speed of trains has increased as the development in the art of loco-

motion has improved from time to time, with resultant improvement in the grade crossing protection equipment.

Higher standards of living have changed the mode of transportation, not only from the standpoint of railroad transportation but also has resulted in improved methods of individual transportation. The old one horse shay has been replaced with high-powered, high-speed motor cars which travel on our highways today at speed several times greater than that of the finest passenger trains when mechanical crossing protection was originated.

To the bell, originally used and which still remains as a warning, has been added many additional features. The next development was to place the bell upon the post which carried the cross-buck railroad crossing sign. This set-up was used for a number of years and constituted the first combination audible and visible signal. This combination, I believe, really came about as a matter of economy, as the mounting of the bell upon the post at the crossing sign eliminated one cedar post support for the bell. This brought about the first real connection between the warning gong and the railroad, and since it was placed on the railroad crossing sign it was thought apparent to the pedestrian that the bell indicated approach of railroad trains.

Protect the Pedestrian in Spite of Himself

Little or no improvement has been made in the audible signal for grade crossings or in gates or barriers; but other features have been devised from time to time in the form of additional railroad signs, advance notice signs, flashing lights, wig-wag banners, and finally the last word in automatic mechanical protection seems to be the installation of the protective equipment in the center of the highway and located on both sides of the railroad. Automatically operated barriers are now in use in a few locations.

It has only been in recent years that mechanical protection at grade crossings has been designed from the viewpoint of the pedestrian or vehicle driver. His protection in spite of himself seems to be the goal.

In the early days it was felt that the bell was all that was necessary to warn the public of the approach of trains, but as time went on and the characteristics, habits, standards of living and attitude of the public changed, the requirements to be met by the designer of mechanical protection have increased to a point where he must place himself in the automobile driver's position in order to develop really effective protective devices for grade crossings.

The first thought to be given the railroad with respect to crossing protection is the distance from the crossing to the starting contact of the signal operation, which is based upon a maximum speed of the trains operating over the particular crossings.

Today mechanical protection, to be effective and efficient, must be constructed so as to present an honest, well-proportioned endeavor to protect.

It must be attractive and have a setting that will produce the proper psychological reaction in the mind of the automobile driver as to the danger of the crossing.

Just a few years ago the wig-wag signal was developed and in many cases carelessly located at grade crossings, with the result that little or no protection was afforded the motorist or pedestrian. Still later the flashing light was developed and in a great many cases located improperly, so it seemed for a time that the expense of these improvements did not warrant their installation. At this point the engineers responsible for mechanical protection at crossings realized that greater study would have to be given the subject if the devices already developed were to be made effective.

Three results may be noted:

Results of the Study of Mechanical Protection

1. The old standby, the bell, was found ineffective in warning pedestrians and has only been retained in connection with other forms of protection.

2. The wig-wags, which were originally mounted from 16 to 20 feet above the highway crossing and at the side, and many times were carelessly placed behind trees where a view of the signal was obstructed from the motorist, have been lowered to a point where they are now very close to what might be termed the horizontal range of vision of the driver of an automobile.

3. The alternate flashing red light is also now placed at a level where it is readily within the range of vision of the automobile driver as he approaches the crossing. These devices are mounted on pipe poles and in a majority of cases are set on fairly large concrete foundations in the center of highways, where they cannot help but attract the attention of drivers of all vehicles.

From the standpoint of safety the whole atmosphere in connection with crossing protection therefore is greatly changed. In the old days if a pedestrian or the driver of a vehicle heard the bell and stopped, it was very good; but if he did not and was struck by a train, he of course should have heard the bell and waited until the train passed. Today in the majority of highway crossings, outside of territory where absolute barriers are provided, the whole thought given to the selection of the device and the location of the signal is from the point of view of absolute protection to the user of the highway. Individual study is given to each particular crossing, the topography, the trees ahead of the signal and those that form the background of the signal are all considered in the plan. Advance warning signs are located and study given to the height, the size and the color of paint employed in the warning sign.

Finally, inasmuch as the first and original requirement for crossing protection, as far back as 1835, was mechanical gates, and they have

been in continual use since, and also judging by my personal experience on our railroad, I honestly believe that the mechanical crossing gate is today still the safest means of providing warning and protection to those who use our grade crossings.

CHAIRMAN EMERSON: This concludes, gentlemen, the part of this session which has to do with grade crossing accidents, protection, and so forth.

Mr. Noonan, I will be glad to have you submit your motion now.

MR. NOONAN: The motion I made was to carry out the thoughts expressed by Mr. Rowe, that we have a committee to make a study of the grade crossing problem from the point of view of the electric railway, not from the point of view of the automobilist or the pedestrian.

It is contemplated that we be given an opportunity for a round table discussion with the steam railroad section. I find it very hard on my property in Chicago to get any contact with the steam railroads.

CHAIRMAN EMERSON: This committee you are proposing to have meet with similar committees of the steam railroads?

MR. NOONAN: They could meet in conference with them and keep in touch with them.

CHAIRMAN EMERSON: Your motion then is for the appointment of a committee on grade crossings as applied with steam railroads?

MR. NOONAN: Yes.

(The motion was seconded.)

Keeping the Grade Crossing Safe in Canada

MR. READE (Quebec): I would like to say a few words on this matter, Mr. Chairman. In Canada, we are under the jurisdiction of the Board of Railway Commissioners. In Quebec we have all interlocking at every grade crossing and where the street car crosses the steam railroad we have to bear the expense of putting in that interlocking plan with the railroad company that operates that crossing, and it is up to them to see that the crossing is always kept safe. We pay 50 per cent toward the upkeep of these crossings throughout the year. We have four in the city of Quebec and in my 33 years in Quebec I never heard of a railroad crossing accident and we have always had the interlocking plan.

CHAIRMAN EMERSON: We are discussing the motion Mr. Noonan made. Are there any other remarks?

A motion has been made and seconded that we appoint a committee on railway crossings as applied to the things which this particular section is interested in.

(The motion was regularly carried.)

CHAIRMAN EMERSON: The committee will be appointed later.

The next order of business is the discussion of Accident Classifica-

tion and Statistics, and it will be opened by Mr. H. K. Bennett, safety manager, United Electric Railways Company, Providence, R. I.

THE VALUE OF CLASSIFIED ACCIDENT STATISTICS

H. K. Bennett, Safety Manager, United Electric Railways Company,
Providence, R. I.

This is not a new subject. For more than 20 years it has cropped out here and there, only to be squelched with the fire of adverse opinion. It is true that local conditions do not always warrant an elaborate set of books to keep the various wheels going around. Yet I unhesitatingly say that if the department of my company of which I happen to be the head, did not keep an elaborate systematized accounting of the accident statistics, we would never know from one week to the other where we stand nor whether we were slipping backward or advancing in the right direction.

To the safety man these figures are as essential as costs are to the purchasing agent, or the number of passengers carried daily, in comparison with other periods, to the operating head of the company. It is true that one set of figures tells the latter story, whereas the safety man has demanded (and rightly, too) that accident statistics be vital and so arranged that they may be compared down to the nth degree if necessary; and wideawake, redblooded, modern executives are realizing this condition and gradually seeing the light of day.

Is it begging the question to know what types of cars are more prolific of accidents? Is it not essential to show the accident ratio between one-man operated and two-man operated cars? And the difference between the number of accidents of the various types as compared with open and closed cars, if you are so unfortunate as to run "bloomers," as they are intimately called? The trouble is that the usual claim department is so zealous in settling its claims that it gives little attention to the cause. The effect seems to be all that interests them. I have noticed, however, that these same claim departments point with pride to the decrease in accidents, the fewer claims presented and the reduced costs.

The question naturally arises, what is considered necessary in the way of keeping statistics?

Perhaps, if I outline briefly the system that is used in Providence, and make the modest assertion that with the ammunition furnished by these statistics we were able to get at the very foundation of accident causes, so that with the first full year of accident work on the property accidents were reduced 26 per cent and, notwithstanding a 20 per cent increase in automobile registrations, there was a decrease of 17 per cent in this classification of accidents, you may be at least interested, if not entirely sold, on the proposition.

In the first place, the safety manager's office is the clearing house for

figures that have to do with accidents on the property of the company, whether it be on the street, in the power station, pits or any other department.

Large maps of the principal cities in which we operate, enlarged to an approximate size of 8x10 feet, giving every street and lane, are used for the charting of the various classifications of street and highway accidents, by means of colored pins placed at the points where these accidents occur. Every day new pins are added and a glance will show where the automobile collisions, pedestrians injured, fatal accidents, derailments, car and car collisions, bus accidents and collisions with other vehicles occur. Thus, you have a birdseye view at all times as to where these various accidents are occurring.

Every accident report is gone over carefully and from each is taken the type of accident, place, date, time, type of bus or car, division, line, and years of service of employee involved. From this data, monthly, semi-annually and annually, reports are prepared for the operating vice-president.

On another chart we classify collisions with other vehicles, with other cars, falls upon boarding and leaving cars, as to the particular type of car. For instance, we have the one-man safety car, the one-man two-man safety car, and converted double trucks operated by one man, these latter having folding steps with automatic control of doors or stationary steps with manual control of doors. Hence the particular reason for this last chart.

For Too Many Accidents There Is Always a Reason

If we are having too many accidents (and of course any are too many) traced to boarding or leaving a certain car, there is a reason. It may be high heels, dragging skirts or plain carelessness; but, on the other hand, the platform may be defective, the edge of the step may be of the saw-tooth variety, there may be loose bolts or some obstruction on the platform, or floor boards or treads may be dangerously worn. The car is then inspected and if anything wrong is found, it is pulled off and taken care of.

Perhaps somebody will say here, "such a condition would not exist if there were proper inspections." My only reaction to this is that such a contention, of course, is perfectly true, but unfortunately there are those who still wait for the horse to be stolen before closing the barn door. Therefore, if anybody thinks we are keeping records unnecessarily, let them be considered simply as a check and the means of constructive criticism.

My good friend Noonan, of Chicago, goes so far as to classify automobile accidents as to the make of the car. Well, I am not going to say nay to that. He may have just as good or a better reason for doing this than I have to keep some records that perhaps may not appeal to you. So again local conditions must to a large degree govern the need for statis-

tics; but I repeat that every company, no matter how small, can well keep such figures as will show them whether they are slipping accident-wise or not.

If you are having a multiplicity of auto collisions at a certain point, there is a reason. Go out there and get a first-hand picture for yourself. It may be out on a suburban line, at a point where there is a density of traffic because some particular intersection is a popular way to reach a shore resort or pleasure park. Brush may obstruct the corner; it may be crossed at grade; or any of a half-dozen other physical conditions may have caused the accidents. Study the situation, put yourself in the place of your operator or motorman; then, if you are unfortunate enough to own an auto drive out and put yourself in the other fellow's shoes and see the accident from his viewpoint. Having done this, apply the cure that seems best to suit the case, remembering that the first application may not work and the patient may need a different kind of treatment. Do not give up for lack of remedies, however, for there are just as many remedies as there are diseases, and accidents are nothing more than a disease of a certain kind. There is a cure for every accident that ever occurred.

Statistics Help in Locating the Disease

But how can a disease be cured if you do not know what the disease is and the remedy to apply? How can accidents be stopped unless you know how, when and where they are occurring, and so have the facts in order to apply a remedy that will cure not only temporarily but permanently?

I have only alluded to accidents to the public but it is as important to know the kinds of accidents that are occurring to our employees as it is to know those affecting the general public.

If employees are being injured by defective tools, your safety department or somebody interested should know it. If any of your employees get a shock in connection with any machinery used in your shops, this fact should also be known. Where you have a safety man on your property, or someone to whom such facts would be valuable, I think an ideal way is to have the heads of your line, power, track, equipment and transportation departments keep separate records of employees' accidents; these should show the name of the injured person (for the purpose of seeing if this particular person is prone to have accidents), the particular classification of accident, where, when and under what circumstances the accident occurred and in connection with what appliance. A duplication of the cause, kind or person involved in a second accident naturally brings up the question of why, and this can be followed out to suit the individual desire.

These records, of course, should be kept in such a way that they may be looked over; and by this I do not mean a casual look over, but a systematic checking so that preventative measures may be applied as soon as possible.

Local conditions and the need for classification of accidents must be the predominant factors in determining just how far an individual company should go in this particular respect. It must be assumed, of course, that a company operating hundreds of cars requires much more information than the company operating a comparatively small number; but I do not wish to infer by this that it is not as essential for the small company, as for the large one, to use some classification.

It may be a new adventure for some companies to delve into this matter of accident statistics at all, but we must remember (and this is particularly pertinent for those of us who have been in the railway game for many years) that this is 1926 and not 1900, and that in this stage of existence there are many new angles to street railway work which could not have been appreciated 25 years ago. One would have been put down as a dreamer if he could have predicted, 25 years ago, some of these new things which are now engrossing the attention of our public service corporations.

So I strongly urge that each representative here give this matter serious consideration. When you get back to your respective properties look the matter squarely in the face, and with the knowledge that other companies have benefited by keeping these classifications, benefited in the reduction of accidents and in suffering, and also from the cold-blooded angle of dollars and cents, adopt some suitable plan meeting the personal needs of your organization and try it out for one year. If you will do this, I will venture to predict that the effort will not have been made in vain, and that at the end of the year you will say that you not only believe in keeping such records, but that you are adding to your classifications as the trend of the times demands.

CHAIRMAN EMERSON: In view of the fact that there are three gentlemen to discuss this same question of Accident Classification and Statistics. I am going to ask that we defer our discussion until we hear from the other two. I will call next on Mr. Victor T. Noonan.

DISCUSSION OF ACCIDENT CLASSIFICATION AND STATISTICS

Victor T. Noonan, Chicago Surface Lines, Chicago, Ill.

I am not going to weary you with any papers. I want to talk. This matter of the standardization of accident statistics is not new. It is as old as safety engineering is in this country. Proper statistical methods, scientific methods, are as necessary to accident prevention work as anything else you do because your accident statistics are the foundation of your work. You can't prevent crime, disease, or anything else unless you know causes and it is from these facts in black on white that the student of the accident problem gets his data. From that data he then proceeds to work out remedies.

I remember 12 years ago we had the same discussions, the same ignorance and the same indifference in the industries of this country in regard to accident statistics. Many of our largest industries made no distinction whatever between first-aid cases and lost-time cases and compensation cases. Everything was an accident and in the course of time I found myself as director of safety under the Industrial Commission and our statistical department was completely at sea because we were not able to compare the accidents of the various industries. I had to go into hundreds of large industries in Ohio and show them simple ways of keeping statistics for the purpose of getting everything on a standard basis, so that then we would know what was happening in the foundries between the various industries.

In education work I have consistently emphasized to every employer and to every safety engineer the utter necessity of having statistics that are right, that are scientific, and that are clear-cut. Now we come to the American Electric Railway. What do we find? We find, gentlemen, that we are in the same battle that the industries were in years ago, we can not compare our accidents from one city to another and if you did attempt to compare them they would be very inaccurate.

A Problem for the Safety Engineer

The American Railways have the same practice that the American industries had 10 or 12 years ago. They made the foolish mistake of calling everything an accident. Everything that happens on a street car is not an accident. With all due respect to our lawyers, as I said yesterday, if a woman sits down on an eggshell and crushes it on the seat of a street car, it is not an accident. If a man driving a Ford car has his fender bumped that, gentlemen, never in a million years can ever become an accident, because an accident can't happen to a piece of metal. Accidents happen only to human beings. Accidents don't even happen to dogs or horses and there is a clear psychology and a clear logic in this. Yet we find our railway brothers calling everything an accident.

Some of our claims men seem to be afraid to make a change. Why? They seem to think that with the coming of accident prevention work the amount of business they are going to do will be decreased. It won't be decreased. There will always be need for a claim department. We will always have accidents, no matter what you do. This problem, gentlemen, is not for the claim department so much. This problem is one for the safety engineer. It belongs in his department. If you can not make out the statistics themselves in an intelligent way then it should be done by the claim department and there should be close cooperation between the claim department and the accident prevention department, and the claim department should give the statistical information, if possible, in a way that it is desired in the safety department. If your accidents are not properly classified, what happens?

Here are some of the outstanding effects that I see, gentlemen. Please

note these two effects. First of all, I have observed that because accidents are not properly classified and put on a standard and intelligent basis, there is one department in every electric railway property that is crucified, loaded down everlastingly with the burden of the accident problem, and that is the transportation department or the operating department. Here is the claim department forever putting a load on them. 1,000 accidents a week, 200 litigations a week, and so forth.

Then the load is pushed down on the average executive so that he is afraid to look at his accident report. All he gets is that constant load of accidents and costs; and then the property itself in the eyes of the public is always being advertised in the press as being one of the worst causes of accidents in the city or town. A jaywalker crosses the street and collides with a street car and is killed. The street car is blamed for knocking down a pedestrian. A man makes a Dutch crossing with his automobile and collides with a street car and the street car company is blamed. A man is intoxicated and he forgets the track he is on; he is going west and strikes a street car going east and the newspapers have it, "Street car rams automobile and kills driver." That is all part of your system of reporting accidents and your system of keeping track of accidents.

Now, gentlemen, if the recommendation that I would like to see go through were adopted, it wouldn't mean a big change in the statistical methods in your claim department but it would mean a big relief and a big load lifted off your transportation department or your operating department and your trainmen, and it would mean more pleasant reports for your executive and vice-president.

Separate the Paper Reports from the Accidents

We should have the accidents brought out in the daylight and not submerged in a lot of camouflage so that you don't know what is going on from one year to another. I am very proud to say that the Chicago Surface Lines' claim department, headed by Mr. Treaty and his predecessor, Mr. Ginan, cooperated 100 per cent with our department. They gave us everything and worked out every new suggestion that was made with the result that today, in our property, we have daily reports and weekly reports and monthly reports which show a clear segregation of the major accidents, from which we are able to make charts and diagrams and put them in a magazine or put them on our bulletin boards, and from which I am able, myself, to put my nose on the track to locate some of the causes.

Now let us find out the simple basis that I would like to see adopted. First of all, instead of calling everything an accident, gentlemen, let us begin at the A. B. C. and separate paper reports from accidents. A paper report is not an accident unless someone has been injured. All things that happen, such as a woman tearing a dress, little arguments, fights between passengers and trainmen, all of those things are not

accidents and should be put in Class Number One paper reports. Not hard to do, gentlemen; it is very easy.

Secondly, going up the ladder, all property damages ought to be kept separate from paper reports. You see that, don't you? You operative men see what that would do, for you get that information every week. And thirdly, your injuries should be kept separate from your property damages. In Chicago we run anywhere from 800 to 1,000 accidents a week, calling them by old classification. It is very important for me, gentlemen, looking at it from the accident point of view every week, to watch that line and every day see how many paper reports are turned in, how many property damages. Why? Because the automobile is more and more becoming a costly problem for the operating railroads of this country. I want to watch that automobile line exactly and compare it with the previous month and with the previous year. Then your injury line—that is very simple. These three simple standards do not necessarily affect any changes in the system of accident statistics as originally adopted by the Claim Association ten years ago. It is a step more to clear the atmosphere.

Segregation of Fatal Accidents Necessary

Outside of your injuries you keep your fatality accidents. Here is one class of accidents that absolutely needs segregation. Many operating departments in this country are every month turning into the management fatal accident reports, and when you get them you find fatal accidents in there that no street car and no motorman ever caused. When a case came through where a girl was killed by a Ford car I use to pass it up. The train crew got out and took the license of the car and gave what first-aid they could, and properly. Yet that accident comes through on our fatal lists as one of our accidents. That is wrong! Fatal accidents other than the company's should be kept separate. That is not hard to see and we see no reason why any claim man should object to that. Yet they seem to object to it.

Then there ought to be a further sub-division along the line, divided into two main classes, injuries and deaths and property damages, calling them preventable and non-preventable; call them company accidents or non-company accidents; the accidents caused by our own trainmen; the accidents caused by the company's own fault; the accidents caused by failure of mechanical equipment, meaning bells and buzzers; and then the clear-cut accident caused by the other fellow, the truck driver who comes out of a side street and strikes the side of your car.

How can any accident prevention department prevent such an accident, and yet those types of accidents are happening. Those types of accidents caused by the other truck driver or the pedestrian should be absolutely kept separate in a classification of accidents because when they are kept separate the safety engineer as well as the general superintendent of operation and the division superintendent of the train

and the trainman can be supplied right along in their committee meetings and in their safety meetings, not with just general talk on the causes of accidents, but with illustrations of the types of accidents that are happening each day on the lines.

In the same way the costs ought to be split up. There should be more study of the causes of cost, and there should be more study as to where the cost lies and on what classes of accidents. We have 35 accidents per month out of 1,000 that are costing in the course of the year a quarter of a million dollars. Here is one bunch of accidents where our accident prevention work ought to center itself to see if they can cut down the number of those accidents and the cost of them.

Gentlemen, this is a problem for the safety engineer largely. Yet to everyone of you operating men here it is important because the proper standardization of accident statistics is going to be the greatest help to you, whether you have a safety department or not, in carrying on intelligently your accident prevention work, so that you will know exactly where to apply a remedy. It is unfortunate that some of our claim departments have taken what I may call an antiquated stand on this. They are behind the times, because this basis of accident statistics that I am urging is recognized by the best scientific experts on statistics in this country as the proper basis for keeping track of accidents. Therefore the claim men who will not cooperate with the accident prevention department or will not help their operative departments to secure this information and standardize it throughout the country, are simply holding back a good work; they are not cooperating in a great and important work in their own organization that has for its purpose the saving of human life and the prevention of suffering.

Cooperation Between Claim and Accident Prevention Men

I have been personally so discouraged about this—I have talked it at these meetings for years—that this past year I absolutely made up my mind that I would not discuss it here this year. I have said if I can't get cooperation through our National Association that I would go ahead on my own job and do the work as well as I can with the approval of my own management and with the cooperation and good will of my fellow associates. But I can look back and remember that Mr. Bennett, as a claim man, had the vision to see the value of this work, and he had the courage, gentlemen, to come here today and read this paper. He read it modestly but well, and when they asked me to back him up I could not stay in the background and refuse to say a few words here. I hope that these few words will give you something to think about, that they will impress upon each and every man here the necessity of watching your accident statistics and having a good standardized system to carry on your accident prevention work.

In conclusion I want to pay you all a compliment. I have attended these meetings ever since the beginning, and never before have I found such pleasure in attending an accident prevention meeting of our Electric

Railway Section and listening to such wonderful discussion from the floor as has come up at these sessions. I have been impressed by the questions that have been asked, and I think, Mr. Chairman, the officers of this Section deserve commendation, but the gentlemen who are present deserve the highest encouragement because I feel sure that each of you is sincerely trying to represent your own property and your own management in the way that men should do who have this great work at heart.

CHAIRMAN EMERSON: The concluding portion of this discussion is to be presented by Mr. G. B. Powell, superintendent of transportation, Louisville Railway Company, Louisville, Kentucky.

VALUE OF ACCIDENT CLASSIFICATION

G. B. Powell, Superintendent of Transportation, Louisville Railway Company, Louisville, Ky.

The subject could be made to produce a formidable array of comparative figures and pages of highly technical statistics but I am not a statistician and have no legitimate reason for attempting to punish those present. The value obtained from accident classification in the organization with which I am connected, The Louisville Railway Company, will constitute the message I have to deliver.

Two reasons for classification of accidents stand out with equal prominence. To determine the "Cause" and "Fix the Responsibility," both of which are fundamentally necessary if the attempt to prevent recurrence is to be successful.

All accidents are the result of the negligence of someone, so in public transportation of passengers it is necessary to classify in order to determine whether the responsibility rests on the employee, passenger or those on the streets. When it is found that the employee is responsible, the remedy can be quickly applied. If the passenger is to blame then by the slower method of additional safeguards and education the results may be obtained; but when it comes to dealing with those who share the streets with us, the careless jay walking pedestrian and the speed mad vehicle driver, the results to be obtained and hope for the future must come by the painfully slow process of legislation supplemented by public opinion produced through costly education.

We use more than 100 classifications of accidents incident to street railway operation. Automobile collisions constitute 80 per cent of the total, so, of course, head the list, and in seeking our goal, cause and responsibility in auto collision, the analysis leads to 20 or more classifications.

For instance, direction would seem very simple—right angle, same direction or opposite direction; but be not deceived if you expect our

good friend, classification, to produce results; open up its pages and search therein.

Right angle, yes; but at street crossings, between corners, from right or left, or at alleys; likewise, same direction or opposite direction is only meager information until classification discloses—struck rear, front, right side, left side, rear left corner, head-on, etc.

Persons injured classified as passengers, pedestrians and employees is only a start; each must be sub-classified under at least a dozen headings before the analysis will yield its value. Car collision, split switches, boarding and leaving, all down the line the process of proper classification must be pursued until each accident is properly tagged and hung up before us, with the reason therefor, as plain as if it had been purposely staged before an audience assembled to witness its production.

When this is done the value of classification manifests itself in the opportunity to present to the party responsible, those in authority over them, and the local safety council the true facts, which often results in cooperation in adopting means to prevent a recurrence of similar accidents.

Another classification we have found valuable is in relation to the location on the property where accidents occur. A map of the city showing all street car lines is posted and colored headed pins are stuck in the map at the exact location where an accident occurs; different colored pins represent the different kinds of accidents—white, auto accidents—red, car collisions—black, boarding and leaving, etc. This method of classification enables us to determine the location on the property where accidents most frequently occur and accordingly concentrates our efforts in the troublesome location.

Data Valuable in Analyzing the Accident

Another classification of great value is in relation to the time accidents occur; this is also kept with colored headed pins stuck in a chart which is divided into hourly divisions. As would be expected, the greater number occur during the peak hours of travel, but many important discoveries were brought to light by this method of classification; for instance, more automobile-street car collisions occur between 8:30 and 9:30 a.m. than during the peak rush hour, 7:30 to 8:30 a.m.

Analysis of this situation discloses that speed substituted for leaving home on time is the predominant cause of these collisions. The increase between 11:00 and 12:00 at night over the earlier evening hours deals with the homeward rush mixed with joy riders starting out, and includes many serious accidents in our line of business. The value of hourly classification is the information enabling concentration of efforts at the right time.

One more classification I desire to mention, one which we deem of vast importance, is fixing the responsibility in relation to our employees. All accidents are recorded on the employee's record card and are classified

"Blame," "No Blame," or "Non-committal." The non-committal are those accidents which the employee was not responsible for but which he might have prevented by the exercise of extreme care and good judgment. In other words, save the other persons in spite of their carelessness. This method enables us to keep constantly before us the efficiency of our force in accident prevention and has materially assisted in building up the splendid cooperation we enjoy in our organization.

Summarizing accident classification, as I see it, knowledge is conceded to be power. Analysis is recognized as the best method of obtaining the desired knowledge of any subject. Classification of accidents is an analysis which will reveal cause and responsibility, the necessary goal if prevention is to be secured. Therefore, classify the accidents which occur on your property: First, in general groups, then subject each group to an analysis which will spread them out before you until their legibility permits a clear vision of the cause and who is responsible, then and only then will you be in a position to apply the best possible remedial preventive measures.

Committee Study of the Various Classifications

CHAIRMAN EMERSON: This concludes the presentation of the subject and the meeting is now open for discussion.

MR. READE (Quebec): I have some interest in this last subject, especially on the point brought out by Mr. Noonan, and I would like to make a motion to the effect that the Council print the code followed by Mr. Noonan and send it out to all members of this section for their approval, and by doing that we can get some adopted plan to classify our accidents.

The motion was seconded.

CHAIRMAN EMERSON: Before asking for discussion on that, it occurs to me that the proper method to pursue would be for the committee to study the various methods of classification and then make a recommendation. The classification Mr. Noonan uses in Chicago wouldn't be the one that applies throughout the United States and Canada. I don't think a committee should be limited in its work to the study of any one particular system. I would like to hear remarks from the other gentlemen.

MR. NOONAN: I should explain that there was a committee in connection with this Section on standardization of statistics, but we got nowhere. My plan is not a classification which would conflict with the claim department because I have simply outlined a skeleton that any company could follow.

MR. VAN OSDOL: If Mr. Noonan's motion has prevailed it is certainly the motive of that committee, after a study, to make such standard recommendations as might seem proper and undoubtedly they will, by questionnaire or otherwise, get the reaction from the various interests; and it seems to me that that will cover the point made by the gentleman from Canada, and this committee will accomplish that very thing.

W. H. BOYCE (Pittsburgh Railways Co.): I would like to make a suggestion along the same lines. Inasmuch as there are about 150 company

members in this group railway Section, there are probably only 20 per cent of them represented by delegates here, and therefore this committee should send out a questionnaire to all the companies embodying the question Mr. Noonan outlined and all the details of Mr. Noonan's plan, and then let the committee study those replies and give that matter careful consideration before they make their report.

SECRETARY EASTHAM: As secretary of the Section during the past year and also chairman of the Committee on Recommendations, I think that the committee to which Mr. Noonan refers has already been under advisement, because the Committee on Recommendations thought that one of the main recommendations and investigations would be along this same line. In one of the news letters sent out during the past year a request was made that all the members send in what they were doing in the way of classifying accidents. I think about three answered out of the 150 members.

Assistance of Section Members Is Asked

Now for the new secretary or the new committee that may be appointed along that line, I would like to suggest that some means be had of seeing that the communications that go out from this Section reach the right party in the different organizations and then that the right party take the individual responsibility to reply to the request, whether it is in the form of a questionnaire or a request to have their classification of accidents or whatever it may be. It is only through the help of you members that this Section is going to be anything like a success.

I'd like to stress something that I think is in line with what is being suggested. I think it would be a splendid thing to get all the companies to send in to the committee just how they are classifying their accidents, whether from the claim department's standpoint or from the standpoint of those who have safety departments. With us, the claim department don't cover it as I want it, so I go over all the reports in my department and get figures for the safety department in addition. I am not going to take the time to discuss how that is done, but it is along the same general lines of classification, not quite as broad as Mr. Powell's, but broader than the average company.

CHAIRMAN EMERSON: I am going to ask you to defer that question until we finish this motion. We want to get an expression with regard to Mr. Reade's motion.

MR. POWELL: I don't believe in passing the buck. Now it seems to me that last year when they were working on this classification proposition, there had been a lot of literature sent out and questionnaires, and somehow or other I didn't know they had been sent out. Now this Section of the National Association should find some means of getting this information or these requests to the right party. Most companies have a safety department and I know they will answer and I know that every transportation department superintendent would respond too.

CHAIRMAN EMERSON: I presume it is the idea back of the motion that

this committee shall study ways and means of securing adequate data so that they can in turn make a recommendation.

MR. NOONAN: We had a committee on that proposition. May I make that clear again? I was on it and Mr. Powell was on it, too. The American Electric Railway Association had such a committee. I was on a previous committee some years ago in this very Section. Mr. Welch, the executive secretary of the American Electric Railway Association, down at his office in New York City has never been able to get information on questions from any companies throughout the country. It is my opinion that if you will draw up a model and send it out as something worked out and something constructive you will get far better results.

CHAIRMAN EMERSON: That is what Mr. Reade has in mind.

G. R. WHITMORE (Illinois Power & Light Co., Peoria, Ill.): I would like to know whether this classification applies to every department or merely the claim department. The transportation department may have a way of classifying accidents, the safety department may have a way of classifying accidents. Just what does this motion mean?

MR. NOONAN: This plan is simply to take the accident data as kept by the claim department which is the proper department to get it from. The claim department is the logical department to start with.

To Draw Up a Model Plan of Keeping Records

CHAIRMAN EMERSON: I understand that what Mr. Reade has in mind is the securing of the proper form of accident statistics which will be handled properly through the claim department, to be adopted by them and which will be adapted to any property. In other words, to draw up a model plan of keeping records and so forth which will throw more information into the different classifications and segregations of the accidents that occur. I think everyone here understands the motion. It has been seconded.

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

J. L. FAHEY (Scranton Railway Co.): I would like to ask Mr. Noonan whether he regards torn clothing, that is clothing damaged on the cars, of sufficient seriousness to be classified as property damage?

MR. NOONAN: Absolutely no. No material that is damaged is a property damage. There are a great many things that happen that don't come under either classification and then you put them under paper reports.

CHAIRMAN EMERSON: We will proceed to the last section of the program for this session, which is a round table discussion. The first section of that relates to "No Report Claims and What Is Being Done to Reduce Them." Mr. G. R. Whitmore, general claims attorney of the Illinois Power & Light Company, Peoria, Illinois, will present that subject to us.

NO REPORT CLAIMS AND WHAT IS BEING DONE TO REDUCE THEM

**G. R. Whitmore, General Claims Attorney,
Illinois Power & Light Corporation, Peoria**

Did any of you claim men ever receive a letter something like the following?

"I represent Sam Traicoff, who was seriously injured about two weeks ago, when he was thrown to the street while alighting from one of your cars at Main and Broadway. According to the witnesses, your motorman started the car with a jerk while my client was in the act of alighting from the car, and this is a straight liability case. My contract calls for 50% of whatever is paid either by way of settlement or suit.

If I do not hear from you within the next ten days, I will file suit for \$20,000.

Yours truly,
I. M. A. Chaser,
Attorney."

All of us have received such letters, and we immediately look through our files and records, and what do we find? Nothing. We then take up the matter with the operating department and both start an investigation.

There is no need to detail the grief, worry and absolute dissatisfaction that follow claims of this character. No one is satisfied or pleased, whatever may be the outcome of the case.

Typical "No Report" or "Blind" accidents fall into two classes, namely, those that are fake and fraudulent and those that are meritorious. This applies either to accidents to employees or to the public.

Accidents involving the public generally will be discussed first and then we shall take up the question of "No Report" employee accidents.

The main purpose of claimants in connection with fake or fraudulent "No Report" accidents is to capitalize them; the best way that we know of to reduce the number of such accidents is to keep them from being capitalized and thus discourage claimants. We can investigate the claimed accidents and the claimant himself, and, if not absolutely satisfied with every feature of the case, we can and should decline the claim. In an investigation of such a claim, something will always crop out indicating that the matter is not straight in every way, and intuition and experience will enable us to detect the crooked claimants.

We have adopted the policy of declining claims growing out of unreported accidents, unless we feel certain in each case that the accident did happen and that the claimant is telling a straight story. Our experience shows that we have very little trouble with claims of this nature, except in one large city where, it appears, there is a gang of negroes making a practice of pressing such claims. In the last three months we have had over a dozen such claims at this point but we have declined them all. Some suits have resulted but we intend to defend them. If we should concede anything in the way of settlement in any of these claims,

we feel that there would be no end to claims of this nature being pressed, especially by unscrupulous attorneys.

However, we believe that it is more important to consider here, how we can reduce or eliminate accidents that actually happen, but are unreported, and where the claims appear to have merit.

Most of the accidents of this class, in connection with electric railway operation, are of two kinds; one, vehicles or persons struck by other than the front end of cars; and two, passengers falling in cars, on platforms or in boarding or alighting.

Railway officials and operators or trainmen can not control the actions of vehicle drivers or pedestrians, who insist upon running into the side or rear end of cars, and such accidents, sometimes unreported if slight and a jar is not noticed by the car men, can not be prevented by the railway. We can and do prevent standing vehicles and persons being struck by the overhang of cars by careful operation, watchfulness and due regard for the rights of others by our car men. Safety lines help and so does proper parking, careful driving, thoughtfulness and alertness on the part of vehicle drivers and the public generally. Naturally, education of the public and vehicle drivers in particular regarding the danger of such accidents will tend to reduce them, but the first thing for us to do is to see that the company officials and employees appreciate the responsibility which they bear in this connection and do what is possible on their part to prevent such accidents.

The Human Element Important in All Claims

What are we doing and what can we do to prevent unreported accidents, where passengers fall in cars and from step and platform? Proper operation of cars in good condition over smooth track and with no outside interferences will tend to prevent them, but we do not always have such ideal conditions. All managers want their equipment and tracks well and economically maintained, but we know that sometimes economy alone in maintenance is the aim. This should be a point to strive for by every mechanical department but there should be no excuse for the operation of defective equipment. Sometimes a car in bad order will get out on the line, but it need not run for any considerable period, if motormen and conductors will report such cars at the first available opportunity to the proper company officials and such company officials do their duty.

It is our feeling that the human element is the main thing with which we have to contend. Our experience has been that one or two men out of a hundred have unreported accidents and these men cause most of the trouble. An old, experienced and loyal employee seldom has to be called on the carpet in connection with an unreported accident. It is the inexperienced, thoughtless, indifferent and careless employee that causes such accidents to happen; and, furthermore, if such an accident does happen he will either not know of it or, knowing about it, fail to report it unless the injuries are apparently quite severe.

The first duty is upon the superintendents, who hire the men, to use judgment in selecting men for operating our cars. Assuming that we have selected the right men as employees, there must then be constant supervision by competent officers to see that the employees are kept up to a high standard of conduct. All the rules and supervision in the world will not make a "bad" employee good and the quicker we weed out the shiftless, careless, thoughtless and incompetent employees, the sooner will this problem be solved. It has been our idea always that properly selected employees, well trained and supervised, will solve most of our accident problems, including the problem of the unreported accident.

The Unreported Accidents to Employees

Unreported accidents to employees are also a source of trouble and annoyance. I think it is the experience of most companies that practically all regular and steady employees report all accidents causing personal injuries to themselves. Occasionally, a very slight injury, such as a scratch or a splinter in the finger or the like, is unreported. Little attention is paid to an injury of this nature unless an infection sets in; then it often happens that the injured person can not recall the place, time and cause of the injury, thus making it very difficult to handle such an accident under the terms of the Workmen's Compensation Act.

Accidents causing strains and particularly ruptures are the most unsatisfactory of all unreported employee accidents. We have all had experience with hernia cases, but we are finding the remedy and a solution in the provisions of the Compensation Acts of the various States. For instance, in Illinois the situation as to hernias has been cleared up exceedingly by the enactment of paragraph D-1, Section 8, Workmen's Compensation Act, which provides as follows:

"An injured employee, to be entitled to compensation for hernia, must prove:

- (1) The hernia was of recent origin.
- (2) Its appearance was accompanied by pain.
- (3) That it was immediately preceded by trauma arising out of and in the course of the employment.
- (4) That the hernia did not exist prior to the injury."

This provision is also limited in that notice of an accident causing a hernia must be given the employer within 15 days after the accident.

Prior to the passage of this amendment to the Compensation Act in 1925, it was necessary that practically all hernia cases be handled in accordance with the terms of the Compensation Act. The time, no doubt, will come when each state, which has a Compensation Act, will provide for the handling of hernia cases somewhat in accordance with the provisions of the Illinois Law and then, in our opinion, substantial justice will be accorded both the employees and the employers in connection with such cases.

The remedy for unreported employee accidents, particularly those in which regular employees are involved, largely lies in constant supervision. By this, we mean that the managers and superintendents should see that the foremen, who are in direct charge of the employees, are instructed that regular form accident reports should be made out immediately upon the happening of an accident and that the foremen carry out their instructions. This is not so difficult where the industry is located in one or two central plants but the situation is complicated somewhat when, as in the case of a company like ours, we serve several hundred communities in a number of states and have various plants, small and large, at many points. However, it is just a question of having a good organization, specific instructions and constant supervision.

When it comes to the question of unreported accidents to casual employees, such as those engaged in track work in the summer, or construction work from time to time, we have a more difficult problem. Such employees are not particularly interested in the welfare of the company, are not imbued with the spirit of loyalty toward the company to see that everything is done in accordance with instructions and what is right and proper, and we often find that a large proportion of our unreported employee accidents come from this source. Casual employees are here today, gone tomorrow and can not be easily traced. With a regular employee, we have this original physical examination and other physical examinations from time to time, as well as a record of his past employment. Such is not the case with casual employees and when a claim is made by such an employee for an unreported accident, it is necessary to spend much time and energy to find out all the facts.

Unreported Claims Are Usually Found Unworthy

One remedy is that of discouragement, that is, an unwillingness to recognize any such claims, growing out of unreported accidents, until every source of information has been thoroughly investigated. We believe that in the vast majority of cases, such claims are found to be unjustified, if not fraudulent. We have just had two such cases, one, a construction employee, shortly after the work had been completed and he had been laid off, claimed that he hurt his leg, the injury resulting in an ulcer. Upon investigation, we found that some years previously this man had a claim under the Compensation Act against another employer and had received compensation. We located the doctor who had taken care of him and he stated that the injured man's leg was in exactly the same condition at the time of the hearing of his claim against our company as it was some years previously. We won this case. Again, another construction employee, shortly after his discharge, claimed permanent disability as a result of an unreported accident. Upon investigation of this case, we found that this man had had a claim against a previous employer and had been awarded compensation for permanent disability and had received a large lump sum settlement.

The attorney for this claimant dismissed his case after this evidence was introduced.

We believe that the safety department can do a great deal to eliminate unreported employee accidents. The safety engineers can educate the employees to report immediately all accidents, no matter how minor the injury may seem to be, can supervise and instruct foremen and can see that the instructions are followed.

Perhaps it is not within the purview of a paper of this kind that we should discuss the question of physical examinations of employees. We believe that practically all employers now follow the policy of having a thorough physical examination of employees at the time of their employment and further examinations periodically thereafter. We do not believe that many employers require physical examinations of casual employees. Our rule is that if a man, originally taken on as a casual employee, remains with the company for a period of thirty days, he must then submit to a physical examination. Solely from the standpoint of the claim department, and not considering anything else, we believe that every employee should have a physical examination prior to his employment. We find that reports of physical examinations are of value in checking up on injuries later claimed by employees, particularly in connection with unreported accidents, and more particularly, in connection with claimed hernias.

I have not attempted to set out how and in what manner all unreported accidents may happen but have discussed only those which are most common. Many otherwise unreported accidents become reported by reason of employees reporting every incident or occurrence in connection with company operations coming to their attention either while on duty or off; the employees should not judge of the importance or triviality of the matter but should report it to the company officials.

In my opinion, unreported accidents will be greatly decreased in number, if all company officials and employees do their full duty.

CHAIRMAN EMERSON: The second section of this discussion is "The Standing of the Safety Department in the Organization," by Mr. James Harmon, safety manager, Interstate Public Service Company, Indianapolis, Indiana.

THE STANDING OF THE SAFETY DEPARTMENT IN THE ORGANIZATION

James Harmon, Safety Manager, Interstate Public Service Company, Indianapolis, Ind.

In preparing a paper on this subject, I am doing so with the feeling that the safety engineer should do nothing except look after the safety work on his property, but I am taking into account also that some safety engineers, in addition to their safety work, take care of other duties of the utility such as claims, insurance, etc.

To find the standing of any department in an organization, it is necessary to study the workings of that department and learn whether or not it renders real service to its organization and the nature of such service.

In all organizations there is service which is productive and non-productive. The non-productive service is always more or less a source of worry to the management because it does not show a direct return in dollars and cents. Unfortunately, the returns from the service given by the safety department are indirect. This being the case we need not expect this department to rank as high in the organization as the productive departments, unless it furnishes an exceptional service, the value of which is not necessarily based on dollars and cents.

The safety department is created for the purpose of educating the employees in accident prevention work by enlisting their cooperation and affording them an opportunity to take a personal part in the program of this work, insofar as it applies to accidents to themselves, fellow employees and the public.

Employees Must Be Kept Posted on All Safety Rules

The employees as a whole must know that accident prevention work is very important and that in order to accomplish the results desired they must, at all times, be posted on the safety rules and instructions and their work must be governed by them. One of the problems of the safety engineer is to be able to make a check personally of his entire organization to see that all of the foremen are doing the things they should do by carrying out the safety rules, and frequently you will find they become careless and that is when the accident occurs.

Quoting Thomas A. Edison from Mr. Babson's book, "If success is the acquiring of money or power or fame, then the struggle is not worth while, because after you get these things you find them to be mere empty shells." The safety department is attempting to do something more worth while than merely to gain a success in money, power and fame. This is to make people happy and when you are able to do that you are a success and you are in a successful business. With that thought in mind, let us investigate the service that is rendered by any well organized safety department.

I have often been asked what is the nature of the work of the safety department. As the head of such a department, the only answer that I can give is that our work is to educate the employees and public in accident prevention work. Years ago before accident prevention work was as aggressive as it is today, it was often felt by the management of certain industries and utilities that in order to operate such properties it was necessary for a certain number of fatal and personal injury accidents to occur to those employed. But statistics show that since this work has been taken up nationally by many industries, and has been made a part of operation, there is a material decrease in the number of accidents on properties employing the same number of men doing prac-

tically the same kind of work; and for that reason the safety department standing in those industries is of the very highest.

One never knows how many people are made unhappy and sad on account of one serious accident. We all know, however, that in many instances it not only does cause unhappiness but also a great amount of suffering, especially if the one who is injured or killed is a father. The dependents will necessarily be deprived of the protection to which they are entitled.

Taking that one thought and comparing the number of accidents that occurred on your property ten years ago with the number that occurred in 1925, you can get one measure of the results of your work. That is the humanitarian side of the accident prevention problem. But there is another side that must be taken into consideration on well managed properties and industries, and that is the amount of money that necessarily must be spent on account of accidents.

When a safety department is able to show a reduction in the number of accidents, it not only preserves happiness to many but it makes a considerable saving in dollars and cents.

A peculiarity of the service given by the safety department is that all members of the company, both employees and employers, profit alike. They all need it and must have it if they are going to continue to be happy and successful.

Safety Work Must Be Done in a Businesslike Way

This department is not set off by itself as in some departments of other organizations. It is a department with which every official and employee should be closely affiliated. The safety director and his assistants only attempt to solicit and direct the support of each and every employee, but the work will not be successful if it is expected to be carried on by the safety department alone.

To conduct safety work successfully and maintain the high standing of your property, it must be done in a business-like way and be made a part of the operation the same as any other department; and it must not be allowed to be set aside in order that some other work of the organization can be taken care of. Every employee must understand that safety duties are as important as any other duties he has to perform.

If you are a successful safety engineer, in close touch with your organization, you are not only able to reduce the numbers of accidents but you are instrumental in bringing the management and employee closer together and so are enabled to establish better industrial relations. You have caused the management to become more interested in the employees and the employees to become more interested in each other. This naturally creates a friendlier attitude among all. Not only does it get the employer and employee closer together, but it develops unselfishness.

It also helps materially in creating a better feeling on the part of the public towards the company. For the public is prone to grasp such

a situation. We have two ways in which we are able to enlighten the public. One is through the employees and the other through the publicity department. All this naturally brings about much better feeling and creates better public relations. When you have reached this point you have accomplished a thing worth while. You have reached a higher efficiency, and this efficiency naturally will show up in the operating expenses of the company.

I have attempted to show that the safety department performs work of the highest class. In addition to the things I have mentioned, it is guarding the company against expenditure of money on which they get no return—that is, the expenditure of money made necessary by preventable accidents. Not only does it assist in reducing such expenditures but it helps materially in getting lower insurance rates.

Round Table Discussion Is Dispensed With

CHAIRMAN EMERSON: This part of the program was to be in the nature of a round table discussion. The two sections just read were to start the discussion. Due to the lateness of the hour I think it is inadvisable to start any sort of a round table discussion. I wish we could limit ourselves to this: that if any gentleman wishes to ask either of the gentlemen any questions with reference to their papers, or can throw any light on the ground which they have covered, we will be very glad to hear from them.

MR. READE (Quebec): I would like to ask Mr. Whitmore whether they ties have tried to pay the claim over there?
submitting these records to the other railroads to see if these same par-have a clearing house for these state claims. Do you have a way of

MR. WHITMORE: We compared notes with Mr. Harmon's company, but we do try to disseminate this information that we have regarding claims.

MR. READE: I think it wouldn't be a bad idea for either the National Safety Council or this Section to have a clearing house and submit all the claims, and then if a repetition came up we could easily isolate those cases.

MR. WHITMORE: I think that has been tried, Mr. Reade, several times. The question has been brought up at several conventions and it has always been found inadvisable to start a thing of that kind.

MR. BOYCE (Pittsburgh): When we get our statistics we don't clamp them up on the wall in the central office. For instance, in our company we get out a list of dangerous points where accidents have occurred and post them on the bulletin board for the benefit of the trainmen, showing them the number of accidents that have occurred within a three or six months period. We are constantly in touch with the inspector of traffic who has to do with all the traffic officers in Pittsburgh, and also the traffic engineer who finds it very helpful to have us turn those accident records over to him, and if we give him the benefit of the information we have he will probably be able to locate a beacon or a safety device that will save us accidents.

CHAIRMAN EMERSON: The following paper has been arranged in place of one upon bus operation which was scheduled for our Wednesday morning session. Mr. N. T. Brown, Vice-President, Philadelphia Rural Transit Company, Philadelphia, has very kindly consented to present his views upon the subject. I take pleasure in introducing Mr. Brown.

SAFE BUS OPERATION

**N. T. Brown, Vice-President, Philadelphia Rural Transit Company,
Philadelphia, Pa.**

Mitten Management has been operating in Philadelphia in coordination with the street car and sub-way-elevated lines of the city, a fleet of motorbuses to the number of about 400, in addition to which we operate an intercity bus service with Philadelphia as the hub, and reaching to New York City on the north, Washington on the south and Atlantic City on the east. All our buses are of the gas-electric type, which was developed by Mitten Management engineers in cooperation with the engineers of the General Electric Company and the Yellow Truck & Coach Manufacturing Company after several years of research. The gas-electric principle thus developed has been generally adopted by manufacturers and operators, and in our opinion is the feature which has made the motorbus entirely applicable to city transportation.

P-R-T motorbuses have had an enviable record of safety, and it is about this particular phase of operation that I wish to speak.

The gas-electric bus is superior, in our opinion, to the mechanical drive from the standpoint of safety. The smoothness of operation during the period of straight-line acceleration produces practically no jar as compared with the uneven advance of the mechanical drive. The significance of this feature is at once apparent when one considers the large number of stops per mile in city transportation service and that passengers are continually walking in the aisles toward vacant seats when the bus is accelerating.

The elimination of gear shifting enables the operator to keep both hands on the wheel and his entire attention on the traffic through which he is driving. The conservation of human energy because of the elimination of approximately 5,000 shift operations per day is helpful in preventing accidents, since the driver is more alert than he would be if he was compelled to shift gears, thereby more slowly reaching the point of physical exhaustion.

The gas-electric bus is provided with three separate and distinct brakes. The foot and hand brakes are common to the ordinary type of motor vehicle, and in addition there is a regenerative electric brake. In making a stop, the operator uses both the foot and hand brake at the same instant, doubling the safety factor. The electric brake is used in emergency, being especially valuable in controlling the bus on a down grade, its effectiveness being in direct ratio with the vehicular speed. That is, when the bus is moving slowly, the braking power is slight, and increases as the speed of the bus increases.

To protect against rear-end collisions because of frequent stopping, each bus is equipped with a rear stop-light. A tell-tale light is mounted on the dash in a position to be readily observed by the driver, so that he may tell at a glance whether or not the stop light is in operation, and govern himself accordingly.

The constant bane of every motorist is the brilliant headlight which blinds him at every hundred yards along our roads and our city streets, and many accidents are caused because of carelessness in the focusing of these lights. The headlights of P-R-T buses are kept properly focused in accordance with the state law, and recently we have installed safety lights which can be played on the edge of the road, allowing the upper headlights to be turned off entirely, and eliminating even the slightest glare in the eyes of the approaching driver, at the same time lighting up the side of the road so that there is no danger of ditching the bus.

We have installed in our central garage a brake testing machine, by means of which brakes are scientifically and equally adjusted, so that the pressure is the same on each wheel when the brakes are applied. The machine indicates the weight of the pull on each wheel, and instantly records any inequality of braking power, as well as whether power is being lost due to dragging brakes, when the brakes are in the off position. High points on the brake lining and drums, and similar brake failures are also indicated. Equal distribution of braking force on both rear wheels has eliminated the hazard of skidding on wet pavements.

Brakes Are Kept at Maximum Efficiency

It is thus possible for us, by regular test of every vehicle, to assure ourselves that brakes are at their maximum efficiency at all times. Since good brakes are a vital factor in the prevention of motorbus accidents, their mechanical perfection at all times is vital to successful operation.

Adequate inspection of a large fleet of motorbuses is a requisite, not only in order to make every vehicle safe at all times, but in order that maintenance may be kept at a high standard of efficiency. Inspection of buses is regular and frequent, and every mechanical detail is tested by expert mechanics.

Nor is the importance of trained personnel lost sight of. In fact, we recognize that the human factor is probably the greatest of all in the prevention of motorbus accidents. Drivers are employed only after passing rigid medical examinations, and after meeting equally rigid standards as to weight, height and age. These men are thoroughly trained in motorbus operation before they are allowed to operate in regular service. Because of this care in the selection and training of men, we have succeeded in building up a force within the past two years, which in appearance, in courtesy, in skill, in operation and in general efficiency has won the plaudits of the public of Philadelphia, and numerous comments from visitors to the Sesquicentennial this summer bear testimony to the esteem in which this operating organization is held because of the high standard of its personnel.

The bus is no longer an experiment. It has come to stay. It has a definite place in the coordinated transportation system of the great city. It finds a field of increasing usefulness in intercity and interurban service. It is encouraging to see that street railway and steam railroad managements are coming to a realization of the fallacy of attempting to thwart the progress of a facility which has so thoroughly met the popular taste by contributing a great share to the speed, comfort and safety of modern passenger transport.

In addition to these factors of safety as outlined, there is maintained in the central office a system map, the duty of one man being to place a pin on this map showing the location of each accident which may have happened. These locations are then analyzed, with the idea of determining whether or not any of the factors contributing to the accident hazard can be removed; for instance, possibly the moving of the traffic officer from one side of the street to the other, or the changing of traffic regulations at this location, or the removing of a billboard or shrubbery which may obstruct the view of the driver approaching an intersection. We have found that this has materially helped to reduce the number of accidents.

The News Letter Should Certainly Be Continued

CHAIRMAN EMERSON: Mr. Eastham spoke yesterday about the difficulty he had in getting responses to his news letters. I think that the news letter is a very good thing if it is followed up and if members respond properly to the information that is asked. Before we adjourn today, I would like to get an expression from those here as to whether they think the news letter should be continued. You are all familiar with it and all those who think it should be continued please raise their hands.

(About 15 raised their hands.)

These cards that have been filled out asking questions which we expected to discuss at the round table today—I know these gentlemen are anxious to have those questions answered. It is going to be impossible to do so this morning, so I am going to turn them over to Mr. Connors and if he sees fit he will use them in his news letters.

Gentlemen, we are about to bring this meeting to a close. Before we do so, I want to call on Mr. Reid who has an announcement to make.

MR. REID: Just a word or two as the chairman of the Program Committee. The program which we have had for the last three days would be absolutely impossible without the cooperation of the members of this Section. The papers which have been read and the speeches which have been made speak for themselves. I just want to express the thanks of the committee for the splendid way in which these speakers have responded. We first as a committee got together and decided upon the subjects which we thought would be helpful to the Electric Railway Section. We then decided upon the speakers that we thought could present the various subjects in a way that would bring some messages to this

Section, that would be helpful and worth while; and I am happy to say that not a single individual refused to write a paper or make a talk before this Section. I think that speaks very well for the interest of the men in the general accident prevention work and of the work of this Section in particular.

I didn't want to let this meeting close without this word of appreciation to those who have so splendidly responded to the preparation of these papers and these talks.

W. J. ROUNTREE (Ga. Railway & Power Co., Atlanta, Ga.): I have not been fortunate enough heretofore to attend a meeting of the Safety Congress so I have nothing to use as a basis of comparison, but in these three days that I have attended these meetings I, for one, feel that the Section owes Mr. Reid and his committee, as well as the speakers, thanks for the service they have rendered us, and I would like to express publicly that appreciation.

A Separate Pamphlet for the Section Minutes

CHAIRMAN EMERSON: Will you put that in the form of a motion?

MR. ROUNTREE: I make a motion that this Section extend to Mr. Reid and his committee a vote of thanks for the splendid work they have done during the past year.

(The motion was seconded.)

CHAIRMAN EMERSON: It is moved and seconded that the thanks of this Section be extended to Mr. Reid and his committee for the very admirable work they have done during the past year.

(The motion was carried and a rising vote of thanks was given Mr. Reid.)

MR. REID: Mr. Chairman, I would like to make a suggestion here and see what the reaction is to it. It will be quite a while before the National Safety Council publishes the proceedings. It is a tremendous job. This is one small section among the whole meeting in Detroit, and I am wondering if it wouldn't be helpful to the members of this Section if we were to ask the National Safety Council staff to print the proceedings of this Section and send it out to the members. I make a motion that the Council be requested to do that and not wait for the big, bound volume of the proceedings that will come out several months hence. I think it would be well to have this right away.

DR. SEGARD (Third Avenue Railways): I think there are 47 Sections in the National Safety Council and if each of these Sections made the same proposal it would simply mean duplicating the work of printing that tremendous volume which we each get free each year.

J. M. LOFTIS (Pittsburgh Railways Co.): I believe that the best results are to be obtained from getting this information to the member companies just as quickly as possible. While I do feel and agree with the brother here that it is a little bit selfish on the part of the members of this Section to ask for special consideration, yet I am thoroughly con-

vinced that the best results will be obtained if we get the information right away.

MR. BOYCE: It seems to me if we took the matter up with the reporting company who reports the convention perhaps we would get a typewritten copy which could in some manner be duplicated and sent to the members rather than impose the burden on the National Safety Council. I would like to hear from some of the members regarding this suggestion.

MR. REID: I would like to say just a word with reference to that. All of this material is set up in type for printing of the big volume that will come out some time and it would be a very small matter, if I understand it correctly, to print the proceedings of this particular Section and send it out in pamphlet form. It will not involve any very great amount of expense or trouble because the type is already set up, or will be, and it has to be printed anyhow. My idea was to get this stuff immediately rather than to wait for the big book that comes out.

MR. READE (Quebec): You can't expect something for nothing. We ought to pay a dollar or two dollars to get this in advance.

W. F. HANN (United Railways, Baltimore): I have attended all these sessions and I know what has been going on here, but there are several other Sections that were held at the same time that I would have liked to attend, and I would like to get a typewritten copy of those I was unable to attend.

CHAIRMAN EMERSON: That is beside the question now.

DR. SEGARD: I have never failed to get my volume of the proceedings of the National Safety Council in due time to use it in addition to my own personal notes.

CHAIRMAN EMERSON: Has the motion been seconded?

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

Many Platform Men Attended the Section Meetings

CHAIRMAN EMERSON: Gentlemen, just one word in closing. I want to thank you gentlemen for the honor that you conferred upon me yesterday. One year ago at this time the National Safety Congress met in Cleveland and that was the first Congress that I had ever attended. At that meeting the general manager of the Cleveland Railway Company gave a complimentary luncheon to the delegates and about 30 or 35 attended. Yesterday there were something over 80 tickets sold at one dollar and a quarter each. The same proportions, if not greater, has worked out in the attendance. The operating man can't help but feel the increasing influence of this safety movement. It is very evident that it furnishes a ground for the getting together of the various departments in the railways and also furnishes an opportunity to coordinate so that the best results may be obtained.

One of the things that gratified me particularly these last three days was to see the large number of platform men that have attended. I think this is a splendid showing. I think it is a splendid idea. I have been an

operating man all my life and I can look at things pertaining to a railway operation better probably from their standpoint than I can from any other. These men are the men that are going to get results in the end. They are the boys that are coming in contact with the public constantly. It is through them that we are going to get anywhere, if we do. I only hope in future meetings that the platform men will have a larger representation than they have had this time. I think it is a splendid start.

I wish to close in thanking you for all your kindness in attending these meetings. I shall be heartened by the interest you seem to have shown and in this coming year I pledge you my very best efforts to try and carry on the work which has been carried on so well up to the present time.

ADJOURNMENT

Employees' Benefit Associations Section

New Officers of the Section

CHAIRMAN: SIDNEY W. ASHE

General Electric Company, Pittsfield, Mass.

VICE-CHAIRMAN: W. FRANK PERSONS

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

SECRETARY: JACK DEMPSTER

Canada Cement Co., Port Colborn, Ontario, Canada.

October 28, 1926

W. J. MacPHERSON, Chairman,

Manager of Industrial Relations, Public Service Company of Northern Illinois, Chicago, Ill.

THE first session of the Employees' Benefit Associations Section, National Safety Council, was called to order at 9:50 o'clock in the Small Banquet Room, Ball Room Floor, Statler Hotel, Detroit, Mich., Chairman W. J. MacPherson presiding.

CHAIRMAN MACPHERSON: The first order of business is the appointment of the Nominating Committee. The Executive Committee has informed me, however, that they have tentative plans for changing the scope of activities of this committee; we will therefore pass up the appointment of the Nominating Committee at this time.

We will take up the first paper, which is by Mr. Frank L. Rector, M. D., editor, *The Nation's Health*, Chicago, Ill.

HOW FAR SHOULD INDUSTRY GO IN A HEALTH PROGRAM?

F. L. Rector, M.D., Editor, The Nation's Health, Chicago, Ill.

How far should industry go in a health program? The answer to this question can be made short and to the point. We may say "the limit;" but as the limit varies in different localities and industries our terse definition needs some elaboration.

One of the qualifying elements to be considered in this question is the relation of the industry to hospital and other facilities. Obviously

in an organization such as a mining camp the management must provide a complete medical service, not only for employees but their families and dependents as well. An industry located near a community having adequate medical and hospital facilities might feel called upon to provide little except emergency treatment for its accidents arising directly out of the employment.

But further than this we may well consider just what should be expected from a preventive medical program among groups of industrial workers. Probably the humanitarian interest taken by managements in their workers is fostered largely by rigid legal requirements on the one hand and the desire to obtain increased production through increased efficiency on the other. This increased efficiency may be obtained in several ways, among which are lessened labor turnover, decreased absence due to ill health and accidents and a greater contentment of workers with their working and supervisory conditions.

Industry Has Obligations in Reference to Employee Health

By a strict legal interpretation of medical service we might say that industry as such is not responsible for any conditions affecting the employee's health or welfare except those associated with his employment; but the industry which places such a narrow interpretation upon its obligations comes far short not only of fulfilling its obligations to the workers but of getting from them in actual production the returns which they would have a right to expect if a more liberal policy of personal relationships prevailed.

A preventive health program comprehends the prevention of more serious stages of disabilities already contracted as well as the onset of any disability. First aid for illness is just as necessary as it is for accident. Headache, stomach aches, backaches, and other aches may be more disabling than some injuries, and may be the forerunners of more serious disabilities that threaten prolonged absence from work. While their immediate treatment may be for relief, the real object is prevention and as such has a proper place in a preventive health program in industry.

Further efforts than simple relief of the immediate disability should be made with these cases to determine the cause. Diagnostic means should be resorted to for the answer. Such types of illness are not regarded by the sufferer as of sufficient importance to consult a physician and if industry does not check them up they will go without consideration until another and perhaps more serious attack drives them to see a physician. Then it may be too late to remove the cause and the worker will be doomed to a chronic condition requiring extended and perhaps life long treatment.

Men who have had wide experience in this work are pretty well convinced that industry profits in all ways by furnishing adequate facilities for determining the physical condition of workers at any and all times. It is felt that industry should not be called upon to provide treatment for those conditions which have no relation to the employment but they

should provide such diagnostic facilities for the careful examination of employees who are below par physically as will enable them to know what is their actual physical condition. Such workers can then carry this information to the physician of their choice to guide him in the treatment of their cases.

Such a worker will not go to a physician of his own accord. He does not consider his ailment sufficiently serious to justify the expense. And the medical man would not be able to give a thorough examination and diagnosis, either out of regard for the expense to the patient or because of the lack of facilities for making the necessary tests. In such a case some superficial examination would be made and the patient dismissed with a prescription and some advice. In any case, no lasting good would have been accomplished.

Two aids to diagnosis are lacking in the average physician's office, the X-ray and laboratory facilities. Both are rather expensive to procure and both need special training to use, something which the average physician does not possess, especially if he has been in practice for several years. Moreover, his practice might not warrant the purchase of such equipment.

On the other hand industry can well afford to provide these two facilities as they will be in almost constant use. With the many cases to be looked over industry can afford to engage some physician skilled in the operation of such equipment to carry on this work, the expense again being unnoticeable.

Possibilities of the Health Campaign Very Extensive

If industry would make provision for such diagnosis, and then insist upon the periodic examination of workers and upon the proper attention by workers to any defective conditions which might be discovered, health improvement of such a group would become so marked as to return to the industry many times any expense which the provision of this equipment may have made necessary.

Instead of interfering with the practice of the local physicians the work as just outlined would be a great help to them. Diagnostic aids would be offered them in their own community that previously could be had only in some distant city. Defects and disabilities hitherto unknown or unsuspected would be brought to the workers' attention and he would be urged to have them corrected before they become incapacitating.

Industry should not undertake treatment of these conditions, but should urge and assist workers to have the work done. Tactful urging of the worker by the industrial physician and tactful cooperation with the family physician would bring about satisfactory results in the majority of cases.

Opposition to such work on the part of local practitioners is due to one of two causes; either the medical man in industry is too aggressive and undiplomatic in his approach to the problem, or the local physicians are satisfied in their smug complacency and resent the efforts of industry

or any other influence to wake them up to a true realization of their duty and opportunity.

We hear much these days of the increase of chronic diseases and the diseases of middle and later life, such as cancer, heart disease, apoplexy, and various forms of kidney disorders. One explanation of this increase is that in recent years much of the health work has been concentrated upon the infant and school child so that the death rate in this group has been markedly lowered. The child has been carried safely over the critical periods of early life, only to fall prey to the more insidious ailments in later years. The death rate from tuberculosis, a disease of adolescence and early adult life has also been cut in half. Typhoid fever, an early adult disease, has been practically wiped out. Diphtheria, scarlet fever and smallpox are on the way to extinction. The chronic diseases just mentioned usually have their beginning in early life although their onset is so insidious and so quiet that only a careful examination of the individual will detect them in their early stage. For this reason a periodic examination of workers should go carefully into any sign of abnormality which may appear and should be carried far enough to satisfy both the physician and the worker that the root of the trouble has been found.

Questions Regarding the Periodic Health Examination

Who should undergo this periodic examination, and how should he be selected? Every person actively connected with the organization from the president down should be included. Frequently the higher executives are most in need of such a physical inventory. Obviously this work takes time, and at first it might be well to take the oldest employees, or those exposed to possible poisons or other hazards, if there are such; another group will be found in those returning to work after a protracted absence following illness or accident. Still others will be found by the foremen who are falling down on their work or who give other evidence of declining vigor. Yet another group will voluntarily ask for such examinations, once they are available. A little quiet propaganda as to the value of these procedures in discovering to a few popular workers that they needed medical attention will do much to remove prejudices against it.

Thus far the financial and economic aspects of such a program have not been stressed although they are of as much, if not more, importance to the workman and his family as they are to industrial management. I would like to suggest to this group, interested as the most of you are in employees' benefit associations, a thought whereby your organization can render to your members a service of far greater value than that which now serves as the major reason for your existence. Benefit associations are for the benefit of their members. This idea of benefit has in the past been translated into personal financial relief in case of incapacity for work due to any one of several possible causes. I have not the latest figures before me but my most recent information was to the effect that the minority of such associations consider the physical

conditions of the applicant when he seeks admission to its ranks. Unless he is obviously disabled or diseased, and few such are found in industry, he is admitted without question.

To my mind, mutual benefit associations offer the finest possible opportunity for doing health work and a program something like the following could be undertaken with profit.

1. Require all applicants for membership to pass a careful physical examination at the hands of a physician designated by the association, who is familiar with the work the applicant does. The plant physician is admirably adapted to do this but in case he is not available a well qualified man should be placed in charge of this work. Those unable to qualify as first class risks may be given a deferred classification until their deficiencies can be remedied.

2. Provide facilities if they are not already available in the industry for determining what the worker needs to remove his deficiencies. If necessary, assist the workman with financial aid to have this work done. It will be much cheaper in the long run to spend a portion of the association's funds for remedial work with the provision that the amount so expended be returned by some regularly stipulated time, than to be compelled to pay for a varying length of time the benefit provided by the association's rules and regulations. Mutual benefit associations, if they so desire, could provide a complete remedial as well as diagnostic service for their members, together with nursing care. This complete service is seldom needed and is not to be recommended except in most unusual cases.

Inducements to Have Corrective Work Done

A higher rating with increased benefits could be made an incentive to have the needed corrective work done. If the organization so desired it could provide its own medical staff and nursing service to carry on this work. In doing this, however, certain matters should not be lost sight of and certain practices which have existed from time to time should not be indulged in. One of these is that of compelling a member to submit to treatment by the association physician, assuming that for some reason he did not wish that particular physician to do the work. The psychological effect of such an arrangement would do much more harm than good. To minimize the chances that such objections might arise the association should always have as its medical advisor a physician with qualifications second to none in the community. By his prestige his services will seldom be refused. Neither the physician nor the nurse should make investigations as to the cause of absences from work. A tactful layman is much better suited to make primary investigations and on the basis of his report the physician or nurse can take any action that is indicated. In that way their services are confined to those of helpfulness and they would be welcomed in their contacts with the workers and their families rather than shunned as so often happens when they are doing ordinary police duty, and that is what first investigations are. I know of nothing that will so quickly demoralize the

average industrial medical organization, both with the workers and with the medical personnel itself, as to require investigation work from the staff.

After nurses have gained entré to the home they will have many opportunities to drop a hint to wives and children regarding right habits of health. A suggestion upon some small but important domestic problems that will be helpful in the conduct of that home will always be appreciated. There are countless ways in which a nurse can render assistance. But she must be tactful at all times and never assume a superior attitude.

Keep each member's records securely away from public inspection. The physician alone should have full access to them. Association officials may be given sufficient information to serve their needs but confidence and cooperation can only be obtained by respecting confidences of others.

Let me recapitulate by saying that industry should go as far in a health program for workers as it can without pauperizing the employee or the private physician. Industry can do collectively for large numbers what few, if any, private practitioners can do in the way of adequate and accurate diagnosis. Such types of diagnosis as X-ray examinations and laboratory tests requiring special equipment and skill come well within the purview of industry to furnish.

The physician should emphasize periodic health examinations. He should give relief to temporary disabilities so that the workers can remain on the job. He should perform the indicated examinations and tests to determine the physical fitness of the worker, provided, of course, that very unusual tests are not needed. Whether or not he sees patients in their homes will depend on circumstances. In general, he should delegate home visiting to the family physician, although he should be in sufficiently close touch with the case to know if proper treatment is being given. He should seize every opportunity to impart some health information without being offensive or a bore.

The Nurse Should Assist in Health Education

The nurse should assist in health education while in contact with workers in the plant and when she visits in the homes it should be only on invitation from or consent of the worker or his family. Here her greatest opportunity will be found in teaching health. Needless to say, both the physician and nurse should be examples of healthy living. A lazy, indifferent and careless person, be he ever so bright mentally, will not be a good example for workers to copy. Physicians and nurses should radiate health as they will teach far more by example than by precept.

Neither physicians nor nurses should be used to make primary investigations of absence, due possibly to injury or accident. A tactful layman should be engaged to do this work and where a health program is tied up with a mutual benefit association the employment of such an investigator can well be a part of the association's program. This will leave the medical and nursing staff to carry on their professional work,

and will forestall any unpleasant criticisms of their duties by those they are serving.

A successful health program is a cooperative affair. Unless the sympathetic understanding of the workers is obtained and the active cooperation of the management is secured, the physician and nurse may blow their trumpets until the walls tumble down without making the slightest impression upon the situation.

Likewise where a mutual understanding is reached great good can be accomplished.

Nothing has been said about such health activities as dental work, eye examinations and furnishing glasses, day nurseries, children's clinics, and related problems. Most of these are of general community interest and should be undertaken by the community. If the industry wants to have a part in this work it can well do so by a contribution to the community chest or other fund which supports the work. Circumstances may make it advisable to undertake certain of these problems within the industry. When such a condition exists the general principles discussed earlier in this paper should prevail.

So we see that the limit which we placed upon this work at the beginning of this discussion is not a rigid one, but flexible and adaptable to varying groups. The greatest good to the greatest number should be the goal toward which all such work is directed.

Discussion Following Dr. Rector's Paper

CHAIRMAN MACPHERSON: We all appreciate Dr. Rector's comprehensive paper. I think that the wide scope of the paper makes the subject almost limitless, so there should be a lot of discussion. I am sure Dr. Rector will be glad to answer questions. The paper is now open for discussion.

H. C. LOGAN (Union Carbide Co., Niagara Falls, N. Y.): We have three doctors in our plant. One full time and the others part time. We have two nurses and two first aid men. We started primarily to take care of our employees but the scope is widening out. I would like to ask the doctor how far a person should go in dispensing medicine? In our winter and fall seasons when there are so many colds, our employees all want to take cough medicine and aspirin home with them. The amount of material going out of the plant seems to be unlimited.

CHAIRMAN MACPHERSON: I am going to ask Dr. Rector to make notes of the questions. There will probably be several of them and he could answer them all at one time.

HERMAN W. ALLEN (M. Wile & Co., Buffalo, N. Y.): We have a plant with about 1,200 employees and it struck me that Dr. Rector's paper referred mostly to plants with 20,000 or 25,000 employees. I don't think our firm would see very easily where they could absorb the expense of a staff physician and nurses. In fact, I think they would notice it so much that it would take a pretty good persuader to do it. Our benefit association keeps about \$1,500 ahead. We don't want to have any more than that because it amply takes care of our needs, and we like to have the

members feel that they are paying their way. The firm donates half the material for the association, and for any unusual occurrence there is always a check forthcoming to see that the fund is kept at this point. I would like to find some way out of it for us, because the doctor's recommendations are very fine.

L. J. PARRISH (A. O. Smith Corp., Milwaukee, Wis.): Referring to the gentleman's remarks on Dr. Rector's paper: he stated that he did not think the same principles could apply to a plant with 1,100 or 1,200 employees. Perhaps that objection could be met by several plants in the same locality going together. In our plant we have about 5,000 employees and we maintain quite a comprehensive preventive medicine clinic. We have a full time X-ray man. We have a full time doctor of internal medicine. We have a full time oral surgeon, dental hygienist and a bacteriologist. We have three technicians, stenographers and nurses. We have been in operation about two years and we are prepared to show that it pays.

Problem of the Company With Many Thousand Employees

HOMER W. BANG (Illinois Bell Telephone Co., Chicago, Ill.): I was not in to hear the first part of Dr. Rector's paper. We do not have periodic physical examinations, but we are very anxious to follow out a plan of that kind if it is feasible. What we are up against is this: we have about 25,000 to 28,000 employees in Chicago, and when you figure a year with 300 working days it will average about 100 physical examinations per day. We appreciate that, would take quite a medical staff, but we want to give them the kind of an examination they ought to have.

We now have health classes throughout the territory in Illinois for women employees. We experimented with that last fall and we are starting out full blast this year and that will bring about the desired periodical physical examination.

Now, as I say, we can not see our way clear to have a staff sufficient to give 100 physical examinations per day. We have about 150 at the present time just on health matters.

I would like to ask the doctor if it would not be a good proposition to offer this service to the employees for a certain amount? Some employees would not have to be examined over once every 10 years and that would make it possible to give these periodical examinations without making our staff almost a good sized clinic.

S. W. ASHE (General Electric Co., Pittsfield, Mass.): Judging by our experience, in order that a physical examination shall be of real value to the man, it has to be pretty thorough, and that means that it is a pretty expensive thing. If you have a head man of the department, for instance, a key man, it is going to cost you \$10 a man to get the kind of examination you want, and if you have 6,000 or 6,500 employees the thing becomes prohibitive; therefore while the periodical physical examination is a fine thing, I think that you have either got to be satisfied with a very nominal examination or you have to cast around for some other way of getting the examinations. One way is with your Benefit Association and

you can work to a certain extent with your local Board of Health, and you can work with the local physicians. Most of them will cooperate with you. You can get from the local Board of Health a list of all contagious diseases.

Now we are very much interested in that kind of work. We keep in touch with the local physician and the local Board of Health. If you see a person working whose record with the Board of Health indicates that he has a disease that needs attention, we see that he is relieved from his regular work and given proper treatment, and also the proper follow-up treatment in the home. In that way we can do it in a pretty thorough way, but if you try to detect all these things through the physical examinations, the cost will be prohibitive.

CHAIRMAN MACPHERSON: There is a challenge to the statement that the periodic examination pays and perhaps we will have some discussion as to how to measure whether or not it does pay.

J. W. RIDDLE (The Youngstown Sheet & Tube Co., Youngstown, Ohio): May I ask a question here? It seems that the discussion is all on the subject of expense. Does that mean the expense to the company or to the Employees' Benefit Association?

CHAIRMAN MACPHERSON: I would say that it depends upon the particular organization, because in some cases it might be a direct cost to the company and in others it might be a direct cost to the Benefit Association; or in some cases the cost might be to both when both contribute to the expense of paying the employees for lost time.

MR. RIDDLE: I brought up that question because it is apparent in our company, from the employees' standpoint, that our Association can not afford to make any sort of an examination outside of what the company might have to make when the man was employed.

The Confidential Relations of the Physician

DR. G. H. WOOD (Frederick Stearns & Co., Detroit, Mich.): Dr. Rector's paper is full of meat and good suggestions and is an excellent guide to certain industries. I would like to go over the whole paper, though that is impossible, but there are one or two points that I would like to bring out. The first is the confidential relations of the physician and his assistant. That is the thing which is violated a great deal in industries and Dr. Rector brought that out. Of course, slips occurs, but some industries want to compel the medical department to act as detectives and that is absolutely to be avoided.

In the course of 14 years' experience in medical and industrial medical work this question has come up to me rather forcibly a number of times. There were times when apparently I was in danger of losing my position if I refused to act as a doctor and then turn around and act as a detective. In other words, I do not go to the employee and get his confidence and then go and tell the employer the confidential things I have learned.

I protect the interest of the company by advising them as to the results to be accomplished if the man is unsafe in the industry. Or better yet, if the employee is in a condition where he should not work

and will not advise the company, I advise him to resign and do not allow him to be discharged. That is just an illustration to bring out what I mean.

In a few cases I have been asked definitely to go out and investigate a man who was believed to be faking or to have been drunk or something of that kind. Where I have done that I have not gone as a physician, I have gone out to his house and I haven't said, I am a company doctor; I have said that the management wants to find out the cause of your accident. I simply went there as a man so that there is no deception.

The point I want to bring out is this, the management should respect the physician's confidential relation with his patients and should not expect him, or a nurse working under his direction, to divulge those confidences. The doctor can protect the company without it. There is one thing in all these years that I have been unable to solve and that is the relation of the industrial physician to the family physician. Dr. Rector has brought up some points here on which I would like to have him give us a little clearer idea, if he can, where to draw the line.

Certain Ideals of Conduct for Every Physician

All physicians have certain ideals and in order to keep successful we must keep those ideals in mind. One of the things which the American Medical Association has written is this, "That no physician shall accept practice under such conditions that he will not be able to give the patient the benefit of his best efforts," and it is the one thing which we all try to follow out.

When a physician accepts a case he is responsible for the whole case until he is through with it, or until he is discharged by the patient. Under these conditions, how far can the plant physician go in treating a patient who is known to be a patient of the family physician? How far should a plant physician go in starting a case and then turning it over to the family physician? When should he turn it over? Dr. Rector says, if I understand him correctly, that when a plant physician undertakes a case he is to do it thoroughly, and later on he says that home patients should be delegated to the family physician.

Now I don't quite get the point as to whether the case is to be turned over to the family physician or whether the family physician is to be asked to work as assistant to the plant physician or what? I would like to see that cleared up.

One disadvantage of the plant physician starting a case and then turning it over to the family physician, is that the family physician does not know the beginning of the case, except maybe from the report.

The question of expense has been brought up here and that, to my mind is the one thing that makes it almost impossible for the plant physician to continue home treatment, because almost everybody tries to avoid the expense of the treatment. It is not merely because they do not like to spend money, it is because they do not have it to spend. The cost of living these days is so high that it is a serious proposition. That is a thing we need to solve and I hope that there are more speak-

ers here who can give us some light on the subject of how the question of expense can be met by either the Employee's Benefit Association or by the employer, or some other way.

H. JOHNSON (The Hoover Co., North Canton, Ohio): I think our subject is, "How far should a company go in a health promotion program," and I want to say that the Hoover Co., North Canton, Ohio, goes the limit. We have had a hospital with two nurses for two years. We have had a part time doctor for almost two years, and every one in our employ must take a physical examination and those physical examinations are charged to the company by the doctor. In fact, the doctor only charges \$2 for those physical examinations and he is assisted by nurses.

To our old employees who were with the company before the physical examinations were started, the physical examination was of course to be a voluntary proposition. I am sorry to say that only about two per cent of them have taken advantage of it. We are starting now to work out something that will give those fellows the incentive to take those physical examinations. We do not want to be making sport of it. Of course when there is sickness and those employees come to the hospital, that is the cue for the doctor to start the physical examination. We have put several physical examinations over in this way.

Our employees organized five years ago an Employees' Benefit Association of their own. They have about \$1,000 in the reserve fund now and the insurance is working out wonderfully without any of the company's help financially.

Advice to Go to the Family Physician

We find that most of our other employees have sickness. They are not injured, while the factory employees are so busy working that they get away from the psychology of having something wrong with them and they work it off, but we don't intend to have them take yearly examinations. We only give those to the employees who come in, and if the doctor finds anything wrong with them he will take another examination in six months of that particular thing that is wrong. He will advise all employees to go to their family physician. We don't ever want our doctor to get to the place where he is treating our own people. We want him to understand that we are throwing him business. We are paying the doctor for part time service and that is all we are asking him to give our employees.

In follow-up systems of that kind, our nurse will call up the family physician and get the data and reports on our employees who are sick. Every morning the foreman reports to the hospital all those who are absent on account of sickness. Where we have such a report, the nurse will automatically try to get in touch with them. Sometimes we find that the person who is sick has a relative working in the plant and the nurse follows up that medium to find out why he is absent. We are going to start the first of the year on a follow-up of the employees in the factory. We are only doing it now in the office, although the nurse secures the report of all factory employees reporting absent. If that

employee is absent three days the nurse will visit his home and find out what the trouble is.

Our Employees' Benefit Association will cover all that possibly in the next two months. They are printing a little returnable postal card and giving them to every employee who belongs to the insurance, and they will mail them in to the secretary when they are ill or are going to be ill for one or two days. The secretary in turn notifies the physical department. Ninety-nine per cent of the factory employees and 48 per cent of the office employees belong to the Employees' Relief Association.

G. M. KELLER (Colorado Fuel & Iron Co., Pueblo, Colorado): Our Health Department dates back about 40 years. We are the pioneer in industrial medicine, but we still have many of the same problems that have been discussed here. The first, I think, is a very delicate question. Just what is the relation of the medical department to the police duties of the employment department? I agree that the medical department must maintain the confidence of the employees or it loses its entire value, but it also has certain very definite responsibilities in maintaining the management standards of the physical welfare of the employees.

Our medical department was an established requirement for the new employees. With our medical department, no one would apply for employment with a venereal disease. We all probably agree that it is undesirable to have anyone with a venereal disease in your employ. The medical department would bar them upon the first examination.

Employees Invited to Go to the Hospital Freely

We want every man who has any disability to go to the hospital freely, and they do, but when a man goes to the hospital, say after some period of employment, for a broken leg or any injury, and while he is at the hospital or dispensary the doctor finds some condition existing as one of the diseases that would bar a man from new employment, what then is the hospital's responsibility? The hospital has set up the standard for new employees and here is a man discovered with a disease, which, if he was a new man, would make him ineligible. What is the doctor's responsibility?

I would like very much to hear the principal speaker's opinion on it, and perhaps some of the other people might express their point of view.

The other thing that was brought up is the matter of expense and I have a notion that possibly the Benefit Association may be a part answer to the problem of company expense. Our plan calls for a contribution of \$1.50 per month from every employee to the medical fund. This entitles a man to medical service for himself and medical service for his family at a reduced rate, but that doesn't cover the cost of our hospital and medical staff. There has been some talk of how it could be extended to give free service to the employee's family because, as has been said today, the question of doctor bills is a very serious proposition to the employee.

We are all getting the insurance habit and the mutual benefit habit and it may be the answer to our problems. We want the benefit fund to be such that it will entitle both the man and family to hospital facilities and medical attention. I know of one such association with the Standard Oil Company of Louisiana, at Baton Rouge, and I wonder if there is anybody here that can tell me just how that association operates?

MR. ASHE: I should like to reply to one question from the management's standpoint. Most companies say that the General Electric Company has set up certain standards for physical examinations on which they will determine whether they are going to hire the employee or not. If a venereal disease, or something of that sort, is found, for the protection of the other employees we will not hire that person.

Standards May Be as High or as Low as Desired

You can set your standards just as high or as low as you want in regard to taking the employee into your organization, but once you take the person into your organization he is a part of your big family, and if there is anything possible that the company or management can do to help him, it seems to me that in justice to the employee it should be done. Now that means when you have a Mutual Benefit Association functioning by the employees. Incidentally, we have a very successful one which we have run for about 15 years and it has cash assets of about \$20,000.

The Mutual Benefit Association has never said, "Well, here is an employee who does not look very well. We should not take that person into the association." If you will bring those things up and let the employees discuss them, you will find that they want everybody in, and the person who is not very well and the person who is likely to need help, they are the kind that they want in the association. You don't want to set standards that are going to keep this person and that person out because they are likely to be a bad risk. If you do that you are getting away from the fundamental idea of the Mutual Benefit Association. If you set certain fundamental principles of that sort back of your organization, all these other little things that come along and cause injustice will be taken care of automatically.

We do one little thing that might help you. We have the regular scheme of paying sickness and death benefits, but in addition to that, over a period of years, we have built up a separate fund, not from the weekly contributions to the association, but from profits of little carnivals and such things. We just let this fund keep on growing and only spend the interest on it each year. At the present time this fund is pretty close to \$10,000. The interest on it runs in the neighborhood of \$400 each year. If we have a case of a man who needs special hospital care or requires an X-ray examination, we have this \$400 each year for just such cases.

G. W. WILLOUGHBY (Michigan Bell Telephone Co., Detroit, Michigan): I am here not as an experienced man, but as a student to learn what

I may from your meetings. It seems to me that while all the points that have been brought up are very interesting, they do not all bear upon the subject as outlined in the program. Unless the time is limited to the discussion of that particular subject, we are not going to get the benefit out of the meetings that we anticipated.

Dr. G. H. Wood (Frederick Stearns & Company, Detroit, Michigan): I have been with my firm for eight or nine years. I have one of the most pleasant connections that could be asked for. My firm has been very liberal to their employees for 30 years, and they have done a great many things not generally done. Years before a compensation law was thought of they gave their injured men full time pay while they were off. That was 30 or 35 years ago, I believe, and they have done many things in a sort of personal way. They have not had an elaborate organization, but, of course, we are talking about organization and what has been done in various ways. When I went with this company eight or nine years ago the employment department wanted me to examine new employees and write out a report for them of what I found. I said to the management right away, "What I find is the basis for my conclusions and it seems to me that what you want is my conclusion, and not something about this man that can be talked about." The management agreed with me.

Men With Contagious Diseases Are Rejected

The management has certain standards that I am supposed to follow. When a man applies for employment, he comes to my office to be examined. I reject anyone who has a contagious condition that would be dangerous to the other employees, and write across his application "Not acceptable." If he is acceptable I write across his application "May be accepted." That is all the employment man knows about the details of the man's condition.

That, I think, will explain how we protect the company's interest and at the same time protect the confidence of the employee or the applicant.

CHAIRMAN MACPHERSON: I find that we are forcing Dr. Rector to write another paper, so I am going to ask him to answer some of the questions we have had thus far.

I want to comment on just two matters. The first is the question of police duty. The question was put up to the Employees' Committee, who have quite an interest in the Employees' Benefit Association, and their experience was that most nurses soon became spotters. We finally decided that if the figures indicated that we needed a spotter, we would get one for such work and not use a nurse. In that way we would not have to try to cover anything up. In fact, the Employees' Benefit Association was a little anxious to try out a spotter for a while. An analysis of cases showed, however, that checking of this kind was unnecessary.

The other thing is the cost of periodic examinations. Periodic examinations increase the lost time on account of illness, and the cost is very

great. The cost may be overcome by getting the people cured and back to work as more efficient employees. Without very elaborate statistics our records show that the periodic examinations have increased the days lost. It seems that "Go home and go to bed for a few days" is still one of our most popular medicines.

DR. RECTOR: The first question is about the dispensing of medicine. That has always been sort of a bugaboo in industries. As far as I know the lid should be clamped on very tight on that proposition. If a person comes in with a cold or headache and is going to stick on the job, you might give him a cathartic or give him a rhinitis tablet that will stop his sniffles and let him go back to work. Beyond that, they should get it outside. You can create the dope habit in a way by continually doping your employees; the first thing you know you will be running a pharmacy instead of an industrial dispensary. My advice would be to not dispense any drugs whatever except one or two minor things. Giving out aspirin tablets which can be bought at any drug store is poor business.

In Some Cases Small Plants May Combine Their Efforts

Now, the question of the small plant which may have a Mutual Benefit Association. The small plant has an opportunity to carry on some of the things that were suggested in the paper. One of the subsequent speakers said that the small plants in a certain locality could combine. I think the small plants should have their Employees' Benefit Association and a hospital. If the small plant can not do it itself, it might get two or three other industries of fairly good size to go in with it.

One of the best opportunities for real medical work is in the small plant. There is an answer to the small plant problem. It is a community or cooperative dispensary in which they could afford to have a full time set-up, both of personnel and equipment, and those full time workers, the physician, the nurses, the attendants and so on, would divide their time as needed among the industries in that community. It has been tried quite successfully in a few cases and I don't know why it has not been carried out to a greater extent than it has. I think that is the possible answer to the question of providing the facilities, which we discussed, for the small plant.

Regarding the cost of re-examining employees, I indicated some of those possibilities in my paper. One was, that when a man is away from work for any length of time on account of injury by an accident, he has to go through the medical department so that we can see what shape he is in. The question of the cost of re-examination in that they increase lost time is possibly so, but if you could check up the condition of your employees, you might find that you have saved a great deal more lost time in the long run, that has been the experience of people all along the line. The physician may send the man away from the job for a short time and thereby help to save a great deal of lost time that would have resulted if he had kept on going in the condition he was in.

Mr. Ashe's experience over in Pittsfield has not been so very good if it costs his company \$10 to have an examination done. I don't think it should cost that much except in very unusual cases where it would take an hour to give a man a physical examination. I think the executives of a company should go the limit in having their employees re-examined. They should have their employees' health looked after and see if there is anything wrong with them. They have a great deal of responsibility. If any of the employees show symptoms of illness, the doctor is justified in going to great lengths in giving those people thorough examinations.

In the case of the average employee, if you have a physical examination record, when he comes in you have a pretty good basis to go on. It should not take so long to make the examination, and it is not going to be a very expensive proposition.

Cost of Conducting Medical Department Is Low

It was found recently that the cost of conducting medical departments in the plants, good, bad and indifferent, all thrown in together, was only 36 cents per \$100 of the payroll. The cost of the work is nothing when we come down to the figures that show the value of the goods produced. I think that any industry can afford to absorb that without very much complaint.

The question of minor illness was brought up by one of the speakers here. I think every industry is justified in taking care of their employees as long as they stay on the job; if the employee is so ill that he must go home, then he should call his own physician. It is the duty of the company to take care of him while he is on the job.

Regarding the question of how far the plant physician should go in the treatment of employees, I think the plant physician should treat emergency cases, but when an employee is able to go home he should have his family physician. Of course, he may want to retain the plant physician as his family physician, which is all right, but the plant physician is justified and authorized to treat emergency cases only. After that it is a question of how far he wants to go.

I don't think I like Mr. Johnson's plan about giving the employee an examination when he comes into the dispensary for something or other. That won't go very long. It is one thing that you must keep away from. Don't try to put something over on the employees for you will find that procedure will not become popular with them. Be open and above board. Don't make the employees think that there is a nigger in the woodpile somewhere. Put your cards face up on the table.

Several years ago I was with the United States Public Health Service and we were doing some examining in northern New York. We went into a plant there and told the men what we wanted to do. We laid our cards face up on the table and got their cooperation, and almost to a man they came up to be examined, but there were a few who said that there was no government doctor going to examine them. We paid no

attention to them, ignored them entirely, and went ahead with our work. Usually the day before we got through we let it be known through the plant that we were going to get out the next day, and I think, almost without exception, all the men who protested against being examined came up and said, "All the other boys have taken the examination so we will take it too." There is always some way you can get at those things if you do not try to force them. If you use judgment and diplomacy, you can get by on practically all of these problems.

MR. JOHNSON: I wonder if we should insist upon the foremen of departments, office managers and assistants, taking the physical examination?

DR. RECTOR: It seems to me that if anybody is to be forced to take the physical examination, it should be the heads of the departments. I don't believe in force. I believe in persuasion, and that brings up a very interesting point. Unless you do get the management behind you in anything that you are doing in this line, you are not going to succeed. The employees will not come up to be examined if the heads of their departments have not taken advantage of the physical department's facilities. So the big problem of the physical department in the industries is to sell the management, from the executive officers on down the line. If all the heads of the different departments have taken advantage of the facilities offered by the physical department, it will not be much trouble to get the employees to fall in line.

A Peculiar Situation in a Boston Plant

I was in Cambridge, Massachusetts, once where the plant physician was on a part time basis and the work was in charge of a nurse. I noticed employees coming in and getting some sort of treatment or medicine and the nurse made no record of it. I told her that she must have a good memory to remember all the people that come in. I asked her why she did not make a record while the employees were there. She said to me, "You know, there is a peculiar situation here. The cost of the medical department is charged against each operating department on a monthly basis, and based on the number of employees who use the hospital facilities, and a number of the foremen will not permit their employees to come down here for treatment if we make a record of it so that it will be charged against them at the end of the month." That was very interesting and you can see what was happening. You must get the cooperation of the supervisors if you are going to put over anything of this kind.

CHAIRMAN MACPHERSON: I think we will have to close the discussion on this paper. I am sure we could go on all the rest of the morning.

The next paper on the program is by Dr. Eugene Lyman Fisk, of the Life Extension Institute, New York City. Dr. Fisk has been unable to get here, and he has asked Mr. Leo D. Woedtke, of the Fred T. Ley & Co., of Springfield, Mass., to read his paper for him.

PERIODIC HEALTH EXAMINATIONS IN INDUSTRY

Eugene Lyman Fisk, M. D., Medical Director, Life Extension Institute,
New York City.

The ways in which periodic health examinations may be linked to the activities of the mutual benefit organizations in the plant, have been well worked out by Mr. Harold A. Ley* and presented in a previous discussion before this body.

That the theory of periodic health examinations in industry is absolutely sound is, I think, admitted by all who have given this subject any attention. There are people, however, who accept the theory and principle but have their doubts as to its practical working in an industrial group. Surely no one familiar with industrial conditions can question the enormous influence of health on industrial productivity, on turnover, on the accident rate, and on perhaps the most important condition that we have to deal with in industry—fatigue.

In considering the problem of industrial fatigue, these questions should always be asked: "Is the worker tired because he is ill, or ill because he is tired?"

Also, industrial experts, experienced in dealing with human beings, realize how difficult it is to influence the personal actions of men. It is an entirely normal and healthy characteristic for men to have confidence in themselves and their health and power to work as long as they feel well. The difficulty of securing the cooperation of men whose impairments are not causing pain or actual physical disability, is well recognized; but most worth-while things we are trying to do in industry are difficult, and no important measure is to be disregarded merely because it is a difficult one to carry through.

In this brief paper I shall present certain evidence bearing upon the practical workings of the periodic health examination system in industry, and its actual results in so far as the service has influenced the lives of those examined. The statistics derived from life insurance sources have already been presented to this Section by Mr. Ley.

I may remind you that in nine years' experience of the Metropolitan Life Insurance Company, a reduction of 18 per cent was effected in the death rate among those examined; and among those found more or less seriously impaired, a reduction of 53 per cent was attained. In the Guardian Life Insurance Company of America, a study covering ten years' experience showed a reduction of 23 per cent in the mortality of those examined; of 26 per cent when the extreme old ages were excluded. These are business figures of tremendous significance. Many have been skeptical as to the degree to which policyholders in life insurance com-

**How to Interest Employees in Improving Their Health*, by Harold A. Ley. Address Before the Fourteenth Annual Safety Congress Held Under the Auspices of the National Safety Council in Cleveland, October 1, 1925.

Prevention of Waste from Ill Health in Industry, by, Harold A. Ley. *Safety Engineering* June, 1926.

panies would respond to the message of a Life Extension examination; but the answer is found in these figures.

Shifting our attention, however, to a different type of statistical proof, I call your attention to the accompanying table indicating the results attained in a group of about 600 industrial employees taking these examinations for three successive years.

TABLE A .

Improvement in Physical Condition of 596 Industrial Workers resulting from Periodic Physical Examination as revealed by the medical and surgical attention needed at 3 successive years of examination.

Class of Medical or Surgical Attention Needed	Number of Cases Needing Attention At 1st Exam.	New Cases Needing Attention At 2nd Exam..	Percentage of Cases Cured Within Year Following Discovery of Impairment
General Medicine	90	60	69
Eye	217	66	52
Ear	64	24	58
Nose and Throat..	144	79	50
Surgical	79	62	62

A study of this group shows why the death rate is so rapidly pulled down by a service of this kind. You will note in the various types of disabilities requiring medical attention, cures were effected ranging from 52 to 69 per cent; that is, within one year of the examination it was shown that the need for medical attention of various kinds had been reduced to that degree. This study covered a group of 596 employees selected at random simply on the basis of having had three successive examinations. In this way any possible special environmental influence is eliminated. These results would indicate the uncomplicated influence of the periodic health examination service and not of any special intensive work at any particular plant.

I think anyone familiar with industrial conditions will appreciate the enormous difficulty of attempting to trace the complete influence of such a service. The results on the death rate in these groups can only be ascertained after many years of exposure, and then it is often difficult to trace cases. The morbidity results may be affected by complicating factors, such as epidemics, special plant conditions and turnover, and other matters having nothing to do with the health examination service. But in this particular study we have evidence derived from individual consideration of the actual characteristics of the people examined and the extent to which these individuals have profited by the counsel given.

The type of examination I have been discussing is the standard one

employed by the Life Extension Institute in industry. This covers an examination of each region of the body, a chemical examination of the urine, and the delivery of a report by the examiner outlining conditions found and making recommendations as to the type of treatment to seek and the modification of personal hygiene that is necessary. This is the kind of an examination that is feasible and attainable for the average worker. I do not, however, think we should ignore the ultimate possibilities of these health examinations made on a broader scale for the higher class of executives. There is evidence available along these lines which is very illuminating and which is summarized in the following table:

TABLE B
Classification According to Degree of Impairment
100 Policyholders Examined Under the Vital Protective
Routine
(Average Age 43)

Class	Number
1. No physical defects or errors in hygiene.....	0
2. Very minor defects requiring attention or observation.....	0
3. Minor defects requiring hygienic correction, or minor medical, surgical or dental attention.....	12
4. Moderate defects requiring medical supervision as well as hygienic correction. Impairment influencing longevity.....	70
5. Advanced physical impairments requiring systematic medical or surgical attention.....	15
6. Serious physical condition requiring immediate medical or surgical attention	3

This group comprised 100 individuals carrying large life insurance policies who received very critical and thorough examinations at the Head Office of the Life Extension Institute, including X-rays of the teeth, of the chest, and of the heart; electrocardiographic study, blood chemistry, and practically every laboratory investigation and specialized study that is available. These men were all high-class executives, accustomed to the best of medical attendance, and carrying on important activities. Yet in this group, three serious cases of heart disease were uncovered, and 27 of the group showed important impairments which could not have been elicited by the more elementary forms of examination.

I am convinced that these broader examinations will in time become the vogue among important executives who require to know whether they are likely to have a fairly long look ahead in their chosen activities or whether they need to modify those activities or prepare in any way for their restriction.

The relationship of these physical impairments to industrial fatigue is very close indeed; in fact, it is my opinion, from a close study of the industrial situation, that the major factor in industrial fatigue is physical impairment and not the hours of work or the nature of the work.

A thoroughly sound and vital human organism can carry almost any load of work through a fairly long working day without accumulating any pathological fatigue. The fatigue that carries over to the following day and is more or less continuously carried day after day, almost invariably arises from some infection or poison or physical deficiency on the part of the individual, and not from the nature or quantity of the work performed. Of course, we meet conditions of mental ill health quite as definite as physical ill health, and these may be a factor in fatigue. These conditions, however, may be revealed by a critical medical survey and oftentimes corrected.

How much underlying unsuspected physical impairment exists in the population was shown by the results of a sickness survey made by the United States Public Health Service. Sickness is not always the real index of physical condition. The diseases that figure most largely in the death rate may show an almost negligible sickness rate—as sickness is ordinarily understood. It is only by the periodic health examination that this underlying physical state can be disclosed and pave the way for corrective work before it is too late.

I can not leave this subject without insisting that the most important measure that could possibly be adopted for the elimination of waste in industry and for the mitigation of fatigue in industry, is the periodic health examination, followed by proper counsel and direction as to the treatment of pathological conditions and the correction of any factors in the personal hygiene or environment that are contributing to physical failure.

In the report that I made to the Hoover Committee on the Elimination of Waste in Industry, it was set forth, on sufficient data, that failure to employ these methods generally throughout the country occasions an annual loss of some three billions of dollars, and that one billion, eight hundred millions are lost in industry. This loss is preventable, and the cost of prevention will leave a margin of profit of at least a billion dollars.

I see no reason to change these estimates which were derived from the intensive study of small but representative groups. This is a practical, constructive business measure in industry, adding not only to the productive lifetime of the worker, but increasing his capacity to work and to live and to enjoy life. That is the principle or theory upon which the work was started, and experience has justified it. There are many business measures universally applied which lack the proof as to their utility which is now available regarding the periodic health examination.

ADJOURNMENT

THURSDAY AFTERNOON SESSION

October 28, 1926

The second session of the Employees' Benefit Associations Section convened at 2:00 o'clock, Chairman W. J. MacPherson, presiding.

CHAIRMAN MACPHERSON: This afternoon's session is to be a "General Round Table," and a general round table means a group that gets together and has a sort of free for all discussion.

The Nominating Committee consists of Mr. Homer Neisz, of Chicago, and Mr. Willis MacLaughlin, of Toronto, Canada. Mr. Neisz could not be here and has asked me to present this slate for him.

They recommend for chairman of this Section, Sidney W. Ashe, of the General Electric Company, Pittsfield, Massachusetts; and for vice-chairman, W. Frank Persons, of the Milwaukee Electric Railway & Light Company; and they recommend that the secretary be chosen by Mr. Ashe because probably he will want to select someone close enough to him to be of considerable service in that position. If you want to grant that authority I will entertain a motion for the election of this slate.

C. G. PATTERSON (Alton Box Board & Paper Company, Alton, Illinois): I move you that the slate as recommended be adopted.

(The motion was regularly seconded and carried unanimously.)

CHAIRMAN MACPHERSON: This afternoon we have six subjects for round table discussion.

On the first subject, "How to Keep the Small Plant Association Out of the Hole," a good deal depends upon what is meant by "hole." In our case we have a very easy way of changing the dues and it is our aim to keep the dues fixed in such a way that the amount of money on hand will always take care of current liabilities. Fortunately, we haven't had to change very frequently.

We have no fear of going into the hole because simply by a vote of the board of directors elected by the employees we can change our dues effective the following month. So there is no such thing in our plant as going into the hole. I would like to hear how some of the other companies keep the small plant association out of the hole.

MR. H. JOHNSON: Our insurance has only been in operation since May, and those starting in January, February and March will possibly be the fat months of the year for benefits and we have contemplated that condition.

Is there any one here who can give approximately the increase of benefits likely to be necessary in what we call the sick months, that is the sickness over the summer months? We don't know just how we are going to get through the winter and we don't want to make an assessment. We all know that assessments are very hard and a very bad thing to start to do.

ARTHUR M. COON (Dunlap Tire & Rubber Company, Buffalo, New York):

Our Association pays a very small fee. The members are assessed 15 cents a week but whenever we vote a large amount of money like \$400 or \$500 to recreation like baseball or bowling or any similar case and we find it brings the reserve fund down further than we would like to have it, I simply notify the company that such is the case and they donate a check through the Association which pretty nearly covers the amount. It is never the same amount but that is how we keep out of the hole. The firm, of course, does this but the members still feel they are running and paying for the Association.

MR. JOHNSON: I want to meet and talk with any member here who has or knows about an association maintained by and for the employees and which is contributed to only by the employees. I think most of the companies represented here and having relief associations are contributed to by the firms also.

FRANK WHITE (American Multigraph Company, Cleveland, Ohio): Our Association is all by and for the employees and they are the only ones that make contributions to it. We have found, of course, that in the months of say November, December, January, February, March and possibly April, about six months out of the year, is when we pay out most of our benefits. I will go so far as to say 75 per cent of our benefits are paid in the six months I have mentioned.

The Association Is Insured Against Deficit

I don't know whether that answers the gentleman's question or not. The company does not contribute to the Association and the employees do not want them to give anything or make any donations.

G. F. CLOSE (Commonwealth Steel Company, Granite City, Illinois): We have had a Benefit Association for about five years, and while we don't have any profit during the year we have no fear of running into the hole because we reinsure the Association with an insurance company. We find that during the six winter months, from November to April, the benefits are about twice as high as they are during the other six months.

Of course when the Benefit Association finances itself, pays the benefits directly, they have a more difficult financing problem than if it is reinsured. We know what our rate is going to be all through the year and we may have to raise our dues at the beginning of a new year when we reinsure. We really haven't that privilege, of course, but during the year we have no trouble because the insurance company stands the gaff.

S. B. WILKES (Larkin Company, Inc., Buffalo, New York): I can't say anything that isn't corroborative. We have an association of 35 members. It is supported entirely by the employees and we have found that about 75 per cent of the benefits go out in the winter months.

NATHAN SHAW (Illinois Power & Light Company, Chicago, Illinois): I would like to ask the gentleman who just spoke what benefits they have that they reinsure?

MR. WILKES: Our Association is composed of two parts. We have

the life insurance which the company provides, and the men pay entirely for the sickness and accident insurance, but as a matter of fact we insure both. The part in which I am concerned covers sickness and accidents outside the shop. The inside accidents are covered by compensation. The Standard Accident Insurance Company of Detroit carries that risk.

JOHN D. SWITZER (Mathieson Alkali Works, Niagara Falls, New York): When our Association was organized about 28 years ago we had, I suppose, in the neighborhood of 400 employees. At that time the company donated 25 cents and the employees 25 cents each month and we paid benefits of \$5 a week. It went along on that schedule for about three years and then we went in the hole. One year we were forced to call upon the company for a loan of \$300 which we paid back later on and we went along for perhaps 15 years on that same basis. We had more members but we still paid the same benefits and received the same compensation.

Benefits Were Raised When Times Grew Better

In that way we swam through it, but about 1917, of course, wages went up all over the country and people were not quite so much disposed to get sick. If they did get sick they didn't lose much time. Five dollars a week was not much of an attraction to them. The result was that within five years we piled up a surplus on that basis of about \$1,500. Then we raised our benefits to seven dollars a week until such time as that fund would be pulled down to \$700, and that lasted for about two years.

I was secretary of the Association for about five years and the expenditures during that time were about 75 per cent higher during December, January, February, March, and sometimes April than they were during any other month or months during the year.

However, we have taken over the group insurance plan for employees at a premium of 50 cents per month. The company is not connected with the Benefit Association except in the way of helping them out, and we are now paying \$7 a week and we seem to be getting along very nicely.

EDWARD S. LIGHT (Empire Gas & Electric Company, Genoa, New York): Relative to keeping the association out of the hole, we are thinking of a plan now that we think will be quite successful and that is an investment for the surplus that we have in the Association. We are thinking of taking this surplus and allowing the employees to make loans on it, to borrow money out of it, and to pay six per cent interest unless the amount is to be used for sickness in their families or something of that sort, in which case they will be required to pay four per cent interest. If that plan goes through we think it will not only build up our surplus but will also make it quite convenient for employees who wish to borrow money in that way.

MR. SHAW: I want to repeat the question I asked when the meeting

first opened. Are there any members who have been connected with the Association who did go into the hole? We want to know what some of the pitfalls are that we might go into.

I don't believe it would be just right to discuss that question without referring to our own organization. About 62 per cent of our employees are now members of a hospital association which we have and which was organized in 1917.

At that time the company realized that in time of illness and death there was more or less distress among its employees and therefore they devised this plan. We are seriously considering revamping it and anything that I might contribute here is given with the idea that some of the others, with a more revised plan than ours, can help us. We have been in the hole and the company has very cheerfully and liberally contributed to the fund in order to keep it going.

During the life of the Association the company has probably contributed about \$90,000, and we graduate the dues or assessments to the fund on a salary basis. In the higher salaried classes they pay rather large amounts. In the lower graded salaries the contributions are very low, the smallest amount being 25 cents a month.

We have gone in the hole (although we don't feel we have provided excess benefits) and if there are other questions that will help us to bring this matter out and help someone else I should be glad to hear them.

Members Contribute According to Various Classes

CHAIRMAN MACPHERSON: Let me ask, when you have gone in the hole where is the burden placed, on the company or the members?

MR. SHAW: The company has always made up the deficit. There has not been any change in the assessment to the members. That is a fixed plan by which we assess them on a monthly basis and we don't change the amount they contribute.

MR. RIDDLE: May I ask what the cost is to the members and what they offer in benefits to the members?

MR. SHAW: The highest salaried employee contributes a maximum of \$4 per month and the lowest 25 cents per month. They are graduated in amounts of \$100 and down to as low as \$2.50, which run approximately 25 cents, 40 cents, 60 cents, 80 cents, \$1.20, \$1.60, \$2, \$3 and \$3.50, and as high as \$4 per month. On salaries less than \$200 a month it runs at one per cent per month and in excess of that amount it runs one and one-half per cent a month. The average cost per employee figures out about 22 cents per month.

It just happens that we have an Employees' Association with the cost all to the employees and where the company has never yet contributed, not because we couldn't secure that contribution but we have never found it necessary. Through 25 years the expense to the insured in the plant was 50 cents per month, with an average death benefit of \$250 and \$7 per week for accident and sick benefits. In the last 25

years with an average of 7,000 members, a surplus of \$100,000 has accumulated.

That is also being rather lenient with the claimant for benefits if it is found that at the end of the disability period (which in our case is 13 weeks) he or she is still in need of help, we may extend that to another 13 weeks in any one year or period. But since that time there has been so much cooperation propaganda about insurance schools with outside groups coming into industrial organizations (possibly you call it underwriting excess insurance), that we have formed a plan of our own where we know through our past experience and through the statistics offered by the various insurance representatives that we can't fail unless it is in the face of a catastrophe.

We have obtained all our figures from authoritative sources. They were accumulated from all the larger insurance companies who write industrial insurance in the United States. We took two months in which to investigate this and find out our cost. So we now have a \$1,000 death claim and \$7 or \$8 a week sick benefits with, of course, the death claim rated at the total disability rate, in compliance with various items in the By-Laws that call for a payment on loss of members and loss of time.

Nothing is Compulsory in the Association

In our Association nothing is compulsory. It may look as if pressure is brought to bear but there is none. We had one benefit where there was no examination necessary to enter the employment of the company, but we decided that in fairness to the other members it was necessary to go through this examination which meant the same thing as getting into the insurance plan. So these figures that I am giving you have really been compiled by the insurance actuaries who are specialists along that line.

CHAIRMAN MACPHERSON: I find the discussion is drifting toward the subject, "How can one determine the proper basis for membership dues?" and unless there is some other discussion on how to keep the small plant out of the hole, we will pass on to the next question.

I think also that the next subject is very much connected with number three and we might discuss them together. Number two is, "The Secret of Success of our Employees' Benefit Association." I think answers to that will be practically the same as the answers to number three, which is "What Is the Best Plan of Administration for an Employees' Benefit Association?" We might discuss those two together.

The secret of our success in the Benefit Association is the fact that it is operated entirely by the employees. They do their own checking up on malingering, make recommendations on cases that are entitled or not entitled to benefits and also the dues are based on our current expense, and, therefore, the employee is interested in keeping our expense favorable. In cases where the company pays the difference in expense, the incentive is probably taken away.

C. G. PATTERSON (Alton Box Board and Paper Company, Alton, Illinois): I am inclined to be like our chairman in his attitude of administration. We have only 175 men in our Association. Our Association attends directly to the employees and we have directors and sick committees who look after its members and in the last three years we have accumulated a surplus of \$3,000 upon 15 cents per week, per member.

The company put in 15 cents apiece for each member but above that we have saved more than the amount the company has given us in the last three years. Prior to that time we had 10 cents a week, a \$50 death benefit, \$25 childbirth benefit and we accumulated a surplus there. Then we cut out taking subscriptions from the men for over a year. But that eliminated the new men coming in, so we had to reform on this basis, with 15 cents a week and the company came in with their part of it.

Our office force is not in the Association at all. The directors are elected by the men. The secretary informed me the other day that the childbirth rate had drawn the fund down \$175 last month.

What Measures the Success of the Association?

HERBERT W. ALLEN: May I ask what you mean by the success of the Association?

CHAIRMAN MACPIERSON: Success might be measured in several ways and I suppose there would be as many opinions as there are people in the room. In my opinion one of the things that indicate the success of the organization is the percentage of members who belong to the Association. Another is the financial structure that guarantees the performance of what you say you will do.

In our particular case we have 92 per cent of the employees as members and have kept that number almost level for six years, and membership is not compulsory. Ninety-two per cent means almost 100 per cent because there are always a certain number of applications in the mail and our membership becomes effective following the first or fifteenth of the month. I would say it would run 98 per cent if we had the applications listed that are always in the mail.

The success of the Association might also be measured by your financial difficulties or the lack of them. In our particular case we have operated for six years without changing dues, and we started out with the intention of operating so that the dues would equal current cost. After six years we have a \$7,000 balance. We feel our rate was a pretty good guess.

Mr. ALLEN: We have been told in our Association that it would not be a success in any sense of the word if we had a 100 per cent membership. In other words, the life of your Association is to have a new knocker or a few people who do not see the benefit of the man at all. If every man is a member the interest sort of dies down and it is not as active and strong as it would be otherwise. For that reason we have never urged that our membership be 100 per cent. We have never made

any extraordinary effort. The ones who want it come and ask for it without being solicited. If they are ever solicited it is only through their work.

We feel that our Association is a success because of the 88 or 89 per cent membership under those circumstances and we take up any activity that any organized group of employees would take up or that they may wish to take up and that activity is paid for entirely through the funds of the Association. That covers everything from baseball and all sorts of sports to education and lectures, entertainment, everything imaginable.

We do what the group wishes to undertake and we feel that because they do take up so many of those activities (and they are usually a success) that our association is a success.

I might mention that we have an employees' representative council in our plant. The directors elected by each of the different departments constitute the representatives in this council and they act for their shop mates both in the Association and in this workmen's council and also in our safety council. The director is "some punkin" in the department.

CHAIRMAN MACPHERSON: We agree with the last speaker on the subject of lining up men. We set up a little resistance to joining by charging \$1 admission fee. That has nothing to do with the dues but we charge that \$1. We find that the fellow who decides not to join and happens to get sick and is sick for six or seven weeks without any benefits, becomes a very fine salesman for the organization in the future.

Each Man Should Be Sold on the Merits of the Association

G. A. DOELLER (Dayton Power & Light Company, Dayton, Ohio): When we employ a man, the employment office doesn't feel that it is really functioning in its fullest capacity if we haven't sold the man the merits of our Benefit Association.

It is rather pitiful when a man doesn't belong and is not in a position financially to take care of his obligations, and who shortly after he has been employed by your company is taken sick and is sick perhaps for six or eight weeks. We feel that we have not done our duty in the employment office if we have not sold him on membership in our benevolent association.

We do not have a compulsory method but in nearly all cases we put the matter up to the new man in such a way that we generally get his application.

MR. ALLEN: It seems to me if the employment department points out all the advantages to the new man he is going to do most anything to get the protection.

GEORGE E. BARLOW (Welfare—Olds Motor Works, Lansing, Michigan): May I ask what is your age limit for a member?

CHAIRMAN MACPHERSON: We have no age limit. Is there someone who wants to say something on that?

MR. RIDDLE: May I give you our experience? Our age limit is 55. Between the ages of 50 and 55 we have them pass this special rigid examination, and I feel that the success of our organization has been the keeping of the average age, the average age limit at 43. That is the insurable age, that doesn't mean the age of the man, that means the premium age. Thirty-five is the average age of the individual. When a man reaches his fiftieth birthday he has to pass a special physical examination.

N. F. STALEY (Goodyear Relief Association, Akron, Ohio): I would like to tell you a little about our relief association during the past 17 years. We have accumulated (if you want to call it a surplus) at the present time about \$123,000. We have been paying \$12 a week for Class A members which includes men whom we hire up to the age of 50. Men whom we hire over the age of 50 we rate as Class B and pay them \$8 a week. Class C are women and we pay them \$8 a week for ten weeks. The other two classes get benefits for 16 weeks.

Total Insurance Carried of Over Twenty-Six Millions

About two years ago we amended our rules and regulations to no pay for the first week and during the first 18 months of that time we ran a deficit of \$10,000. We pay where the state pays, regardless of whether the injury happens in our shop or outside the shop. We pay for it anyway and I think that is quite a drawback, because when a man is injured and gets paid by the company and the state too it has a tendency to foster malingering. The big thing that we are up against is our Class C, the women. We have run a deficit on those people ever since we took them over in 1917. This year I believe it is going to run something around \$2,000. Up to the present time we have been doing the best we could but we have made an amendment to our By-Laws whereby we are going to raise the dues on the women, making them pay the same as Class B, and we think that will wipe out our operating deficit.

We have enough money coming in on our securities to offset the deficit and I believe we are going to make a little net profit. Our investment must earn in order to cover the operating cost. The insurance is furnished by the Goodyear Tire & Rubber Company. That has nothing to do with the relief association any more than if you should join our association and we should make you a present of \$1,000 insurance and pay the premium.

At the present time we have what we call service insurance. That is where men have been with us for long periods of time. Our total insurance at the present time is over \$26,000,000.

Now that is not all paid by the Goodyear people. We have what we call personal insurance, or extra insurance, that the men can purchase at a very small rate, \$5.40 per thousand a year and quite a few have availed themselves of that opportunity. I think we have something like \$4,000,000 of personal insurance but the balance of it is paid by the Goodyear Rubber Company. The \$9 a year that the men are glad to pay, covers sick benefits for 16 weeks at \$12 a week.

We saw where we were going to run a deficit for paying the first week and we took it up with the men. We have, by the way, the industrial representation plan in our factory and you not only have the individual member to deal with but you have the industrial service to deal with. We took it up with some of those men and we finally did get it down where we didn't pay for the first four days, and that has saved us in the last year, approximately \$7,000.

We also have a clause that we must be notified within six days of a disability. That can be changed by the trustees. For instance, if a man is seriously ill he can not notify us at once but within a six-day period he usually can notify us, or some member of his family can do so. That rule, of course, is very flexible and I would like to hear from some of the rest of the Mutual Benefit Association men on notice of disability.

Our experience has been that some of the men will leave their work regardless of whether they are taken from the payroll, go away possibly the length of five or six states and come back at the end of three or four weeks and bring a doctor's certificate indicating illness during that time. We know we are getting stuck, but we can't help ourselves because we do pay on the doctor's certificate.

A Waiting Period of Thirty Days

Also we have a waiting period of 30 days. However, that does not affect the insurance; it is effective right away. We had one man who had only worked two hours and a block flew over and killed him, and of course, his family was paid \$1,000.

There was a time when we let them work three or four months before they were told about the insurance but that was a cumbersome way of getting men and it kept an extra solicitor on the work. So now we take them as they come through the labor bureau and we write them up right then and tell them the benefits will not be effective for 30 days. We charge \$1 initial fee. Every man is examined by a physician when he comes in and his physical condition determined at that time. But the thing I am interested in hearing is what is your experience with your women employees.

MR. CLOSE: The last speaker has raised the question which has bothered us more than any other one thing in our Benefit Association experience and that is the employees being sick and failing to give proper notice. We have a rule that a man must give notice within 10 days if he wishes to draw insurance, but as a matter of fact we can't enforce it. If a man is really sick and we know he is sick, even if he didn't give notice, we sometimes threaten him and tell him we can't pay him. We tell him the insurance company may turn him down. But as a matter of fact we have always paid those claims on delayed notice if they are bonafide sick claims and I don't believe there is any way of getting out of it.

The only way to do is to emphasize it in any way you can in your plant publication and through the board of directors, having them empha-

size it with the men in their departments; but after all if a man is really sick you are going to have a heart and you are going to pay him. It is a very serious problem and one that causes a lot of inconvenience and trouble.

If anyone here has found a way to solve the problem to really secure prompt notice in every case, I want to hear from him.

CHAIRMAN MACPHERSON: You will find that question is listed here on our program as number five, "How we check up on our disability cases," and I hope your question will be answered then.

I would like to move on to number four, "How can one determine the proper basis for membership dues?"

Now let's get that question in mind. I don't think the question means how much do you charge in your Benefit Association, but how to determine the proper basis upon which to make the charge.

Study of Other Associations Valuable

You will find when you have studied and discussed Benefit Association work, that one charges one price, say 50 cents a month or 50 cents a week, and somebody else charges some other amount; there are so many ways, we would have to get out our note books and take notes to remember them all. It all depends, of course, whether or not life insurance is included in your plan. It depends on whether or not you start paying benefits after the first week or after the first day or after the fourth day or some other period. It depends also upon whether or not the workmen's compensation cases are included. I think the money charged should not be included in this question. How can one determine the proper basis? I suppose the answer to that by a good many people would be, tell the actuary the kind of association you want to set up and then let them tell you the rate to charge.

In our case we went to three companies that had Benefit Associations; they had had them a long time. We found out what the amount of lost time was on account of sickness. In those companies we found sickness beyond the first week (which was what we wanted) amounted to 1.03 of the total working time. In other cases it was 1.06 and in another case it was 1.01.

We made a guess that our employees were just a little bit healthier than that. We guessed that we could charge dues based on one per cent of the benefits to be received. Then we distributed that cost to the men and to the company. The employees paid two-thirds of the benefits and the company paid one-third. When the rates change, that proportion still holds good. In six years we have not had to make a change.

Our scheme was to find out the amount of lost time and then base the dues on that estimate.

Now perhaps somebody has a better method or a more scientific scheme for determining the proper basis for dues. We would like to hear from you.

MR. JOHNSON: We guessed at it in this way. We tried to figure what

the lowest paid worker in our plant would consider. We guessed it 15 cents and it has always stayed there.

CHAIRMAN MACPHERSON: When you say 15 cents that has to be related in terms of what you pay, of course. For instance we pay from 75 per cent to 100 per cent of full pay for a period of 52 weeks. Most of our advisors told us that that method would cause malingering, but our experience has been quite the contrary.

MR. JOHNSON: Isn't it a fact the cost to the member is based entirely on the amount of money you pay back to him? An insurance plan as given to us by outsiders was based on the amount of money we had to pay outsiders and was paid on the amount of money we had to pay back to our group plan plus their overhead as mutual companies.

We took our record for 25 years and took their records on group insurance over an average insurable age about which I spoke a minute ago. In addition to that we figured we should have a certain backup to offset. Most of the smaller organizations' plants are in one place and the risk is all in one place. That meant that in the case of a catastrophe, a whole group would be wiped out and we figured that the success of our larger organization would be still greater if we combined the various works in the various states under this insurance, thereby spreading the risk; so I can say again that our cost to the member is based entirely on what we have to pay to the member or to those who have become sick or who have died in the meantime. And also by the figures of the actuary writing group insurance.

How to Check Up on the Disability Cases

CHAIRMAN MACPHERSON: On this next question, "How we check up on our disability cases," I think there will be a lot of discussion and questions.

DR. H. E. ROBERTSON (Norton Company, Chippawa, Ontario, Canada): We have about 225 men in Ontario under this plan. We find that it is very profitable to employ a trained nurse. Our By-Laws stipulate that a man must notify us within 40 days when he is sick. But our employment department makes up a list every morning showing the men who are absent. The first day the nurse will not look a man up but when he does not appear on the second day, the record will show that there has been a second day off and if she finds that he is sick she will render whatever service she can. By the time it gets to the fifth day, if he is not able to make out a disability slip she will make the slip and turn it in to the secretary.

Every now and then a man neglects to turn one in and it has been our custom when we find a man that has neglected to turn it in through some cause or other, to try to read the "Riot Act" to him.

We have our directors' meeting every Thursday night and we make it a point to bring him in and find out just why he failed to turn in his slip. In that way we throw a scare into the man and we find it is mighty good advertising. We get him up there, get his story and then,

of course, our By-Laws leave it up to the board of directors whether or not we can give him benefits. We put it up to the board of directors.

Then again in our annual meetings or semi-annual meetings we continually drum upon that subject of disability. It is really a process of education because while 75 per cent of your men may be steady you still have the new men that are coming in all the time, who do not know anything about the rules of your association and it takes time to educate them along those lines.

I will say in connection with the nurse's services, we have found it very beneficial. We have eight directors in the association spread out in the shops among the employees. We find that if we cooperate with the foreman who is vitally interested in the man being on the job, we get somewhere with the training. We have 30 or 40 men really tracing or training the new men all the time and in that way we keep down the malingering to a very great extent and find it very easy to operate.

Notice of Illness Must Be Given Promptly

We have a clause in the by-laws, "No benefits paid unless notice has been given within six days." Our organization is now on its second year. Since the day of organization we had over 30 per cent of the men and have had continually, for the past year 95 per cent and have also been a financial success.

One thing we have had since the first day of our organization: the fellow who don't report his disability until he is ready to collect his benefits does not get the benefits. We check up in this way. We made every foreman a member of the board of directors in the different departments and had them report all of their men that were off and the cause for the absence.

To show you how far some of them will go, we had one man who had been off 14 months and he wrote in for benefits. We had never had anything like that before. This fellow had gone six or seven states away and then made his claim. We have prided ourselves on the fact that we have always paid the benefits the second week after the man has been disabled and made all the further payments until he returned to work. We make the payments every two weeks and all of those fellows who did not report within the first six days, had to wait until after a regular period, until after the meeting of the board of directors, unless the men were in bad financial circumstances.

MR. JOHNSON: We haven't had a case of that kind in five months. I think it is due to the fact that we have a clause in the by-laws which states that if we are notified within three days they will receive compensation but otherwise the disability will not begin. It begins only on the date on which it is received by the secretary of our association.

Of course we do not pay for the first seven days' sickness or accident. If he is off seven days and we get the notice on the seventh day he would draw benefits on the eighth day but if he doesn't get his notice in until the tenth day he has lost three days.

Another clause we have is that no employee or member of the association dare leave the city in case of accident or sickness without first notifying the secretary, and that case will be brought up at the next regular board of directors' meeting. He may secure permission to go if he leaves the address to which he is going and keeps the secretary informed that he is away. Unless he does that religiously he will not be eligible for any benefits. We have had very good success with this plan.

We had a case of one of our girls going away to a resort in order to rest up. She had had a nervous breakdown. She reported to the secretary she was going to be away for six weeks. The secretary reported it to our company doctor who also called her in and talked to her. It was brought up before the board of directors when she came back at the end of 10 weeks and she reported back to the secretary and the secretary reported to the doctor who talked to her again, and the benefits were passed upon and approved.

I think enforcing those measures has done more to get our employees to report their sickness and accidents than any other one thing.

CHAIRMAN MACPHERSON: The point of view seems to be to make the Benefit Association an insurance company and puts the burden on the members. I wonder if we should not consider it as a service department of the company and that it might take the initiative and go out and try to serve the employee who is sick.

A Membership Committee Visits the Sick

If the employee is sick we go out to see him. The membership committee selects a man to go or maybe several will go and they will help him fill out his form of proof of claim, and see that it does get through properly and promptly. Do not misunderstand me, this isn't a professional visitor or a nurse, it is a member of the committee selected by the employees for that purpose.

C. H. WHITEMAN (The Mathieson Alkali Works, Saltville, Virginia): There is one point that makes a different condition at different plants. One of our troubles is we have several hundred foreigners. We have several hundred colored men employed. The ordinary American white man will understand the rules and will be very glad to comply with them, but it is a tremendous job to get the foreigners and colored men to take any responsibility on the thing at all. We do all we can in every possible way to help the fellow fill out his notice when he is sick but we have some 38,000 or 40,000 men and we can't get reports every day, not oftener than every week or every two weeks through our employment department to know when men are off.

We have a nurse we send around but, of course, if we don't know the case we can't send the nurse around to investigate it. That is the particular problem with us, these groups of people who are not educated in American ways of doing business and who don't seem to care to learn.

CHAIRMAN MACPHERSON: One scheme that sometimes helps a little is

to have the reports go to the office and a copy of them sent to the Benefit Association and someone there goes through them every day to make sure that none who are off duty on account of sickness are overlooked.

MR. PATTERSON: We have a bonus system in our plant that requires each man when he is off to notify us the same day or his bonus for the month does not stand. That bonus averages 17½ per cent of the man's monthly wage and it is quite an item. If a man does not report the first day he is off, his bonus is delinquent, so that helps us to keep in touch with all our men.

MR. STALEY: It is all well and good to have these rules and say that we won't pay if they do not notify us, but if a man is down and out and you know he is sick and he brings you the credentials that he is sick, I think that fellow should be paid absolutely whether he notifies you or not.

A Little Trouble Will Develop Once in a While .

Of course, we have a little trouble once in a while with a fellow that is beating you and he even boasts about it, that is hard to handle. We had a case of a girl who went out of the state and had a doctor from the Goodyear people to take care of her on the side and when she made that claim we had to pay her the money. Those are the cases I would like to know how to handle.

CHAIRMAN MACPHERSON: We have that problem to some extent in our association, but they know we will pay the benefits. We have heard of companies that wouldn't pay benefits unless they were notified by a certain date, but there aren't many who enforce such a rule and consequently we do not have such a statement in our rules.

On the question of malingering, whether or not some outside doctor states it is a bona fide case, our rules provide that when there is any question, or the membership committee refuses for some reason to sign the proof of claim or when any officer of the association refuses to approve it, that case is referred to the committee of employees who have final decision.

Our experience has been that the employees who are interested in running this association are very hard boiled on the subject and we haven't found a malingerer they let get by. Since this plan was instituted we have had only five cases where the employees' committee has recommended "no benefits" and a case like that now and then has a very wholesome effect.

MR. WHITE: I think the chairman has hit the keynote when he says that we should look upon the association as a part of the service division. Also the gentleman from Canada in the plan he outlined said practically the same thing.

At the multigraph company we know that sometimes we are being beaten by a malingerer. It can't be helped at times, yet if it is going to be a mutual organization in fact as well as in name we have got to consider in our estimation that it be part of the service division work to see that these men and women are taken care of.

We have our board of governors, composed entirely of employees out in the plant. We tell them if we can be of service to call upon us, but they prefer to run it themselves.

CHAIRMAN MACPHERSON: I have heard frequently that we are being beaten by malingerers and I have never had any statistics. In our company we picked out one division with 1,000 employees, appointed a committee consisting of both management and employee representatives, and had that committee analyze every single case of sickness for one year in that group of 1,000 for the purpose of finding repeaters or finding cases that could possibly be classed as malingerers.

That committee could not find a single case where they would even suspect malingering. Every case was checked up by someone close to the employee or by going to the family or the doctor, and they were not able to find a single case. We have had several cases where the employees have recommended discharge and no benefits. We have three cases within the last two years where the employees' committee has suspected malingering and where the company had to take a stand and prove the employee was entitled to benefits.

The Follow-Up System Prevents Malingering

MR. ROBERTSON: I believe if you have a Mutual Benefit Association you have to make it a part of your organization. You have got to follow up the production and where you have a large number of men or in plants where you can not have a trained nurse I think the followup system is certainly a wonderful thing and it can be handled through these committees. I have seen it worked out in other plants. I know how it worked in our plant. We have never had a case of malingering, due to the fact that we have had this followup system.

You should have a large number of men on these committees and if they discover any malingering it is up to the board of directors to disallow such claims.

DR. WOOD: When these employees make these investigations do they do it on company time and if so is there any special arrangement made for replacing them while they are away, or how do you manage that part of it?

MR. ROBERTSON: As this other gentleman stated, we work through committees. Each department has a committee according to the number of employees. They have a committee of one, representing about 15 employees and if that person can not call on the sick person the first night or the second night we have to send someone else because we must have a report not later than the second night. Of course, we look up all we can but it is simply a check, and they go on their own time.

We figure they are interested in the association to the extent of going to see this sick person and we have a rule that they may spend any amount of money up to \$3 for flowers, food or something of that sort, providing they have reasonable belief that that person is sick when they start out.

There is one little thing I would like to ask. How many accept a doctor's certificate as final proof of the sickness? We put that thing up to our board of directors. We believe there are some doctors who are not absolutely honest and ethical, just the same as other people in business, and we put it all in our board of directors' hands in case there is any suspicion of the doctor's veracity. We have an investigation made and sometimes we find it a good thing to do so.

LEONARD KING (Brooklyn, New York): You seem to have answered some of these questions in the same way we deal with them. We have a division in the company of about 25 bureaus. It is a gas manufacturing concern and these heads of departments have been sold on the association idea, so that they have to inform the members of the sick committee within that certain section by the second or at most the third day of sickness, and in case there is no such information given we hold the sick committee's representative in that section responsible.

The Doctor's Statement Is Not Always Final

I don't think we have under discussion the question as to whether the employee is cheating you or not. That does not seem to be very important to me. I guess all these gentlemen will admit that that is only a very small loss at least. It does not pay to take it into consideration.

CHAIRMAN MACPHERSON: Answering Mr. Robertson's question as to whether or not the doctor's statement is final: In our company it is not. The committee determines whether or not the individual is entitled to benefits. We had a case where the committee doubted the sickness and the employees questioned his rights to benefits. Then he brought a statement from the doctor, that so-and-so was absent from work on account of sickness. Then the committee called on the doctor and finally he admitted that the employee was absent on account of sickness but that it was on account of sickness of someone else.

MR. LIGHT: Our company supplies power and light and gas for the territory covering 18 or 20 towns and cities. In the cities we have perhaps two and perhaps three men that act on the board of directors, in towns or villages there will be perhaps only one.

These men are elected by the members of the association of their town or city and they have complete charge of visiting the sick, complete charge of collecting dues for their particular territory, and we find it works out very successfully. The word of those men is taken for the truth. Anything they think should be done, is done. They also send in requests for flowers and food or anything of that nature to be sent to the sick person and we find it works out very nicely.

CHAIRMAN MACPHERSON: We were asked a little earlier in the meeting to ask Mr. Williams for his observations and whether or not the so-called employees association is regarded by the employees as a company association or whether they think it is something the employees are actually running?

MR. WILLIAMS: I think the answer to that question depends on what the actual experience is in each case and how it works out for employees under a given condition.

I have been asked a great many times what the ordinary worker thinks about the plant doctor and whether they resist plant examination by the doctor. That was a question very much in people's minds several years ago and I kept my eyes and ears open and I found it all depends upon the way the people were actually being handled by that doctor. If they were handled well by the doctor they continued to believe in the system and if they were not handled well they thought it was a bad proposition; I was really shocked to find how badly handled the average worker was when he went for a physical examination.

The answer, therefore, to any of those questions is, that the worker is getting his attitude toward these things always by means of his personal experience. If he has a bad experience he is against the whole proposition and it is an idea that is worth keeping in mind.

Unemployment the Cause of All Unhappiness

The temptation of every convention is to leave out that factor of the actual closeness of relationship between those who are working out a given situation and those perhaps who have had a favorable experience, and we tend to overstress the value of that or this particular mechanical detail; so that we are inclined to say we will do it this way or that way because such and such reports a good experience from this plan, and then are surprised to find it doesn't work so well for us.

It seems to me that if you can make sure of keeping in close touch with the workers and see that time after time they are well handled, you can be perfectly sure you don't have to be bothered about any unreasonable attitude in the situation. It does seem to me in general the Mutual Benefit Association gives a tremendous service.

Of course we all know that unemployment is the cause of all unhappiness in the industrial world today. That is either the fault of the management or the industry or of the public or the ill health of the employee or by accident to the individual. And when I think of all the troubles I have heard told, told to me by workers in this country and abroad, I believe that practically 90 per cent of them are the troubles which come from the loss of jobs, either from causes over which they have no control or resulting from sickness or accident. The ordinary man who has a job and who is able to work is likely to be a fairly contented employee.

I think, Mr. Chairman, the better step along this whole line of the Mutual Benefit Association is to give more individual attention to health, to prevention of accidents and the happiness of the employees. Of course, more and more caution is being taken to prevent accidents and yet the matter of the prevention of ill health is being given no attention at all as compared to the attention given the prevention of accidents; and that is in the face of the doctor's statement that a great deal of

ill health is preventable; so I should like some suggestion that next year more attention be given at meetings like this to the possibility of the prevention of ill health as a legitimate part of the ordinary Mutual Benefit Association.

CHAIRMAN MACPHERSON: Our last topic is, "How far should the Company go in Contributing to the Up-keep of the Association?"

There are quite a number of ways of doing that. Some of the companies feel that the company should contribute to these losses and in that way make up the loss. That, I think, takes away a certain amount of incentive. There is an advantage, perhaps, in the company paying none of the Benefit Association costs and still most companies, before there was a Benefit Association, did pay certain people when they were sick and perhaps the company would be embarrassed to turn over to the association the results of their experience and make it look as if the company were trying to unload a certain obligation or expense; that is probably why some of the companies contribute to the association.

In our case, the company pays for the first week's sickness, half time for hourly employees and full time for monthly employees the first seven days. That has nothing to do with the association. After the first week the employee receives 75 to 100 per cent of his salary for 52 weeks.

The Company Here Shares in Payment of Dues

Dues are arranged so that the company pays one-third and the employees pay two-thirds. The company pays all the administration expense. So in the net result the company pays a little more than half the total expense for sickness but still when talking to the employees we talk about the fact that the employees pay two-thirds and the company one-third. We think it is a good thing for the employee to feel that he is carrying more than one-half the load.

I would like to hear a lot of opinions on how far a company should go in contributing to the upkeep of the association.

MR. ROBERTSON: Our association has, as I have stated, 225 men. We have two classes. Class A covers the employees who are earning less than \$90 a month. There are, of course, very few in that class. They pay fifty cents a month. All the others pay \$1 a month.

Our Mutual Benefit Association went into the group insurance plan and the company agreed to pay half of the insurance premium, which, at that time with about 95 per cent of the employees in the Benefit Association, amounted to \$1,600 a year, so that the company is paying really about \$800. Our dues from the association run at an average of about \$200 a month, which gives us a figure of \$2,400 per year, plus the \$800, which the company gives. You can readily figure out that the men are paying the major part of the money and the total of the claims run about \$1,000.

By that method any death benefits are taken care of by the insurance company and the Mutual Benefit Association is only paying the accident benefits which amount to \$6 a week, that is \$1 a day for industrial accidents, and \$12 per week on sickness. We find with that arrange-

ment we are above water and running along smoothly and giving service to the men which is the primary object of the Mutual Benefit Association.

From our experience it has a tendency to keep your employees satisfied and also lowers your labor turnover, which is quite an item in these days and always will be for that matter.

P. J. KORTSCH (Milwaukee Coke and Gas Company, Milwaukee, Wisconsin): Our company contributes 25 per cent of what the employees put into the fund, providing it is kept up to 65 per cent. We have clocks that the employees punch. As a matter of discipline we dock them for coming late or for missing the clock, and we never felt that that money belonged to the company, so we returned it by putting it into the Mutual Benefit Association fund at both our plants.

MR. WHITE: Our boys seem to feel that they are more on their own feet if they do not receive any cash contribution from the company. In other words they feel better about financing and operating their own project on the cash they put into it themselves and for that reason our company does not make any regular contribution. They would, however, make a contribution if we asked for it, any time. They have so stated that fact.

Employees Are Well Satisfied With the Association

Insofar as our employees are concerned they are perfectly satisfied with the way it is run.

In the group insurance, the company, of course pays all the premiums and that provides for \$500 insurance after 30 days in the service, increasing up to \$2,000 after 10 years of service. We have, in addition, the plan whereby the employees may elect to take an additional \$1,000 at a very low cost.

The fact that the company does not make contributions and that this Mutual Benefit Association is carried on by the employees has tended to create a better feeling in our company and in the plant. I would like to ask the chairman at this point whether or not we are going to have an exchange of opinion here this afternoon on the weekly or the monthly rates or dues and the weekly benefits?

The last gentleman said his dues amounted to from 50 cents to \$1 a week, or month, and that they paid \$6 a week benefits. It seems to me that there are some complications, and to get an exchange of opinion on all cases, such as death benefits and many cases that are unique within themselves, it would almost require the sending out of a questionnaire on the subject. However, if the members here feel that such information would be desirable do you think, Mr. Chairman, we could have that arrangement made?

CHAIRMAN MACPHERSON: Yes, that could be done but there has been information published on this subject and I assure you it is very complicated. It is a big subject and should be given time and thought.

MR. LICHT: It might be a good plan to exchange our constitutions

and by-laws. Then each member could be furnished a list and it could be mailed to them regularly after the information is collected.

(A motion was made that the chairman appoint a committee to go into the question and communicate with the members present at this congress, how far they would be willing to go and how much they wanted to contribute in the way of financing the project).

MR. ROBERTSON: I second the motion.

MR. H. JOHNSON: I want to offer an amendment to that resolution. I like the idea of the exchange of constitution and by-laws. That would give us just exactly what we want in the way of dues and benefits, but it might help all of us possibly to help our own association if we could get some of the good things out of our constitutional by-laws that we don't have time to note as we talk about them here in this meeting. If such an amendment is in order I would like to make it.

(The amendment was accepted.)

CHAIRMAN MACPHERSON: Any further discussion. I would just accept a modification if I may. There are 6,000 delegates at this convention and I do not feel we could ask the various companies to send us 6,000 booklets. I am going to ask the people here who desire such an exchange of information to notify me after the meeting and we will put them on the exchange list and try to get this information for them from all of the Benefit Associations of the companies.

(The motion was passed unanimously.)

CHAIRMAN MACPHERSON: We have gone through with the list of subjects that were scheduled for discussion today. Has anyone any general question or statement to make on this subject?

Problem of Incorporation in the Small Association

MR. LICHT: I would like to ask if any of these smaller associations have found it necessary or advisable to incorporate? Our association is studying out that problem now and we haven't quite decided but we feel as though we must do something before long because if any of those funds were misappropriated the directors would be held responsible.

CHAIRMAN MACPHERSON: We contemplated that very question and took the matter up with our attorneys who recommended that while the association should operate independently, still the recognition of it by the company and by the board of directors should make the Benefit Association a department of the company and that covers our incorporation. The Benefit Association legally is a department of the company.

MR. COON: This is not in strict accord with the discussion right now but the question has been asked as to whether it is a general practice with the companies to set aside time for the directors' meetings.

In our plant the Benefit Association has been in effect a very short time and no provision has been made for that proposition.

MR. SLOAN: We have an association controlled entirely by the employees, while we have the undivided support of the company along

with it. We employ, when we are in full operation, about 1,800 to 2,000 men. We have about 50 per cent of them in membership. Our dues are \$1 per month. We have accumulated about \$1,100, possibly \$1,200 in a period of four years. We pay \$12 a week for sick benefits, \$12 a week for accident, and the accident benefits start after the third day and the sick benefits after the first week off.

Our relief association is incorporated under the state law of Ohio. Our board of directors is elected at our annual meeting for the election of officers. We have a president, a secretary and the board of directors, consisting of nine members.

The board of directors passed a resolution on a motion that any director failing to attend is fined and each director is paid for those meetings by the relief association out of their funds. Each director is paid \$3 a meeting for attending. Of course we are a rolling mill, and rolling mills never operate after 11:00 o'clock Saturday morning. That is the way our association is run and we have been very successful in four years.

CHAIRMAN MACPHERSON: It would be very presumptuous for me to try to interpret the attorney's decision but I think the company would back up any controversy by a member suing the association or for any other situation that might come up.

MR. STALEY: Our relief association was incorporated as a separate association for the relief of sickness and accident and it has been operating very successfully. The company has nothing whatever to do with the management of it. The directors are all elected from the membership and we really try to keep executives from being elected on account of the effect it might have on the membership at large.

Does the Association Pay An Income Tax?

I would like to ask what some of the associations have been doing in the way of income tax, whether they have been paying any or not? That is a question that we have been up against for several years. We haven't paid any yet but we didn't know whether we should set aside a fund for it or not.

MR. RIDDLE: We have been organized for 16 years and have paid no income tax. We are not incorporated. We feel that we are a relief association whereby all money paid in by the members is payable back to the insured. Therefore, we do not come under the state commission of the state or the other association. If we incorporated we would have to lay down certain specific rules that we would have to live up to.

Previous to the war we had paid no income tax and after the war the Government sent on some men and notified us that there had been a special tax placed on relief associations, that this law had been put on the statute books of the United States Government and that we were compelled to pay a certain tax per member for a period, I believe, of three or four years. We went back and pleaded our case and we have

been notified that anything we do so long as it is not for profit is not taxable.

C. W. ALBRIGHT (Morgan and Wright Company, Detroit, Michigan): I will say that in Michigan the general incorporation law passed by the legislature in 1921 provides specifically for the incorporation of non-profit Mutual Benefit Associations. This gives the advantage of naming the association legally to handle all money and to own property and to sell it. That is necessary to carry on the business and does not involve any elaborate, technical organization or responsibility which would be embarrassing.

ADJOURNMENT

Food Section

New Officers of the Section

CHAIRMAN: VERN D. SUTTON

Postum Cereal Co., Inc., Battle Creek, Mich.

VICE-CHAIRMAN: F. A. HASSE

Corn Products Refining Co., Chicago, Ill.

SECRETARY AND CHAIRMAN MEMBERSHIP COMMITTEE: A. H. WEIDENMANN

Casualty Reciprocal Exchange, Kansas City, Mo.

Committees

PROGRAM: F. A. HASSE, Chairman

Corn Products Refining Company, Chicago, Ill.

STATISTICS: RALPH E. PROUTY, Chairman

Aetna Life Insurance Co., New York City.

POSTER: A. C. SELMON, M. D., Chairman

Kellogg Company, Battle Creek, Mich.

ENGINEERING REPRESENTATIVE: THOS. S. STROBHAR

Wagner-Taylor Co., Philadelphia, Pa.

EXECUTIVE COMMITTEE (The Officers and)

H. T. EGGERT

National Biscuit Co., New York City.

ALEXANDER DIENST

National Sugar Refining Co. of N. J., Long Island City, N. Y.

STANLEY H. KERSHAW

National Safety Council, Chicago.

October 26, 1926

VERN D. SUTTON, Chairman

Safety Supervisor, Postum Cereal Company, Battle Creek, Mich.

THE Food Section of the National Safety Council convened in Parlor "D" of the Book Cadillac Hotel, Detroit, Michigan at 9:30 o'clock, Mr. Vern D. Sutton, safety supervisor, Postum Cereal Company, Battle Creek, Michigan presiding.

CHAIRMAN SUTTON: Well, gentlemen, the first session of the Food Section of the National Safety Council will come to order.

We are very glad to see so much interest manifest in the new Section.

PURPOSE AND SCOPE OF THE FOOD SECTION

Vern D. Sutton, Safety Supervisor, Postum Cereal Company,
Battle Creek, Mich.

Ellis Parker Butler, in his very amusing story, "The Great American Pie Company," tells of a couple of old codgers following the occupation of delivering pies baked by their respective wives. Meeting one day with their baskets of wares, they fell into heated argument over the competition each was creating for the other, but finally decided that more profitable than fighting would be to combine their interests and control the market for home-made pies in their village. With control of the market they could raise their prices, and with the extra profit buy up the fruit in season which came into their town, and thus eliminate competition of the commercial bakers.

Following this they might corner the entire fruit market and prevent the manufacture of goods to be shipped in by outside bakers. To prevent overbidding by bakers, canners, and fruit and produce men, they would buy up the orchards and farms and hire the farmers to run them. This would give them control of the wheat as well, and they would have to buy up the mills for grinding the wheat, the lumber and cotton industries for making boxes, barrels, and bags, the railroads for transporting their goods, the steel mills for nails and railroad iron, and ultimately the state legislatures and Federal Congress.

In organizing a Section of the National Safety Council for manufacturers and distributors of foods, we found ourselves with almost as limitless prospects before us as the pie merchants of Mud Creek, Indisourl. All Sections of the Council are closely affiliated with the subject of "Food," because this is vital to life itself and the major part of life's activities center about it.

Take food out of transportation and that industry would find its business greatly curtailed. The Steam Railway and Marine Sections, therefore, are eligible to the Food Section.

Much food distribution is by automobile, and because of this and that customers must be brought to points of distribution, we also welcome the Taxicab and Fleet Owners Section, and the Electric Railway Section.

To provide vehicles for delivery we gladly include the Automotive; and to provide tires and gasoline, also the Rubber and Petroleum.

Our foods must be prepared by heat and we open our doors to the Public Utilities and Mining.

We must have buildings to house our distribution points, and therefore Construction, Cement, Quarrying, and Woodworking are joyfully embraced.

And so we might go on, including Health and possibly, for obvious reasons, Rehabilitation, and all other sections. At any rate, friends, members of all Sections are royally welcome to the Section of Food Manufacturers, Distributors, and, to be more comprehensive, Consumers.

But if our interests are so interwoven with the other Sections, why separate ourselves from them? Because, while our topics are of interest

to them and their topics of interest to us, we may have topics not applicable to them and they have had topics not applicable to the manufacture and distribution of foods. During past Congresses of the National Safety Council, your speaker has found it necessary to try to spread over so many Sections that he ultimately was too thin even for pancake batter.

I would visit the Automotive Section, for instance, to hear a discussion of "The Value of Statistics," and at its termination the next speaker started to talk on "The Hazards of Spraying Bodies." Now we are dealing with the inner portions of bodies, and Duco finish and like subjects are of greater interest to us when we are seeking our new chariot and flirting with the temptation to lay safety aside and step on it out on the highway.

In the Mining Section "The Display of Posters" enticed me into the meeting, but the succeeding topic, "Blasting" frightened me out. If we were brides instead of representing experts in food preparation, we might care to know something about blasting.

In the Metal Section, "Shop Committees" was decidedly appropos, but "Foundry Hazards" did not aptly apply, as our moulding is more likely to be done on a moulding board.

It Is Now Possible to Be Mutually Helpful

So it is readily perceived what agility was required in order that a delegate might hear two or three papers of interest during a session. By having a Section devoted to the Food Industry it should be possible to have all topics on our program of more or less direct interest to all delegates from food manufacturing and distributing concerns.

It will be possible also to be mutually helpful throughout the year by pooling our problems and exchanging ideas. One of the ways in which this can be done is the news-letter. Now, a news-letter is not a book written by the president or secretary, or one versed in letters; it is the views of all members who are sufficiently interested to take part in the discussion, and unless there are contributions from a large number it will be worthless.

We have issued four news-letters, inviting responses in each, and have received just three letters contributing matter to be incorporated, one of which arrived just as I was leaving for the Convention. I'm sure others had something to say, but why didn't you say it? During the coming year I hope you'll say a plenty.

How about the posters of the National Safety Council? A lot of them are not good for the food industry; isn't that right? They will be glad to publish some that are good. What are your ideas for a poster? The Section ought to be able to help the Council get out some fine food posters.

There are many things in which we can help each other. If organization has made possible the great safety movement in industry, in public and in the home, why will not organization of those whose interests are more specifically the same, make possible great achievement in safety among those engaged in the manufacture and distribution of food?

I am going to ask Mr. Wiedenmann to speak along the same lines on "The Purpose and Scope of the Food Section."

DISCUSSION OF THE PURPOSE AND SCOPE OF THE FOOD SECTION

A. H. Wiedenmann, Casualty Reciprocal Exchange, Kansas City, Mo.

Having been associated several years with an insurance institution specializing in only a few industries, all of which with the exception of two, might be classified under the "Food Industry," I have felt the need of a Food Section in the National Safety Council to stimulate the industry's interest in accident prevention.

It may seem strange to those present associated with the food industry, but there are still an enormous number of food manufacturers, large and small, who have an alarming number of accidents, but consider them inevitable or not preventable and take no action to eliminate them. They feel that insurance will make amends for their neglect to preserve life, limb and property. Incidentally these concerns are working hardships on others in their industry as well as themselves.

Wherever our engineers can tactfully do so they recommend membership in the National Safety Council. In the past when the benefits of the Council were outlined a large percentage of our policyholders have felt little good could be gotten out of it because there was no Section to fit their particular needs.

Now comes the establishment of the Food Section, and I feel confident that as soon as we can get the news of the Section broadcasted among the industry generally we shall have one of the largest and most active Sections in the Council. I have some ideas for advertising the Section and feel that if everyone present puts forth his best efforts toward this end, our ambitions will be realized.

I feel statistics can be gotten for the different industries which will bring to light many safeguarding methods not heretofore used. In my experience I have seen hazards which were believed beyond correction for lack of methods. I have even made some suggestions which, perhaps, were not at all practical and have had the engineer explain to me how impossible it was to guard the hazard. And then I have seen this same engineer get a vague idea out of my impractical suggestions and eventually work it into an effective safeguard.

Experience of this kind means only one thing, and that is that each of us may be the means of bringing to these Congresses ideas and suggestions that can help in the solution of problems for somebody.

CHAIRMAN SUTTON: There may be some little discouragement because of the limited representation we have, but it is pleasing to know that we have a larger representation than the National Safety Council anticipated. That is evidenced by the fact that we are over-crowding our room.

In order that we may be well acquainted, I want to say that Mr.

Wiedenmann, who has just spoken, represents the Engineering Department, Casualty Reciprocal Exchange, Kansas City, Missouri; he has been one of the members of the Steering Committee and has rendered very splendid service in organizing this Section.

Another member of the Steering Committee is Mr. Strobhar, Wagner, Tayler Company, Philadelphia, Pennsylvania. I am going to ask Mr. Strobhar to express his ideas along this same line.

THOMAS F. STROBHAR (Wagner, Tayler Company, Philadelphia, Pennsylvania): I did not hear all of Mr. Sutton's first remarks, but I listened to enough to find out he was describing this as the National Safety Council meeting and that all the other sections are subsidiary to ours.

We were presented with a long list of members of the National Safety Council who possibly might be interested in the Food Section. We had expressions from a number of them apparently not being in favor of organizing a separate section. Those letters I believe came mostly from the packers and tanners. They seemed to think that we were trying to take food from them.

We have received one letter, however, from a Mr. Snyder who is with the Griggs Cooper Company of St. Paul. I am going to read a letter that he wrote in, because, I think that letter amplifies some of Mr. Sutton's remarks on the subject. The Griggs Cooper Company are manufacturers and wholesale grocers.

Letter From An Interested Food Manufacturer

"Your letter in reference to the organization of the Food Section of the National Safety Council received, and in answer will state that this movement has my hearty cooperation. In regard to the problem of accident prevention in my plant, I would say that we are in rather a unique position owing to the peculiar condition of our factory.

"In the first place we operate a 60-oven cracker bakery, making all kinds of crackers and cookies, from the cheaper grades to the highest in the market. The plant is extensive and very complete. Next we have a large candy factory which is also complete in every detail, making a general line of candy of every description. Then we have a complete roasting establishment, spice grinding machinery and extract department and other departments where we manufacture and pack baking powder, soda, and starch. In another department we prepare and bottle pickles and olives. In connection with this we also have a vinegar department where vinegars are reduced and put up in barrels. Then we have an extensive preserve and syrup department where we make a complete line of jellies and jams and put up all kinds of syrups and molasses.

"In conjunction with these factory units we have just constructed another building to take care of our large jobbing business which heretofore has been located down in the center of St. Paul. We have our own refrigerating plant with large coolers where we store tons and tons of raw material of every kind. We have just constructed a large garage

because we cover both St. Paul and Minneapolis with our truck service.

"You will see, therefore, from this brief resume that our hook-up, if you will pardon the term, is rather unique. We have a great deal of machinery in these various units of our factory that would possibly not be found in another establishment of a somewhat similar character. We have them all safeguarded and in our past experience have had a very low percentage of lost time accidents." (You see, that, perhaps, is why he is not here today. They are perfectly satisfied with what they are doing, but we will show them up later in the things we want to bring out.)

"In thinking over what part of our institution would probably interest manufacturers of food as safety problems"—you see, this is a news letter item he is bringing right here—"the thought comes to me that we have one thing that no doubt every manufacturer of food some way or another uses—the steam jacketed kettle, which is used throughout our plant and they are very hazardous. We have had a number of blow-ups in times past and one just recently where the bottom of a large kettle blew. Fortunately we have had no serious accidents result from the blow-ups, but if some course could be taken whereby all steam jackets could be made uniform with all popular safety facilities I believe this one proposition would be very effective in national safety work."

Now, I took the trouble to salvage that letter from among the number that we received in our steering committee work, thinking that it would open up avenues of thought and use in this Food Section from other members, and also to get those who are members and who are affiliating with the Section to go after the other manufacturers that we would like to have reap the benefit from the Section work that we are going to put out.

The Food Industry Shows Need of a Food Section

One of the other particular reasons for having a Food Section, aside from all the things Mr. Sutton brought out, is its use, its universal use. As you go over statistics, for instance, in the state of Pennsylvania, the manufacturing state, for the first six months of 1926, we found that the building and construction program showed an increase of 44 per cent in accident frequency. Food section, plus 66 per cent, the outstanding one of the entire list. Textiles, three per cent; publicity minus 41 per cent. Hotels and restaurants, plus two per cent. Metal workers, plus 10 per cent. Now, if that applies in Pennsylvania, (and no doubt it applies in other states, as well), if those interested in food show an increase in accident frequency of lost time accidents of 66 per cent, that industry needs help.

At this Congress, I believe, the Construction Section is going to ask the National Safety Council to provide a paid secretary. They are claiming that they are the largest industry; that is, that the Construction Section represents throughout the country the largest wealth and that they had the highest accident record. No doubt they do have a

great many accidents and they do need help, but when we take frequency of accidents—lost time—plus 66 per cent in one state, I know that by cooperating together in a body, exchanging ideals, helping each other, that we can not help but show something like the public utilities here show in a minus 41 per cent.

CHAIRMAN SUTTON: In order to perpetuate this organization it will be necessary that we have officers and at this time I am going to appoint a Nominating Committee who will report at our session tomorrow morning. I will appoint on that committee Mr. F. A. Hasse, of the Corn Products Refining Company, Mr. H. T. Eggert, of the National Biscuit Company, and Mr. S. H. Kershaw of the National Safety Council. These gentlemen will report their nominations at our meeting tomorrow morning.

The matter of steam jacketed kettles has been very splendidly introduced already into this meeting and we are now to know something about this subject. Mr. J. T. Morrison, chief inspector, Hartford Steam Boiler Inspection and Insurance Company, Chicago, Illinois, will speak on that subject.

STEAM JACKETED KETTLES

J. P. Morrison, Chief Inspector, Hartford Steam Boiler Inspection & Insurance Company, Chicago, Ill.

(Accompanied by lantern slide projections.)

One identified with the Hartford Steam Boiler Inspection and Insurance Company derives great pleasure from attending the National Safety Congress for we have been engaged in "Safety First" work for something over 60 years. In fact, I am confident in saying we were the pioneers in that field. Our first policy of insurance, issued about 60 years ago, and subsequent policies, carry the provision that our inspectors have reasonable access to the boiler, steam jacketed kettle, or other insured object, for the purpose of making inspection to prevent loss of life, injury to persons, and damage to property.

When the inspection work was inaugurated, the steam boiler was looked upon as the source of energy most likely to get beyond control and wreck the surrounding property, but as industries developed and changing living conditions resulted in the establishment of immense food preparing plants, in which the old-fashioned preserving kettle, which the housewife had used on the kitchen range, was replaced by vessels of much greater capacity, using steam instead of the direct action of the fire as the heating element, the safety of such equipment naturally became one which concerned not only the owner of the establishment but the public in general, as the explosion of a jacketed kettle or rendering tank was quite likely to be disastrous.

Those things having a direct influence on the safety of steam jacketed kettles, retorts, rendering tanks, and pressure vessels of most every description, may be grouped under the classification of material, design, construction, installation and operation.

The material should be suitable for the purpose intended. Many of the acids and gases which result from food preparing processes, have a rapidly corrosive effect upon iron and iron alloys, while they may affect to a less extent such materials as copper and aluminum. On the other hand, the vessel of copper and aluminum may not safely withstand the pressure which could be carried upon a similar vessel constructed of steel.

Assuming the material and design of the vessel is all that it should be, the methods of construction employed by the manufacturer may be such that the vessel is irreparably damaged, and does not possess a sufficient margin of safety when it reaches the purchaser. Such imperfections may be so concealed by other parts of the structure that they can not be detected until failure takes place. A means of avoiding methods of that kind is to provide in the specifications for rigid shop inspection by an expert representing the purchaser. We frequently encounter the excuse, "That's good enough," when material or workmanship is criticised by the shop inspector. I know of nothing which will undermine and destroy the workman's judgment more rapidly. The man who is continuously being satisfied with inferior goods because it is "good enough," soon loses the power to judge and appreciate perfect work.

A Copper Hemispherical Jacketed Kettle

You will recognize the accompanying slide as representing a copper hemispherical jacketed kettle, such as is used in the majority of food preserving plants. The outside shell of the jacketed section is exposed to stresses tending to pull the copper sheet apart, while the inside shell is subjected to collapsing stresses, which copper, as a material, is poorly equipped to resist. The small cross section illustrated, gives an idea of the manner in which the material was stretched during the process of manufacture. This reduction in thickness could not be detected after the parts were assembled, so the vessel continued in operation without its weakness being suspected, until it failed quite violently, causing the death of two men. The manufacturer of such equipment should know if his finished product possesses but one-third the thickness, and one-third the strength the material had before fabrication was commenced.

We encounter a great variety of methods of connecting up food cooking equipment. In some cases there is a safety valve on one steam line leading to the kettle, although there may be two or more such steam lines without any pressure regulating device. Again, the safety valve intended to protect the vessel from an over-pressure may be located directly on the vessel, which, in the case of rendering tanks and objects used in kindred service, is prohibited, as the contents of the tank are quite likely to obstruct the safety valve if it has occasion to operate, so future operations will be seriously interfered with, if not absolutely prevented.

The food preparing plant should be equipped with a sufficient number of steam headers, that each vessel of a certain pressure classification may

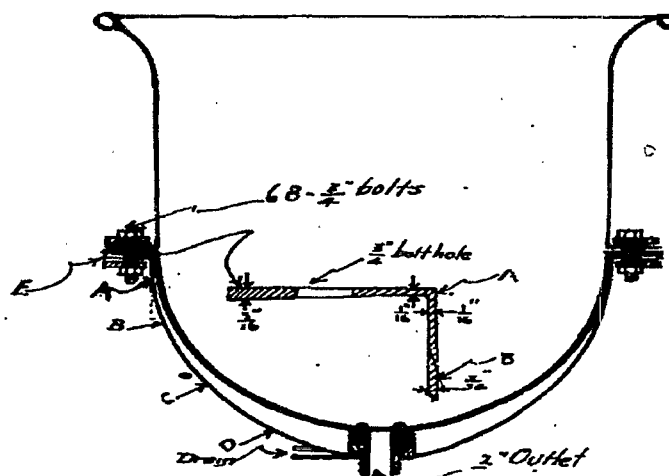
be connected to the header carrying that pressure, and the steam header should be provided with a stop valve, pressure regulating valve, safety valve and pressure gauge, of sufficient capacity to meet the requirements of all the vessels connected to it. A jacketed kettle intended for but 20 pounds pressure should not be connected to a steam line carrying 80 or 100 pounds pressure, with the thought that the attendant will regulate the steam flowing to the jacketed kettle with such precision that the 20 pounds pressure will not be exceeded, unless the branch line leading from the higher pressure header to the lower pressure object, is equipped with proper safety devices, consisting of a stop valve, pressure regulating valve, safety valve and steam gauge.

Thickness of outer shell

- A-1" below bend $\frac{1}{16}$ " thick
- B-4" " " $\frac{3}{32}$ " "
- C-14" " " $\frac{1}{8}$ " "
- D-center at bottom $\frac{1}{16}$ " "
- E-edge of flange $\frac{1}{16}$ " "

Kettle -

Copper - 500 Gallons
54" diameter x 27" deep



Drawing of a copper hemispherical jacketed kettle.

In our inspection work we are frequently confronted with the statement that a certain condition, which has been criticised, has existed for weeks or months or years, and an accident has not occurred. If such reasoning is carried to its logical conclusion, we might be just as sure that we shall never die, because we never have. I was impressed with a news item from Washington, D. C., which appeared in the daily press recently. A blacksmith is said to have had 25 years of experience at his trade, and during that time is estimated to have put on 100,000 horseshoes, which would correspond to an average day's work of shoeing three horses. He had been quite fortunate, and had never suffered injury. However, a few days preceding the date of the news item, the horse-shoer entered his chicken yard. His Plymouth Rock rooster jumped up and kicked him. The spur entered the knee between the joint and the kneecap. The blacksmith is on crutches, with the probability of being a cripple for life. So do not let anyone tell you that because an undesirable condition has existed for a number of years, it should not be remedied.

There seems to be abroad in the land the idea that steam at 80 pounds pressure contains twice as much heat, and will do twice as much work in one-half the time, as will steam at 40 pounds pressure. So the plant superintendent, anxious to increase production, and reduce production costs, is inclined to carry a higher pressure on the jacketed kettle than that for which it was intended. I have in mind the chef of a large kitchen which was equipped with a large variety of food cooking vessels, upon which 100 pounds pressure was carried, although the margin of safety required by good practice would limit the pressure to 40 pounds. In fact, one of the kettles was tested to disruption, and failed when the hydrostatic pressure exceeded 100 pounds but slightly.

The chef would not agree to a reduction in pressure, but when a pressure gauge was so adjusted that it traveled from zero to 100 pounds, while the pressure actually was increasing from zero to 40 pounds, and the regulating devices were set to control the pressure at 40 pounds, the chef was entirely satisfied. He could not tell the difference between 40 pounds and 100 pounds by results, but depended entirely upon the pressure gauge, which in this case had been purposely calibrated to deceive him.

The Incident of the Michigan Cheese Factory

Before considering seriously any plan to exceed the safe pressure on a jacketed kettle, tank or retort, try setting the pressure gauge a few pounds ahead, and see if the results are just as satisfactory. The increase in pressure from 50 pounds to 100 pounds, increases the stress in the material 100 per cent, and reduces the margin of safety by 50 per cent; while the heat contents of the steam at 100 pounds pressure is but approximately one per cent greater than in steam at 50 pounds pressure.

Just by way of emphasizing the little thought given to even primary safety requirements by some people operating pressure vessels, I would mention a recent experience of one of our Michigan inspectors. He visited a food preparing plant. As a matter of fact, it was a cheese factory. He was to make the preliminary inspection of a boiler which had previously been uninspected and uninsured. Aside from a number of defects resulting from operating conditions, the boiler appeared to be an average risk. But the inspector could not locate the safety valve. Upon inquiring of the engineer he learned that the factory inspector had visited the premises but a short time before, and that during the visit the safety valve of the boiler operated automatically. When it did so, a considerable cloud of soot was discharged from the boiler-room into the cheese making department. Quite naturally the factory inspector objected to the preparation of food in just that way. Those in charge interpreted his objection as being directed at the safety valve, and proceeded to remove the offending member just as soon as the boiler could be taken from service. They explained to our inspector that the factory inspection laws of Michigan do not permit the use of a safety valve on a boiler in a cheese factory. It had apparently not occurred

to them that the safety valve could be adjusted to discharge in some other direction.

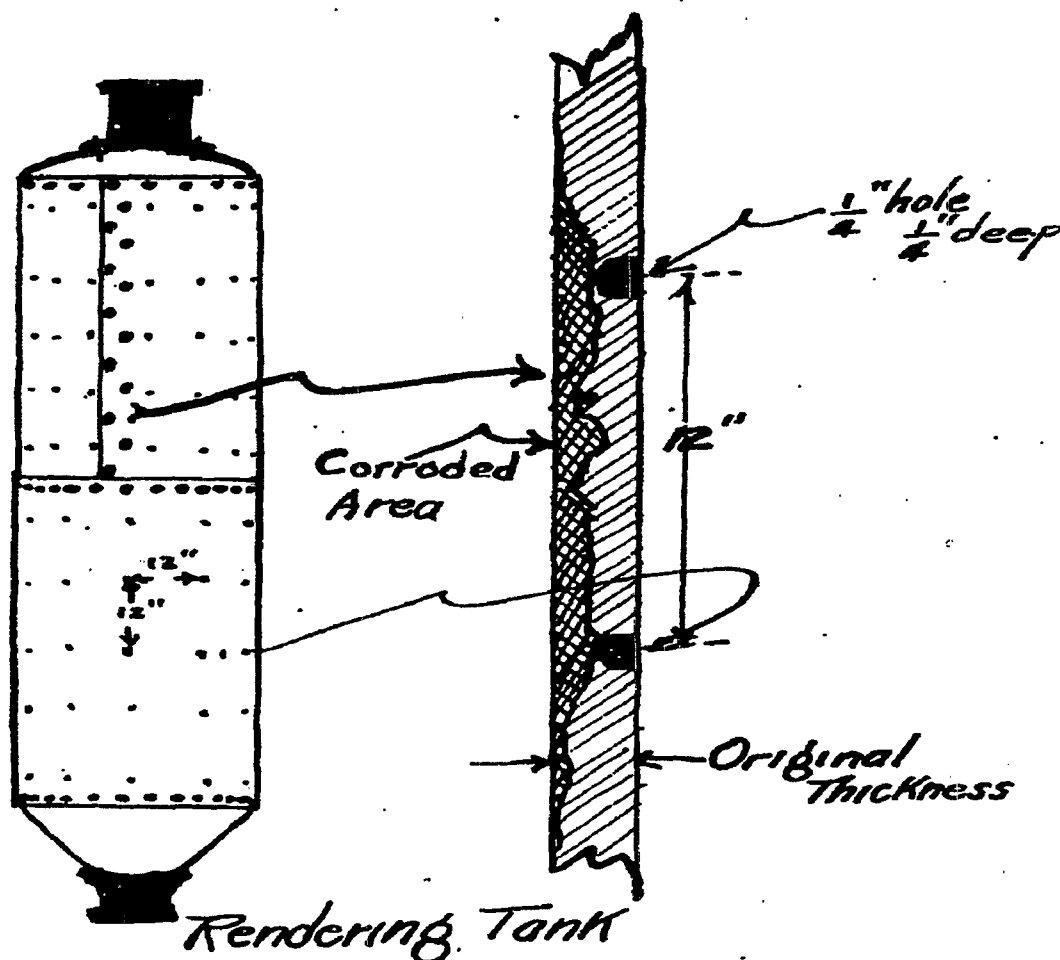
"Familiarity breeds contempt." The truth of this old saying appears to us quite frequently. The man who has observed a certain pressure on a certain vessel daily for a number of years, soon becomes of the opinion that everything is safe and serene, and that there is no cause for uneasiness. Forty or 50 pounds pressure is quite low when compared to the 1,200 or 1,300 pounds pressure now being carried in some of the central stations, but those boilers and turbine casings subjected to that pressure possess a relatively larger margin of safety than does the ordinary jacketed kettle or rendering tank carrying 40 pounds.



After an explosion in a rendering tank at St. Louis.

The accompanying slide pictures the results of the explosion of a rendering tank when carrying 40 pounds pressure. The failure resulted in damaging a considerable part of the plant, as well as in the death of one man, who was decapitated, and the serious injury of another. The investigation which followed developed the fact that the rendering tanks in the establishment had been examined thoroughly during the month of June. Several of them were found to be so badly corroded they were considered unserviceable, and accordingly were disconnected from the steam header. The tank which exploded, and the one adjoining it, were criticised, but it was estimated they could be continued in service until the first of the year, possibly a term of five or six months. The inspector understood those tanks which were immediately removed from service would be replaced with new ones, but such was

not the case. The balance of the tanks were continued in service approximately 24 hours a day, so the deterioration was twice as rapid as the inspector estimated it would be. The explosion occurred on November 13.



A vertical rendering tank showing corrosion.

It is logical that some means be devised to detect the deterioration which takes place in cooking vessels, so plans can be perfected for replacing the old ones with new before the point of failure is reached.

The third side is intended to represent a vertical rendering tank, with which our packing houses are equipped by the thousand. In the sectional view you will note the manner in which the internal surface has been corroded until the tell-tale holes have been reached, resulting

in slight leakage, to be taken as a warning of the decrease in thickness which has taken place. Under ordinary operating conditions, the tell-tale hole may be closed by a wooden plug until the "cook" is completed, and after the tank has been emptied, may be permanently closed by the use of a one-quarter inch rivet driven cold.

These tell-tale holes are one-quarter inch in diameter, and drilled one-quarter inch deep from the outer surface of the shell of the average size vessel, say 72 inches in diameter, and are located opposite the region of greatest wear, which occurs on the inside surface of the tank. This plan, with certain modifications, can be applied to pressure vessels of all descriptions, where the operation is likely to cause a reduction in thickness, and weaken the vessel.

The operation of a pressure vessel, such as a jacketed kettle, rendering tank, retort or compressed air tank, may not in every case present a hazard equal to that encountered with the operation of a steam boiler, for the steam boiler has temperature stresses, and is subjected to the changes which result from the use of impure feed water; but the cooking vessel is subjected to some temperature stresses, may be affected by acids and gases, and, in general, is operated by men having little or no mechanical training, undependable in an emergency, and properly enthusiastic in catering to the needs of the inner man. So I would urge that some competent authority be consulted when new equipment is purchased, and that you have a survey made of that now in use, to determine if life and property are being needlessly exposed to danger.

Discussion Following Mr. Morrison's Paper

CHAIRMAN SUTTON: Would anyone like to ask Mr. Morrison any questions or make any comments on this paper?

MR. STROBEAR: I should like to ask regarding the location of the relief valves on the cooking utensils. You spoke as though they were to relieve right at the utensil; is that customary?

MR. MORRISON: The relief valve and all the safety devices should be on the steam line furnishing the steam to the cooking utensil.

MR. STROBEAR: I get that all right, but perhaps the relief should blow off in the room. You were talking about the cheese factory and the boiler blowing off in the cheese room in making Roquefort cheese, which they had not anticipated. Now, the question comes from the picture you were showing and the description you indicated on that slide.

MR. MORRISON: That is one point I did not go into. I did not go that far with it. This should not discharge in any place that would be likely to injure a workman. Ordinarily those pipes are piped to six or eight feet and discharged upwards. They do not need to be located in the room. They can be located at any place. You have brought up a thought of something that occurred in Detroit not so very long ago in a large automobile plant. The safety valve on a boiler discharged right toward the man-hole of another boiler and when that safety valve blew, two men working in that other boiler were killed. Those safety valves

should discharge so that it would not likely injure anyone by escaping steam which is quite hot, but I did not go quite that far.

MR. STROBBER: I had that in mind when I asked the question. The other was the possibility of taking some legal action against the manufacturer of that kettle. Were you able to recover on account of any negligence on the part of the manufacturer when he made a copper jacketed kettle such as you described, as being one thickness in one place and another thickness in another place—one thickness at a joint or bend? I inferred that it was extreme negligence on the part of the manufacturer to make an apparatus of that kind.

MR. MORRISON: That was not done and I would say that after that had been in service a year, it would be hard to establish the manufacturer's responsibility.

CHAIRMAN SUTTON: Safety is practically synonymous with far-sightedness and in making safeguards and corrections of hazards it is always necessary, as has been brought out in this discussion, to be very certain your safety provisions do not create another hazard. We have found that very frequently.

We have another interesting talk, in fact, two more which I believe will apply more or less directly to all of our industries. The first is by Mr. G. C. Agry of the Lanson Company, Syracuse, New York.

HANDLING OF BAGGED AND CRATED MATERIALS

G. C. Agry, Special Representative, The Lanson Company,
Syracuse, New York

While I am admittedly new to this particular group meeting and its intents and purposes, I have endeavored to read, behind the actual subject assigned, the intent which caused the assignment. I have given careful thought to what form of message would prove of greatest interest to this important branch of the National Safety Council. With a desire, therefore, to give you as constructive a message as possible, I am taking the liberty of broadening the subject assigned to me and have given it my own interpretation, which is perhaps best summarized in the following rewording: "Safety in Handling Package Loads." My discussion, while particularly applicable to food plants, has many factors which have equal application in most other forms of industry. I hope the very broadness of its scope, therefore, will have a particular appeal.

Some ingenious person for convenience of memory, has divided the common forms of package loads into what he popularly terms "the six B's." They are: Bags, Boxes, Barrels, Bundles, Bales and Baskets. Of course, as particularly applied to the Food Industry, there are many subdivisions of these, and there are forms of containers in common use which are not adequately described by any of the six "B" terms, such as Cans and Bottles. But for purpose of having in mind what is meant by pack-

age loads, the six "B's" will serve excellently, and further description of packages will be given as we have occasion to make mention of them.

It will be well appreciated that the advantages of mechanical movement and handling of materials have been largely viewed from other aspects than that of safety. In the use of automatic conveying machines, emphasis has been largely laid on such important factors as, speeding production, saving in handling labor, reduction in floor space requirements, reductions in cost of manufacture and similar production and cost minimizing considerations.

Let us, however, take these four items and see how many safety factors are automatically incorporated in them. Let us do this by comparison methods.

Speeding Production

Picture a plant not equipped with modern conveyORIZED methods in which the necessity of increased speed of production has become essential. It is difficult to describe adequately all factors. Probably, however, it will be necessary largely to increase the force of laborers devoted to handling and trucking materials, raw, in process, finished product. Can any such increased handling force be used with full efficiency? It is doubtful.

If unloading platforms and storage space for incoming material have been adequate under former conditions, necessity of increasing volume of production by increased handling labor is almost certain to result in increased congestion and confusion throughout the incoming materials division. The same is true, probably in even greater measure, as concerns the handling of work in process. Aisleways are likely to become overcrowded. The injury hazard is not only increased by larger numbers of people passing to and fro for the carrying of materials, tending towards accidents due to collision and dropping of materials, but overcrowded aisleways tremendously increase the danger that not only handling labor but machine operators will be jostled or bumped in a manner so that clothing and parts of the body become caught and entangled in machinery.

Finished products in the increased volume brought about by greater speed of production must be handled into storage and out to shipment—but how? If handled by increased labor, the hazard of collision accidents along loading platforms oftentimes adjacent to railway sidings is increased; strains and over exertion casualties in finished stock warehousing operations are subject to increase, not only because of larger number of workers, but because of the haste and necessity of work under tension.

Suppose in contrast we substitute for attempts to speed production with larger man power facilities, conveyORIZED movement of material, incoming along receiving platforms and into storage; through the processes of manufacture, to and from the various machinery operations within the plant; and out to freight car or auto truck loading of finished product and into finished product storage.

Taking these in order, we shall then have for incoming material a system of conveyors arranged in logical manner along unloading platforms and into storage. The man-handling of materials will in general consist merely of placing the materials on the conveyors at the loading point and removing them at the opposite end. Peaks of handling and necessity of providing speed in movement of incoming materials can readily be taken care of by a properly controlled conveyor flow, for mechanical conveyors can be made to run at a speed in excess of the maximum rate at which materials can be placed on and removed from the conveyors. Under such conditions there will be no increased congestion or confusion in handling incoming materials under necessity of speeding production.

Similarly, conveyors for handling material in process can be arranged to give a logical flow between operations. Many times even the removing of loads from conveyors can be taken care of by automatic deflectors. Speed in production with conveyORIZED movement of materials eliminates necessity of otherwise traffic crowded aiseways. Some conditions will permit of placing conveyors on ceilings and in all events, since there will no longer be necessity of people moving about aiseways carrying or wheeling articles in process, collision, dropping of loads, jostling of operators near machinery and similar hazards will be entirely done away with.

The use of elevating conveyors for raising loads between floors, and of chutes and spirals for downward passage of material, eliminates the hazards incident to the operation of elevators for materials handling movement. Involved in this are all the well known dangers of elevator operation, the getting of loaded vehicles or hand carried loads on and off of elevator platforms and similar considerations.

Conveyors for the loading out of finished product into railway cars, auto trucks and into warehouse storage will be, for the most part, non-reciprocating. A movement of finished product by conveyors does not nominally require a return of an empty container for reloading. If such is required, returning loads are arranged to flow over a uniform, well designed and adequate pathway. The condition is in contrast to outward passing loaded trucks with returning empties and the hazards of confusion, collision and excessive strain under pressure of speed. Conveyors can properly meet any necessity of speed in handling, and warehousing operations are simplified by conveniently arranged conveyORIZED movement to and out of storage.

Saving in Handling Labor

The safety factors involved in this production item are obviously allied with those previously brought out.

There are many operations in industries which can be done only by human hands and human intelligence—plenty of such operations go around. The more we can relieve labor from performing as a truckhorse or beast of burden, the more we reduce the hazard of strain, flat feet and

casualties resulting from overtired physical condition. Reduction in numbers of material handling laborers of course reduces hazards in proportion to numbers.

Reduction in Floor Space Requirements

From the standpoint of production it is very evident that factory floor space should be devoted to machinery and manufacturing operations and not to storage of materials in process. Much emphasis in connection with the consideration of the use of conveyors is therefore rightly laid upon reduction in floor space requirements through making as large a percentage of actual factory floors available for manufacturing operations as possible. Let us consider for a moment then, what is the effect on safety factors of this improvement in use of floor space.

A plant operated without modern handling methods and utilizing a considerable portion of floor space for storage of materials in process evidences considerable accident hazard, due to materials standing about machines and piles of unfinished merchandise stored in various places around operating floors. Trays, boxes and containers of one sort or another; standing trucks, platforms and similar paraphernalia promiscuously standing about machines and aiseways increase the hazards of stumbling falls. In many plants where the movement of materials from operation to operation is dependent upon the intermittent arrival of labor, it is necessary that goods in process shall be placed in temporary storage in an unavoidably haphazard arrangement about machines and other forms of manufacturing operations, awaiting the arrival of the laborer who is to move these goods.

Such standing merchandise, especially with unavoidable lack of uniformity of location at all times, is unquestionably a fall and bruise hazard. We are all creatures of habit. Witness how successfully we move about a darkened room at night when all pieces of furniture are in their usual place, but how quickly we stumble and bruise ourselves on articles out of their accustomed location, even though we ourselves may have placed them in their new position but a few moments before. In similar manner, operators, with minds intent upon production, find difficulty in moving about floors with promiscuously placed merchandise.

Then, too, standing merchandise has an important effect upon proper lighting at machines and other operations.

Standing merchandise creates an extremely dangerous hazard when it prevents accessibility to machines in case of accident either to machine or operator.

The extent of hazard resulting from fire with piles of unfinished merchandise standing about manufacturing floors is obvious.

Again, standing materials in process are often a detriment to efficient supervision and departments operated with imperfect superintendency obviously offer greater accident hazards than do departments which, because of fully supervised orderly methods, function with standardized efficiency.

There are many other angles from which this interesting consideration can be viewed, but time permits me to stress only a few of the reasons why a consideration of methods of reduction in floor space requirements, through the employment of mechanical carrying devices, automatically improve the casualty hazards. In general, conveying machinery can be arranged to give uniformity in flow of material from operation to operation, can be placed in a manner largely to eliminate idly standing merchandise, and where storage between operations is necessary, such can be provided for in uniform manner, at definite locations where all hazards of light, accessibility to machines, fire precaution requirements, and proper supervision have been definitely considered. Very frequently, too, the utilization of conveyors suspended from the ceiling will provide a large amount of "conveying storage." I mean that goods are in storage while they rest on the conveyors; and since in the latter instance the conveyors are suspended from the ceiling, adequate storage space is provided with the merchandise entirely removed from the manufacturing floors.

Reduction in Cost of Manufacture

This is the last of the four commonly stressed production factors which I have suggested. It is obviously so wide a subject that lengthy discussions could be given to it alone. Let us briefly consider only a few of these.

Oftentimes excessive costs are brought about through a lack of uniformity in the timing of flow of material. Intermittent man-handling of goods in process brings about time almost of idleness about machines and other operations, during periods when operators are awaiting the arrival of new work; while in marked contrast there are peak periods when congestion of work is so much in evidence that operations must be performed with extreme haste under pressure. Such peak conditions may become extremely tiring to operators. Haste of itself, when operators realize that an abnormal amount of work must be performed in a brief space of time, brings about a psychological condition in the manner in which materials are handled and work performed, which is not conducive to safety.

Perhaps one of the outstanding performances of conveying machinery in general is to bring about uniformity in flow of material. The pace is set for proper performance of work and goods pass forward continuously and uniformly, according to standardized methods carefully determined upon. There are no periods of breathless haste supplemented by periods of comparative idleness. Proper relaxation is taken care of by definite rest periods, and expertness during working hours is brought about by uniformity in volume of work to be worked upon.

Another important item in the reduction of cost of manufacturing often revolves around the consideration of reducing the interval of time of manufacture. It is frequent that the time necessary for the complete manufacture, inspection, packing and shipping of products can be re-

duced as much as two-thirds through the installation of systematic uniform methods of handling materials through all processes. While the chief factors of such accomplishment involve large financial savings in goods in process and permit that manufactured articles be turned into profitable sales much more speedily than would otherwise be possible, it is evident that from the safety side, such accomplishment in reduction of interval of time of manufacture can only be brought about through simplified, uniform, systematic methods of handling throughout. All reductions in handling decrease accident hazards in proportion, and especially is this true if handling methods are scientifically studied and worked out.

CHAIRMAN SUTTON: His talk has been so complete and lucid I think there is very little we could misunderstand about it.

A recent no-accident campaign on the part of neighbors of my own company, the Kellogg Company, enlisted my interest so heartily that I found myself participating in spirit almost to the same extent I would have, had the contest been in our own plant. When finally a lost time accident occurred, you can imagine the feeling I experienced, and we have with us Doctor Arthur C. Selmon of the Kellogg Company of Battle Creek, who is going to talk to you, I hope, on the no-accident campaign to which I refer.

"NO-ACCIDENT CAMPAIGNS"

Dr. A. C. Selmon, Kellogg Company, Battle Creek, Mich.

This paper will be based on the "No Accident Program" which we are following in the Kellogg Company factory. While we were proud of our past low accident record, yet the very much lower accident rates reported by certain other industries assured us that we could do more than we were doing to decrease the sum total of mutilation and suffering resulting from injuries sustained in our plant.

Beginning with July of this year, we started on a program that is producing very gratifying results. In the recent past our plant averaged a lost-time accident for every 70,000 man-hours. July and August have always been our worst months for accidents because during these months we have a large number of new and untrained workmen. But in spite of this handicap, under our new program we put in 700,000 man-hours without a lost-time accident instead of 70,000, which had been our average previously. For the 71 days, from the first of July until the ninth of September, our Safety banner was not lowered once, a record many fold better than any previous one in our plant.

The main objective in a "No Accident Program," as I conceive it, is to take men and women who are already well stocked with old, careless habits and root out these, planting new and better ones in their stead. We started out by attempting to get every employee thinking and talking about Safety First. It is surprising that even in the best regulated factories workmen get into the habit of doing many thoughtless and

careless things. To break these habits requires at the outset something in the nature of a decided jolt or shake-up.

We put up bulletins offering a reward for the arrest of the cause of accidents, and asked for slogans, suggestions, posters, etc., bearing on accident prevention in the plant. The price paid for the usable ones was large enough to make it worth striving for. Slogans and suggestions poured in by the score. They came from men and women in every department, from janitors to foremen.

A sub-committee from our large Safety First Committee met daily for the first few weeks, and later two or three times a week, to go over these contributions and select the best ones. The usable ones were posted throughout the factory, together with the names of the authors.

Thought was given to methods which would be most effective in making use of the "eye-gate." A large safety banner was made and hung in such a location that one could not pass the time clock without seeing the banner. When there is a lost time accident, the banner comes down for a whole day and its absence is so conspicuous that it strikes you with almost as much force as though the floor had been taken up.

A Gold Banner at End of a No-Accident Month

We started with a green banner and when the month of July was passed without a lost-time accident, we replaced it with a gold banner. When the demon of carelessness finds his devilish way to our factory and we have an accident, the gold banner comes down and the green banner goes up again, but it carries a gold star for each month passed without an accident, in order to keep prominent the record of past achievements. The gold banner replaces the green one at the completion of a full month without a lost time accident.

In the use of slogans, bulletins, posters, etc., staleness must be avoided. A single fresh slogan or poster every day or every couple of days, is noticed and read, whereas if the board is posted over with a number of bulletins, the men, seeming appalled with the effort required to do so much reading, only give a passing glance and do not stop to read. Fresh posters or bulletins every day or two lead the men to form the habit of stopping at the bulletin boards daily—whereas material left on the boards for several days gets stale and destroys this very valuable habit. Even such a minor thing as changing from day to day the location on the bulletin board of the bulletins and posters is well worth while.

We make use of a large, three-sided pedestal-like bulletin board for extraordinary announcements. When in use this is placed in the lobby in such a position that one or the other side directly faces every person passing in or out of the plant. When an accident happens and the safety banner is taken down, a bulletin is posted immediately on this board, giving name of the injured, nature of injury, how it happened, department where he was working, etc.

In checking up on the adequacy of guards and the presence of hazards, a safety first man of wide experience was invited to spend some time

working with our own safety inspectors. At the time of instituting our present program the whole plant, from cellar to garret, was given a thorough going over. This is very essential because even a very good safety first man who has continually inspected the plant may fail to note things that need attention. So it is worth while occasionally to get in a man who is not familiar with the plant, just for the sake of a check-up on things that may have been overlooked.

When making safety first inspections, examining guards, looking for hazards, etc., there is an educational value to the workmen in doing this ostentatiously. By making a certain amount of show of the work the men will be impressed with the importance of everything that has to do with accident prevention. The men should be encouraged to point out to the safety inspector anything they think is a hazard and he should get their suggestions. In this way he will often pick up something of value. Whatever he does, he should not give out the name of the man who reports these things, if by so doing there is any possibility of getting him in bad with his foreman or fellow workmen.

A Small Safety Committee a Mobile Unit

Accident prevention work covers every phase of a plant's activities and we have found it essential in our factory to have a small safety sub-committee of four or five men who form a mobile unit, giving prompt attention to everything connected with safety work. They promptly investigate every accident and as far as possible assess responsibility, considering such factors as whether the accident was due to lack of proper guards, neglect of foreman to instruct the man, carelessness on the part of fellow employees, or whether it was due to carelessness or disregard of safety rules on the part of the injured man himself. The result of their investigations is put in writing together with any suggestions as to measures to be used in avoiding a recurrence of such an accident.

Many of the near-accidents, that is, minor accidents which come near to being serious ones, should be looked into by this committee. The hospital staff and the foremen must cooperate in this accident prevention work. It rests with them to get the data on how and where these near-accidents occurred. This information must reach the small safety committee without delay.

Upon investigation it will often be found that the stage was all set for a crippling accident but an overruling Providence in some way mercifully intervened. It may have been due to a piece of gross carelessness or to disregard of safety rules, and should this be the case, if the party responsible is given a few days layoff, the lesson to him and to his associates will be driven home and clinched.

Activities of this nature have great educational value and therefore are well worth the effort. It is a case where a "stitch in time saves nine." The men are brought to realize that accident prevention is as much a part of their job as is the oiling of their machines. They find out that accidents, near-accidents, and disregard of safety rules are really serious affairs.

CHAIRMAN SUTTON: Are there any questions you would like to ask Dr. Selmon?

MR. STROBHEAR: You brought up a very interesting subject when you talked of near accidents. So few of the companies keep a record of the near accidents. I would like to know if you have the relationship of near accidents to accidents. Do you keep a sufficient record to chart and show how they bear to lost time accidents? If you know what an accident costs, you can readily see the value of the safety work.

DOCTOR SELMON: You understand, I am a novice in the whole safety work. Medical work was my line, but it struck me this is the finest piece of preventive medicine that can be done any place or by anybody. That is what interested me in this work. If we went along at the old rate we would have 19 people with eye or other accidents, whereas we only had three; so I can visualize that bunch of 16 people with fingers on their hands and eyes in their heads that can see. That appealed to me and as a result we had a check up on those near accidents. That is where the nurses and doctors in the medical work must cooperate by carefully and diplomatically inquiring into how this thing happened and finding all about the people concerned and all the factors concerned. But we haven't been going long enough to get this proportion that you mentioned here. We will have that in time, but to give you figures now would be of no value at all because the time is too brief.

Green Favored as Color for Safety Signs

MR. WIEDENMANN: I am not criticizing Dr. Selmon's signs at all; I think they are very fine; but there is one thing that I noticed and that is red. We have quit using red almost entirely on any sort of safety signs and are using green. I think it is more restful to the eyes, draws more attention, and is certainly a positive color for safety.

DOCTOR SELMON: I accept that criticism. It is well taken.

MR. MORRISON: I would like to inquire about the plan of positively fixing responsibility for the accident, or at least, broadcasting the responsibility. That is something of an innovation. I would like to know how it is received in general by the employees. Now, that is one of the British methods in case of a boiler accident. They classify them, minor and major. In case of a major boiler accident resulting in considerable injury or death they hold an investigation and not only fix and publish the responsibilities but frequently in a measure fine the responsible workmen, the money so paid being turned over to the injured party or the defendant, as the case may be. In a sense, making the party responsible for the accident contributes toward compensation payments.

DOCTOR SELMON: This is the only instance of the kind that we have had, but after carefully investigating the case in question and consulting also with the man's fellow workmen, there was no question at all about his negligence. So far as we can see it had a very wholesome effect, and as far as the man himself is concerned, I think he rather accepted it that he had been careless and something was coming to him.

We were very discreet about it and considered it from the stand-point of his fellow employees, whether we were doing him an injustice; that is one of the things we must not do, treat them unjustly.

MR. AGRY: I would like to ask Mr. Wiedenmann concerning his comment on the use of red. I am new to safety councils of this sort, but I visit a great many plants and I venture to say that 80 per cent of the plants I visit do have red signs. I notice that whenever I go into a plant I always read the red signs. I wonder what the experience of the council has been? Has the experience of the council been such that they feel that green or red is the best color?

MR. WIEDENMANN: I think the red signs are good for fire apparatus and things like that. Red is all right for a single danger sign or something like that, but for safety instruction I think green is far better. I have made some tests with that in a few plants and it has met with their hearty approval.

More Posters for Food Section Next Year

MR. AGRY: There is a little feeling that the use of too much red is bad.

MR. WIEDENMANN: Yes. We consider green a positive color.

MR. EGGERT: I think it is wise practice to change your colors every week or two, or every month. If you leave the same color they think it is the same sign and it doesn't create the interest necessary to accomplish what you are after.

CHAIRMAN SUTTON: At the beginning of the meeting we spoke of the possibility of getting some posters for food members, I think we have found that there is a talent in the Food Section and we should make an effort during the coming year to get out some food posters or to assist the National Safety Council in getting out some.

This banner to which these slogans and posters are attached, covers one which the Council put in here. Now, these bulletins, which you can not now see, are all usable in our industry, but do they carry the forceful message that something especially applicable to our business would? This emphasizes, I believe, the need of endeavoring to get out some Food Section posters.

MR. STROBBER: I don't want to make any comparison. I think we might get ourselves in a little bad here if you are trying to compare the posters as issued by the National Safety Council against one issued by one of our members. We are selling the National Safety Council service and along with that goes the use of posters which our members may procure. I think we might, as a Section, appoint a committee on posters, and either ask our members or others to contribute posters, material and experiences which may be turned over to the National Safety Council for use among our members. If you wish to stimulate that income of posters I am perfectly willing to offer a personal prize for the best one that the committee might select or something of that kind. The committee has at its own disposal the selection of them. I

won't mention what the prize will be but the committee can make the selection as to the one which deserves the prize.

CHAIRMAN SUTTON: That is the spirit. I think we have demonstrated here a fine spirit. I am glad Mr. Strobhar spoke as he did. I don't want to be misunderstood. The National Safety Council has entreated us to send them our home made posters and suggestions for posters that they might serve us better, and I am not criticizing the service they have rendered because they have done splendidly in getting out the posters that we do use, without our assistance. They have offered prizes to the workmen who would suggest a poster, and those workmen, of course, would suggest something applicable to their line of work. What I am trying to emphasize is that this Section should at once take up the work, as you suggest, of contributing our part and our ideas on safety posters so that the National Safety Council can serve us better, as they so earnestly desire to do. I am sure we will be benefited by it. I think the suggestion of appointing a Poster Committee is one thing we should do and I believe you are all agreed upon that.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The Food Section of the National Safety Council convened in Parlor "D" of the Book Cadillac Hotel, Detroit, Michigan at 9:30 o'clock, Mr. Vern D. Sutton presiding.

CHAIRMAN SUTTON: The first thing on our program will be the report of the Nominating Committee. Mr. Hasse will give us that report.

MR. HASSE: Gentlemen, the Nominating Committee selected the following officers for your approval, to serve you the following year: Vern D. Sutton, chairman; F. A. Hasse, vice-chairman; A. H. Wiedenmann, of the Casualty Reciprocal Exchange, secretary. On the Executive Committee we have H. P. Eggert, of the National Biscuit Company; T. F. Strobhar, of the Wagner, Taylor Company, Alexander Dienst, National Sugar Refining Co., and S. H. Kershaw, of the National Safety Council.

MR. STROBHAR: Mr. Chairman, to save time, I move that the secretary be instructed to cast a ballot making the election of these men as proposed unanimous.

(The motion was regularly seconded and carried.)

CHAIRMAN SUTTON: The first talk we are to have this morning is by Mr. John S. Spicer, chief of Accident Investigation Section, Pennsylvania Department of Labor and Industry, Harrisburg, Pennsylvania.

SPECIAL SAFETY PROBLEMS IN THE FOOD INDUSTRY

John S. Spicer, Chief, Accident Investigation Section, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

When this subject was assigned to me, I thought it might be interesting to give you the actual experience in our state, and accordingly I asked our statistical division to give us a statistical report of accidents in the food industry for the year 1925 and the first six months of 1926.

I am not quite sure whether it covers the scope of this Section. In fact, it may overlap some of the other sections that have been formed. But during 1925 in the state of Pennsylvania, 31 fatal accidents were reported to the Department, and 4,133 non-fatals; as compared with the first six months of 1926, when 16 fatals were reported and 2,460 non-fatals.

I have my own ideas, of course, of the specific problems in the food industry because all the accidents occurring in Pennsylvania pass over my desk every day and sometimes they average from 200 to 900 a day.

Naturally, you get a little bird's eye view of what is occurring throughout the state.

Now, the food industry is not peculiar in itself. It has a few individual problems, but as far as accidents are concerned the food industry is the same as any other section of industry in the kind and variety of accidents occurring.

I thought it might be interesting to analyze the fatal accidents that were reported and so I gathered together those 31 reports that were sent in to the department during the year 1925. I thought we would analyze them and see whether there are any particular outstanding features of those reported accidents.

In the first place, I found that five of the reports covered accidents which occurred in previous years. For some reason they had not been reported in the year in which they occurred, so that leaves us a net total of 26 fatalities occurring in 1925 and in the second six months three additions were reported, so as far as the record of our department in Pennsylvania, we absolutely know there were 29 fatal accidents occurring in 1925.

Details of the Fatalities During 1925

Now, consider for a moment how these were classified. Two fatalities were automobile collisions; one being a grade crossing, and the other the night foreman of the mill was killed by being crushed between two railroad cars in the mill yard. Two fatalities occurred to painters who were up on a scaffold painting a building. The rope was a very stiff new rope, and in some unaccountable way it came off of the F hook which holds the scaffold and those men were dropped to the ground. Three were elevator accidents. One of them a man was going up in the elevator and stuck his head out and got crushed between the elevator floor and the floor of the building. Another fellow was on the floor and he raised the gate and looked in and got crushed, and the third man opened the elevator door and stepped into the open hatch-way. One was kicked by a horse. Two were killed by means of fire arms. One was a district manager, held up and shot, and one was a guard who dropped his gun out of his pocket; and incidentally we have had almost a half dozen of those accidents where a guard leaned over or something, and the gun dropped out and he was killed. I think I can recall three within the last few years, showing the absolute need of guards wearing holsters at all times when they are carrying firearms.

We get now down to the accidents which are peculiar to the food industry.

We had two men killed with, or, in connection with kettles handling hot material. One man was making cheese and it boiled up in some unaccountable way and the stock ran over him and scalded him and he died a few days later. Another, in a candy factory, had had steam on a kettle and he turned the steam on, but instead of waiting for a

little while until the steam condensed and the pressure was relieved, he opened the top and it came out and scalded him and he died. Then in handling material, the same old story, you know, occurs in all industries. We have five killed from that cause. One fellow hoisting sugar bags in a sling. A couple of them rolled out and knocked him off of the pile of sugar bags and he was killed. Another one, a repair man was hit by a falling pipe. Another fellow had a strain from lifting; peritonitis developed and he died. We had two blood poisoning cases. One fellow was pulling back a bolt on a door and lacerated his finger; blood poisoning set in. And another one was handling crates of material and he crushed his finger and blood poisoning set in.

So as we analyze these various accidents we find that very few of them are hazards peculiar to the food industry. They are found in all these various industries.

Accidents in Machinery Peculiar to Food Industry

Our machine accidents, however, show some things which are interesting peculiarly to the food industry. We had one fatal in the bread mixer. We had one fellow get up in a conveyor to adjust it and he fell off and was killed. Another man removed the belt, or a guard from a belt, on a shaft and was trying to make some adjustment. He was caught in the shaft and whirled to his death. Another fellow was working alongside of a large fly wheel, which was guarded with standard rails, and the supposition is that he fainted, and when he came to in a dazed condition he wanted to crawl away, but instead of crawling away from it he fell over the board in the fly wheel and was mashed up considerably.

Another was crushed by a big truck backing up against him. Another man was helping an electrician trace out short circuits and he caught hold of the brass electric light fixture and the floor was wet and he was covered with perspiration and he was electrocuted. Another one occurred in a sugar crusher, which was a horrible accident. It seems that it was the end of a turn and the man when he came on was supposed to go up and look at the crushers and see that they were all right before he started them in motion. He came on the job, went up and looked into one crusher, but failed to look in the other one where a man was employed making repairs. He went down and turned on the juice and as a result that fellow was mashed up.

Now, there is an analysis of the 29 fatal accidents occurring in one year. You will see that a very small proportion of them were the result of hazards peculiar only to the food industry.

I did the same thing with 1926 accidents which were reported for the first six months to our department. We had 16 reported as you will see in the table. Five of those were for previous years. So that left a net total of 11 occurring in the first six months of 1926. If we consider that with the 29 reported as occurring during 1925, we will find that we have had a 24 per cent reduction in fatal accidents in the food industry. Assuming, of course, that our experience during the

last six months of this year will be as good as it was during the first six months. But on the other hand, our non-fatal accidents have shown, as you will note, considerable increase. About 4,900 this year, as compared with 4,100 last year. Assuming, of course, that the rate for the last six months of the year is the same as for the first six months.

An analysis of those accidents shows as follows. Five were falls of persons. One gored by a bull—a dairy man, with a dairy company. A machine accident—another bread mixer. Now, during these two years we have had reports of three fatal accidents in bread mixers and they were horrible things. One occurred, I think, in Philadelphia, where the man was attempting to clean the bread mixer. Of course, he tried to do it while it was in motion, as they alway do, and was drawn into the mixer. It took them a half hour, I think, to try to get him out by running the machine backwards, and, of course, he was smothered to death besides being mashed all to pieces. A street car collision. Another hold up. Another strain while lifting a lot of meat. Another fellow was up tightening the gasket on an ammonia line while it was under pressure and the ammonia blew out and suffocated him.

So as far as fatal accidents are concerned we find that the food industry has the same problem, in so far as the general trend of accidents is concerned, as any other section of industry. You can take experience in any particular industry and you will find that the outstanding classifications under which accidents are occurring are those old familiar ones of persons falling, falling objects, and handling objects. Machines are generally in the minority.

In Pennsylvania Machine Accidents Being Reduced

I think you will find it very interesting also to note that as far as experience of Pennsylvania is concerned the number of machine accidents is being reduced.

Now, what are these machines that are being reported as causing these accidents? Well, this matter of bread mixers sort of got on my nerves. I took over this work about two years ago and as you sit at your desk and observe a flow of accidents coming over, from 200 to 900 a day, you, of course, can't pick out many details, but there are certain things that are outstanding and that impress themselves on your mind. What we try to do is pick out the serious ones—the ones we thought there was some possibility of doing something to prevent and then studying them; sending them out for investigation by our inspectors and then taking another procedure which I want to talk to you about and which has brought wonderful results, I think.

In the matter of bread mixers we decided, of course, that these accidents only represent the most serious. There were a bunch of other cases where bread mixers were involved, where a man maybe got his arm broken or a less serious injury, because it was possible to shut that

machine down; somebody happened to be there before the man was drawn in, and possibly it was not a high speed mixer where if it once gets hold of you I guess it is almost impossible to get away.

We started in reporting these accidents back to the manufacturer of the machines. We would send a man out and investigate them and then we would report back to the manufacturer of the machine. That has had wonderful results. I think chiefly on that account one of the firms manufacturing these machines has developed an electrical control whereby this type of accidents will be eliminated.

I believe today if you will go in any bakery, factory or industry you will find the men cleaning the machines while they are in motion. There are signs on the machines that you are not to do it, but the men will do it. When the machine is thrown—turned over on its side to throw out the dough—after the dough has gone out, then they will take their paddles and get in there. Of course, they are careful and many times they get away with it, but sometimes on these high speed machines, if they get caught, then, of course, it draws them right in as it did in the three cases I cited.

An Electrical Control Was Developed

The company I mentioned has developed an electrical control. As that machine is tilted to a certain angle it stops and as it gets over further the only way in which you can make it revolve is by pushing a button, and then they can clean it out with the one hand on the button. If that hand is released from that button the machine stops, so the possibility of getting caught, I think, has been reduced to a minimum, because if a man gets caught he is not going to keep his hand on that button. It will come off immediately. They at first, I believe, developed a system of foot control that you had to keep your foot on a bar, but you can imagine if a man was caught with one or both hands he would try to push down with his feet and the chances are would keep the power on the mixer and the danger would not be eliminated. But with this system of one hand being necessary on this electric control button while he might use the other cleaning, I think those accidents have been reduced to a minimum.

Another class of machines on which there are very many accidents is the meat grinders. I venture to say that in a year's time I have had 50 cases. They got so numerous I could not help but notice them and I started to follow the same plan of procedure. There were about four, five, or six companies in the country who were manufacturing these grinders and I began shooting out these accidents to them, showing these employees in hotels and plants who were sticking their fingers in the hopper instead of using the plunger which is always provided. They stick their finger in and get the end of the finger chopped off; and in fact in one case in a packing house, it took a man's arm off to the shoulder. These manufacturers said, "We never

heard of all these accidents occurring. We are surprised. We can hardly think it is possible."

Well, why haven't they heard of them before? For this reason, I think. Here is a man who purchased a machine from a manufacturer. It is in perfect condition and he turns it over to his employee and says, "You shouldn't do this or that with the machine," but the man does. He does take chances. He doesn't use the precautions which he should and he is injured. The employer doesn't think it is the fault of the machine, and as a matter of fact it isn't. The employee has taken chances which he should not have taken, and naturally there is no report made to that manufacturer.

Results of Reporting Accidents to Makers

Well, we take the other position; we believe that the manufacturers, if they know that accidents are occurring on their machines, will take some particular pains to see if they can't make that machine so that accidents will be eliminated. One company manufacturing meat grinders, and selling a large proportion of the ones that are in use, began getting these accidents and they began to sit up and take notice. I notified them all. I would tell them we had an accident on a certain type of machine at a certain place at a certain time. They all get that same information. Naturally they are not interested to see so many accidents occurring on their particular class of meat grinder, for you can fully imagine that their competitors will say, "Our machine is safer than that fellow's. They are having a lot of accidents."

Well, they began sitting up and taking notice, and the company has developed now a machine which I had the pleasure of looking at last week, where they have changed the hopper arrangement and have an auxiliary feed to take the meat from the hopper into the worm that does the cutting, and which generally cuts fingers at the same time, so that the chance of accidents has been almost eliminated. There is one possibility. If a man reaches his hand way up in under he might have the tip of his finger cut off. What has happened to that particular machine? They are now able to advertise, "We can cut meat with speed and safety," and not only is the machine more safe, but it has increased the capacity almost three times.

One of our largest companies which uses enormous numbers of those machines and in whose branch plant occurred that case where the man's arm was taken off, is seriously considering, I understand, putting in all these new machines. We believe that this system of going back to the manufacturer of the machine and telling of these accidents is going to have more weight and we are getting more accomplished than by any other system we have adopted.

In the food industry, I think about 78 per cent of these machine accidents occurring particularly in bakery products—occur at the point of operation, and we find that particularly the case with respect to rolls of all kinds. We had an interesting experience along that line by re-

ferring these things back to the manufacturer of machines. It was where they were making pans, which, of course, is a part of the food industry in a way, but they were corrugating rollers where the sheet metal was run through the roll to make a little corrugation. The fellow got his fingers in there—I don't think he was very seriously hurt, as I recall, but we sent that accident out to the manufacturer of that roll and we said, "Have you devised any way in which that point of operating can be guarded?" It developed that the owner of that machine was running it backwards and of course the manufacturer was only too glad to set him right. He was tickled to death that we had called the matter to his attention; and the owner of the machine, of course, was satisfied, and we were helping everybody. Naturally, the chance of accident in that machine was eliminated.

I don't think I can stress that matter too strongly. If the owners of these machines will shoot back their experiences to the manufacturer we are going to get improved machinery and we are going to eliminate to a large extent these machine accidents. I think the reduction in machine accidents as shown by our experience there is an indication of this kind of work, particularly on safeguarding, because at the present time if there is a serious accident occurring our inspector is on the job usually within a week, as soon as we can get the information out to him and he finds time to go around.

An Enormous Number of Accidents in Automatic Machines

In the development of automatic machinery, like packaging machinery and wrapping machines, we have an enormous number of trivial accidents and still they are reportable accidents from these causes. Little gears and sprockets and chains sometimes have not been guarded. Now I remember not so long ago, I found a fellow that got his fingers caught in a pie making machine. I never knew there was such an animal and I wrote out to the company; I found there was a machine that makes something like 100 or so pies an hour, but there are little gears and sprockets on those things which are not protected. We called the matter to their attention, and I think the new machines that they send out are going to be safeguarded in those particular places.

We have had the same thing occur on conveyors. Conveyors are going to cut down our handling accidents considerably, but on portable conveyors we have found little gears or sprockets or belts that have not been guarded and the men invariably get caught in them. As the accidents occur we refer them back to the manufacturer of the machine and they are developing little aprons or little guards to cover up those things. On dough breaks we have had a bunch of accidents. If you recall, I think, there are two sets of rolls there. The men shove the dough in at the bottom and it comes out at the top roll. They put their hands under there and invariably if they are not careful they will stick their hand in with the dough underneath. Within the last six weeks I had a man come to my office from across

the river. His hand was in terrible shape. It was a question of whether they wouldn't have to amputate it. On one of the dough breaks a little apron is now being developed that is put on those machines so that it will protect and keep the hand out from under that roll where for some reason they will stick them in.

So that all this automatic machinery with the small gears, cogs and belts, if you people have them in your own establishments, I think it is well worth while considering having those moving parts covered up, because sooner or later these men get hurt on these things.

Then the question of infection is one which I suppose has been considered. It seems prevalent, more prevalent in the food industry, especially in meats and packing houses and things like that. A small cut generally results in infection if it is not given careful consideration. It is peculiar that where meat is handled the chances of infection seem to be greater than in many other branches of our industry and we have a large number of accidents. This is particularly so in places like restaurants and hotels where meat is cut and sliced. Then the slicing machine is another source—bread slicers and meat slicers. We have been having the same experience on those machines as the grinding machines, and we are keeping back the accidents.

Manufacturers Getting Tired of Hearing About Accidents

I know from the tone of the letters that some of these manufacturers are getting sick and tired of hearing about accidents occurring on their particular machines; but we shoot them back just the same and I see it reflected in some of the talk of the salesmen. I was down at the Sesquicentennial at Philadelphia where a lot of machines are on exhibition and I questioned them and some of them are making claims on their various machines that they are more safe than others and so on. But we feel that you can't give a man a machine and say, "you must use the plunger." You have got to make that machine so the use of the plunger is a necessity, and if that is done I think we are going to eliminate a lot of machine accidents. Just how it can be worked out is going to take a little time. The thing can't be determined in a minute. But I think the problems can be worked out, and who is better fitted to do that than the manufacturer of the machine?

We have had 100 to 200 accidents on bread slicing machines and meat slicing machines in a year's time and usually it is the tip of the finger or even one or two fingers that have been taken off. They will take a small piece of bread or small piece of meat and instead of putting the block back of it and shoving it up against the knives they stick their fingers in there and the first thing you know it is off. As a matter of fact, down at the Sesquicentennial exhibition there are two meat slicing machine exhibits side by side. Of course I went in and looked them all over and did not tell them who I was. Afterwards I was telling why I was interested in one particular machine and he said his rival demonstrator was giving a demonstration of cutting

meat and, be-gad, he got his finger cut off right there in the demonstration. So when the demonstrators of the manufacturers cut their fingers off I think it is high time for the manufacturers to sit up and take notice.

In talking about these matters I am not covering all these hazards. I realize that very seriously, but I am giving you our experience on what is actually taking place. There may be more dangerous machines. There may be greater hazards, but if there are they are not being reflected in the accident reports which are turned into our department from day to day.

The main things are rollers, slicers, dough mixing machines, all kinds of packing machinery, wrapping machinery, meat grinders, sausage stuffers, ice making machines. They are the types of machines which are causing the trouble. Particularly where you have to put something in the hopper and the man will follow up and stick his hand under or in after the material. For instance, in a grinding machine there is an orifice at the bottom usually where the ground material comes out. Now, there seems to be a peculiar fascination for a man to stick his fingers up in there to see what is in there, just like they stick their fingers in the cigar cutter. They put them in there to see how the end of the cigar is cut off and they find that the man gets his finger cut off. Now, they have done that on the grinders. They stick their fingers up there. One of the manufacturers has made a series of rods that are up in the orifice there so that the material can come out, but the person can not get his fingers up in the mechanism. I think that is a very good development.

This Man Showed Just How the Accident Happened

I remember a case in a lumber mill—a wood working plant, of course—but a fellow had been injured on a saw and his fellow employee took another man down to show him how this fellow was injured and he stuck his fingers up there and had the same accident occur to him.

We don't believe that you can stop accidents until two or three things are done. First, is the machine. It has to be made fool-safe. Second, the foreman has to be on the job everyday, insisting that the men perform their work in a safe and sane manner and be held strictly accountable for the accidents occurring in his own particular department. And third, we believe that it is absolutely necessary that the man at the top be sold on safety.

I don't care how much safety engineers work or how hard they work or what they do, if the boss at the top isn't sold on safety, his efforts are practically of no avail. These safety meetings that are held when the boss is conspicuous by his absence are, to my mind, simply a waste of time. If a man isn't willing to put his time against the time of his employees at a safety meeting, I think you might just as well not hold them. I have reached the point in my experience that I would not go out and talk at a safety meeting if it wasn't held on company time. The plant that wants to hold a safety meeting at noon while the men

are eating is just making a gesture in safety and really is not sold.

In the last analysis I think you will find that up at the top is the main factor in not holding that meeting on company time.

In conclusion I would like to say that the food industry is, to our mind, no more hazardous than any other. It has a few particular problems, yet a majority of them are almost the same as other plants; and my plea to you, as owners of machines, particularly if you get these accidents, is that you shoot them back to the manufacturers. We are going to get somewhere, we believe, if you do that. We have had evidence of it. I could cite you 50 cases, I think, similar to the ones I have given you, and in so far as machines are concerned, I think we are going to get an awful lot in reduction of accidents if we work along those lines.

Discussion Following Mr. Spicer's Paper

CHAIRMAN SUTTON: Are there any questions anyone would like to ask Mr. Spicer?

MR. STROBIAR: I think Mr. Spicer brought out a very important point. So many of the machines used in the food industry are made by the manufacturers themselves. It is right, and I am thoroughly in accord with the idea of communicating with the manufacturer and seeking his cooperation and support. I think the same thing should be done with every manufacturer of food machinery. The food industry has people who make other similar machines and I don't think there is any necessity of keeping those things a secret any more than the Department of Labor and Industry.

Perhaps if the department in Pennsylvania found that the National Biscuit Company was manufacturing a machine for its own use that was discovered to be dangerous and could seek their cooperation and support in improving it, which I am sure they would do, it would be a fine thing. There are other manufacturers of similar products that ought to be advised of that dangerous condition. I don't know whether they are communicated with. For instance, in many of the various kinds of equipment that are submitted to the Underwriter's Laboratory for approval and bear the label of the Underwriter's Laboratory in Chicago, that in itself is an indication of the efficiency of that particular type of machine and it is so published and listed in the selling of it; and people will say, "Has it been approved by the Underwriter's Laboratory?" Food machinery is never submitted to the Underwriter's Laboratory for a label—that is machinery made by a manufacturer for his own use. I have never heard of any. I was wondering if we might not in some way become a clearing house for communications with our members if we learn of a dangerous proposition or if we learn of a good means of protecting the dangerous equipment; why couldn't we broadcast that information to our members who, I am sure, are interested in the subject?

CHAIRMAN SUTTON: That is a very splendid suggestion. Anyone else?

F. J. MALLOBY (Representing the Province of Ontario Health and Labor Department): I notice that there were several fatal accidents, and other accidents on elevators. I do not know whether the state of Pennsylvania has adopted inter-locking systems which we have in Ontario, but in the last two years we have not had a single fatal accident and very, very few minor accidents. I am just wondering whether they adopted that or not?

MR. SPICER: We certainly have, but inter-locks won't prevent a man from sticking his head out as the elevator is going up or down. In that connection I want to make this point on elevators: within a space of two years, notwithstanding our inter-lock, a large number of accidents occurring in cities of first importance, like Philadelphia and Pittsburgh, have come to our attention. Of course, these larger cities have their own elevator inspection departments and are not under state control. In our monthly bulletin some months ago I made a list of about 25 accidents, many of which were fatal, where men had walked into open shafts. The door had not been closed or there had been some reason for that inter-lock not operating.

Elevators as a Rule Are Not Properly Lighted

I think that has been due to a large extent that elevators as a rule are not properly lighted. In several places lights have been on the elevators and the man has reached in to turn on the light before he steps in, thinking the elevator is there and then he goes to the bottom. We had a case of a nurse in a hospital; it was a hydraulic elevator, I believe; and she got into the elevator and got off at a certain floor, leaving the door open, and the elevator crept up a little bit. It was a little dark, you know, and she came back and walked into the open hatch-way without looking. We had another case in a factory where the elevator was not to be used for passenger service. It was contrary to the rules, of course, but it seemed to be the custom that about 5:00 o'clock when the factory closed, they would jump on the elevator and ride down four or five stories. In order to do away with this practice, they shut down the power and when they got down half way between the floors the power went off and one of the women got excited and pulled up the gate, tried to jump off and rolled under the gate and down the shaft way under the elevator floor.

Now, possibly inter-locks would have stopped lots of those accidents if they were in proper condition, but I think in some way they had gotten out of order and of course, had not been discovered up until the time the accident occurred. Notwithstanding the strict enforcement we are trying to do, these elevator accidents are continuing. Of course, we have quite a number of elevators in the state, but I would like to emphasize that many accidents could be prevented if our elevators had sufficient illumination and if the people would get out of the habit of going into a dark hole.

CHAIRMAN SUTTON: We have another very interesting topic to be handled by Mr. David J. Price, engineer in charge of development work, Bureau of Chemistry, United States Department of Agriculture, Washington. I have been very anxious to know what Mr. Price is going to tell us.

THE OTHER SIDE OF DUST EXPLOSION PREVENTION

David J. Price, Engineer in Charge of Development Work, Bureau of Chemistry, U. S. Department of Agriculture, Washington, D. C.

A National Safety Congress is evidence of the fact that safety to life is of nation-wide importance. It can no longer be considered a local matter, in which interest in a catastrophe or a disaster is limited to the section of the country where it occurs. Matters that concern the protection of human life are of nation-wide interest. We have learned by costly experience that the disaster of the East or West today may become the catastrophe of the North or South tomorrow.

It is, therefore, a splendid arrangement which makes possible a national meeting where safety to life is the principal object and where plans for the application of safety measures can be given thorough consideration. The creation in the National Safety Council of a section designed to give direct attention to safety in the manufacture of our food products also makes possible the consideration of any special industrial hazards.

Attention in the United States and Canada has been directed in recent years to a peculiar industrial problem involving extensive losses in life and property. The possibility of dust explosions in the manufacture of our essential food products is now generally recognized, with the result that research has made very helpful contributions to the knowledge available on this subject.

The purpose of this address, however, is not to refer primarily to what would be termed the technical phase of the problem. It is rather my intention to refer to an aspect of this industrial plant study not heretofore presented, an aspect that has impressed me as peculiarly significant, which may be termed the "other side of the story," or the humane aspect of the work.

It is sometimes difficult to measure the accomplishments of safety work and really to see that encouraging results are being obtained. This address, therefore, resolves itself into "a message of encouragement" to the safety men in the industries, with the thought that it may stimulate them to greater achievements if possible in the noble work in which they are engaged. No one can engage in a nobler undertaking than to devote his time and effort to the development of preventive methods that will result in the protection of the life of his fellowman.

In recent years dust explosions have occurred in lines of industry where they had not previously taken place. The number of industrial plants in which the dust explosion hazard exists appears to be constantly increasing. Explosions of wood dust, powdered rubber, sugar, sulphur, zinc

dust, magnesium powder, aluminum dust, cork dust, powdered milk dust, paper dust, dye material, pitch dust, leather dust and starch dust have occurred. In fact, it appears that any type of dust which will burn will readily explode and result in a dust explosion under favorable conditions.

This development in recent years, which indicates definitely that dust explosions can occur in practically all lines of industries where combustible dusts are created during manufacturing operations, is of particular significance. We readily recall that in view of the fact that the earliest dust explosions occurred in flour mills and grain handling plants, it was the general opinion for some time that such explosions were necessarily confined to the grain handling industries. The disastrous losses experienced, however, in a large number of recent dust explosions indicate the wide range of the problem. This emphasizes the importance of careful study to determine the relation between certain types of processes and the dust explosion hazard.

Extent of Losses

The Bureau of Chemistry has a record of 280 dust explosions in industrial plants. In 70 of these explosions 459 persons were killed, and in 92 of them 760 were injured. The property loss in 144 explosions amounted to \$33,500,000, an average of approximately \$240,000 for each explosion.

The importance of this can be more fully appreciated when we realize that a recent census of manufacturers shows that approximately 28,000 industrial establishments in the United States alone are subject to this hazard. These factories employ approximately 1,324,000 persons and manufacture products of an annual value in excess of \$10,000,000,000.

Research work has shown that dust explosions and gas explosions are somewhat similar in behavior. The causes which ignite combustible gases will readily ignite combustible dust. The various dusts have fixed ignition temperatures, as have the combustible gases, and require certain limits of concentration to make an explosive mixture. The control of the problem, therefore, must be approached in much the same manner as the control and prevention of gas explosions.

Progress Made in Control

Although the matter of dust explosion prevention has been given direct attention in the United States and Canada only in recent years, significant progress has been made in the fields in which this special endeavor has been undertaken. Marked progress has been made in connection with the losses from dust explosions and resulting fires in grain threshing machines in the Pacific northwest. These explosions and fires cause extensive losses to both threshing machinery and grain and very little relief was afforded until the matter was taken up by the United States Department of Agriculture and the state experiment stations in that territory.

The investigations resulted in the development of effective control measures which have been instrumental in the reduction of losses and the prevention of these explosions during the threshing of the grain crop in

the northwest. This is a definite example of service which the Department of Agriculture has rendered the farmer. The value of this work has been recognized by the insurance companies, with the result that special rates are now given to the machines equipped with the devices developed by the engineers of the Department of Agriculture.

Marked progress has also been made in the control of dust explosions in certain lines of industry. This is particularly true in flour mills, in which the first disastrous dust explosion on record occurred. This resulted in the design and installation of mechanical methods for effective dust control. The explosion in the Washburn Flour Mills in Minneapolis in 1878 resulted in the loss of 18 lives. The records indicate that only four lives have been lost in dust explosions in flour mills since that explosion.

This must not be taken to mean, however, that dust explosions do not occur in flour mills any more. There have been a number of explosions in recent years. Because of the effective control and preventive methods adopted, however, they have been localized in effect and confined to very limited areas.

Similar progress has been made in other lines of industry, particularly in those industries in which large losses of life and property damage have been experienced.

New Contributing Causes

The question as to why so many dust explosions are occurring in our industries in recent years in comparison with the earlier periods of operation is raised. This ought not to be difficult to understand.

There are several principal contributory causes of the frequency of dust explosions in our modern industries. The expansion to large-scale operation, accompanied by new processes for the utilization of by-products, naturally increases the hazard. Large-quantity production results in the creation of finely-divided dust clouds, which make the ignition more readily possible. New lines of operating processes and new types of machinery and appliances have also contributed to the hazard. In dealing with this matter it must be understood that many of our dust explosions at the present time occur in what may be termed our modern up-to-date and improved industrial plants.

The "Other Side" of the Story

I do not propose to discuss the technical aspects of dust explosion prevention. I am dealing today with "the other side" of the story. The research work is directed primarily to the determination of the causes of these explosions and the development of control and preventive methods. It is gratifying to observe that, as a general rule, these measures are applied by the industries as rapidly as they are developed by the engineers of the Bureau of Chemistry, and that very close cooperation exists between the manufacturing companies and the Bureau in this research work.

There is a certain stimulation, however, to the safety worker in the manufacturing plant, that should make a special appeal for renewed interest and activity in this industrial problem. In dealing with a subject of this kind one naturally becomes impressed with the importance of the protection of the lives of the workmen involved.

In the investigation of industrial plant dust explosions it is necessary to proceed very promptly to the scene of the explosion and to remain long enough to obtain at least some definite idea as to the circumstances under which the explosion occurred and the methods that might be adopted for the prevention of a similar occurrence in other lines of industry.

This close contact with the "human aspect" of the problem gives the investigator an impression which can not be obtained under any other circumstances. In many instances when the explosions have occurred in extremely cold weather the recovery work has been very difficult. Sometimes from ten days to two weeks have elapsed before all of the bodies have been recovered. Often identification is impossible, which adds to the complicated situation.

One can not deal with a problem of this kind in which human life is involved without being tremendously impressed with its seriousness. An explosion resulting in the loss of lives of 50 workmen means a large number of dependent wives and children. The pathetic instances surrounding tragedies of this character leave an impression upon investigators that can never be entirely taken away. It affords a stimulation for greater incentive and for wider exertion of effort to bring about a full realization of the importance of this entire matter and the development of additional precautionary measures.

Value of Safety Work

During the recent observance of fire prevention week our attention was called to the importance of the reduction of our fire losses. The estimates indicate that the annual fire loss of the United States for 1925 was about \$570,000,000, making an approximate loss of \$1,084 per minute. Although this fire loss is increasing at a rapid rate, the tragedy of it all is that reports indicate that upwards of 16,000 lives were lost last year in these fires. President Coolidge in a special proclamation referred to "the thousands of lives sacrificed each year through fires" and stated that "the conservation of man power and material wealth from such destruction is a challenge to the progress of our civilization."

It appears that approximately \$150,000,000 of the loss was caused by fires on farms. These losses have been advancing at a very rapid rate. Secretary of Agriculture Jardine in a statement on fire prevention week, called attention to the losses from fires on farms and referred to the estimated loss of 3,500 lives each year as a result of fires in farming communities. Up until this time very little has been done in a national way to make a thorough study of farm fires and to render assistance to the farmer in the prevention of these fires and the protection of life and property.

When we consider that 16,000 lives are lost annually in explosions and fires in the United States—approximately two lives every hour—the larger proportion, of course, being in the industries, we can not help but be inspired to greater effort and endeavor.

Safety work in the food industries is a noble undertaking. Although the results in many cases can not be definitely measured, this work should carry with it a sense of satisfaction that could not be enjoyed in any other line of effort. The desire on the part of the safety man to acquire all knowledge available on the subject of dust explosion prevention is deserving of the greatest encouragement.

The application of this knowledge in the installation of control measures will eventually result in the reduction of our losses from dust explosion and fires and in the saving of life and property. The human appeal that accompanies work of this character should in itself be an incentive for greater effort on the part of the men in the industries to protect the lives of the workmen engaged in the operation of our factories.

The Food Section of the National Safety Council can render a ~~distinct~~ service in this matter and it is hoped that this address will direct attention to the "other or humane side" of the problem. A service of this kind rendered to one's fellowman, although difficult to measure, will eventually result in those accomplishments which under no circumstances could be otherwise obtained.

The U. S. Department of Agriculture is willing and anxious to make available all information it has that will in any way assist the industries of the country in the reduction of the losses of life and property as a result of dust explosions and fires.

Practical Experiments at a Plant in Louisville

CHAIRMAN SUTTON: We are certainly very grateful to Mr. Price for coming here, and we feel that he has given us some very valuable information. Are there any questions you would like to ask Mr. Price?

W. P. PENTY (Kellog Company, Battle Creek): At Louisville, two years ago, I was greatly interested in the subject of dust explosion, and was disappointed because the gentleman who was supposed to speak did not appear. But through the information I received there I sent to the Bureau of Chemistry at Washington and they very kindly sent a miniature grain elevator to our plant. I collected dust—possibly 10 or 15 different kinds—and we had a demonstration to about 1,500 employees, and in every instance the dust exploded, more particularly the dust that comes from the unloading of corn. That seemed to be more powerful really than powder. We have been very careful since to keep the dust cleaned off and in a safe manner.

MR. WARREN (Minute Tapioca Company, Orange Mass.): We had a question in our mind as to whether our raw material, being a tapioca flower, had any dust hazard; and so our chemist took the matter up with Mr. Price's department and we sent samples of various dusts of the product in various parts of the processes. The report came back—a very

complete report—showing just wherein there were no hazards and wherein we should take a particular safeguard. We have used the vapor-proof lamp in our raw material department where the flower comes in, feeling that there was a possible danger. The report was of particular benefit to the men. Probably you also have workmen who have been with you for a number of years, who have said, "Oh, there is no danger here. We haven't had any trouble—probably won't have any trouble."

But we got the different foremen together and went over very carefully with them the report and it was a very liberal education; they were surprised and since that time it is quite often that they come to us and say, "Now, do you think this particular thing that I am doing is going to have any possible effect upon any hazard?" The effect we have gotten with the men looking out for any trouble has been a wonderful help to us to get that thought of a possible hazard across.

The Department Actively Cooperating With Industries

MR. PRICE: Mr. Chairman, I certainly appreciate those kind words. I would like to make clear this one thing. We enjoy at this time in this work pleasant relations with everybody concerned. I mean by that, the companies and insurance people and underwriters and everybody in the game. I am chairman of two committees of National Fire Protection and the insurance men are all close friends of mine, but we appreciate at Washington what might occur as far as that particular aspect is concerned. If an industry finds there might be a dust explosion hazard present and that there might be an unpleasant relation resulting from the insurance aspect, they may take the matter up confidentially with the Bureau of Chemistry. We have had a policy from the very first that if any company sends in a sample of dust and wants that confidential relationship it will be maintained. If, for instance, an insurance inspector goes out and collects samples from this factory and sends them to the Bureau, we have refrained from making a test of that dust until we are assured that the company which operates that plant is a party to the agreement. We will not send the report unless a copy is sent to the company, and it has worked out very nicely and there is no embarrassment. The big thing, I think, on both sides is to try to get somewhere in the way of control. We had a case last week where we were in conference with a company in the east that is grinding a product that is shipped in a bale from Japan. It is used in the manufacture of insecticide—very explosive. In that conference we tried to convey this thought: the morning after an explosion takes place and the New York executives call you in they get an awful lot of satisfaction out of the fact that they were doing all they could to stop it. The executives are quite remorseful when they haven't done just as much as they ought to have done, and that is the important thought—a fellow gets an awful lot of satisfaction out of knowing he has done all he can do.

MR. EGGERT: Is that reel available?

MR. PRICE: Yes, we have quite a number of the reels. During fire prevention week we had several copies in use and we will be glad if you

will write in for one and we will send one to you. We also have lantern slides we can send out. Anyone needing that material may write to us at Washington and we will be glad to supply you either with the films or lantern slides. If at any time our engineers are in your vicinity when you are having a meeting we will be glad to have them arrange to stop off with you. We can't always send them to meetings on special occasions. But if they were in your territory and an explosion occurred, they might stop over and see you on the way back.

CHAIRMAN SUTTON: The Postum Cereal Company also borrowed these films and the miniature elevator from Mr. Price's department. We put on an exhibition and we took one precaution, purposely, in giving our demonstration. We gathered the dusts, as did the Kellogg company, but before blowing them into the miniature elevator we put them in a mass on the table and touched a flame to them and none of them would ignite in that way, but blowing them into the elevator, suspending them in the air, mixing them with the oxygen, they exploded, every one of them.

Hazards from Dusts in the Event of a Fire.

MR. PRICE: This afternoon at the request of the Detroit Fire Department, I am going to show this same film. Some of our greatest disasters have been as a result of dust explosions. For instance, firemen have attempted to draw the contents of a bin after they thought the fire was out. We had one case in Milwaukee, a furniture factory where there was no evidence of any fire remaining. The sprinkler heads had worked and the firemen could not see a fire but they did not want to go back without making sure the fire was out, so the chief kept one company of 12 men and they pulled the contents of a bin. It was about 30 feet deep. It was fine wood dust, and when they were doing that an explosion occurred and six of the men were killed—the captain and five others—and that same thing has occurred in many instances. That is one type of hazard. The contents of such bins should never be drawn during a fire or after a fire, but they should be wetted down and the contents left in. You can appreciate the reason for that, because if you are pulling the contents out into a room and get the right mixture of dust in the room you are going to get an explosion.

Now, another hazard has been in the firemen approaching these plants during a fire. There was a case of this character in a cinnamon factory, where 18 men were caught and who were right over the bins when the bottoms dropped out and the cinnamon dust exploded. The other point the chairman referred to brought this to my mind. This pile of dust will not explode unless you diffuse it with the air. In some cases we have had explosions where the firemen could not understand what happened. They approached the building and it blew up. We had a case in a cork factory where they were manufacturing oil cloth. It seems a heavy stream of water struck the dust and blew it into the air. If it gets into the air you are going to have an explosion. That is a very interesting development. The firemen should not have approached it with a very heavy stream of water, because the shooting of the heavy stream

into the pile of dust will blow the dust into the atmosphere and if there is fire an explosion will follow. We have had several cases in the last year where men have been killed.

MR. SMOKE: Doesn't that same thing occur where you have static electricity in a mill?

MR. PRICE: There is a possibility of that if you are using air for removing dust from machines. Of course static sparks will ignite dust, but I don't think it would be safe to blow dust if you were near a fire or source of ignition.

MR. SMOKE: I was getting back to Postum's idea of the short circuit and the charred wood and dust.

MR. PRICE: The static as a rule would have to come from some operating machinery.

MR. SMOKE: Belts and things.

MR. PRICE: It is a very interesting thing. We have gone out where they are threshing grain, between the Cascades and Rockies, where there were as many as 400 explosions in six weeks in threshing machinery, right out in the open fields. It is a very low humidity and a high temperature and the wheat entering the machines, the friction of the straw on the metal surfaces, gives the same effect as if you stroke a cat's back. You build up a static charge and the static sparks ignite the grain dust. The first thing we did was to ground the machines like a lightning rod system on a house. Of course it was difficult because the ground was dry and it had to be moistened. They burned up so many machines insurance companies would not carry the risk and it was a very pretty problem to deal with. I think it has been controled to this extent: we have placed fans on the decks of the machines and have used the grounding method; but it indicated beyond a shadow of a doubt that the static sparks were sufficient to ignite the dust. Some engineers said it was too cold a spark to ignite the gas. We have had many cases recently in industry to contradict that. It appears as if certain of these dusts will electrify themselves by friction.

CHAIRMAN SUTTON: The present problem is to dispose of the dust?

MR. PRICE: I think so, yes.

CHAIRMAN SUTTON: I am sure we have many good things today, and we have a very interesting talk coming next by Mr. Thomas S. Strobhar.

DANGERS FROM FOREIGN OBJECTS IN FOOD PRODUCTS

Thomas S. Strobhar, Wagner, Taylor Company, Philadelphia, Pa.

Some of you are manufacturers of food, some dispensers; we are all consumers, for we must eat to live. My particular plea is to safeguard the public from foreign objects in the food they eat, and at the same time protect the manufacturer and the dispenser from a comeback on the part of the injured public with unreasonable and exaggerated claims.

The numerous claims brought by consumers of food on account of the presence of foreign objects has resulted in practically all casualty insur-

ance companies looking askance at insuring manufacturers or dispensers of food, especially the chain restaurants and chain stores.

I have in mind a certain chain restaurant and retail store, the insurance of which has been offered to every large insurance company, either to be declined or cancelled. In order to find out why this was so, I made a study of all claims brought against this concern, analyzing them as to cause and effect, and learned certain facts which may be of interest.

Six Months Summary

Number of Houses in Operation.....	28
Cause:	
Glass	29
Stone	11
Nails	7
Tacks	5
Wood	4
Miscellaneous	4
Live Stock	3
Wire	3
Bones	3
Shot	3
Tin and/or Solder.....	2
Pits	2
Total	76
Effect:	
Nervous Indigestion	3
Broken Teeth	19
Lacerations and/or Infections of mouth and/or throat.....	51
Miscellaneous	3
Total	76

A study of this table shows that the larger numbers of injuries were found to be due to the presence of glass, stones, nails, tacks, wood; whereas livestock was a comparatively small cause, showing at a glance general cleanliness.

The presence of foreign objects in food naturally causes alarm, resulting in some cases in nausea; and a large number have resulted in lacerations of the mouth or throat, with consequent infection; also broken teeth, and usually a loss of time from business. It is against all this that a defense must be developed.

There is very little law on this subject, but the cost of investigation and of building a defense against shyster lawyers, especially in this particular kind of claim due to negligence or implied warranty, is very expensive. A lawyer who pursues a nuisance claim or who seeks an amicable settlement out of court should not be encouraged but should be faced in court and no claims paid until the court so decides.

To return to the analysis, after a six months' drive, the number of claims was reduced from 25 to 13 a month.

How has this been done? By organizing for safety. It may seem a coincidence that the ratio of the number of accidents to the public is in direct proportion to the number of accidents to the employee; but it simply means that if the employee is deeply interested in the idea of safety for himself and others there will be fewer accidents to the public and vice versa. Safety committees, safety sections, plant inspections, analysis of the principal causes of accidents, all play their part in the campaign to eliminate foreign objects in food.

Safety activity should begin at the time the applicant applies for a position. Safety should be stamped indelibly upon his mind and he should be made to realize the importance the management gives to safety, and by keeping everlastingly at it the entire personnel of any organization may become imbued with the safety movement and, naturally, result in greater efficiency and safety to the public and the employee.

A Concrete Example Is Stones in Beans

Let us consider as a concrete example of our problem, the presence of stones in beans—the ubiquitous bean—for there are perhaps more orders of the homely bean served from coast to coast than any other cooked food. The stone which is usually found in beans closely resembles the bean in appearance and perhaps goes undetected until someone's tooth is broken. The same problem was faced by coffee roasters years ago, and eliminated by a device which all bean packers would do well to adopt. An apparatus was devised whereby coffee is placed in a hopper on the floor, is passed through metal chutes through the floor and lifted up by air into storage bins; all but the stones or nails which are not lifted but sifted out at the bottom of the chute.

Or take, as an example, nails which are sometimes found in cereals. This foreign object is removed by having the grain spread on a jiggling table, enclosed on the sides but open at the ends, with a trough leading into a metal chute. Underneath the table are long bar magnets. As the table moves back and forth the grain is jiggled to the ends and as it passes over to the edge of the chute, any nails or pieces of metal adhere to the magnet.

Glass, which I found to be the cause of the largest number of injuries, is frequently accounted for by broken electric bulbs having fallen into uncovered containers, or by broken containers themselves. Glass is found in sugar because the lid is often screwed on carelessly or too tightly, or because when a tray holding a number of bowls is jarred and the edge of a bowl cracked, a piece of glass may fall into the sugar.

The department for assembling food is often too crowded and too poorly lighted. These conditions, if present, can be changed. There should also be a separate room where boxes and containers can be opened and thus remove from the assembling department the hazards attendant on unpacking, such as nails, nail heads, splinters, etc.

Constant supervision must be made by a foreman to see that the employees are using due care in handling food so as to avoid the presence of foreign objects. Too much emphasis can not be placed on the need

of daily inspection of the employee as to neatness and cleanliness. During the last six months we have only had one single claim for the presence of pins in the food. Prior to this, it was customary to have as many as five in one week. The pins were worn by the serving and waiter girls and those in the bakery and kitchen. Pins worn by factory girls should be prohibited and their need replaced through garments that may be tied on.

In this brief space I have only touched on a few of the foreign objects in food, how they can be removed and the eating public protected. Each one of you will have his own special problem to work out but we can all get together in taking every precaution for safety in the preparation of food or, if accidents will happen, by fighting nuisance settlements of unjustifiable claims through cooperation.

Foreign Particles in the Food a Serious Problem

MR. EGGERT: I am absolutely in accord with Mr. Strobhar's idea of fighting shyster lawyers. We come in contact with them ourselves and we know our own experience.

CHAIRMAN SUTTON: I think we all agree with that. You may save some money in one case by conceding to the lawyer and settling your claim, but you are opening the gate for all the rest of the shyster lawyers in the country.

MR. EGGERT: They are worse in New York City than in any other place.

CHAIRMAN SUTTON: I said, jocosely, in opening the session yesterday, that I thought we might include not only food manufacturers and food dispensers, but food consumers. We learned from Dr. Jackson Monday afternoon, and from Mr. Strobhar this morning, that there is great possibility of applying safety to food consumption, and it might be well either to adopt that phase in this Section or organize a Section in the National Safety Council to teach the people how to eat.

It may be that food manufacturers can find some way to prevent foreign particles getting into food some day, but they haven't found it yet, and when you fight it one way you find it popping up in another. I know in our plant we did as Mr. Strobhar has suggested. We provided aprons that tied on and the girls were not allowed to wear pins. We also ruled against their having pockets so that they could carry anything to the machines in their pockets. But there are certain articles that girls must have, and when we did that they would carry these little articles in the front of their dress; when they leaned over the food those things would sometimes drop in, and we had a veritable avalanche of shine eradicators. So now we don't know where we are.

MR. SMOKE: There could be a long discussion had between Postum and Kellogg on that subject.

MR. WIEDENMANN: I think in the food industry welfare work is very important because I have known of cases where there has been malice on the part of the employee toward the employer and they would see

that some foreign substance would get in the food before it went out. We have had cases like that.

MR. EGGERT: That happened more frequently during the war.

CHAIRMAN SUTTON: We had a case just like that. The girl got angry at her forelady so she took some of these little rubber bands and she cut them in about half inch pieces and threw a handful of them into a package, and we got a report from the customer that the grape-nuts was full of worms. I am glad you suggested that, Mr. Wiedenmann. That is another application of welfare—how it reflects to the employer by protecting against just such things as that.

We are now going to have the pleasure of hearing about the "Specific Hazards in the Sugar Industry," by Mr. Dienst.

HAZARDS AND THEIR PREVENTION IN THE SUGAR INDUSTRY

Alexander Dienst, Safety Supervisor, National Sugar Refining Co. of New Jersey, Long Island City, N. Y.

In days gone by sugar refineries were referred to as slaughter houses with respect to accidents, but today they are as safe to work in as any other well guarded industry. This is due to continual striving for safety on the part of the management and its staff.

A sugar refinery consists of much high speed and heavy machinery, such as centrifugal machines, conveyors, elevators, minglers, high pressure pumps, etc.; also hot water and liquor tanks which are of a most hazardous nature. No expense has been spared in properly guarding all these hazards. This is a most essential step. The next is to educate your workers to think safety, and continually keep this thought in their minds by having an occasional rally with a safety talk by some expert safety engineer who can put the idea over, and by displaying safety bulletins all over your plant. This counts for much, as the pictures bring the safety thought home to the men when other methods sometimes fail. A most pathetic picture was published recently under the caption, "Why Doesn't Father Come Home?" These words were uttered by a little girl standing at the gate of a small cottage awaiting the return of her father from his day's work. Instead, notice came that he was lying in a hospital—a victim of carelessness. Articles of this nature have a powerful influence upon the minds of workers.

Team work produces results; train your men's minds upon one thought, "Safety," and have them pull together and you will meet with success.

Promote the fullest cooperation in your plant. This can be done through the foremen only, by bringing them together at an occasional meeting. We find the best time to do this is immediately after working hours in your cafeteria (if you have one) and serve them with a dinner and a smoke. They then become warmed up and express their ideas of safety freely and point out the weak spots in their various departments, if there are any. Encourage them to talk, don't throttle them.

Walter P. Chrysler says: "If you know how to do your job better, don't hesitate to tell your boss about it. Men who advance far do not refuse to listen to suggestions from men they employ, but welcome practical suggestions for improvement.

Bring the men on the firing line into the picture and fix their responsibility. Show them the main objective toward which your organization is directed. Keep this objective continually before them in visual form if possible. Show them the obstacles which confront them and the challenge which is laid down before them. Express your confidence in them, and make them feel that success rests upon their shoulders.

The problem of accident prevention may be briefly stated as follows:

Make it some person's business to discover unsafe conditions and practices and then do everything possible to eliminate them through active cooperation between this person and those responsible for the performance of the work.

Education is obviously required, but discipline to enforce the results of education is equally essential.

If you do not get cooperation voluntarily—force it.

We had a case where our mechanics deliberately removed the glass guards on the emery wheels before using them. We immediately placed a sign on each wheel reading: "Don't use this wheel without the guard in place or wearing goggles, otherwise you will be discharged." This produced results.

The Birth of the Safety Organization

Now let me tell you about the birth of our safety organization.

Some five years ago a safety rally was held in Long Island City by the Metropolitan Safety Council, then a local branch of the National Safety Council (of which I was a member). We attended this meeting, fourteen strong, and afterward adjourned to a dining room nearby where one of the party suggested that we start a safety organization in our plant and we then and there organized and elected our officers.

One week later we called a meeting in our main office after work and invited our plant manager to attend.

He met with us and commended our action, told us we had his hearty approval, that we could count on his support, and assured us that the management would back us up to the full limit.

We enlarged the organization to include all first class foremen in the plant.

The following object was unanimously adopted:

"The object of this organization is to promote safety throughout the refinery and to lend encouragement to public safety, to the end that accidents may be prevented and better industrial conditions and civic life may be promoted."

After holding several meetings we found that matters were getting complex. As important questions came up, there were too many conflicting opinions and we got nowhere (a case of too many cooks spoil the pie).

We then organized an executive committee of six, consisting of the assistant superintendent, assistant consulting engineer, master mechanic, production manager, personnel manager and safety supervisor, who meet bi-weekly during business hours and discuss and pass on all matters of importance and report back to the general committee who meet monthly around the table. This works out very satisfactorily as it gives everyone a chance to talk for himself.

We have three factory inspection committees, each consisting of three first class foremen who serve four months during the year. They, with the secretary, make a complete tour of inspection through the plant monthly and note any possible hazard they may find.

We also have a safety inspector who makes an independent inspection weekly and bends every effort to find hazards the committee may have overlooked. The moral effect keeps the committee alive.

Details of the Practical Safety Plan

These reports are discussed by the executive committee at their meetings and orders are given to make the necessary changes to eliminate the hazards reported.

Giving the executive committee power to act on these questions saves much lost time.

A complete report of all matters transacted by the executive committee is made to the general committee at their monthly meeting for discussion.

The officers of the safety organization are safety supervisor, safety engineer, safety inspector and secretary (who keeps all records and attends all meetings).

Our dispensary, or first aid room, maintains a medical department consisting of a full time graduate nurse and a part time physician who visits the plant one hour each day and is on call at all time for emergencies.

All cases that receive first aid treatment by the nurse are ordered back the following morning for examination by the doctor who passes on the merits of each case and a complete record of same is filed.

The personnel of this department is such that the workers feel entirely free to come for treatment or advice for the most trivial accident, as they are always treated with courtesy and kindness.

We are running a safety contest and distributing cash prizes to each foreman and sub-foreman of the five departments having the best safety records for each six months, and those winning first prize also have their names inscribed on a banner displayed in a conspicuous place in our cafeteria. This contest is based on hours lost and the results are obtained from past experiences and a suitable allowance for the hazard in each department.

All our men are examined for hernia before employment.

We have a fast rule that each mechanic before starting to repair any machinery must remove the fuse from the fuse box and carry it with him, so that no other person can possibly start the machine while

he is working on it. There is also a sign placed on fuse box reading: "Hands Off—Repairs Being Made."

When instructions are given to clean or repair a bucket elevator the foreman locks the fuse box (which automatically lights a red light on top and at the elevator boot), and keeps the key in his possession, giving the man a key to unlock the boot, which he is not supposed to do unless the red light is on. After the work is finished the man locks the door in the boot and returns the key to the foreman in person and he in turn opens the fuse box with his key and starts the elevator. We place the entire responsibility on the foreman.

I will quote our accident record since 1922 which shows a marked improvement.

ACCIDENTS CLASSIFIED

Year	No. of Accidents		Percentage Based on Full Time Workers		
	Total	Monthly Average	No Lost Time	Lost Time	Total %
1922	471	39.25	2.12%	1.47%	3.59%
1923	226	18.83	0.71%	1.22%	1.93%
1924	227	18.92	0.89%	0.83%	1.72%
1925	140	11.67	0.33%	0.74%	1.07%
6 Mos.—1926	67	11.17	0.23%	0.73%	0.96%

As a result of the workings of the safety organization every piece of machinery is guarded as far as practicable and various safe practices have been inaugurated.

Among the material effects of this work are the following which in most cases are characteristic of the sugar industry:

- 1:—All new installations are inspected thoroughly by the safety engineer and are not allowed to be put into operation unless O. K. from a safety standpoint.
- 2:—Centrifugal Machines: Individual vertical motor drives have replaced the horizontal line shafting.
- 3:—Char House: a ventilating system has been installed to drive out the intense heat, making working conditions more favorable.
- 4:—Boiler House: a ventilating system has been installed to expel the gas fumes, thus lessening the liability of men being overcome.
- 5:—Belt Conveyors have been placed as near the ceiling as is practical and in other cases railings have been placed around them.
- 6:—Live Steam Lines: at each live steam outlet a bottle of carron oil and some cloths are placed, in order to give a sufferer from burns some relief before going to the first aid room. All foremen are trained how to use it.
- 7:—Ash Cellar: water has been run in with the ashes to lessen the amount of flying dust and so lessen the chance of eye injuries.
- 8:—Dust Collector: a dust collector has been installed in the powdered sugar department, which makes working conditions better. This collector deposits the dust in water, thus decreasing the fire hazard.
- 9:—Notice: we hand each new employee a memorandum reading as follows:

NOTICE—Read Carefully

It is the policy of this company to cooperate with its employees to prevent accidents.

Should you meet with an accident, no matter how slight (if only a scratch) report to your foreman at once, and go to the First Aid Room for treatment.

This may prevent infection, loss of time and much suffering.

This notice is printed in four languages, English, Polish, Italian and Spanish.

We also have a Safety Boosters Club consisting of all employees. Each member is presented with a Safety Boosters button.

CLASSIFIED PERCENT OF ALL ACCIDENTS

Year	Hand Labor	Infections	Burns	Eyes	Falls	Machinery	Miscellaneous	Total
1922	49%	4%	4%	13%	14%	9%	7%	100%
1923	63%	3%	2%	9%	8%	3%	12%	100%
1924	64%	7%	3%	10%	10%	3%	3%	100%
1925	70%	2%	4%	7%	8%	4%	5%	100%
6 Mos.—1926	64%	3%	4%	14%	6%		9%	100%

Actual results which are accomplished by saving man from pain and suffering have a tendency to promote good will among workers. Workers' good will has definite value as a factor in increased productivity; yet, important as productive efficiency may be, unquestionably the conservation of human life, health and happiness is a much more important consideration.

MR. SMOKE: May I ask the number of employees you have?

MR. DIENST: Twelve hundred. This is just one plant that I look after.

CHAIRMAN SUTTON: I want to say that I think next year at least, so far as my influence will be effective, we shall have a less number on each program, and have a larger number of sessions and opportunities for further discussion—more discussion than we have had. Moreover, I am going to endeavor to convince the rest of the committee that we ought to have a luncheon and get-together and get acquainted with each other as some of us did at breakfast one morning. It is very helpful.

Now, we are going to hear something of specific hazards in bakeries by Mr. Allan H. Wiedenmann, manager, engineering department, Casualty Reciprocal Exchange, Kansas City, Missouri.

SPECIAL HAZARDS IN THE BAKING INDUSTRY

Allan H. Wiedenmann, Manager, Engineering Department, Casualty Reciprocal Exchange, Kansas City, Mo.

It will be my endeavor to cover my subject by a review of the causes of accidents in 100 bakeries for a period of one year.

While this experience may not be indicative of the entire industry, observation and experience show that there will be but few causes that

escaped listing. I am sure that if there are any such causes, the frequency thereof will be of no consequence.

The plants analyzed have been taken at random from the subscribers at Casualty Reciprocal Exchange having annual payrolls varying from \$3,000 to \$200,000. Thus, we get what may be referred to as average plants, going from the smallest to those with a comparatively high payroll exposure for a bread bakery.

The year 1924 has been used in this survey, because it is the latest year in which complete information can be had on the time lost and labor costs.

In analyzing the 100 bakeries producing the 384 accidents, we made some interesting preliminary disclosures. For instance, there were 58 of the 384 claims not tabulated because there was no time lost, no medical expense, and no compensation expense; 144 medical cases had no lost time; 117 medical cases involved lost time, with a total number of 704 days out, and 65 compensation cases with 1959 days lost time. The severity of these 65 cases can be judged by the fact that there were only four costing more than \$300 in combined medical and compensation cost, three of which were from \$300 to \$500, and one cost approximately \$1600. There are no dismemberment cases other than the loss of fingers.

While the 100 plants reported 384 accidents, there were 36 that did not report a single case, 21 reported only one accident, and 21 reported more than five accidents; only nine of the total number had more than 10 accidents.

Excluding the plants reporting no accidents and the 58 claims without loss of time, medical, or compensation expense, we have a remainder of 326 cases, which have been divided into the following 25 causes:

Number Proximate Causes	Medical Only		Compensable			
	No.	Time Lost	Non-Serious	Serious	No.	Time Lost
44 Falls of Persons.....	40	121	4	132	—	—
35 Handling Objects.....	33	71	2	14	—	—
31 Striking Against Objects.....	23	49	8	140	—	—
23 Operating Machines.....	10	7	12	321	1	186
23 Pushing or Pulling Objects.....	17	50	6	209	—	—
21 Gases, Acids, Hot or Corrosive Substances.....	18	20	3	63	—	—
18 Falling Objects.....	17	47	1	8	—	—
17 Machine Exposed Moving Parts.....	16	32	1	90	—	—
15 Lifting.....	11	37	4	142	—	—
15 Cleaning Machines in Motion.....	8	15	7	254	—	—
12 Hand Tools.....	11	24	1	13	—	—
10 Falling Objects Handled by Inj.....	8	29	2	37	—	—
10 Caught Between Objects.....	9	69	1	46	—	—
10 Struck by Objects.....	9	4	1	7	—	—
10 Protruding Nails.....	7	33	3	72	—	—
7 Explosions, Gas.....	5	16	2	40	—	—
7 Slivers, Wood.....	6	16	1	14	—	—
5 Foreign Objects.....	5	—	—	—	—	—
4 Oiling, Repairing, Adjusting Mach's.....	—	—	4	154	—	—
2 Horse Play.....	1	38	1	17	—	—
2 Broken Glass.....	2	4	—	—	—	—
2 Slivers, Steel.....	2	10	—	—	—	—
1 Defective Flooring.....	1	9	—	—	—	—
1 Intense Heat.....	1	2	—	—	—	—
1 Electricity.....	1	2	—	—	—	—
326 Totals.....	261	704	64	1773	1	186

FALLS OF PERSONS:

Ladders, pushing objects, stairs, wet and greasy floors, tripping, slipping on level and an elevator shaft contribute to this cause, and with the

exception of one case, accidents were not due to defective equipment or the absence of safeguards. In my opinion, the elimination of this cause will require carefully prepared educational campaigns:

HANDLING OBJECTS:

A total of 35 accidents come under this cause, 14 from handling defective or rusty bread pans, eight hot bread pans, two defective dough troughs and 11 miscellaneous objects. The prevention of this cause requires careful inspection and maintenance of bread pans and dough troughs. Also that employees be instructed to use pads or gloves, with ample protection of the fore arm in handling hot pans.

STRIKING AGAINST OBJECTS:

This cause is purely a case of carelessness or clumsiness on the part of the injured and can be remedied only by instilling the safety habits.

OPERATING MACHINES:

These accidents are due to the point of operation hazard of the machine which frequently becomes jammed or the dough sticks and without thinking the employee attempts to get the dough feeding properly again by pushing it with his hand while the machine is in motion. The machines on which the majority of these accidents have occurred are the dough mixer, divider dough brake and moulding machine. Safety rules on this cause should be posted instructing employees to stop machine before relieving jam. Enforcement is imperative.

Other Classes of Minor Accidents**PUSHING OR PULLING OBJECTS:**

Seventeen of these were bread racks, four dough troughs and one box. The employee jammed the bread rack against another one, wedging his finger between or, in pushing dough trough through a door, would strike the side of the door jam with his hand. There were also two hernias and four strains caused by attempting to push or pull a rack or trough too heavily laden. Prevention of this cause can be accomplished through proper instructions on handling objects and careful physical examinations.

FALLING OBJECTS:

Most cases occurred where the employee was struck while passing by or coming in contact with improperly piled stock and material, such as bread pans, rolls of paper, sacks of flour, etc. The prevention of this cause will require the careful inspection of stocks and seeing that they are safely piled.

MOVING PARTS: ARE DIVIDED AS FOLLOWS:

Eight gears, five belts and pulleys, two chains and sprockets, one set screw and one shaft end. Accidents of this nature can be prevented by efficient safeguarding.

LIFTING:

These accidents in most cases are caused by the employee not properly lifting or attempting to lift too heavy a load, in each case resulting in a hernia or a strain. The elimination requires instruction in lifting properly and careful physical examination.

CLEANING MACHINES IN MOTION:

Machines entering into this cause are moulder rolls, dividers, dough mixers, rounders, and bread wrappers. Machines must not be cleaned while in motion.

HANDLING TOOLS:

The majority of these were caused by the careless handling of the (dough) scraper commonly used in bakeries in cleaning machines and other equipment.

FALLING OBJECTS HANDLED BY THE INJURED:

In most cases this was purely carelessness or too much speed. Prevention can only be accomplished by instilling the safety habit in the employees.

You can readily see that the majority, in fact nearly all, of these accidents have occurred through thoughtlessness and violation of safe practices on the part of the injured. This is true also of the remaining causes whose occurrence has not been so frequent.

There is no doubt that these causes can be eliminated only through educational measures such as frequent instruction, oral and written, in the proper operation of machines, accident prevention contests, safe practices, and safety bulletins characterizing the most prolific causes.

Experience Favorable from an Insurance Standpoint

The point desired to be emphasized is that all of these plants have had periodical inspection for the removing of dangerous conditions evident to competent safety engineers. They have also had the bulletin service, which, while general in character, continually reminded the employees of the possibilities of accidents and their basic causes.

With these considerations taken into the analysis of the claims, we believe the experience for this period may be considered favorable from an insurance standpoint. However, much yet remains to be done in the prevention of accidents, through perfecting more "fool-proof" bakery machinery, and through the careful planning of educational campaigns. Our own observation of other plants where the same type of safety engineering and accident prevention service has not been in effect would indicate that the baking industry outside of the plants served at Casualty Reciprocal Exchange, has a far greater frequency and severity of accidents.

In the past, I believe the point of operation of the dough mixer has been the greatest hazard, causing death and permanent disabilities, all of a gruesome nature, and all resulting from the bakers attempting to remove dough, or clean the machinery while the power was on. There has been no practical way devised to guard the mixer so that the power could not be applied when the mixer is in a tilted position; however, companies are now manufacturing the tilting type mixer with an auxiliary motor, so that power is applied to the rotating of the mixing arm only so long as the operator keeps his finger on the safety button located in front of the dough mixer. This permits him to have one arm free for the removing of dough

or the cleaning of machinery, and likewise places the control of the machinery under his finger at all times.

It is hoped that this type of mixer will rapidly replace the old type, although the bakeries still demand the old type, and manufacturers, eager to satisfy this demand, and with no thought of safety, continue to make them. That same thing applies to a great many machines manufactured today without proper safety devices. There has been a noticeable improvement in the last several years in the manufacturing of bakery equipment, and you will seldom see modern equipment now which does not have the moving parts completely guarded before leaving the factory. As a whole, we believe the manufacturers of baking equipment should be commended for the improvement they have made from a safety standpoint.

There is much to be done for the elimination of accidents in the baking industry. I am not only expressing my personal opinion, but the opinion of my principals, when I say that the Food Section of the National Safety Council is invaluable in promoting safety among bakeries, as this section will concentrate its activities on the methods of preventing accidents in the foods industry.

ADJOURNMENT

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1926

TRANSACTIONS

OF THE

**National Safety
Council**

**FIFTEENTH ANNUAL
SAFETY CONGRESS**

VOLUME II

INDUSTRIAL SECTIONS

(M to W, Inclusive)

Volume I of these Transactions contains General Sessions and Industrial Sections A to F, inclusive.

Volume III of these Transactions contains the Public Safety and Education Sessions.

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NOTE

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

Marine Section

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Potter Transportation Company, New York City.

2ND VICE-CHAIRMAN: ROBERT F. HAND

Standard Oil Company, (N. J.), New York City.

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4TH VICE-CHAIRMAN: F. P. FOISIE

Waterfront Employers' Association, South Seattle, Wash.

SECRETARY: A. R. BUSH

The Barber Asphalt Company, Maurer, N. J.

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PROGRAM: R. E. PROUTY, Chairman

Aetna Life Insurance Co., New York City.

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STEVEDORING: F. H. WEEKS, Chairman

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RESEARCH: CAPT. IRVING L. EVANS, Chairman

United States P. & I. Agency, Inc., New York City.

PUBLICITY: ARTHUR M. TODE, Chairman

The Texas Co., New York City.

INFORMATION AND SERVICE: MILTON D. MCINTYRE, Chairman

Pickands, Mather & Co., Cleveland, Ohio.

ENGINEERING REPRESENTATIVE: W. E. WELCH

The Travelers Ins. Co., New York City.

October 26, 1926

W. E. WELCH, Chairman

Safety Engineer, The Travelers Insurance Co., New York City

THE first session of the Marine Section of the National Safety Council Congress convened at 9:30 o'clock, Tuesday morning, October 26, 1926, in the Statler Hotel, Detroit, Michigan. Mr. W. E. Welch, chairman, presided.

Fifteenth Safety Congress

CHAIRMAN WELCH: We of the Executive Committee desire to thank you for your presence here. There are not so many in quantity but the quality is good. We extend a welcome to you all and also the membership of the Marine Section.

The first thing on the program is a report from your chairman for the year. I haven't much to report. We have increased our membership slightly and it is in good shape. In addition to this good membership, some of the steamship lines are placing safety aboard their ships along the lines of the activities we have suggested through the Marine Section and the Executive Committee. I have in mind the Texas Company, the Garland Steamship Company, the Standard Oil Company, and so on.

We started our news letter about the first of the year and we have as good and instructive a news letter as any Section in the Council; and that has all been done through the hard work of our news editor, Mr. Bush.

In addition, we have held a meeting, every month, of the Executive Committee, conferring together, giving assistance to those who were at the meetings in connection with safety aboard ships. We have placed bulletin boards aboard ships, and so on.

We will hear from Mr. A. R. Bush, chairman of the Program Committee.

Reports of Two Committees

A. R. BUSH (The Barber Asphalt Company, Sewaren, N. J.): The activities of the Program Committee during the past year may be summarized chiefly in the items of this program which we are about to present to the Section, in all of which we are confident you will be greatly interested.

In addition to the program planning, the committee, upon request of the Section Chairman, inaugurated in February a News Letter which has been issued at regular intervals up to the present time. It is hoped this feature has been a real service to the membership for this is its sole purpose and justification for continuance.

CHAIRMAN WELCH: Now from Mr. Edwards, Statistics Committee.

R. F. EDWARDS (Prudential Insurance Company, Newark, N. J.): My committee can report progress. The work has been principally an effort to gather statistics. Probably the most valuable work is on the way now, which is an analysis of the P. and I records, of which Captain Evans will give you more information in his paper. That promises to be a very valuable contribution when it is finished. I know we will have a very good line on health hazards in the direction of disabilities and fatalities in the marine industry.

An effort has also been made to get real statistics from a number of oil companies, and many matters are still in the air. It has not been definitely settled as to just what we can do in that line.

CHAIRMAN WELCH: The next in order is appointment of the Nominating Committee and I will name the following for this committee:

Robert F. Hand, Standard Oil Company.

Arthur M. Tode, The Texas Company.

Captain W. P. Kain, American Steamship Owners' Mutual Protection & Indemnity Association, Incorporated.

These gentlemen will please report at tomorrow's session the designated officers and chairmen of committees for the coming year.

We will now listen to a paper by Mr. D. N. Hoover, Supervising Inspector General, U. S. Steamboat Inspection Service, Department of Commerce, Washington, D. C.

ESSENTIALS OF MARITIME SAFETY

D. N. Hoover, Supervising Inspector General, Steamboat Inspection Service, Department of Commerce, Washington, D. C.

Safety of human life, the thing for which the National Safety Council exists, safety at work, on the street and in the home, is something that has developed increasingly in modern times. It has become the purpose of many associations to conserve human life, and as we travel upon railroad and steamship, as we undertake to cross busy thoroughfares, we may see at every hand the effort that is made by man to prevent accidents and possible loss of life.

So far as the service of which I am the head is concerned, you are interested in knowing the policy that is followed in the Steamboat Inspection Service with a view to carrying out the constructive principles for which you gentlemen are working; and it may be stated that our first thought is to make the thing itself safe from a constructive point of view. To illustrate, a man may have a sore upon his body and a lotion or salve may help him; but it should be remembered that if his blood were pure there would be no sore; hence the intelligent physician, while he may undertake to give local relief, will also seek to find the causes back of the condition with which the man is suffering.

Applying that principle to the inspection of ships, we first endeavor to see whether the hull of a vessel is in proper condition. The Statute, in brief, requires that the local inspectors shall, at least, once in every year, carefully inspect the hull of each steam vessel, within their respective districts, and shall satisfy themselves that it is of a structure suitable for the service in which she is to be employed, has suitable accommodations for passengers and crew, and is in a condition to warrant belief that she may be used in navigation with safety to life, and that all requirements of law in regard to fires, boats, pumps, hose, life-preservers, floats, anchors, cables, and other things are faithfully complied with. The local inspectors shall also, at least once, in every year, carefully inspect the hull of each sail vessel of over 700 tons carrying passengers for hire and all other vessels and barges over 100 tons burden carrying passengers for hire within their respective districts, and shall satisfy themselves that each is of a structure suitable for the service in which she is to be employed, has suitable accommodations for the crew, and is in condition to warrant the belief that she may be used in navigation with safety to life.

Whenever any inspector or assistant inspector shall find on board any

vessel subject to the provisions of this title, any equipment, machinery, apparatus, or appliances not conforming to the requirements of law, he shall require the same to be placed in proper condition by the owner or master of the said vessel, if possible; and if he shall find on board any such vessel any life-preserver or fire hose so defective as to be incapable of repair he shall require that the same be destroyed in his presence. Local inspectors have power to enforce these requirements by revoking the certificate of the vessel, and by refusing to issue a new certificate until the requirements shall have been fully complied with.

In the inspection of the hull, the inspectors are called upon to see that the vessel is properly constructed, whether she possesses proper strength, whether her bulkheads are properly placed and constructed and, since the Eastland disaster, the inspectors have given increased attention to the matter of the stability of ships. In a word, we seek to do with a ship what a municipality seeks to do with a building, for in the building it matters not how excellent the walls may appear or what kind of a roof may be required, we must be certain what kind of a foundation the building has. Hence, in the case of a ship, regardless of what may be placed in her in the matter of boilers and machinery and on her in the way of life saving equipment, the important thing to determine first is that the ship, herself, is good.

No Ship Is Better Than Her Boilers

If one speaks to an engineer, he will hear him say that no ship is better than her boilers. The law contemplates the importance of this feature, and in the Revised Statutes states that "The local inspectors shall also inspect the boilers and their appurtenances in all steam vessels before the same shall be used, and once at least in every year thereafter, and shall subject all boilers to the hydrostatic pressure. All such vessels shall comply with the following requirements: That the boilers are well made, of good and suitable material; that the openings for passage of water and steam, respectively, and all pipes and tubes exposed to heat, are of proper dimensions and free from obstructions; that the spaces between and around the flues are sufficient; that flues, boilers, furnaces, safety valves, fusible plugs, low-water indicators, feed-water apparatus, gauge cocks, steam gauges, water and steam pipes connecting boilers, means of prevention of sparks and flames from fire doors, low-water gauges, means of removing mud and sediment from boilers, and all other such machinery and appurtenances thereof, are of such construction, shape, condition, arrangement, and material that the same may be safely employed in the service proposed without peril to life; and the local inspectors shall satisfy themselves by thorough examination that said requirements of law and regulations in regard thereto have been fully complied with. All boilers used on steam vessels and constructed of iron or steel plates, inspected under the provisions of section 4430, shall be subjected to a hydrostatic test, in the ratio of 150 pounds to the square inch to 100 pounds to the square inch of the working steam power

allowed. No boiler or flue pipe, nor any of the connections therewith, shall be approved, which is made, in whole or in part, of bad material, or is unsafe in its form, or dangerous from defective workmanship, age, use, or other cause."

In proceeding in this matter of boiler inspection, the law and the rules require that the plans of Scotch and similar boilers shall be approved by the respective boards of local inspectors having original jurisdiction and, in the case of water tube and similar boilers, the plans are required to first be approved by the Board of Supervising Inspectors. But we do not stop with the mere approval of plans, and require that all material subject to tensile strain shall be tested by an inspector of this Service. That material is tested and stamped with the tensile strength, the initials of the inspector, the stamp of the United States Government, and the number of the plate, and we have in the office of the Supervising Inspector General at Washington a record that is not complete until each plate in every boiler subject to inspection is checked by the record of tensile test reports in the office at Washington.

Equipment of a Life Saving Character

It is also required by the law that at least once a year hydrostatic pressure shall be applied in the ratio of 150 pounds hydrostatic pressure to 100 pounds of steam pressure. Furthermore, at annual inspection, the inspector is required to enter the boiler, if possible, and by actual visual examination and the use of the hammer, determine whether the boiler is in good condition. This matter of annual inspection takes place also with reference to hulls and the hull inspector is required to go through the water bottoms and, in fact, every part of the ship, and determine whether the ship is safe to be certified for another year.

We may now have a vessel excellently constructed, according to plans laid down by the best and most expert naval architects, boilers composed of the finest steel and fabricated by the best workmen and, yet, there is another factor to be considered in the matter of inspection and that is the equipment of a life-saving nature, such as life boats, life rafts, life preservers, davits, hose, etc. Life boats are built according to plans and specifications approved by the inspectors and this is also true of life rafts and life preservers and all of this apparatus is carefully examined at the annual inspection and, in the case of excursion and ferry steamers, at least three times a year in addition. The davits for ships are carefully tested and anyone who has ever seen davits tested, either at the foundry or place of manufacture, must be impressed with the gruelling tests imposed by the Government upon the manufacture of such apparatus. In order to get water to a fire, it is necessary to have hose, but hose is of no avail if it be not strong enough to carry the stream, and hence the inspectors are particularly careful in their inspection to see that it will stand a certain pressure.

Ships, however, are built not for pleasure or for the purpose of giving employees of the Government an opportunity of inspecting them. They are built for use in transporting people and cargo, they are built as a

business investment and hence we have to bear in mind the discipline that must prevail and the regulations that must exist with reference to the transportation of certain kinds of commodities. The law is very particular in laying down certain things that shall not be carried and in stating the conditions under which certain things may be carried as, for example, "No loose hay, loose cotton, or loose hemp, camphene, nitroglycerin, naphtha, benzine, benzole, coal oil, crude or refined petroleum, or other like explosive burning fluids, or like dangerous articles, shall be carried as freight or used as stores on any steamer carrying passengers; nor shall baled cotton or hemp be carried on such steamers unless the bales are compactly pressed and thoroughly covered and secured in such manner as shall be prescribed by the regulations established by the board of supervising inspectors with the approval of the Secretary of Commerce; nor shall gunpowder be carried on any such vessel except under special license; nor shall oil of vitriol, nitric or other chemical acids be carried on such steamers except on the decks or guards thereof or in such other safe part of the vessel as shall be prescribed by the inspectors.

Precautions Against the Hazards of Fire

"Refined petroleum, which will not ignite at a temperature less than 110 degrees Fahrenheit, may be carried on board such steamers upon routes where there is no other practicable mode of transporting it, and under such regulations as shall be prescribed by the board of supervising inspectors with the approval of the Secretary of Commerce; and oil or spirits of turpentine may be carried on such steamers when put up in good metallic vessels or casks or barrels well and securely bound with iron and stowed in a secure part of the vessel; and friction matches may be carried on such steamers when securely packed in strong, tight chests or boxes, the covers of which shall be well secured by locks, screws, or other reliable fastenings, and stowed in a safe part of the vessel at a secure distance from any fire or heat. All such other provisions shall be made on every steamer carrying passengers or freight, to guard against and extinguish fire, as shall be prescribed by the board of supervising inspectors and approved by the Secretary of Commerce. Nothing in the foregoing or following sections of this Act shall prohibit the transportation by steam vessels of gasoline or any of the products of petroleum when carried by motor vehicles (commonly known as automobiles) using the same as a source of motive power: Provided, however, that all fire, if any, in such vehicles or automobiles be extinguished immediately after entering the said vessel, and that the same be not relighted until immediately before said vehicle shall leave the vessel: Provided further, that any owner, master, agent, or other person having charge of passenger steam vessels shall have the right to refuse to transport automobile vehicles the tanks of which contain gasoline, naphtha, or other dangerous burning fluids.

"Provided, however, that nothing in the provision of this Title shall prohibit the transportation by vessels not carrying passengers for hire,

of gasoline or any of the products of petroleum for use as a source of motive power for the motor boats or launches of such vessels: Provided further, that nothing in the foregoing or following sections of this Act shall prohibit the use, by steam vessels carrying passengers for hire, of lifeboats equipped with gasoline motors, and tanks containing gasoline for the operation of said motor-driven lifeboats: Provided, however, that no gasoline shall be carried other than that in the tanks of the lifeboats: Provided further, that the use of such lifeboats equipped with gasoline motors shall be under such regulations as shall be prescribed by the board of supervising inspectors with the approval of the Secretary of Commerce: Provided, however, that nothing in the foregoing or following sections of this Act shall prohibit the transportation and use by vessels carrying passengers or freight for hire of gasoline or any of the products of petroleum for the operation of engines to supply an auxiliary lighting and wireless system independent of the vessel's main power plant: Provided further, that the transportation or use of such gasoline or any of the products of petroleum shall be under such regulations as shall be prescribed by the board of supervising inspectors, with the approval of the Secretary of Commerce. Provided, however, that kerosene and lubricating oils made from refined products of petroleum which will stand a fire test of not less than 300 degrees Fahrenheit may be used as stores on board steamers carrying passengers, under such regulations as shall be prescribed by the Board of Supervising Inspectors with the approval of the Secretary. Provided, that the owner of any automobile in which all fire has not been extinguished and the motor stopped immediately after the automobile has taken its position on any vessel found on navigable waters of the United States and in which such fires do not remain extinguished and the motors remain idle until the vessel is made fast to the wharf or ferry bridge at which she lands, shall incur a penalty of not more than \$500, for which the automobile shall be liable."

You Can Not Get Away From the Human Equation

While this Statute goes into considerable detail, it had to be changed as it contemplated conditions as they existed on western river steamers, and hence we are confronted with the problem of applying a law that is more applicable to a western river steamer than to an Atlantic liner. The law has been amended and the Interstate Commerce Commission has given authority to formulate regulations with reference to the transportation of dangerous articles on board ships, and, eventually we shall have a good constructive code to follow with reference to this subject.

You may have a good ship, well constructed, of the best material, boilers composed of the finest steel, fabricated by the most expert workmen; you may have a sufficient number of life boats and life rafts, life preservers, pumps, hose, davits and, yet you can not get away from the human equation. The Steamboat Inspection Service does not operate ships, although whenever a great disaster occurs, the public seems

to think so. But we do recognize the existence of this human equation and here we come to another arm of our Service which has to do with the licensing of the officers who command these ships, such as masters, mates, pilots and engineers and the licensing and certificating of able seamen and lifeboat men. Licensed officers are required to be examined in the principles of first aid, and deck officers have also to pass an examination in color sense and visual acuteness. Licenses are issued for five years unless suspended or revoked and, in the case of deck officers, at every renewal of the license, the man is examined for color sense. The reason is because, as you know, there is a green light on the star-board side and a red light on the port side of vessels; also, you know that buoys are of different colors and these colors mean something, and, hence, it is absolutely necessary that a deck officer shall have correct color sense so as to avoid possible disaster as the result of collision. Furthermore, all licensed officers have had actual, practical experience on board vessels.

Conduct Investigations of Law Violations

In carrying out this work, we not only license men and take their licenses from them, if necessary, but we also conduct investigations of violations of law by licensed officers, so that you have, in the case of the Steamboat Inspection Service, an organization that is unique in the Federal Government. We have certain administrative functions to perform when we inspect hulls and boilers and certificate vessels and license men. We have certain quasi-judicial functions to perform when we investigate the conduct of licensed officers and in so proceeding the boards of local inspectors have original jurisdiction. From the decision of such boards, an appeal lies to the supervising inspector of the district and from the decision of the supervising inspector an appeal lies to the Supervising Inspector General in Washington. We have legislative functions to perform when the Board of Supervising Inspectors, consisting of the Supervising Inspector General, as president, and the respective supervising inspectors of the districts, formulate rules and regulations and these rules and regulations, when approved by the Secretary of Commerce, have the force of statute law.

Despite the care taken, however, disasters occur, and it will always be so, because we are human and not perfect, and, because, no matter how perfect a thing may be, there will yet be found some flaw in it, and, because, despite regulations, there is always present the human equation.

Yet, this is true—that the inspection work done by this Service has been effective and it may easily be said with reference to the Service that "by its fruits you shall know it," for during the year ended June 30, 1926, 350,370,065 passengers were carried on steam vessels that are required by law to report the number of passengers carried. Dividing this number by 103, the total number of passengers lost, shows that 3,401,651 passengers were carried for each passenger lost; also during the last fiscal year, there were 752 lives saved through apparatus furnished

for that purpose. At the same time, however, it is to be remembered that if it were possible to make perfect rules and regulations, if it were possible to make perfect ships, if it were possible to make men with perfect minds who never erred in judgment, there would be no need for an inspection service and there would be no need for a National Safety Council. But, it is because we recognize our human shortcomings, that we organize ourselves into Associations for the purpose of conserving human life and we have our representatives in Congress passing laws making men be careful whether they will or not.

We would be dead men however, if we only look backward and quote statistics, or if we only look at that which exists and say this is good enough. We are only live men in proportion as we have vision and look toward the future, and there are some things necessary to be done in the matter of laws in order to improve safety conditions on board ship.

For example, we need a new law for boiler pressures that will, instead of writing the matter into a statute and taking all discretion away, give the Board of Supervising Inspectors the discretion of making such rules and regulations as may be necessary covering boiler pressures. I have referred to the necessity for a change in regard to the transportation of dangerous articles. You will recall that we had certain disastrous fires not long ago on the Atlantic coast and this brings up the question of proper fire control, a matter that has been receiving the attention of this Service; and we hope, within the not distant future, to be able to formulate rules and regulations in this respect that will be abreast of the best modern practice, in accord with the best authorities in this country and abroad. In the formulation of such regulations, our spirit is not necessarily to say to a man you *must* do a certain thing or you *cannot* do a certain thing, because, after all, people do not like to be talked to that way; but to take into our confidence, if you please, the various interests which we touch, consisting, upon the one side, of vested interests in many millions of property in the shape of ships, and, on the other side, of men who go down to sea in ships, such as licensed officers, able seamen and lifeboat men; and, last but not least, and, in fact, most important, is what I may term the "third estate," the people, the public, who pay taxes for all of the service and who have a right to obtain efficient service.

Discussion Following Mr. Hoover's Paper

CHAIRMAN WELCH: We all desire to thank you, Mr. Hoover, for that very fine exposition of safety which will make a very good hand book on safety when printed.

R. F. EDWARDS: I would like to ask Mr. Hoover, if you have any details of accidents and what they are?

MR. HOOVER: When accidents occur the licensed officers are required to report them to the local inspectors of the district that has jurisdiction. The local inspectors of the district are required to investigate those accidents and make a report to Washington. Those reports are not made

at the end of a month or a fiscal year, but as they occur, so we have a complete index covering as many details as we can get.

MR. EDWARDS: Does that cover accidents that occur on ships?

MR. HOOVER: Yes, accidents that occur on inspected vessels.

F. P. FOISIE (South Seattle, Wash.): In connection with a proposed longshore compensation act now before Congress, suggestion has been advanced that the authority and jurisdiction of the Steamboat Inspection Service be extended to the ship's gear for cargo handled. Do you care to contend that that is feasible?

MR. HOOVER: I might say in regard to that that during the past years we have gradually been extending our inspection in some directions over things over which we have not had express jurisdiction—ship's gears in particular.

Up at the Great Lakes particular attention has been given to inspection because I have discussed inspection service with supervising heads at Detroit and Cleveland on safety devices.

Answering your question squarely, it ought to be extended, and our service could handle it.

CHAIRMAN WELCH: Having had considerable to do with stevedoring work I believe your activities in our direction would be a great movement.

GEORGE A. MARR (Lake Carriers' Association, Cleveland, Ohio): We feel we are so well acquainted with the Steamboat Inspection Service we do not have to ask questions. They answer them without query. We do find that the Steamboat Inspection Service is ready at all times to cooperate with the vessel interests and that the vessel interests receive a great service from the Steamboat Inspection Service and that inspection protects us from ourselves.

I think Mr. Hoover has brought out the point very distinctly that the human equation is the one most serious question that has to be considered in matters of safety and we always find and always will find that men are not only liable to err, they are willing to err if they can save a little money or save themselves some trouble and effort. The Steamboat Inspection Service is the safeguard we have against committing errors intentionally or unintentionally and our cooperation with them is always to our own benefit.

CHAIRMAN WELCH: We will now hear from Lieut. Commander H. H. J. Benson, U. S. N., Naval Hydrographic Office, Washington, D. C.

THE NAVY'S CONTRIBUTION TO SAFETY AT SEA

Lieutenant-Commander H. H. J. Benson, United States Navy,
Washington, D. C.

The navy's contributions to safety at sea have been of two kinds: Those relating to safety on individual ships such as interest every ship owner and ship master, and safety as it affects the navigation of ships in general. The mission of the Hydrographic Office, where I am on duty, is to assist mariners to travel with safety on the sea. I will, therefore, dwell chiefly on that phase.

Since its earliest days, the Navy has stood for safety at sea, although before 1840 perhaps its chief contribution was in fighting to protect merchant shipping from interference by the Barbary pirates and even by the civilized nations whose ships stopped ours and impressed our seamen into their own service.

The Hydrographic Office was established under the Navy in 1830. To carry out its mission, charts, light lists, sailing directions, and navigational books are issued. Due to changing conditions, earthquakes, erosion, new discoveries and new construction, the charts, light lists, and sailing directions must be continually revised. For this correction, daily and weekly notices are distributed, containing all new information and when urgent, messages are broadcast by radio. To obtain the necessary data, the office is in communication with its surveying ships, other Naval and over 3,000 merchant ships all over the world. In addition, official notices and new charts are received from foreign governments.

The work of the Hydrographic Office has been a steady development from the start. The development during the time of Commander M. F. Maury was particularly marked. This was from 1842 to 1861. Commander Maury during this period, after consulting the log books of thousands of voyages, obtained data from which he was able to determine with considerable accuracy the prevailing winds in the various parts of the sea, and the general flow and strength of the currents. This information was laid down on charts in such a way as to be of practical use to mariners. Until his wind and current charts were issued, little information was at hand regarding the effect, for instance, of the Gulf Stream on trans-Atlantic ships.

An Old Chart Produced by Benjamin Franklin

One of the first current charts indicating the effect of the Gulf Stream was produced by Benjamin Franklin from a drawing made for him by a Nantucket ship captain. This drawing was used to explain why vessels of the Colonists were able to make better time to America than the British mail packets, which were larger and faster ships. The Colonial vessels knew of the Gulf Stream, and utilized it going to the eastward, and avoided it returning, while the British packet ships, not having this information, bucked the current on the trip to the westward.

Since Maury's time, repeated effort and investigation have been made to determine with accuracy as much information as possible regarding the Gulf Stream. These investigations have been carried on principally by Naval officers, and among those who have been specially connected with this work are the late Rear Admiral Pillsbury and Rear Admiral Sigsbee.

The courses that could be followed with best results in taking advantage of the prevailing winds and currents from our ports to other ports of the world, were laid down on the wind and current charts for sailing vessels. In those days, practically all of our commerce was carried on by sailing vessels.

Captain Jackson, commanding the "H. D. C. Wright" of Baltimore, was the first to follow the new track from the United States to Rio de Janeiro.

He made the voyage out and back in the time frequently consumed by the outward voyage alone. The work of planning new sailing routes was continued in all of the oceans as rapidly as data could be collected and utilized. The time saved on voyages from New York to San Francisco, in consequence of these well studied and laid out routes, was 44 days.

When the steamship *San Francisco* was wrecked with hundreds of U. S. troops on board, Maury showed the Secretary of the Navy on the chart just where the wreckage would drift, and where to send relief. The survivors were picked up in the place indicated.

Up to 1850 no soundings of great depths had been made, it being impossible to heave up the weights from great depths. About this time, Midshipman Brooke proposed a contrivance by which the weight would detach itself upon striking the bottom and the line was reeled up with a sample of the bottom in a cup on its end. This device together with the use of fine piano wire working on a metal reel operated by steam, made it possible to take soundings of any depth. This enabled the sounding of large areas of the Atlantic and led to Maury's recommending the route for the laying of the first trans-Atlantic cable, between Newfoundland and Ireland.

Charts Are Important in Life Saving at Sea

Charts are highly important articles in safe navigation at sea. Mariners' charts may be compared to road maps for the automobilists, but as the ocean is not so well marked with sign posts as most of the roads, charts are very much more necessary than road maps. The safe channels, aids to navigation and the dangers to be avoided are plainly marked on the charts. A poor chart is probably worse than none. Their importance is fully recognized by Naval officers and a great many of the charts of the world are made from surveys undertaken by our ships.

Thus, while on cruises, to show our flag or to protect our interests in far corners of the earth, Naval officers have taken advantage of the opportunity to add to existing or frequently non-existing information. Among the early editions of charts are several made by the expedition under the command of Commodore Perry when he opened up Japan to trade with the United States. These charts are very interesting, showing many historical details, such as the house where the treaty was made and positions where the ships anchored. Our ships still continue such work and recently the ships of the squadron stationed in Central American water, where revolutions are not altogether uncommon, have surveyed several harbors while at the same time protecting United States interests. Three Naval vessels are maintained for and employed in surveying duty alone. They are now surveying the coasts of Cuba and Venezuela.

In addition to the charts for navigational purposes, charts are published monthly which show the conditions of wind, weather, and ocean currents which may be expected during the month. These charts are called "Pilot charts" and are further developments of Maury's original charts. On them we advise what tracks are desirable to follow in going from one port to another.

In 1855 Maury published a chart with two lanes laid down, each 25 miles broad, for the use of steamers in going and returning across the Atlantic. By following these lanes, vessels avoided the danger of frequent collisions with other steamers, sailing vessels, and icebergs, particularly during the dense fogs which hang perpetually over the banks of Newfoundland. This was the beginning of the elaborate system of tracks at present followed by the principal steamship companies across the Atlantic. They are changed with the seasons and are so laid down as to reduce the dangers from ice and fog to a minimum.

If we consult a winter pilot chart of the north Atlantic ocean, we see that vessels going from ports on the English Channel to New York will probably encounter many gales and adverse currents along the northern routes. The large, high powered vessels are not seriously affected, but for the smaller, low powered vessels, heavy winds cause great delay. Therefore, we find that the route for such ships is laid down far south where the percentage of gales is much less. Such vessels following these courses as laid down actually make better time for the voyage and arrive in port having sustained little or no damage from heavy weather; whereas vessels in trying the high powered route suffered heavy damage during the same time of the year. Vessels following the northern routes to European ports have the benefit of favorable currents and winds. The winds in the strong gales are generally astern and tend to help them along.

Stories of the Strange Drifts of Bottle Messages

Knowledge of how the currents flow has been and still is greatly augmented by the use of bottles containing papers giving date and place where set adrift. The stories of these, in many instances, are quite interesting. One of the most remarkable drifts of bottles which has been reported is one which was dropped overboard in Latitude $50^{\circ} 30' S.$, Longitude $50^{\circ} E.$, far south of Madagascar. This bottle drifted about two-thirds of the way around the world and was picked up on the coast of Chile three years later.

Recently a paper was returned by a man in Australia who apologized for not sending it sooner, explaining that his pocket had been picked and as the paper was in the wallet with his money, it was some few weeks before he could recover it. Another paper has been sent in by a woman who walked 18 miles to have it forwarded to our office.

One of the sources of danger to ships at sea is caused by derelicts, waterlogged vessels, frequently loaded with lumber, which float very little, if any, above the surface of the sea. These would be very dangerous to any vessel which collided with them. Derelicts have been known to drift around the ocean for years and travel thousands of miles. Whenever their positions are reported by vessels, this information is sent out by radio and is printed in our publications.

An interesting drift of a derelict is that of the "Fannie E. Wolston," a three-masted schooner, abandoned October 15, 1891, off the North Carolina coast, northeast of Cape Hatteras. Reports from ships which sighted this derelict show that it made a complete circle around Bermuda, going as far east as Longitude 40, over halfway across the ocean. It then drifted

almost to the Bahamas, then northeastward to a position about 700 miles east-north-eastward of the position where abandoned. It was last sighted October 21, 1894, having drifted approximately 9,000 miles in six days more than three years. During that time it was reported 46 times. It drifted backwards and forwards in a very irregular course.

Between October 1923 and October 1924, the derelict schooner "Governor Parr" drifted over 4,000 miles in a very circuitous route from the place she was abandoned south of Newfoundland. When last reported it was near the Canary Islands. During the year it crossed the steamer lanes several times, drifting in unusual directions.

In 1885 the Hydrographic Office started collecting data on the use of oil to prevent damage by heavy sea. Such use is encouraged and accounts of success are published in the Weekly Bulletin. These reports are numerous. During the last year, the most outstanding example of the use of oil to calm seas was when the crew of the Antinoe was rescued by the President Roosevelt in such a brilliant manner. This rescue also brings to mind the successful use of the radio direction finder or radio compass.

The radio is a very important aid to the Hydrographic Office in circulating information regarding navigational dangers. The Navy was the first regular customer for radio telegraph apparatus in this country. Companies were formed and the Navy cooperated closely with them. In the early days there was practically no other field for the sale of radio and competition was keen. The Navy assumed a large part of the development charges of these pioneer companies and practically supported the growing industry.

The Battle Fleet Carried Radio-phones in 1907

It is an interesting fact to those who think that the radio telephone is very new, to know that in 1907, when President Roosevelt sent the battle-ship fleet around the world, each one of the ships was fitted with a radio-phone.

In 1912 experiments were begun with various schemes for obtaining directions of radio signals. An elaborate shore compass system was established during the war. Since then they have been used both for military and navigational purposes. Over 19,000 bearings were given during the month of June for navigational purposes.

Recently a vessel with her magnetic compass damaged so as to be useless, was navigated into port by the use of radio bearings from a shore station and the master was most profuse in his praise of the service. Another case was that of a vessel noted by the radio compass observer on shore to be standing into danger. He told the captain of the vessel he had better back out. The captain stopped his engines but did not back and in seven minutes an S O S went out saying the ship was aground.

This instrument, developed primarily as a war device, is of the great est value for peace time activities. As it has been so successful in locating ships from shore stations and in assisting one ship to locate another whose position is unknown or doubtful, the next step may well be as an adjunct to the whistle to avoid collision in a fog, particularly on the high seas where such additional warning would greatly reduce the danger.

Many lives are now saved each year by the prompt answer of assistance to S O S calls. Whenever an S O S is heard, the radio compass stations attempt to ascertain the position of the vessel sending it. If successful, the position can be broadcasted even though the vessel may have been unable to include the position in its message.

If, some night, you are listening to a good radio concert and the station has to shut down for an S O S, don't object. Remember the compass operators are straining to get a bearing of what may be a very weak signal, perhaps the last dying squeak from some vessel.

In addition to using the radio for broadcasting messages notifying vessels of navigational dangers, the weather forecasts and time signals are also sent out by radio. By use of the weather forecasts and reports obtained from the weather bureau and broadcasted, mariners can make up their own weather maps and shape their courses so as to avoid dangerous storms. To encourage the practical use of these reports, articles on the subject are frequently published on the pilot charts.

In 1821 a ship was given the wrong chronometer rate and in a voyage to the Cape Verde Islands of 25 to 30 days got about 60 miles out in her reckoning. Due to this, she might easily have been lost with all on board. Such errors need not occur today as vessels can receive the time signal from the more important Naval radio stations twice a day and so be sure of the correct time which is so important in navigation.

Naval officers frequently assist mariners in correcting their chronometers. Recently the captain of a schooner signaled the captain of one of our destroyers to ask him to assist in finding the error of the schooner's chronometer. The answer was "certainly, bring it aboard." He was surprised to have the skipper come aboard with a big alarm clock which he used for a chronometer and with which he had navigated a quarter of the way around the world.

Patrolling the Area of Dangerous Icebergs

In 1913, after the Titanic was sunk by collision with an iceberg, the Navy started patrolling the area of dangerous ice during the season when bergs might be expected to menace the steamer lanes. The positions of bergs were broadcast by radio and vessels kept informed of safe courses. The next year, there were no Naval vessels available for this patrol and the coast guard service sent ships. They have continued it each year. This work is known as the international ice patrol and is supported by contributions from all the leading nations. The cutter on patrol locates the ice, informs vessels in the vicinity, broadcasts it and reports to the Hydrographic Office. The information is then circulated to mariners in the chief ports of the United States and to ships at sea by radio.

In experimenting with devices for detecting sounds under water, for the location of submarines, the sonic depth finder has been developed. This has been very successful in sounding the depths of the oceans. Types have been developed for use as sounding machines. These will be a great protection for vessels approaching shallow water in fog, or when, for any reason, their position is not definitely known.

The Navy publishes nautical almanacs and navigation books to enable the mariner to fix his position at sea. New methods are being constantly developed. Those which are considered most useful are published. Only recently two volumes have been issued which simplify navigation immensely.

Much of the development of safety of operation of marine engines has been due to the Navy. Practically all forms of motive power in the United States have been developed first by Naval ships. The steam reciprocating engine, the turbine, the Diesel engine, and the electric drive are certainly steps for safety because each enables more power to be used with safety.

A Naval medical officer, in collaboration with officers expert in diving, a few years ago carried on an extended series of experiments which made it possible for divers to work more efficiently and with more safety at great depths.

Great progress in the development of water-tight compartments has been made in the constant improvement of war vessels, as in these water tightness is a vital consideration in war time. The results were apparent in the last war when many of the merchant ships which were torpedoed were brought into port without sinking.

In general, the Navy has been interested in any device which would increase safety at sea.

Fatalities at Sea Through Careless Motor Boats

J. F. H. WYSE (Canadian National Safety League, Toronto, Canada): This paper is of especial interest to me because Commander Benson is one of my nephews of whom I am very proud. He has had a wonderful record as cadet at the Naval Academy and as officer of the Navy, and this paper has a special interest as it gives us a great deal of information.

His mention of the wreck off San Francisco Harbor is also of special interest as this ship went out from New York carrying a regiment of 500 soldiers to San Francisco to look after the Indians who were kicking up a disturbance. My father was in command and my mother was on board that ship with her first baby. They were wrecked and my mother was put in the first life boat. My father and some of the other survivors were found, probably due to the information furnished by Commander Morey as to the drifts or currents carrying the wreckage from where it was first wrecked by the storm.

One matter of special interest that my mother told me was that Colonel Washington, then in higher rank than my father, came on board the ship late, at New York. Through some mistake my father and mother had taken staterooms on board the main deck which was the top deck, and when Colonel and Mrs. Washington came aboard they put father and mother down below deck (as I suppose was perfectly proper). The result was that when the storm first broke over the vessel these staterooms aboard the main deck were carried away with Colonel and Mrs. Washington, and my father and mother were safe below deck.

MR. WYSE: I would like, Mr. Chairman, to ask this meeting or any one personally, if they know anything about licensing gasoline motor

boats? We have had, in Ontario, several fatalities on account of the careless handling of motor boats. They bulldoze the smaller craft and act as though they were the only boats on the water, and we have had two instances where they have run down people through careless handling.

I only know of one place where there has been any attempt to license boats and that is in the harbor of Toronto. There is a life saving service and police patrol handled in connection with the city and harbor, and they require all boats, including canoes, to take out license.

I haven't been able to get any action from the Dominion Government, although I have taken it up. What I want to ask of the committee is, does any one know of any place where the matter of licensing smaller craft on the water, especially motor boats, has been taken up with the local authorities in control?

MR. HOOVER: I think I can answer that. The inspection and control of smaller motor boats in this country, from my own point of view, is not at all satisfactory. We have what is known as a motor boat act—the act of June 9th, 1910, which endeavored, theoretically, to get safer conditions. That law is thoroughly absurd and inadequate. For example, it is possible in the United States to have a steam vessel of not over 65 feet in length, carrying passengers for hire (examined only if she be between 40 and 65 feet as to approval of the design of machinery) in charge of a licensed operator who need not be 21 years of age and who passes no examination. We are forbidden to examine them. This young fellow has in his hand a piece of paper as beautiful to hand down to posterity as the licensed steamship master. He may be a minor or he may be an alien. That is what the law has done for us.

Peculiarities of the Maritime Regulations

By that same law a steam tug boat, no matter what her length, must be in charge of licensed officers; so you have the startling picture of a steam tug boat being given greater care than a steam passenger boat of the same size. I am working along the line of increasing inspection; thus far I have not been able to get accord between the different minds.

What ought to be done is this: they ought to give us a law that will permit us to inspect, and when I say inspect I mean to examine, as we do a steamer by rules applicable to a motor boat. Of course not such as you give to an ocean liner, but a sufficient inspection, especially on that type of boat that is carrying passengers; and beyond that, certain inspection of every boat of that kind that would insure that it was in good condition.

I would be in favor of a law that would enable us to examine these operators at least in regard to "rules of the road" and visual accuracy as well as color sense. I don't wish to infer that we should give the same examination to an operator of a small craft as that given a master of an ocean steamer. The difficulty is that so many people take license and liberty to mean the same thing. They feel that the slightest interference with their pleasure (an inspection of their motor boat for in-

stance) is interference with their liberty. It is as Mr. Marr so aptly stated, saving them from themselves.

MR. WYSE: Yes, to a certain extent, but the main question I intended to put is, is there any place in the United States licensing small craft, privately owned and not operated for hire or gain or remuneration?

MR. HOOVER: I think that is covered by what is known as the Bureau of Navigation, to a certain extent. It gives numbers to these motor boats. If your question has to do with the exercise of police jurisdiction, that is something, of course, not exercised by the Federal Government. It might be by certain municipalities; certain harbors may have local authorities to do something.

In my opinion the control of motor boats is not effective and it ought to be extended to what I consider an intelligent inspection and control of the personnel in charge, no matter how small.

MR. WYSE: There is necessity for licensing privately owned pleasure boats the same as the licensing of an automobile.

MR. HOOVER: I quite agree with you, but we have not been able to get any satisfaction simply because it has often been held to interfere with the individual liberty of the person.

MR. WYSE: We ought to safeguard people in lesser craft that are at the mercy of these small motor boats: I mean the row boats and the canoes.

I have in mind my own experience. I was out from port in Lake Erie; I was anchored and fishing and a motor boat carrying passengers drove right at me. If I had not pulled up anchor and gotten away they would have run me down. It was a sort of joke with them but not with me. A fatality I have in mind was on the St. Lawrence River where a school teacher was swimming across a bay and a motor boat ran her down and killed her. That boat drove right into her. There was no check on those boats and they had no license; they were just operated by careless operators. Every year we have had that kind of thing to contend with in Canada.

CHAIRMAN WELCH: Mr. R. F. Edwards will now read a paper on the "Hazards of the Maritime Industry from the Life Insurance Point of View," by Mr. A. D. Reiley.

MARINE RISKS FROM THE LIFE INSURANCE STANDPOINT

A. D. Reiley, Mutual Life Insurance Company, New York City

I should say that the life insurance standpoint is the dollars-and-cents standpoint on a purely life and death basis. We, of course, judge our risks in their relation to the average mortality of healthy lives, which is, after all, what is meant by a mortality table.

There has been adopted recently by the actuaries, underwriters and statisticians of a number of companies, a new occupational classification for statistical purposes, and in this the classification of marine risks is as follows:

OCEAN STEAMERS:

3,000 or more gross tonnage.

Tropical ports.

Other ports.

Less than 3,000 gross tonnage.

Tropical ports.

Other ports.

GREAT LAKES STEAMERS:

2,000 or more gross tonnage.

Less than 2,000 gross tonnage.

Sailing vessels—ocean and Great Lakes.

RIVER AND HARBOR CRAFT.

ALL OTHERS.

This is not quite as diffuse as the classification for rating purposes used by most life insurance companies. The classification for this purpose which is used by the company with which I am connected is as follows:

STEAM AND POWER VESSELS:

Ocean.

Temperate zone and to Cuba and Porto Rico.

First class vessels, regular routes, 2,500 tons and over.

Vessels less than 2,500 tons, and tramp steamers.

Torrid zone except Cuba and Porto Rico.

First class vessels, regular routes, 2,500 tons and over.

Vessels less than 2,500 ton, and tramp steamers.

Great Lakes.

Vessels 2,000 tons and over.

Vessels less than 2,000 tons.

Inland—river, harbor, and lake, excluding Great Lakes.

SAILING VESSELS:

Sea and Great Lakes.

Vessels 150 tons and over.

Vessels under 150 tons.

Coastwise.

Vessels 60 tons and over.

Vessels under 60 tons.

Inland.

POWERLESS VESSELS (barges, lighters, etc.):

Sea and Great Lakes.

Inland.

This last classification is not as diffuse as that proposed by Captain Evans before last year's Congress.

From these classifications it will be seen that distinction is drawn along several lines:

1st—Size of vessel.

2nd—Deep sea, coast or inland.

3rd—Whether she plies in temperate or tropical waters.

The distinction between sail and steam is, of course, decreasing in importance. The reasons for the first two classifications are obvious. The last contains a strong health reason.

There is also a distinction drawn between officers, engineers, radio operators, pursers and chief stewards and seamen, firemen, etc.

In general, most companies make no extra charge for straight life insurance to officers and engineers on ocean steamers of 2,500 to 3,000 tons and over, traveling on regular lines in the temperate zone, and for officers, engineers, pursers, etc., on inland steamers. For other classes, smaller steamers, tramps, sailing vessels, vessels going to the tropics, etc., and for seamen an extra charge varying from a rate covering a mortality of from 125 per cent to 200 per cent is made. That these rates have rather favored the industry is shown by the experience of all life insurance companies. This was brought out in the joint investigation of occupational hazards by Life Insurance Companies; the Medico-Actuarial Investigation published in 1913. Of course this experience is familiar to everyone, but I quote it merely for continuity.

Officers and Engineers on Steamers on the Great Lakes

Actual Deaths	Expected Deaths	Ratio of Actual to Exp. Deaths
95	80.80	118%

Officers and Engineers in Coastwise Trade, excluding those traveling to the Tropics.

Actual Deaths	Expected Deaths	Ratio of Actual to Exp. Deaths
34	24.69	138%

Officers on Steamers on Rivers, Lakes, Sounds and Harbors, excluding Great Lakes.

Actual Deaths	Expected Deaths	Ratio of Actual to Exp. Deaths
75	70.41	107%

Officers and Engineers on Ocean Steamers.

Actual Deaths	Expected Deaths	Ratio of Actual to Exp. Deaths
103	66.07	156%

The death rate from accident among those whose duties keep them on rivers, lakes, sounds and harbors was three times the normal; among those on the Great Lakes, four times; among those engaged in the coastwise trade, and on ocean steamers, five times the normal.

Practically all the data included in this study date back 20 years or more. On the other hand, the classes are the most favorable in the straight marine part of the industry, as they include only officers and engineers.

A limited life insurance experience to which I have had access shows but little change in the mortality on the same classes for the last 18 or 20-years up to the present time. In fact, where there is any difference the mortality is a few points higher. The accidental death rate also swings in much the same scale although this may be due in part to claims during the late war. This is by no means conclusive that there has been no improvement in the industry from the standpoint of mortality during this period. The experience is not large and is subject to considerable accidental fluctuation. I am of the opinion that, could the

joint experience of all life insurance companies be taken, it would show considerable improvement.

This view seems to be borne out in part by the latest Combined Group Mortality Investigation, 1913-1924. This shows among employees on vessels other than river, a mortality only 63 per cent of the expected by the A. M. table as compared with 84 per cent for the entire group experience. The actual deaths numbered 20 in an exposure of 3,388 years of life. This is also a very small experience and valuable only in connection with other data.

The English compensation figures (1920 to 1924, inclusive), show that fatal accident rates are higher in the shipping industry than in any other

Cause of Death	1	2	3	4	5	Total
Accidents	---	---	---	---	---	---
Drowning	---	3	7	7	16	33
War claims	---	---	1	---	12	13
Falls of all kinds	---	---	1	---	3	4
Murders	---	---	---	1	3	4
Explosions	---	---	---	2	1	3
Asphyxiations	---	---	---	1	2	3
Auto accidents—in car	---	---	1	1	---	2
Crushed by falling tree	---	---	---	1	---	1
Diseases	---	---	---	---	---	---
Influenza	---	1	2	6	5	14
Pneumonia	2	---	2	5	4	13
Tuberculosis, pulmonary	---	---	---	3	7	10
Disease of respiratory system	---	---	1	---	---	1
Cancer	1	---	2	3	2	8
Heart disease	1	---	1	5	---	7
Acute endocarditis, pericarditis	---	---	1	1	1	3
Angina pectoris	---	---	1	---	---	1
Suicide	---	---	---	2	4	6
Diabetes	---	---	1	1	2	4
Cerebral hemorrhage and apoplexy	1	---	1	1	1	4
Nephritis and Bright's disease	---	---	---	4	---	4
Typhoid fever	---	---	1	1	1	3
Inflammation of brain	---	---	1	1	2	2
Cirrhosis of liver	1	---	---	---	---	2
Disease of bone	---	---	---	---	1	1
Hernia, intestinal obstruction	---	---	---	---	1	1
Peritonitis	---	---	---	---	1	1
Syphilis	---	---	---	1	1	1
Embolism and thrombosis	---	---	---	1	---	1
Disease of arteries	---	---	---	1	---	1
Disease of bladder, prostate, etc.	---	1	---	---	---	1
Sudden death	---	---	---	1	---	1
Total	6	5	23	49	70	153

of the seven large groups of industries, not excluding even mines or quarries. The rates varied between 1.1 and 1.6 per 1,000 exposed during the five year period 1920 to 1924, as compared with an average rate of .4 for the entire experience. The English figures are given separately for steam and sailing vessels, and fatal accident rates calculated for the five year period 1920 to 1924 are 1.2 per 1,000 exposed for steam vessels as compared with 4.0 for sailing vessels. No further data on types of vessels or trade routes are given.

As these figures are not given sufficiently in detail to admit of close analysis, we can not tell whether the somewhat low accidental death rate is due to dilutions or not. By dilutions we mean the inclusion of numbers of risks not subject to the same hazards as the group that furnishes

the American mortality. The accidental death rate is noticeably lower than the American experience. As this was given by Mr. Edwards in his paper before this body in 1924 it need not be repeated here.

The accompanying table is an analysis of 153 life insurance death claims drawn from the following classes:

1. Steam and power vessels—Great Lakes, 2,000 tons and over.
2. Sailing vessels—Ocean and Great Lakes.
3. Steam and power vessels—Coastwise.
4. River, harbor and lake steamers, excluding Great Lakes.
5. Steam and power vessels—Temperate zone (including Cuba and Porto Rico) 2,500 tons and over.

These are all officers and engineers. No seamen are included.

Accidents caused about 40 per cent of the total number of deaths, 63 out of 153. Of these accidental deaths, more than half were the result of drowning. The tuberculosis mortality was about 50 per cent above normal. The mortality from influenza, pneumonia and suicide was about twice the average and the homicide rate was about five times the average.

It is interesting to compare this data with that given by Mr. Edwards in his paper in 1924 from which I beg leave to quote:

"Considering the mortality data at hand covering the experience of the British merchant marine during the period 1919-1921, it will be noted that pneumonia caused the largest number of deaths, or a rate of 6.2 per 10,000 men employed. Circulatory diseases were next in frequency with a rate of 3.9, followed by tuberculosis with 3.4, malaria with 2.0, typhoid fever with 1.4, and alcoholism with a rate of 2.1 per 10,000. The death rate from diseases varied with the class of vessel, or from 15.2 for sailing vessels to 36.0 per 10,000 for steam vessels. The corresponding suicide and homicide rates were 1.5 for sailing vessels and 3.1 for steam."

A Higher Mortality Expected of Common Seamen

None of the foregoing remarks have any relation to any class of marine risks other than officers and engineers. Seamen, firemen, etc., are not included. This is because I have no data, whatever, to offer, and I think few, if any, old line companies have. The sailor is not a provident soul and is scarcely the type that applies for old line life insurance. Again, it has been only of comparatively recent years that old line companies accepted deep sea sailors at all, and many, perhaps a majority, do not do so today. Those that do accept them charge heavy extra premiums.

In all probability the strictly industrial accidental death rate among deck hands, seamen, stokers, etc., is no higher than among officers, and may even be lower. In spite of this fact, life insurance companies expect a higher mortality from them than from the officers. This is due to the generally accepted opinion of the sailor's mode of life. I have had a little sea experience myself and know that, in the past at least, when confronted by the three great instruments of relaxation, wine, women and song, the sailor was never one to confine himself to song. Further, when confronted by the middle instrument, he did not greatly trouble himself with abstruse problems of race, creed or color, especially on ves-

sels touching at tropical or Asiatic ports; these penchants are scarcely the attributes of good life insurance risks.

With regard to special conditions in tropical ports, the United States Public Health Service reports that about one patient out of every three who report to the Manila station for treatment is afflicted with venereal disease. The majority of these infections have been acquired in Japanese and Chinese ports. However, the same condition may obtain elsewhere, for the Hamburg port medical officer reports that venereal diseases constitute one-third of all cases of disease among sailors in the port of Hamburg, Germany.

Careless life ashore has other effects, however. Malaria is of frequent occurrence on ships trading to the tropics. It is reported that between 1908 and 1914, on ships calling at Hamburg, 6,697 cases occurred in a total of medical casualties of 46,000. Figures for 1921-1924 show a smaller proportion, 2,000 malaria cases out of 21,315 patients. Also 124 cases of dengue were reported, almost exclusively in ships from India, 14 per cent of whose crews were affected. In the last three years there were 165 cases of dysentery and 65 cases of typhoid.

I have heard that higher wages and better living conditions are gradually producing a change in personnel and deportment among sailors as they undoubtedly are among ship's officers, but I doubt if the day has arrived when seamen will show anything but a mortality considerably above average.

In summarizing the subject, I think it clear that the old line companies, as a whole, have treated the marine industry up to the present time with perfect fairness. Such extra premiums as have been charged are amply justified by the mortality, as we have been able to ascertain it, and whatever divergence there has been, is on the side of liberality toward the industry rather than the opposite. I believe that conditions are steadily improving and that the mortality rate is gradually receding toward the normal. Certainly no one wishes it to reach that goal more sincerely than the life insurance underwriter.

CHAIRMAN WELCH: Our good friend, Mr. Prouty, of the Aetna Life Insurance Company, New York City, will read a paper by Mr. S. F. C. Sweeny, Safety Engineer, Shipping Federation of British Columbia.

GENEROUS COOPERATION A NECESSITY FOR PROGRESS OF THE SAFETY MOVEMENT IN THE STEVEDORING INDUSTRY

S. F. C. Sweeny, Safety Engineer, Shipping Federation of British
Columbia, Vancouver, B. C.

Cargo handling is a peculiarly hazardous occupation for many reasons, from among which might be selected the following five as being perhaps the most outstanding:

(1) World need for economy, which drives ship owners to supply poor and inadequate gear with which to work their ships.

(2) Competition among stevedores causing cutting of prices and the consequent avoidance of all actions causing delay; in other words, creating *rush*.

(3) Lack of final authority to insist on improvement of working conditions, or the taking of prompt action when unsound conditions present themselves.

(4) Working hours are irregular and employment is full of peak loads and depressions. Night work under bad lighting conditions is prevalent.

(5) The type of work is continually changing.

For these reasons, through cooperation of a very generous nature only, can the hazards of cargo handling be materially reduced.

Poorly found ships, poorly maintained, make for carelessness on the part of every individual having anything to do with them. Bad working conditions are a depressant.

Competition must acknowledge the clear boundaries of safety.

Safety must have authority.

Continuity of work must be striven for.

Adaptability must be attained.

From a responsibility classification of injuries received over a period of nearly two years we are in a position to say:

Statistics Based Upon Experience of Two Years

(a) That from the frequency point of view 80 per cent of our longshore accidents could have been avoided by carefulness on the part of the injured or their partners, and 20 per cent might have been avoided by better methods, more consideration or better gear as provided by the stevedore or ship owner.

(b) That from the severity point of view these figures must be altered to 60 per cent and 40 per cent respectively.

What need for cooperation here? Obviously some need, and when we consider that both costs and personal suffering are more nearly proportional to severity than to frequency we feel inclined to accept the severity rating of responsibility for injuries as being the measure we should adopt.

In all our large ports we have, besides a general port authority, (a) a General Port Federation or Association of Shipping Interests, and (b) a General Port Federation or Association of Labor.

Now the recipients of practically all the injuries are the longshoremen. They are protected usually by some compensation law insuring them 60 per cent to 65 per cent of their wages for time lost through injuries received while at work. As a class they are not thrifty, they spend just what they earn and, if not seriously injured, rather enjoy their better than half pay holiday. There is of course a percentage who strive hard to avoid injuries but the bulk are of rather fatalistic tendencies.

This being the case, definite stimulation from some outside source is necessary to accomplish any reduction in this 80 per cent frequency and 60 per cent severity. Obviously the first essential is to present the case clearly to the longshoremen and to continually keep them posted as to

their responsibility for individual accidents as they happen. They must then be impressed with every phase of the necessity for making an effort to improve their safety record, through encouragement to avoid the misery caused to themselves and through the enforcement of regulations to avoid the expenses caused to the industry. Here then is where a "Safety Department" operated by the employers is necessary; the first act of cooperation on the part of the employers.

This safety department must analyze the hazards existing, determine the relation of employer and employee responsibility, where injuries are received, and frame regulations or standards of practice to prevent recurrence.

Having this part of the safety department's work accomplished will take us, however, only part of the way to a substantial reduction in this 80 per cent of injuries received. Effort is necessary, and more than the effort that can be instilled by the most rigorously enforced regulations. An effort of good will is required from the longshoremen. The desire to make a sustained effort to reduce injuries received must be instilled into the men and their associations. If the men can be induced to encourage carefulness and censure carelessness within their own associations, to hold Courts of Inquiry where they have been held to blame, and to run safety competitions among themselves, injuries can be reduced to a minimum. It means selling the idea to the men's associations and this selling is one of the most important functions of the safety department.

The idea is "Goodwill" and the price is "Cooperation." The employer can have cooperation of the employee if he will give of his good will to the extent of acknowledging his responsibility for injuries, and by taking definite action to improve the conditions which have placed this responsibility upon him.

The Employer's Responsibility for Injuries

This brings us to the employer's responsibility for injuries received, which we have set at 20 per cent frequency and 40 per cent severity. What further need for cooperation here?

Better working conditions are required, and they are not so easy to obtain, because the working places and a great part of the machinery used are supplied by owners, often represented only by agents in the employer's association concerned. In simple language, stevedores can only supply good working conditions insofar as they can supply good tools and good supervision. Unless ship owners maintain good machinery and good equipment bad working conditions will prevail. Cooperation between stevedores, shipping companies, ship owners and ship agents is necessary to obtain sound working conditions.

"Good will is the birthplace of good work and of good working conditions." . . . This is an axiom that might well be adopted wherever industry is carried on. As an example, it is necessary that steamship agents should be ready when so required to support the association by going to owners they represent and asking for improvements in equip-

ment and machinery, to eliminate unsafe working conditions and maintain the good will existing. That such action is necessary is realized by every stevedore who has loaded ships. Working conditions such as are found in almost a majority of deep sea ships would never be allowed in factories on land.

Among the prevalent hazards might be mentioned: (1) hatchbeams that can not be securely fixed in their sockets; (2) winches lacking guards over moving parts; (3) winches with insecure clutches; (4) insufficient lights for night work; (5) bad ladders into holds; (6) ill fitting and poorly conditioned hatchboards; (7) lack of holdfasts for snatchblocks or other means of mechanically stowing heavy, bulky cargo such as logs; (8) poor and insufficient holdfasts for guys and preventer guys on derricks.

Good will is the foundation of accident prevention and to maintain this foundation it is necessary for shipping interests generally to get together and improve working conditions.

I maintain that the shipping organization should operate a safety committee to investigate all important accidents, the prevention of which lies outside the power of the injured individual to prevent (I estimate these at 20 per cent of the accidents happening) and should take action to minimize the causes.

I maintain that the men's organization or associations should operate safety committees to investigate all important accidents, the prevention of which lies within the power of the injured individual to prevent, and should take action to minimize the causes.

I maintain that if any benefit is to be derived from these committees, their respective associations must support them by taking action with respect to their recommendations or findings.

I maintain that unless the employer tackles the question of "Improvement in working conditions" and makes progress in his attack, it is useless for him to expect the worker to give up his careless habits.

I maintain that without standardization of safe practices the employer can not eliminate many hazards now existing, because of the necessity of avoiding loss of time.

I maintain that with progress in the attack on "Unsafe working conditions," enthusiasm will prevail, the safety committees will flourish, safety competitions will be possible, and "No Accident" campaigns will be carried to successful conclusion.

I maintain, lastly, that with standardization of practices an undesirable phase of employer competition will vanish.

Such is my idea of the cooperation necessary to insure progress of the safety movement in the stevedoring industry.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The meeting was called to order at 9:30 o'clock by Mr. W. E. Welch, chairman, who presided.

CHAIRMAN WELCH: We will listen to the report of the Nominating Committee for the officers and chairmen of committees for the coming year, whose date of office will take effect after the adjournment of this congress.

A. R. BUSH (The Barber Asphalt Company, Sewaren, N. J.): In the absence of Mr. Hand, chairman, I have been asked to render report by the Nominating Committee.

Chairman, Captain William P. Kain, manager, American Steamship Owners' Mutual P. & I. Association, New York City.

First Vice Chairman, C. H. Potter, president, Potter Transportation Co., New York City.

Second Vice Chairman, Robert F. Hand, assistant manager, Marine Department, Standard Oil Company (N. J.), New York City.

Third Vice Chairman, Captain R. C. Brennan, operating manager, Pacific Steamship Co., Seattle, Wash.

Fourth Vice Chairman, F. P. Foisie, industrial relations manager, Waterfront Employers' Association, Seattle, Wash.

Secretary, A. R. Bush, safety supervisor, The Barber Asphalt Company, Maurer, N. J.

A motion to accept the nominations was regularly made and carried.

CHAIRMAN WELCH: The next paper will be by Mr. Arthur M. Tode, superintendent, Technical Division, Marine Department, The Texas Company, New York City.

ACCIDENT PREVENTION ON TANK STEAMSHIPS

Arthur M. Tode, Superintendent, Technical Division, Marine Department, The Texas Company, New York City.

Virtually every accident on board ship is preventable. On this fact hinges the success or failure of an accident prevention campaign, which consists primarily of bringing home this message to every one connected with the shipping industry.

A careful study of the accidents which occurred on board the vessels of the Texas Company's fleet during the years 1923 to 1925 inclusive, and an analysis of the injuries which resulted, made it apparent that relatively few of the accidents could be classed as unavoidable. In fact, the majority of them could have been prevented by greater carefulness and watchfulness on the part of the men injured, and by co-workers, who in

some instances were partly and in others entirely responsible for the accidents.

The problem of promoting safety on board ship resolves itself into one of education and proper supervision. The first part, that of education, consists in a mental training of all the personnel to think of safety and follow out the principles which promote safety in their daily tasks. Recognizing that mechanical appliances play but a comparatively small part in accident prevention, and that the greater proportion of accidents are attributable to the human factor, an effort must be made to arouse the interest of the worker in the safety of himself and his fellow employees. The individual man on board ship must be taught that his safety depends largely upon himself, just as does the safety of others. The second part of the problem, that of proper supervision, requires the cooperation and assistance of every member of the Marine Department from the highest executives down to the ordinary seamen, wipers, and messmen.

Proper Supervision of Men and Machinery

Proper supervision must include men and machinery. The licensed personnel on the ships, who frequently complain of the inexperience of the men in their charge, must be taught to realize their own responsibility for this condition and make serious efforts to train and instruct the men under them.

The marine department management in turn, must find the ways and means to arouse an interest among the officers on the ships so that the principles of safety, through them, will be indelibly impressed upon the men. This is important because the turnover of the unlicensed personnel on board the vessels is large in proportion to the officer personnel replacement.

The executives of a steamship company, especially one engaged in the oil tanker trade, when attempting to inaugurate or follow out an accident prevention campaign have not the same facilities or opportunities to pursue this work which are available in general factory or plant management on shore.

Chief among the advantages offered the factory employer who is interested in reducing his list of accidents is the opportunity which his safety representative has of talking collectively and individually to the superintendents, foremen and other employees of the various departments; the holding of safety first meetings and rallies at suitable times and places; the inspection of possible hazardous appliances, places or conditions in the plant when reported; and the ability to investigate fully the causes of accidents as soon as they take place and to analyze them with the view of preventing a recurrence.

In contrast, let us consider what the marine department of a large oil company must contend with. Here there are a large number of ships carrying cargoes of crude and refined oils to ports on the several continents. In the tanker trade a quick turn-about is of the greatest importance. Before reaching the loading port the crew of a tank vessel are

busily engaged making all preparations to take on board the oil cargo immediately upon arrival. Not infrequently an oil tanker will reach her loading port in the morning, and before the sun has set will have started on her return voyage. In the interim a cargo of some 60,000 or more barrels of oil has been pumped into her tanks, several hundreds of tons of package freight securely stowed in the 'tween decks and holds, and bunker fuel, boiler feed-water and commissary stores loaded. At the same time such repairs and adjustments have been made to the machinery as may have been required, and the many miscellaneous duties, both on deck and in the engine room, which must be attended to have received the proper attention.

Upon the vessel arriving at her discharging port a similar picture is presented. The safety representative of the oil company would receive but little encouragement from the master or chief engineer of the ship, should he attempt under such conditions to talk to their crews on accident prevention. The safety representative of a general passenger or cargo steamship company whose vessels are in port from one to several weeks at a time may, perhaps, have the opportunity of personally talking to and impressing upon the men the company's ideas of safety.

Voyages Are Governed by Supply and Demand

In the oil tanker trade the voyages of the respective ships are largely governed by the law of supply and demand—both domestic and foreign trade. With loading terminals on the southern and western coasts of the United States, in Mexico and in South America, and with many discharging ports at home and abroad, it is difficult and in many cases impossible to determine the itineraries of the vessels for any considerable future period. Under these conditions the safety representative may not have the opportunity, much as he may desire, of visiting some of the ships excepting at very low intervals.

The Texas Company, upon serious consideration of the best means to reduce the accidents on board its ships, found itself confronted with the difficulties which have been mentioned. It appeared that a good start toward reducing the number of accidents could be made by stimulating "safety thinking" among the sea-going personnel, by attempting to create good-will for accident prevention work among the men, and by reminding them of the care to be exercised in performing their duties with the highest degree of safety for themselves and their fellow workers. It therefore was decided to display safety posters on all vessels of the ocean-going fleet, the barges, the tugs, and at the several marine warehouses.

As the preparation of a large number of original safety articles and posters would entail considerable time, the poster catalogue of the National Safety Council was consulted. Of the many hundreds of splendid posters available from this source only a comparatively few are applicable to marine work. About seventy posters finally were selected with which to start an accident prevention campaign. Various types of bulletin boards for displaying the safety posters were considered and two sizes of boards chosen. The boards are of a neat appearance, one

size being 18 inches by 24 inches overall, for the large vessels, the other being 18 inches by 12 inches, for the small fleet. A metal sign "SAFETY FIRST" is attached at the top of each board. On the large ships two bulletin boards have been placed (each displaying two safety posters), the latter being changed weekly by the master of the vessel. On the barges and tugs only one bulletin board has been installed, displaying one poster which is changed weekly. Lack of space on the latter craft made it necessary to furnish them with the smaller size boards.

Considerable thought was given to selecting the most desirable locations for installing the boards on every ship, that is, to select places where the majority of the crews would be brought in contact with the departments' ideas of safety. In the majority of cases the safety posters are being displayed simultaneously in the officers' mess room and in the crews' mess room, although in some instances, other locations were selected.

All the bulletin boards and the complete sets of safety posters were assembled at one office and, together with complete instructions for their installation and display, were sent to the marine superintendents at the several terminals of the company for delivery to the vessels upon their next arrival in port. In addition, letters outlining the marine department's plans for lowering the accident record were sent to all masters and chief engineers.

Consultations on safety work are being held with the officers of our ships as the opportunity offers. Their interest and cooperative spirit are gratifying and should be the contributing factor toward a successful accident prevention campaign. Material is being gathered in order that original safety posters may be prepared by the Texas Company to be used when the present supply has been depleted. As these safety posters are finished from time to time copies will be submitted to the National Safety Council in Chicago so that other steamship companies and allied industries may use them. Such cooperation should assist in promoting safety at sea on board the ships of those companies which are members of the Marine Section of the National Safety Council.

Discussion Following Mr. Tode's Paper

MR. GEORGE A. MARR: I would like to ask if you trade between regular ports?

MR. TODE: Yes, we do trade between regular ports but we rarely can tell to what port the ship is to go. A vessel may leave Port Arthur bound for Boston; on the next trip it may go to Stockholm or Italy or some other place and a great many times the charters for these vessels are for one voyage only. Arriving at designated port she may immediately be chartered to another port—Port Arthur, or México, or another place. Sometimes we have charters that run over a six months' period or even a year.

MR. MARR: A vessel doesn't trade between Port Arthur and New York, and so forth?

MR. TODE: No. There are several vessels we do keep in a close trade

and some intercoastal trade, but that is all governed by the law of supply and demand. If we get a charter and must send a vessel to a port we must take it out of one trade and put it in another.

MR. MARR: Do you change your crews in trade?

MR. TODE: Among the licensed men we have stable crews but among the unlicensed men it is only fair.

MR. MARR: When do you pay off?

MR. TODE: We pay off at the end of every trip.

MR. MARR: Do you hire without the men leaving the vessel? Is it quite the usual thing for a large portion of the crew, outside of licensed officers, to remain on the vessel?

MR. TODE: I would say on the whole, yes. At times you will find a ship, and perhaps it is a happy ship, going on a far voyage and some of the men prefer to remain along the coast; in such instances we may lose five, six or eight members of the crew; but many times a ship comes in found for Europe and no one will leave.

Get the Men Engaged in Safety Actively Working

MR. MARR: In the discussion of this paper, Mr. Chairman, which is a very interesting paper and one which in theory confirms our theoretical ideas in regard to the safety work on board ships, I want to ask how much interest you would have in your safety council if your members gathered here today, again next year and the next and were only given a paper or pamphlet or circular to read and take away with them to their homes? I don't think you would have the meetings more than one or two years.

You are not going to get active interest in any movement you undertake unless you get the men engaged in that movement actively working. I don't think the poster on the wall is worth the paper it is written on unless it is followed up by a real active working interest by the men concerned.

You can go to a church and if there is nothing there but the minister and his sermon you go away without any particular interest in that church. But if you take part in the singing and in the prayers and all that sort of thing, a real active interest, you will come back again and you will go away feeling better and come back feeling better.

The Lake Carriers Association has been active, I think. One of the first things it did was perhaps before our safety movement got going. You will remember the first danger sign that was adopted, possibly by the National Safety Council, was a red disc. Every time that red disc was placed anywhere it was an indication of danger.

About that time Mr. Collins was chairman of our welfare committee and he devised a sign to put on board our boats consisting of a red disc on top of a piece of metal, and under that red disc was written "Safety First" in large letters. Below that were five or six general cautions such as "Be Careful," "Look Before You Leap," and such things.

I went to a great deal of expense on them. I had them made of red and blue enamel with white lettering. One of them was fastened on the

forward end of the after house and one on the after end of the forward house, so from any place on the deck those two signs were facing right down the deck. How much good those things did I don't know but I haven't any idea they were worth the price we paid for them; still we are turning them out and furnishing them to vessels today. I venture to say that a regular sailor will go aboard and work for a month and not be able to tell you whether those signs are there or not.

Now I really think the thing you have got to do is to get active work among these men and I don't believe that posters will do it. I think you have got to get those fellows thinking safety first, as you say, and that is the sum and substance of the whole thing; and that is what your conclusion was, Mr. Tode, that was the theme on which you have spoken.

MR. TODE: The points you have just brought out concur with mine fully. We also realize that putting up posters is not going to prevent accident to an appreciable degree. However, it is a start, and you have got to start somewhere; it brings the thing home to officers to whom we want to sell our idea, and also to the men, by having the safety posters before them and giving them the "Make It Safe" pamphlets.

We realize the turnover on crews is large compared with licensed men, and our company is trying to educate the unlicensed personnel. Our officers are loyal and, as a rule, have been with the company many years, especially captains, chief engineers and first assistant engineers. It is to those men we are trying to sell our message.

Safety Posters Are Urged Upon All Vessels

I visit the vessels four times a year. I go a considerable distance from New York to make an inspection of a ship and on that trip I talk to the captain and to the chief engineer about safety. I try to sell the idea to these two men and any other officers who happen to be present, because I feel we can only reach the unlicensed men through the officers who are in contact with them all the time. No one can take the time to talk to every steward and mess man aboard a ship.

Now there is another point. I should like to see a great deal of additional interest taken by our own Section and by men who are not members of the Marine Section at the present time. Supposing the Lake Carriers' Association, the Barber Asphalt Company, the Standard Oil Company and Texas Company were all trying to work up safety (and they are), that is perhaps five per cent of all the steamship companies operating. If a sailor or fireman sees a safety poster on one vessel and then goes to another and does not see a safety poster the effort of the one is wasted; but if we could only put the idea across to steamship companies the same as the railroads have done, we could get somewhere. No matter what railroad you cross you see a safety sign at every crossing. If we could visualize before them the idea of safety and the necessity for stimulating safety thinking, much could be done.

A. C. WARFEL (Supervising Safety Engineer, Hartford Accident & Indemnity Company, St. Louis, Mo.): Mr. Tode brought very vividly to my mind the first trip I made to sea on board the "Admiral Farragut," of the United Fruit Company. I went as an engineer cadet. I don't

know whether they use such a term now but I was what is now known as a wiper.

I was about 14 and going to grammar school. One morning as we came out of Port Antonio one of the oilers came down and was tinkering over his particular engine; it was a twin screw, and he was drunk. The first assistant engineer saw him and could have stopped him then and there, but this fellow went on feeling the eccentrics with his fingers and before he realized what he was doing he had cut them off.

It goes to show that had the first assistant engineer been approached and talked to on safety and had there been posters around and some word given about the danger of a man going on watch drunk, an accident could have been prevented.

CHAIRMAN WELCH: We will now hear from Mr. Ralph E. Prouty, engineer, Aetna Life Insurance Company, New York City.

SAFETY ENGINEERING AS APPLIED TO SHIPBUILDING

Ralph E. Prouty, Engineer, Special Risk Division, Aetna Life Insurance Company, New York City

A discussion of safety engineering as applied to shipbuilding may well be opened with brief definitions of the terms that will be employed. As used in this paper, "Safety Engineering" is the science of applying engineering principles to the prevention of accidents.

There are three main branches of safety engineering—the educational, mechanical safeguarding, and engineering revision. As we proceed, the importance of each in the solution of shipbuilding problems will be obvious. "Shipbuilding" will be used in its broadest sense, and should be understood to include yards devoted to steel production, yards equipped to turn out wooden vessels, and, in addition, what properly should be called repair yards, since no new work is done in them.

In order to determine the relative importance of the several branches of safety engineering in the shipbuilding industry, analyses have been made of a number of accident, lost time, and accident cost records. Some of the data were secured during the great activity in American yards the last year of the World War and the year following its close; others are of recent origin and refer to conditions which may be considered more nearly normal; all are thought to be indicative of the general hazards of the industry.

Chart No. 1 shows the accidents in a large eastern shipyard during the period of greatest activity. In this yard the steel was shaped, the plates cut, punched and bent, and extensive shop work of all kinds performed. In the preparation of this chart all accidents reported were included in the analysis, as it was thought that they would show the potential dangers of the industry better than would charts based upon analyses of tabulatable accidents only.

Chart No. II shows the percentage of lost time from different causes in one of the largest steel yards. This chart should be of considerable

interest, for after all the economic losses from accidents sustained by employers, employees and society vary with accident severity rather than accident frequency. It is striking to observe in this connection that in both forms of analysis the part played by machinery is practically negligible.

Turning now from the steel yards to those in which wooden vessels are built, a study of Chart No. III will show principal accident causes. In wooden shipyards there are machine hazards which can not be ignored, and this chart particularly illustrates their relative importance.

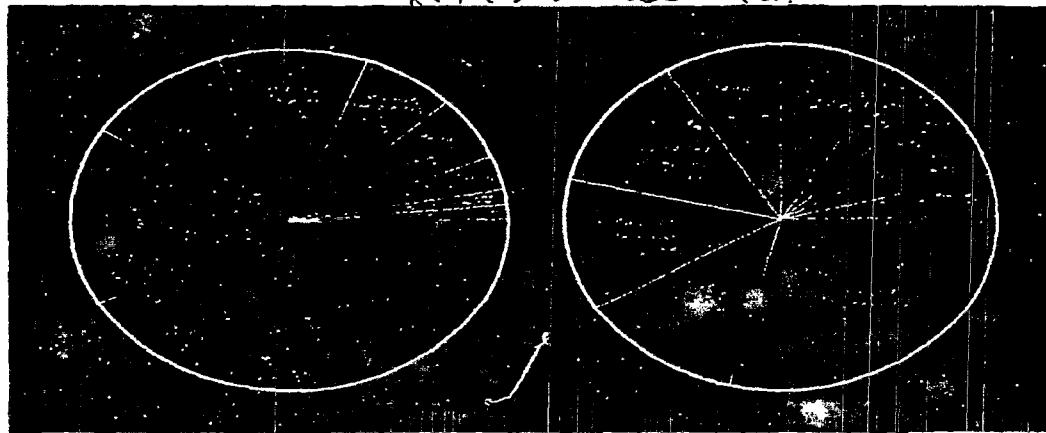


Chart I: Accident analysis based on accident frequency. Chart II: Accident analysis based on accident severity.

Chart No. IV is based upon an analysis of accident cost in the same yard covered by Chart III. Accident cost includes compensation payments and the amounts expended for medical treatments.

Two more charts conclude the series. They are designed to show the causes of accidents in yards that do shipwright work only. Chart V refers to shipwright work on wooden vessels such as barges, tugs and launches, while Chart VI portrays the accident frequency in a steel repair yard.

Having reviewed these analyses, one is impressed with the preponderance of accidents and the large percentages of time and monetary losses from the non-mechanical causes. Inasmuch as non-mechanical accidents are due in a large measure to shortcomings in human nature, and only in a small way to physical conditions, the educational branch of safety engineering assumes great importance.

Safety education in a shipyard should begin in the employment office. One looking for a job expects to be told at the time he is hired of the conditions under which he will work and the rules which he must agree to observe in order to obtain employment and hold down a job. His mind is very receptive at this time, and an employment manager fully in sympathy with the safety movement can invariably get a new man started

right by judicious reference to accident prevention during the interview and while waiting to turn him over to his foreman.

Foremen are, or should be, leaders of men. A good one will not only be able to keep his gang keyed up to the required productive pitch, but he will take each man in turn as he joins the force and instruct him in the safest way to do the particular job to which the man is to be assigned. Further, he will keep a constant check through his assistants and by means of personal observations on the manner in which the daily work is being done, and will correct immediately any practices likely to cause accidents before casualties occur.

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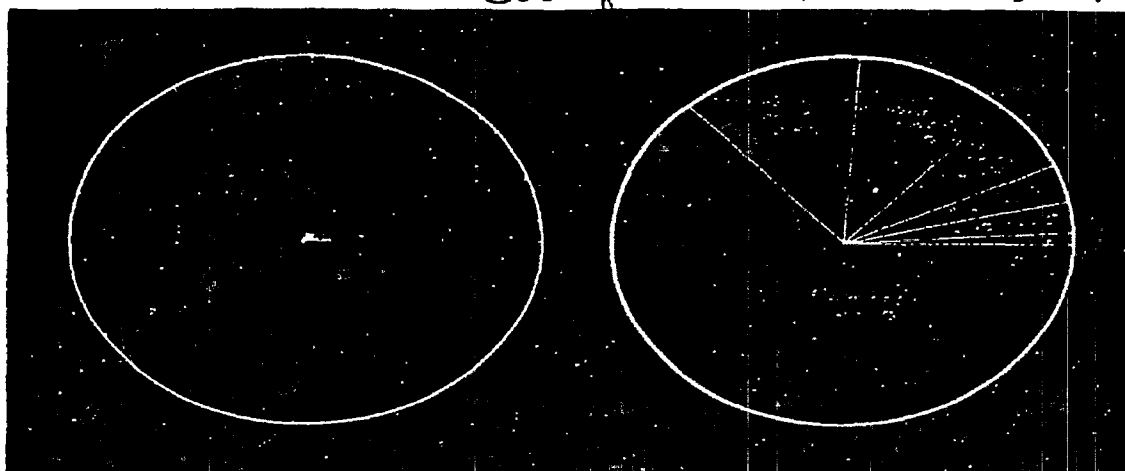


Chart III: Accident analysis based on accident frequency.

Chart IV: Accident analysis based on accident cost.

The safety engineer of the yard should make daily inspections of the premises, or such parts of them as his time will permit. He should be vested with sufficient authority to enable him to have dangerous conditions corrected without having to go through a lot of red tape. His efforts and those of the foreman should dovetail, and his success will depend largely upon his ability to sell himself to the foreman as a "regular fellow." If he can do this, he can educate the foreman to his point of view and have the support of the ones whose help he needs most in putting over his program.

There should be periodical meetings of foremen for the consideration of accident prevention. The executives should attend these meetings, and by their presence put the stamp of approval on the efforts being made by the ones directly responsible for the safety work. Accident prevention should be discussed at these meetings not as one more thing to engage the foreman's attention, but as a part, and a very important part, of the productive program.

Safety rallies and meetings for the entire personnel may or may not produce desired results. If the meetings are made interesting and are addressed by men who can talk the language of the yard, much good can

be accomplished. On the other hand, a meeting that leaves the men talking about the white-collared guy who doesn't know his stuff may do a lot of harm.

Visual education often proves more effective than the spoken word. Carefully selected safety posters on well-placed bulletin boards constitute the most valuable single medium one can use in a shipyard. Motion pictures and stereopticon views are also invaluable. The safety man who can use a camera to take pictures in the yard for home-made bulletins will be well repaid for his trouble by the added interest aroused through giving the bulletins a bit of local color.

Safety men have discovered an important truth which is well known to all who are called upon to lead in movements requiring the cooperation of a large number of men. It is that you can best develop interest and, having developed it, keep it alive by giving as many as possible something to do. Churches, fraternal organizations and other bodies make use of this principle, and it has been employed to good advantage in shipyard safety work. In one yard which came under my observation, a committee of workmen was appointed and the membership of the committee changed at frequent intervals. During their service on the committee, each man was provided with an attractive safety committee button. After being relieved from active committee duty, the button was retained, and each man was given to understand that he was still considered a part of the safety organization. Within a comparatively short time there was a large number of men in the yard wearing safety buttons and boosting for safety.

Another method by which the interest of the men can be secured and their cooperation developed is through the use of safety suggestion boxes. These boxes are placed at strategic points throughout the yards, and all employees are asked to place in them suggestions for preventing accidents. Sometimes cash prizes have been awarded for the best suggestions, and it is interesting to observe that many suggestions have been received through this source that not only had a distinct bearing upon the accident prevention problems, but on production as well.

Mechanical Safeguarding

Mechanical safeguarding in a shipyard should be considered to include the proper protection of scaffolds, runways, hatches, approaches, and other physical equipment as well as machinery. Time will not permit the detailed consideration of the best and safest methods of constructing scaffolds and other equipment of a more or less temporary nature. During the war specifications for safe construction were prepared by the Emergency Fleet Corporation from extensive studies in yards throughout the country. One can do no better than to follow these specifications in so far as local conditions will permit.

Without attempting to go into detail, a few general principles of mechanical safeguarding might well be mentioned. The belts, dangerous moving parts, and points of operation of all machines should be guarded adequately. All scaffolds should be provided with toe boards to prevent

tools from falling, and guard-rails for the protection of the men working at elevated points. Hatches should be provided with guard-rails and toe boards, as well. All ladders used in hatches should extend at least three feet above the hatch level, and the rungs above the hatch level should be removed so that it will be possible to step through the side-rails instead of around one of them.

To prevent certain types of accidents, safeguards must be applied to the men themselves instead of to equipment. Riveters, caulkers, chip-pers, welders and others exposed to flying particles or harmful light rays should be provided with suitable goggles and required to use them. Men handling acids and corrosive substances, such as certain employees in galvanizing shops, should be furnished proper protective garments. The

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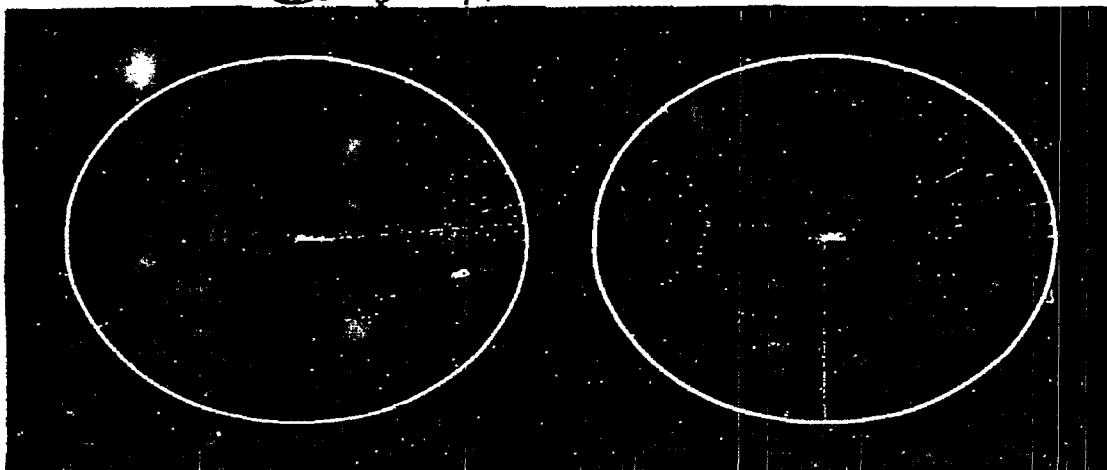


Chart V: Accident analysis for shipwright work on wooden vessels.

Chart VI: Accident analysis for shipwright work on steel vessels.

constant use of these forms of protection, once they have been provided, can only be insured by a combination of good discipline and effective educational work which will bring home to the men the folly of taking chances.

Engineering revision is a most important factor in accident prevention work. It contemplates improved designs of machinery and equipment to the end that the tools of production may be made increasingly safe for use. Educational activities are carried on very extensively in American industry in connection with accident prevention work. Mechanical safeguarding has been perfected to a gratifying degree. The next big step in the prevention of human suffering and monetary losses arising from industrial accidents will be a more general acceptance of engineering revision as an aid in the good cause. To the question, "What can be done to make the machine more efficient?" the words, "and safer" will be added by the designer of the future.

A few examples of engineering revision in the shipbuilding industry may be cited. The heavy electric drills and reamers used in ship work

are built to overcome any resistance which might be encountered in drilling or reaming a hole. When a drill is cutting properly, the operator has no difficulty in holding against the torque or pulling force of the motor. Should it bind in the hole, or take an extra heavy bite in the work, the motor immediately responds with greater power. If the operator is unprepared to resist the sudden push on the handles, he may be forcibly thrown aside and seriously injured by falling or by being hit by the handles of the drill, which are then revolving with the drill housing.

Engineering revision eliminated this hazard. The tools were re-designed in such a manner that the removal of the operator's hands from the handle, either voluntarily or by the jerking of the handle from his hands, would cause the current to be shut off automatically and an electric brake applied.

The ordinary bucket which has been used to catch heated rivets from time immemorial was made the subject of engineering revision by a safety engineer in a shipyard on the Pacific coast. He designed funnel-shaped rivet catchers made of sheet metal and provided with outside handles so the hand of the one catching would be protected by the taper of the funnel. Under certain circumstances it is necessary to heat rivets on one deck level and use them on lower levels. Throwing rivets down ladders was common practice until an ingenious safety man hit upon the idea of using chutes to carry the heated rivets to points immediately adjacent to the place where they were to be used.

Summing up, safety engineering in shipbuilding requires the application of all of the branches of the science if accidents are to be controlled. Educational work alone will not suffice; mechanical safeguarding by itself will prevent but a small percentage of the accidents; engineering revision is only a part of a complete accident prevention program. A combination of all three elements, each given the degree of attention required by existing conditions, is bound to produce satisfactory results.

A Great Percentage of All Accidents Avoidable

MR. TODE: I believe that Mr. Prouty mentioned something about the number of avoidable accidents, and in my paper I also call attention to that. In fact in a great many addresses which are made on safety in any Section one hears of the large percentage of avoidable accidents.

I attended the conference at Washington a few months ago which was called by Secretary of Labor Davis, and in his opening address there Secretary Davis pointed out that figures on avoidable accidents in industry had been compiled by the Bureau and the statistics showed that 75 per cent were avoidable. I mention that because I have been looking over the accident records of the Texas Company for four years and for my own satisfaction have determined that exactly 75 per cent of our accidents have been avoidable accidents. It struck me as a coincidence that it was the exact figure that Secretary of Labor Davis brought out, where, in his case, several millions of accidents had been recorded.

In compiling our records we have sent letters to our captains and

chief engineers asking them for all possible information, but I believe you can do more by personal contact in talking to a captain and getting him to relate the history of his life and asking him where he has been sailing, and then gradually getting around to accidents. He will tell how many have been injured on the ship and you can get him to realize and feel sympathy for his men. In that way you can generally get him around to giving some good suggestions which might not have been thought of.

MR. PROUTY: Personally I don't believe in paying a man to do what is right. I don't think we need to provide bonuses to get a man to practice safety. It is true that in many cases the initial safety stimulus has been provided by giving to men who do something meritorious a little prize, not always in the form of cash, but perhaps a little emblem which will be a visible token to display to companions and fellow workers indicating that he has done something to protect them and protect himself. I like the idea of giving these little pins and buttons to men who come across.

There is an opportunity in the marine industry to stimulate the safety work in general by getting the men to make suggestions and to tell you of things they discover in their daily work which have nearly caused them to get hurt.

Statistics Show Conditions in Particular Yards

MR. EDWARDS: Mr. Prouty, I would like to ask if you have included in that paper the statistics as given on your charts? I raise the point for this reason. I think the information given there is not only valuable but should be brought to the attention of every one of us. I have found it rather difficult to get charts and data printed unless it is included in the article.

MR. PROUTY: I purposely omitted reference to the ship yards and I did not include the basic data on which the charts were prepared. I took all of the accidents and considered them 100 per cent and included the different causes. The actual work in making the charts was done in the home office from their data. I assume they still have those figures and I shall be very glad to look them up and let you have them.

I don't think it would be safe or fair to take such statistics as these and assume that they indicate anything beyond the particular yards to which they apply. There is not a sufficient exposure of accidents, not enough of them. This simply shows what happened in these particular yards.

CHAIRMAN WELCH: In connection with this paper I desire to state that the ship construction yards should belong to us; I don't think they are hooked up with any other Section now. During the next year I am going to try and get them in where they belong. A good many of the ship yards are members of the Council but they are possibly hooked up with some plants and they should go to the Marine Section.

Now we would like to hear from N. F. Titus, Chief, Division of Transportation, Bureau of Foreign & Domestic Commerce, Washington, D. C.

ORGANIZING FOR SAFETY ON THE PACIFIC COAST

N. F. Titus, Chief of Division of Transportation, Bureau of Foreign and Domestic Commerce, Washington, D. C.

A paper was scheduled for the Friday morning session of the Marine Section by Mr. J. J. Rosedale, safety engineer, in charge of the safety work in San Francisco, and I looked forward with a great deal of pleasure to hearing this paper. On account of the inability of Mr. Rosedale to appear, I suggested to Mr. Welch that it might be interesting to some of you to know what is being done out there.

I am taking the floor with considerable reluctance because what I have to say is entirely impromptu. I would have liked to have the advantage of weeks, if not months, of preparation; but I felt that it would really be unfortunate in a meeting of this kind, if the program were allowed to go through without something being said about the safety work being produced on the Pacific Coast relating to maritime affairs. What I am going to say is just a plain statement of what the work consists of, how it was started and really what is being accomplished.

In order that you may understand the situation I would like first to explain that San Francisco is the major headquarters on the Pacific Coast from a shipping standpoint. By that I don't mean the volume of business conducted, but I would say San Francisco is the headquarters of most of the operators, or rather operating companies. We have about 35 or 40 major shipping companies, and we have in San Francisco the headquarters of the American Steamship Association which really represents the offshore operating fleet. We then have a Ship Owners' Association which was organized because we have on the Pacific Coast a peculiar type of vessel known as the steam schooner which is a particular Pacific Coast development.

The problems affecting that business were so different from the offshore trade, it became necessary for steam schooner operators, owning 225 vessels, to form their own organization.

There is a third organization, known as the Waterfront Employers' Association, just a company of stevedores.

These three organizations work closely together; they occupy an office building exclusively their own. They each have their own secretary and their own directors. Every Monday morning at 11:00 o'clock they have a joint meeting of the directors of the three associations so there is the most intimate correlation of effort. They also have an employment bureau located on the ground floor, with a general manager supervising the employment service. So we have here a distinct organization for cooperative effort.

Now the background of this situation goes clear back to 1911. At that time one of the brokerage concerns in San Francisco introduced a Pacific Coast Protection and Indemnity Insurance, as we all knew it. This brokerage concern operated a market in England where, in that

year, 1911, practically all the Pacific Coast operators entered their fleets in one or other of the British clubs. They did not enter strictly as a member but took out the real P. and I. policy on a flat basis. A few of the companies have, from time to time, come into the American club which Captain Kain represents, but most of the insurance of P. and I. was taken out with the British clubs.

Of that business most of it went to the West of England Steamship Owners' Protection and Indemnity Association.

The plain statement of the case is this, that from 1911 until quite recently, within the last year or 15 months, the steamship owners have considered that the thing was off their hands, that having P. and I. insurance fully covering their vessels they were no longer concerned in accident prevention, it was the insurance company's business.

We all know the fallacy of that viewpoint, but the fact remains that these operators were so busy securing the handling of lumber, oil, ore and so forth, they were too busy to pay much attention to this thing, especially since they considered it the insurance company's business.

You can imagine the result of a situation of that kind when no one paid any attention to the business of accidents. Accidents multiplied and within the past two or three years they have nearly trebled. If I told you they went up 30 or 40 or 50 per cent you could understand that; but it is a fact they nearly trebled. We tried to compare experiences to find out how and what caused it and it seemed due to a general laxity on the part of the operators and owners.

Murmurings of Discontent in London

As a result we began to hear murmurings of discontent from London. Finally Holman & Sons who represented the operators in the West of England Steamship Owners' P. & I. Association relinquished some of the business. They gave us certain classes of business on the Pacific Coast so within the last two years we have found a new situation and that is that many of the owners not able to get the West of England P. & I. insurance through Holman & Sons have been obliged to get the brokers on the streets of London to get regular stock company insurance.

We found that as the P. and I. Associations developed this business and accumulated data through long experience, that the regular underwriters who write it as they would a P. and I. clause on the regular Hull policy, excluded whole blocks and sections of the trade from the P. and I. Clubs due to their accumulation of very bad experiences. The situation kept getting worse and worse and it was quite noticeable at the first of the year when a great many renewals came to be placed. There were indications of increase of rates and more stringent alignment of conditions on the policies, and those people who were at all thoughtful began to exchange experiences.

The situation came to a head in March. We then had a joint meeting in one of the clubs in San Francisco where the representative members of these three associations met and considered this matter. The condi-

tions of the problem were very simple. The owners recognized that rates and conditions were becoming more stringent and wanted to get together and find out what they could do about it. Very naturally when you talk over these things and you find your insurance rates and conditions getting more stringent, you find out the cause is frequent accidents, and the only way to correct that is to reduce it. So, by the very force of the onslaught on their pocketbooks they were obliged to take up some sort of consideration for a reduction of accidents, a consideration of safety methods, and through no bright analysis, but simply by the dollar and cents standpoint, they were forced to consider the suggestions of this Section.

A committee of seven was appointed; a general chairman and two members from each association, to look into this matter.

This, in brief, is the situation (and I am speaking from memory) that up to last year, for instance, the steel fleets were insured, in general, at five-eighths per cent with no deductibles. Along about the first of the year the rates began to creep up to 70 or 80 per hundred and instead of no deductibles we began to find a \$50 deductible. Then along about January, February and March, very rapidly as other members began to renew their policies, instead of a \$50 deductible we found \$200, \$250 and \$500 deductibles, and the last of March the rate ran up to one per cent and a great many are now paying one and one-quarter per cent.

More and More Difficult to Get Insurance

When you tell a man that his rate jumps from five-eighths to one and one-quarter, he can look at his premium and he can read; but when you speak to the average operator and tell him that his deductibles increased from \$50 to \$500, he does not know what it means. Of course he knows it means something serious. So at that meeting we analyzed that feature and through the very fine work being done through Mr. Foisie's organization, which is really the only organization which had made any analysis, we were able to find that a \$500 deductible meant, as I recall it, that if 88 per cent of the claims were for the owners account, with a \$500 deductible the P. and I. Association or underwriter would only assume 12 per cent of the number.

Then another remarkable situation came in. Some of the owners who had probably a little poorer experience than others could only get insurance at \$1,000 and some \$2,500 deductible. A man with \$2,500 deductible is getting paid for death. Some accidents come within the total loss insurance.

In other words, by not only doubling the premiums and greatly increasing the deductibles the result was that the British clubs found the risk too great and had to run out from under, leaving the Pacific Coast handling its own insurance. So, very naturally, what we did was to study the situation very rapidly. We did not have much time. Each new cable that came in gave more drastic quotations, so very quickly we secured a couple of safety engineers whom we hired, one to act as a

sort of consulting engineer. That is Mr. Rosedale who was to be here to speak to you on Friday; and another full time man who went up and down the waterfront.

On account of the peculiar nature of our organizations out there, we decided to let the safety work apply on shore and on board ships as well. So the thing I want to point out is that I think there is here the first cooperative effort ever started in America for a safety program that is comprehensive in its application among a large number of fleets, both ashore and afloat.

We had enough common sense to know that when we tackled this thing we would have to be tireless in our efforts, so we tried to find out what other people had done. We examined various situations and found very quickly the fine and able work done by the Lake Carriers' Association. We read some of the articles published by Mr. Marr that are what we might call, a specialty covering a peculiar type of carrier and only accomplished by a safety committee on shipboard. Due to the fact that most of their work is carried on by mechanical loaders and unloaders it did not offer much of value to us except as safety work on shipboard.

Reports of Safety Work Good in Seattle

We found practically nothing being done on the Atlantic Coast. Bad as we were, we felt conditions intensely worse on the Atlantic Coast. We found practically nothing on the Gulf Coast, so really we had to come back home with very little in the way of experience we could copy except what had been done in the northwest. We found there considerable comfort because we found Mr. Foisie's organization had done some very fine work. At that time they had been operating for nearly two years with safety engineers. We also found the shipping federation at Vancouver had done some fine work under Mr. Sweeney. We noted that as a result in some 18 months or two years Vancouver had reduced their accidents in the neighborhood of 40 per cent.

The reports in Seattle showed about 35 or 40 per cent reduction at that time. We noticed with a great deal of interest that in a six months' period in Seattle some of the most outstanding things had speedily been corrected. Their reports showed they had had 13,000 house losses through the giving of wrong orders. They speedily corrected that condition and in the next six months they had no house losses. They showed a way whereby we could greatly profit and apply it to our business.

The work in Seattle was very encouraging. In this connection we also looked into the situation at Portland. They had no safety engineer there but had a safety committee headed by a young and progressive stevedore operator, and some data obtained there showed 30 or 40 per cent reduction in accidents. And so we felt the only way to accomplish these things was to get right down and do it.

We put two engineers out and started a campaign. We issued a weekly bulletin and printed the things they discovered. These bulletins

were more for popular consumption and management of men and were not scientific. The engineers were charged with the responsibility of taking photographic records of good and bad practices and getting out specific data on the subjects.

The committee started right away to communicate with the British brokerage concerns, C. T. Bowring & Company, Sedgwick, Collins & Company, and Robert Gardiner Mountain & Company, telling just exactly what we were doing. In other words, we started a back fire to let them know we were not as bad as they thought us and that really, through the spur of necessity, we were doing some work. We got some very interesting responses.

The sum and substance of this thing was that it was high time we woke up. It had been a constant source of amazement to the Britishers that we had gone along these 14 or 15 years and had not thought about these things. It only started when the insurance companies raised their rates because until they raised their rates they let the insurance companies pack the load, and as long as they carried the load they let them.

American Losses Six Times Greater Than British

As chairman, I received one very interesting letter from Holman & Sons and I remember the figures very distinctly. In addition to the general comments upon the fact that they felt it was high time to get into the safety work, they commented on the fact that in their association, which is the largest association of its kind, they having had most of the Pacific Coast fleets, the British vessels entered showed a loss record for loss of life and personal injury claims of five-tenths per gross registered ton, and the American records showed two shillings and six pence. Their records showed that our losses were six times greater than the British and it certainly is no wonder they were filled with amazement at our criminal neglect in our business.

I left the coast about six weeks ago, and we had a meeting of the directors of the three associations to take stock of this safety program that had only been in operation in San Francisco for four months. At that time they had this first aid convention at San Francisco and they had a big time and all the safety engineers were out there and we had Mr. Markle come in and make a report. Our directors were very anxious to know, as business men, what was being accomplished. They liked the theory and wanted to know the actual results and Mr. Markle was able to show, as a result of the first 18 months' work in Seattle, a reduction of 61 per cent. We were certainly collecting some very obvious evidences of bad practices, and there were some operations that were almost criminal.

We very quickly discovered this: that through the peculiar nature of the shipping business we found the average executive—the president, the vice-president and the general manager, for instance—did not know a sailor or longshoreman by name. To them these men were merely beasts of burden and meant no more than automobiles or auto trucks

or horses mean to the ordinary business; they were merely adjuncts to the business.

The executives, far removed from the scenes of activity, knew very little of what was going on; so we found most of the bad practices were the result of this removal of the managing power. We set about making quite a conscious effort to bring the management in touch with shipping labor.

We found situations like this up in Seattle, that during a certain period three or four men in Seattle met death through defective hatch covers. I know the president of my company and I know him well, and I don't think any president, if he knew there was a defective hatch cover, would hesitate to say, "Have a new one put on," or "Why the devil don't you fix them?" I am sure he couldn't see any sense in his fleet being operated with defective hatch covers. But it seems the trouble comes in along the line—the passing and shifting of responsibility, and that is why the thing isn't taken care of. It may also be due to the superintendent or engineer holding down too closely on repairs, but some one along the line is responsible and the responsibility has to be traced to bad practice in management, and when we discover these things we must correct them.

Mr. Foisie found that one of the greatest troubles was caused by the fact that the general offices in San Francisco, conducting agencies in Seattle, did not give authority to these local agencies to go ahead and repair defective gears or hatch covers, and the management in San Francisco had not been thoroughly aroused to attend to these things.

Necessity Forced a Real Cooperative Plan

All that I am telling you here today is simply this: that through the force of necessity the main operators there have gotten together on a real cooperative plan and they are working with Seattle safety engineers and the San Francisco engineers and are exchanging experiences and are rapidly getting to a point of a united Pacific Coast program ashore and afloat.

It is the only place I know of where this is being done. San Francisco is charged for going into the Los Angeles harbor and we are considering a safety engineer for Los Angeles. I think the results of Seattle and Vancouver speak for themselves. Sixty-one per cent in accident reduction is great progress.

We are organizing what is probably one of the most vital features; that is, we are acquainting the management with the problems attending the management of labor, something they have shifted to some one else. This is a very vital link.

Although this committee was appointed to be a safety committee, we found very quickly, in addition to safety work, other lines of effort opened themselves up for consideration, and a very significant feature was the necessity for some sort of cooperative medical effort. We found, when accidents occurred, that the men were being sent to some doctor,

possibly one who had never been seen, a doctor appointed by the insurance company, and as matter of such practice the ship owners or operators felt little concern because it was the insurance companies' business. Again there was that remoteness in operation the same as in the labor question. Our medical expenses were all out of line.

When I left there we were fast coming to the point of having a medical director for the combined shipping business. This medical director can look over the X-ray plates; he doesn't necessarily have to do the work, just control the situation. If Mr. Brown does the work he can report to this medical director and he would tell Dr. Brown, "I have looked at this X-ray plate and in my judgment this man who was injured should be discharged in three weeks. Dr. Brown, will you see that he is discharged in three weeks?"

That is the obvious method of handling medical direction. A great many operators and owners are paying unnecessary amounts to the medical profession. They are really being bled; not through unethical methods, but it is simply a case of dealing with human nature. It is a case of turning a bunch of doctors loose and paying any bills they send in. Human nature is such that when a doctor is in doubt he will string a case along two or three weeks or a month. He thinks the corporation is rich and he is doing a good job and far be it from him to turn down the case.

Safety a Factor in the Problem of Efficiency

We also began to discover the necessity for cooperation in legal work. Too often the companies don't know how to handle these cases. The P. and I. insurance clause reads that the P. and I. people reimburse for ship's liability. You have to pay your claim if the ship is liable and present it to the P. and I. underwriter and show the ship's liability and claim in order for you to be reimbursed. In many cases it has to be referred to an attorney, and, always, for the last analysis, to our own attorney; and many and many a time we have had a \$200, \$300 or \$500 legal bill; so we are fast getting to the point where we are going to get legal direction.

These things are very significant. They all show we have been recklessly spending our money and this safety program is only one very small factor in the whole program of efficiency.

Now with your indulgence I want to mention a couple of points that tie up with the work I am doing in the Department of Commerce. As you know, Mr. Hoover has long been interested in the elimination of waste in industry. Mr. Hoover's work has been of such a character that his name has been coined into a new word. We all know what it means to "Hooverize," save, economize, and eliminate waste. In the development of this he has done great work in standardizing business practices, and I think there is a significant message in that work and development for all the ship operators. That is one of the things that appealed to me and one of the reasons I am there. The shipping industry is woefully deficient in all this business of Hooverizing.

In other words, we found, as in our committee work, that (to use our commonly accepted term) the shipping industry was 25 years behind the times. The better class of industrial operators and executives had, during the past 25 years developed most efficient, significant practices. Americans had gone to the forefront in business. They had gone far and wide in the matters of cost accounting, taking of stock in their business, paying attention to the lighting and heating factors, personal old age pensions, life insurance, saving methods, and all the multitude methods of welfare education, club houses, and so forth.

These things have been significant and industry has gone to the forefront in such a way that American practices are considered so unique that European countries want to know what they are. Commissions have come over from England to study our American practices. To use Mr. Hoover's terms, "They come over to see how we do it."

Commissions have also come from France, Italy and Germany and they find to their astonishment that we are paying the highest wages in the world and yet are able to compete with people paying starvation wages. They want to know how we do it. These countries send commissions and expect to find some magic formula of mechanical operation, and when they have found we have social factors entering into this business as well as economic factors they have gone home and told their people lots of things and many have gone home a little exercised over what they found because of the peculiar American social status which can not be imposed on European society.

In America the poor boy can climb to the top, but in Europe, because of their social conditions he can not do that. The result of this opportunity, this massed education (for instance, as Mr. Hoover points out, we have more students in institutions of higher learning in the state of California than they have in all Europe) this constant selection of brains, is we are getting people to head our industries that are progressive, that think and act scientifically.

Overlooking Some Very Vital Things

While this economy and progressiveness have been going on in industry we in the maritime industry have not taken the trouble to pay any attention to it or to profit by the better business practices and so forth, and this matter of safety is only one of them.

The cooperative effort in the medical direction and in legal work, in claim adjustment, and settling claims economically and quickly, will create good will from the man and will cut out the lawyers' fees which are usually 50 per cent of the settlement. You know all that, of course.

We have been overlooking some very vital things, overlooking the standard practices as practiced in the best industrial plants.

One more point is this: my idea has not been expressed in this meeting here. The only way to put over this safety program is to do it cooperatively. To me it is a source of disappointment that in this meeting, in our expressions, we are giving individual experiences. What we

should be doing is organizing our industry and getting these things done cooperatively. That is the message I want to give you, if our experience means anything at all. There is only one way to get this thing done and that is cooperatively. We are leading to a unified Pacific Coast program, and heaven knows that on the Atlantic Coast you need the same thing. The situation there is terrible.

I can maintain that we are 25 years behind in our industry and one thought I wish to put forth is this: that on the Pacific Coast we have demonstrated one way to do this, and that is cooperatively.

I am so sorry that there are not more of the American Steamers' Association here to imbibe some of the spirit we get out of the National Safety Council meetings. They will give us again the same thing that we encountered on the Pacific Coast. If they don't do it voluntarily it will have to be done involuntarily—and it will have to be done cooperatively.

CHAIRMAN WELCH: That is a very fine outline of your work on the Pacific Coast, but about the Atlantic Coast—I am not going to say anything. We have been trying to do something for three or four years. We have started something. Is there any discussion?

Have a Single Objective to Work Toward

MR. HEINRICKS (Assistant Superintendent, Engineering Division, Travelers Insurance Company, Hartford, Conn.): The speaker's remarks have been so pointed and have so directly hit the main objective, as I see it, it rather inspired me to say something that bears along the same line, and this is the thought that occurred to me.

The business of cooperation, of course, is a necessity; it is a thing we must have to get results. But above all things this Section must find some one thing that is the main objective to shoot at, something that has got to be accomplished, and then spend time along that particular thing with other things as incidentals. Having one thing as a main objective and working on that intensively, we will get farther ahead and in a quicker manner than if we try a dozen things at once.

Now what I have to suggest is a specific thing to do that will have for its end the reduction of accident toll losses in stevedore and allied maritime compensation records. Along the line of costs the consideration of insurance rates is rather important. I am now talking about an incentive, the humanitarian one, and everyone in this Section knows that the humanitarian business incentive is money. Insurance rates are too high—*absolutely* too high; they are ruinously high for stevedore and other allied operators, and they can be reduced.

The example just quoted of excess over manual premium, to me, means simply this that this particular industry is being penalized by that excess and further by the fact that it would be possible to get a reduction of that same manual rate if a portion of accidents was eliminated.

I want to talk along the line that, as a specific point, the Travelers

Insurance be the chief objective. Now a further business incentive is the cost to the owner, employer, or steamship owner. The cost to the man who employs labor and has accidents is not represented so largely by the premium he pays, for which his liability is assumed by the insurance company, but it can be directly measured by this one way of looking at it. He knows he has other losses.

Let me cite one case. A stevedore had losses amounting to \$10,000 a year for over five years. In five years to that stevedore the insurance company paid \$50,000. That stevedore paid \$200,000 at the same time out of his own pocket, not including the insurance premiums, but in overhead on account of losses due to accidents. That is something that should be considered; it is a four to one cost because if the cost of the claim is \$5 the cost to the employer is \$20, and that is usually the average. However, if the compensation cost is \$10,000, naturally in that sort of case the owner does not pay four times \$10,000 or \$40,000. But in other cases a \$5 cost has meant hundreds of dollars in loss to the employer from the standpoint of property damage, especially if the accident is due to defective materials (for instance if a draft of goods falls upon a wedge or down into the hold); he loses several times the cost of the claim to the injured man, to say nothing of the cost of time lost; because even in the case of a man being scratched or bruised, he is laid off from work and goes home and somebody goes with him and in most cases the cost of a taxicab is involved.

I have taken 10,000 cases involving stevedore accidents and made a fair average, and including all these other things, it has been definitely proved that the cost comes out four times the amount of the insurance paid to the carrier. Add that to the premium he actually pays on his insurance and you get some idea of what his accidents are costing.

The One Big Thing Back of Accident Prevention

Now as to the specific remedy I have in mind. In stevedoring it has been our experience that the one big thing that lies in back of accident prevention is not so much the fit condition of the men, nor the kind of tools used; it is not so much the condition of the rollers, or the gears, or the blocks, or the inspection of that material (although those things are absolutely important); it is not so much that as it is the business of believing first of all when accidents occur somebody is responsible, and there is necessity for fixing that responsibility. No matter how small or trivial that accident is, there is a responsibility and that responsibility lies chiefly upon the man, the foreman, the supervisor of the gang, the man directly in charge of the fellow doing the work.

Stevedores hire gangs employed by other stevedores not their own men, and there lies the big point. If you hold the foreman or the supervisor personally responsible for the accident when it occurs under his direction, you can control the situation in the stevedore and allied industries, and it is fair to hold that man accountable; and you will have an awful lot of trouble if you don't believe you can hold him

responsible. It can be done, and you can make that man admit that he is accountable when a man slips, falls or stumbles: because a foreman's duties are such that even though he is supervising 30 or 40 or 50 men they must include, besides getting out production, the business of watching and handling his men, of knowing the careless habits of the men, of knowing their peculiarities of disposition: and if he handles his men right he knows long in advance whether a man is liable as a potential accident producer. If he knows that and knows that the boss knows it, it makes him personally accountable, and that rule will get results.

MR. FOSBERG: With the last speaker I agree on the point made of the necessity of fixing responsibility in the effort to prevent accidents. I think, however, I disagree over where that responsibility rests primarily. He would fix it, by way of illustration, upon the person immediately responsible for supervising the operation where the accident occurs, in this case on the foreman.

I think our experience is slightly different, or at least our reasoning takes us to a different end. In our point of view the responsibility and opportunity are practically identical in theory with management. I rather think that the speaker, if he analyzed those illustrations where he found that responsibility had been fixed and therefore had decreased accidents substantially, would find that the management, in that business clear up and down the line had analyzed each and every person's responsibility and had reckoned that all persons involved, particularly the executive, were definitely being checked up on.

The Main Difficulty Is Inertia in Management

We believe, in other words, that the principal difficulty in accident prevention is due to inertia in management, and with progressive management all of the factors, perhaps the primary one which is responsibility, are carefully evaluated. I don't think there is any single remedy such as the principle of fixing responsibility for accident prevention work.

Referring to Mr. Titus' address, I think I must absolve myself from some of his charges. Out on the Pacific Coast we do stand together. There we form a mutual admiration society and that fact is best evidenced in the cooperative spirit existing there, an atmosphere from which Mr. Titus has been lifted into the highest form of a cooperative job in the leadership of shipping interests centering in Mr. Hoover's department.

The business of cooperation in shipping is peculiarly dependent on this spirit. Compactness of organization among the highly diversified shipping interests is the problem that squarely confronts it. How to secure that is what I hope to speak on tomorrow.

CHAIRMAN WELCH: I have one short explanation to make to Mr. Titus. He was disappointed in one way in some of our activities. You should know what you are really doing because you did start this Section.

When we first organized the Marine Section about three or four years ago, I read an article on Stevedoring and it fell into the hands of my good friend, Mr. Foisie, out on the coast. He immediately got in touch with me, saying, "This is pretty good. We haven't been doing anything out here. We want to get in touch with this movement. My company belongs to the Council, but we haven't been doing much."

I got in touch with Mr. Foisie and before long he had hired a safety engineer, so he started ahead and because of that you got some valuable guidance from him as to what was to be done.

In connection with the east, we have done everything imaginable to get the shipping industry interested. We were supposed to have Mr. Raymond here, but he notified us he could not come. You can't hold the Section responsible for that. We have had articles written by Mr. Hand and George Marr and we sent them to all the managers and presidents of the steamship owners in New York City, and they are dead. As you say, they are 25 years behind. What do you want us to do? We tried to interest them in every way and when you gentlemen out in the west show the Atlantic Coast up as being dead, dry, and rotting, as they are, that will, perhaps start some cooperative work.

A Combination of Effort Very Essential

MR. TITUS: As I said before I am speaking bluntly, but that is the only way to get any constructive benefit and criticism, and I think that is what we need to start this cooperative effort. There has been a wonderful pioneering work done; however, the point I want to convey is that if we are going to do the big work, if we are going to capitalize, some sort of concerted onslaught should be made on them. This can not be done entirely by individual, voluntary effort. You have to have a salaried personnel. You can't get a salaried personnel through individual subscription, you must get it through cooperative associations. That is the thing I would like to see started. A scheme could be evolved through this Section for making a presentation, or have something done to try to arouse the American Steamship Owners' Association to undertake this cooperatively. I venture to say that if they don't do it voluntarily they will have to do it involuntarily.

We didn't enter this work through any spirit of research or uplift; it was done simply because the underwriters stood us up against the wall and pointed a gun at us and told us we would have to dig up the money to get our coverings.

CHAIRMAN WELCH: I want to explain our side, too. In connection with the American Steamship Owners' Association, what would you think of a management who said, "We have never had any safety engineering on our ship, and never will have?" As you say, Mr. Titus, it will come to that point sooner or later when they will have to have.

MR. TITUS: On the Pacific Coast we found that some of our biggest operators (I don't care to mention names) were very much in the same position as this concern you speak of. One of them finally went so far that their representative met with us and collaborated with us in giving

us his ideas. The representative of the other was appointed on the committee, but resigned because his association didn't want to get involved.

The greatest joy which indicated a great measure of success, after months of effort, was when that company which said they would have nothing to do with us changed their ideas and said they were interested and would probably join because they began to see some results.

I don't care what cooperative plan you evolve, you will find objectors, and my theory is that you get started; if you haven't 20, start with five and get going. The thing is so easily demonstrable, I think. When folks find out that the water is fine they want to get in and swim around with the rest of them.

MR. HEINRICKS: Just a word, Mr. Chairman, in rebuttal. I am a very poor speaker and I feel that I have not made the point I wanted to make as clearly as I should. I am entirely in agreement with Mr. Foisie in what he says in regard to the responsibility of accident. Not only should the foreman be held accountable, but in the cases I had in mind it was most decidedly the management also. There was a spirit of recognition of responsibility that pervaded the whole line. I did not mean to omit that; I was merely making the assumption that the management was sold, that they wanted safety, was determined to have it and conveyed their impressions and thoughts so thoroughly that the foreman was finally held accountable unless these previous conditions didn't exist. I was assuming something that I had not stated.

The Foreman All Things to All Men

MR. FOISIE: I was interested in elaborating on Mr. Heinrich's word. We are rather in agreement. It has been my experience in industry that the foreman is held responsible without being given, at the same time, adequate assistance. He has too often been made the goat of bad management. In the case of the stevedore organization he is in a peculiar position aboard the ship, the plant of his employer, but quite remote from the management itself in an office on the waterfront. He has a boss directly above him who is usually an irritable one.

The supervising of cargo has become a training school for immature and inexperienced men who have the authority of the uptown office which in turn controls the stevedore management's business frequently in a dictatorial and inconsiderate way.

Then, of course, the foreman must be all things to all men. He has the difficult task of having to organize a group of men from a highly disorganized and chaotic group, men from many ports—floaters, if you will call them so. So at least the stevedore foreman from our point of view is much in need of assistance: not necessarily more authority, but assistance and enlightenment and consideration from the management. I have yet to hold him responsible for many things within his control, and many things that are not.

I want to pay tribute to the Atlantic Coast. Not to the whole, but to

a few. Mr. Welch called attention to an article which he wrote. I had it mimeographed and distributed among employers, men who were operating in Seattle. It had to do with men and management having equal authority—joint authority in all matters; and the keynote in that text gave as one of the clues to safe operation the recognition of men.

The conclusion I wish to draw from his paper of that date is that without recognizing the work of the men in shipping, whether it be the stevedores, the dock wallopers or the seamen, without some effort by the management to make their jobs reasonably worth while, reasonably stable, you are never going to have adequate safety operations in shipping. If shipping expects to get the cooperation of employees the management of shipping must show the spirit, at least show the way. The management is the group who, in American industry, has the opportunity or ability to furnish the leadership. You can't expect much of such a situation. One of the essentials for fixing responsibility is that you must recognize the employment of men far beyond that which is the case at the present time, for with casual workers you can only get casual results.

CHAIRMAN WELCH: We have about ten minutes more and I would like to introduce to our group our very distinguished chairman for the ensuing year. I think it is only proper that he should come up here and make a few remarks.

Chairman-Elect Kain Is Introduced

CAPTAIN KAIN: Mr. Chairman and Gentlemen: I am not a speech maker. I came here solely in the interest of safety work because I, personally, and the organization with which I am connected, have been interested in safety work for the past 10 years; in fact, we have been preaching safety work for 10 years, but it has fallen on deaf ears.

As Mr. Titus pointed out, the real urge on the Pacific Coast was the boost in rates which the various steamship companies got last year and the year before. Up to that time I think it was possible to get insurance in the British market after we had insisted on paying adequate rates for risks we were assuming.

I think he has hit on the real key to the situation when he speaks of cooperation. I think there is, on the Atlantic Coast, a woeful lack of cooperation in the maritime industry. The stevedoring work, to a large extent, is conducted by independent contractors. Those independent contractors are carrying their own insurance. The steamship companies are getting the work done on a basis of so much per ton and are therefore not interested in the accidents occurring to the stevedores.

Of course this is reflected upon what they have had to pay for stevedoring, but they have always felt that they had no reason to be concerned with it.

Now, so far as the steamship business on the East coast is concerned, if Mr. Titus, for instance, could find a means of appearing before the Steamship Owners' Association and give them a talk such as he gave us

here this morning I feel reasonably certain there would be some radical changes in the attitude of the shipping executives. I think they are afflicted with the same trouble his organization discovered, and that is the management is not familiar with what is going on on the ships and on the docks. I think the cooperation should go even farther than that. I think it should be plain to the naval architects when plans are laid down for the building of ships that accidents are due to the improper design of hatchways, and that a study of the accidents occurring both to seamen and stevedores should be made and an effort made to correct the design of the hatchways.

The architects who designed those hatchways are interested in certain forms of classifications. The regulations of classification societies are very largely general in this nature. I see no reason why most of the hatches should not be of the same size. On different steamers, unless they are of identical type, it may be a necessity for a difference in the size of the hatches. We find, for instance, that on certain ships the weather deck hatch is of one dimension, the hatch on the deck below is of another dimension and so on to the bottom of the hold. Not only that, but adjoining hatches have different dimensions. Now in a good many instances the hatch covers are painted a vivid color to indicate to which hatch it belongs, but you can not get these longshore men to take an interest and the covers go back helter-skelter with the result that they are put on the wrong hatchways and sooner or later somebody goes into the hold.

I have seen, in some instances, three tiers of wooden covers and instead of having those three tiers all of the same length there would be a difference of maybe three inches in the lengths of the different batches of covers; and the landing surface of the hatch strongback or beam may have been three and a quarter or three and a half. In nine cases out of 10 the wrong cover is put on the hatch: nobody notices it because it is bearing fairly well, but in a short time it shifts and before it is noticed and corrected a man goes down the hold.

Many of these instances come to our notice and I think the owners and ship's officers do not have knowledge of those conditions. I think if the different interests were connected in building and running ships and a safety man employed or consulted when drawing up plans for building ships, that a great many of the injuries which are now due to mechanical hazards would be eliminated. I don't think there is on board ship such a small proportion of accidents as you might think from reading some of the articles that have been produced.

ADJOURNMENT

THURSDAY MORNING SESSION

October 28, 1926

The meeting was called to order at 9:30 o'clock by Mr. W. E. Welch, chairman, who presided.

CHAIRMAN WELCH: First number of our program this morning is a paper by Mr. F. P. Foisie of Seattle, Washington.

**THE URGENT NEED OF ORGANIZED SAFETY, AFLOAT
AND ASHORE**

F. P. Foisie, South Seattle, Washington

Shipping, particularly port cargo handling, appears in need of taking not merely a leaf but a whole sheaf of leaves out of the book of accident prevention, as practised by progressive manufacturing industries. Costs of personal injuries are mounting sharply; competition is compelling the elimination of waste. Safety by legislation looms large on the horizon unless responsible management voluntarily removes the preventable causes of loss of life; and such corrective legislation will be attempted perhaps without the benefit of practical experience.

Believing that there is an urgent need for organized safety in shipping, and looking to the Marine Section of the National Safety Council as a means for collective action by the industry, I inquired of the officers recently whether it is feasible to stimulate prevention of personal injuries in shipping by staffing the Section with a qualified paid executive. Mr. Bush, chairman of our Program Committee, responded by extending an invitation to present the matter to the membership at his Congress.

What, then, are some of the high hazards inherent in shipping?

First among these are the many varying operating conditions coupled with elusive control of the men, especially longshoremen, which present problems in safety organization peculiar to this industry. In the second place the predominance of machinery, tended by constantly changing operators, brings in its wake notably severe accidents as well as numerous ones. If it proves to be true, as alleged in this Congress, that too much is being said about safety education and too little about safeguarding machines, then the responsibility of marine management is the greater thereby. A third feature is the excessively severe strain, speed and long shifts common to longshoring which brings fatigue more pronounced than in any other industry. A fourth factor not generally known is that the usual reliance of industry upon highly competent foremen for constant activity in accident prevention is less possible in longshoring, because many, probably most, "hatch-bosses," "straw-bosses" and even "walking-bosses" are hourly men, without a guaranteed wage, getting only ten cents an hour more than the least skilled longshoreman. Often these foremen are not attached to any one

employer, and more likely than not are foremen today and workmen tomorrow. The foregoing inherent high hazards can be and have been moderated substantially by progressive shipping firms.

There are other hazards commonly alleged to be inherent in the industry which have proven otherwise, however, in actual practice. One of these, high labor turnover, was given in the 1923 Congress as an inevitable obstacle to organizing safety in marine affairs. But Mr. Bush pointed out at last year's Congress that personnel management, highly effective in reducing turnover in factory industries, is conspicuous by its absence in shipping, and for no recognized reason.

That high labor turnover is no more necessary in port cargo-handling than in other industries is evidenced in the Port of Seattle, which has as little turnover among the longshoremen as a well regulated factory. The reasons for this are that sensible employment selection is practised, safety work is organized with steady reduction in accidents, the earnings of the men are fairly high and steady, and the men deal in an organized collective way with the employers. These results have been secured by a joint organization of longshoremen and truckers and waterfront employers. They can be duplicated in any other port. Seemingly the outstanding obstacle to be overcome is management inertia. Some phases of safety in shipping present real challenges, to be sure, but that is the most that can be said of them. For example, lumber is said to be a high-hazard cargo, yet one Puget Sound lumber stevedoring company enjoys a low stevedore liability insurance rate, well below general cargo simply because the management exercises constant safety vigilance through competent foremen employed at good salaries.

Absence of Statistics Is a Serious Difficulty

A second alleged inherent difficulty is the comparative absence of worth-while accident statistics. This defect can be remedied best by collective action of the industry, but this would seem to offer no greater problem than that presented in other industries. Shipping and port associations, insurance clubs and the clearing facilities of the liability insurance underwriters could no doubt give us a good beginning. However, it is more than likely that it will take an act of Congress to require the reporting of injuries as a means to establishing compensation for injured seamen and longshoremen, before we can know the extent and causes of our marine personal injuries. However, the Pacific Ports are already beginning to exchange causation figures. Mr. R. F. Edwards, chairman of the Committee on Statistics, can no doubt give us a satisfactory set-up for statistical reporting if the shipping interests will respond.

One evidence of lack of progress in safety 'longshore is the limited literature, the library of the National Safety Council yielding just 19 references, none of them larger than small pamphlets, and most of them the work of members of this recently-formed Marine Section.

Foreign shipping is not so sterile, the accident prevention movement in Europe having gone the lengths of sound safety legislation developed by leaders in the industry, and used principally in compelling observance of minimum safe practice standards by unfair competitors. A similar development may hopefully be predicted in this country; that is, it may be necessary to enlist the authority of the government to compel unwilling employers to guard against preventable accidents, but the industry itself should provide the sound, tested safety regulations.

But Why the Urgent Need?

Such a picture as the foregoing is an old, familiar one in shipping circles. The need for accident prevention is well known. Are there any recent developments justifying the statement that there is *urgent* need for safety activity?

There seems to be a number of situations coming to a head which call for organized safety activity. Foremost is a sharp and continuing increase in accidents, as reflected by mounting insurance costs, refusal of many stevedore risks, advance in deductible amounts, and agreement among marine insurance clubs not to compete for personal injury business. The industry has been charged with lack of interest in reducing its accidents, and with the loss of that homely feeling of individual responsibility for accident prevention among many shipping members. Although we lack knowledge of the number and causes of accidents, we may nevertheless take it for granted that insurance costs furnish a reasonably accurate barometer over a period of years, despite some indications of restricted bidding for insurance business.

Not less important than the severe increases in costs as a stimulus to reduction of personal injuries is the prospect of a Federal Compensation Law for longshoremen and harbor workers. Although it is limited to these groups and has been opposed by seamen, there is reason for believing that it will later be extended to include them. The compensation principle is now accepted in industry generally and we should welcome it if extended to shipping. The bill before Congress calls for the most liberal provisions of any compensation legislation yet adopted in this country, including the following:

(1) Weekly compensation of 66⅔ per cent of earnings, with a maximum limit of \$25 per week, a 25 per cent increase in the country's maximum; and there is a tendency in compensation legislation to remove the maximum limit altogether.

(2) Occupational disease is treated as personal injury, and there are none of the restrictions and safeguards attached to this provision which have been found necessary in state compensation laws. There is danger that through lack of exact medical knowledge almost any sickness may be attributed to the job and claim made for compensation; in effect, this means that shipping (later other industries) may come to be required to insure the good health of the worker.

These are but two of the advance provisions of the proposed law; indicating liberalizing tendencies in state legislation generally. Liberalizing the law has been brought about through three instruments: changes by legislature, discretionary rulings of industrial boards, and court interpretations. Not all of these tendencies are being wisely safeguarded and guided in the light of sound experience. Unless administrative technique, moderation in legislation, and soundly based court decisions prevail, fraud, malingering and other wastes are certain to result.

The alternative to the compensation principle is an extension of Employers' Liability Acts under which, as in the Merchant Marine Act, the age-old employer defenses of "fellow servant," "assumption of risk," and "contributory negligence" are made invalid. This, coupled with the increase in size of recent jury verdicts, and the always unsatisfactory "sue or settle" situation, makes it clear that it is to the advantage of management in shipping to accept the principles of workmen's compensation.

Government May Soon Prescribe Safe Practices

A third factor calling for organized safety in shipping is the likelihood that a government authority will shortly be created to prescribe safe practice standards. This authority is contained in the clause of the proposed Federal Compensation Law for shipping (H. R. 12,063, Sec. 61). "The commission shall study safety provisions, the causes of accidents and occupational disease among the employees covered by this act, and shall from time to time make such recommendations as it may deem proper to Congress and to employers and carriers as to the best means of preventing such accidents and occupational diseases." Is the shipping industry, through collective action and practical leadership, going to lead in developing a constructive safety program, or will it allow itself to be placed at the disadvantage of appearing to oppose all safety legislation because forced to take exception to excessive or impractical measures advanced by labor or introduced by government agencies?

A final urge to accident prevention is the increasingly severe competition within shipping in this country; between shipping and rail transportation; and between the shipping of this and foreign countries. Moreover, the whole system of distribution, in which shipping is an important factor, appears due for overhauling because of the need for reducing the spread between production costs and the price to the consumer. Such a substantial item of waste as staggering personal injury losses through failure to minimize them will not be overlooked.

When one considers the combination of increase in accidents and costs, the liberalizing of compensation laws, the almost certain Federal legislation prescribing safety practices, and increasing competition's demands for elimination of waste—isn't it evident that there is abundant need, and *urgent*, for organized safety afloat and ashore?

Although this picture may appear gloomy, there are relieving bright spots. Progressive management in shipping is beginning to accept its responsibility for accident prevention work, this is particularly true in a number of the large shipping firms with stable management, which are making a deliberate effort to reduce costs of operation and improve the well-being of their employees, with a consequent increase in goodwill. In many ports there can be found here and there an individual stevedore manager or dock operator alive to the situation who is practising constant vigilance, and this is reflected down through the management including the foreman, and results in a good experience rating with lessened insurance premiums. Such companies are likely to be found on the roster of the members of the Marine Section.

In addition to individual effort, group effort through port organization for safety is a thing already accomplished along the Pacific coast, beginning in Vancouver, B. C., and extending down through the California ports. Of course, the Great Lakes offer the classic example of group effort in shipping circles to reduce personal injuries.

Perhaps the brightest spot in the foreground is the prospect of stimulus from the Department of Commerce. There is a group affiliated with the department under the title of American Marine Standards Committee, which represents the leaders of the country in ship design, construction, ownership and operation. Marine safe practice standards are beginning to issue through this clearing organization of practical experience, and are scrutinized, tested, and finally promulgated. In addition we are fortunate in having the initiative and leadership of Mr. Norman F. Titus, who has just left the service of the McCormick S. S. Co. to become Chief, Division of Transportation, in the Department of Commerce. Mr. Titus led in the recent inauguration of safety work in the Port of San Francisco, both on board ship and along the waterfront. He goes to his new work with a determination to put the influence of the government behind efforts to extend accident prevention work throughout the country's shipping.

Proposals

My excuse for this general discussion is that it seemed necessary to attempt to appraise the conditions before submitting the two proposals which I wish to put to this membership for consideration. They appear to me to be thoroughly practical—not at all chimerical.

The first of these is that the section proceed to staff itself with a qualified executive, who will devote his entire energies to accident prevention in the industry through enlisting the financial and moral support of the organized shipping interests of the country. The practical obstacle to be overcome is raising the first year's budget of \$10,000. When one considers the magnitude of the insurance premiums paid for personal injuries in the shipping industry of the country, such a sum is infinitesimal.

A second proposal is that we submit to the shipping interests and to Congress a plan for an administrative set-up under the proposed Fed-

eral Longshore Compensation Law whereby a practical shipping man and a representative of longshore labor be appointed to any administrative commission that may be responsible for the development of marine safe practice standards enacted into legislation.

No mention has been made of the two motives leading to interest in accident prevention. The first is the humanitarian, which is frequently ineffective. The effective motive is self-interest; it is fatuous to blink the fact that usually it is as workers only, when injury is brought close home to us, that we exert ourselves to prevent recurrence; and employers are commonly galvanized into the prevention of personal injuries by increasing costs. This is not strange, merely human, for fear moves the one, and cost, as a measurement of the toll of accidents, moves the other.

I realize that skepticism may attend the consideration by the shipping interests of such proposals. The value of personal injury prevention work is still doubted, especially by those most in need of practising it.

Faraday, the electrical inventor, was urged by his friends to exhibit his invention, the fore-runner of the electric dynamo, to Gladstone, premier of England. He passed a metal core through a magnet and as a result an electric current was established. Mr. Gladstone exclaimed, "Interesting! very interesting! but of what practical value is it?" Faraday replied: "Mr. Gladstone, some day you may be able to tax it."

Now if there is anything which possesses great practical value in the eyes of a country's premier it is something he can tax. So it is with accident prevention work. Interesting! more than interesting! of immense practical value, which can be definitely measured, both in human lives spared and in large sums of money saved.

Discussion of Mr. Foisie's Proposals

CHAIRMAN WELCH: Mr. Foisie's first proposal is in connection with the employment of a secretary for the Marine Section, to be obtained from the maritime interests. I would like to have your opinion on that, gentlemen; it is up to the Section.

MR. TITUS: I was very much impressed with Mr. Foisie's paper. I think it epitomizes the points that have been brought out in the papers of the other two days.

I think the thing we need is a plan; if this Section is really going to accomplish what it could accomplish, it must have some concrete plan for putting this proposition into real action.

I notice that there are two distinct suggestions made by Mr. Foisie; one for the Section to do this work itself, or possibly for the government to undertake it. I think the best thought in the country now is that the correct way of accomplishing anything in any form of business is for the policy to originate in the business itself; the plan must come from within.

The best thought seems to be that it is not the function of the government to superimpose any organization or any method of action upon an industry. It is believed now by the best leaders in Washington that it

s the function of government to aid and assist industry. So I think, if you went to Washington, you would find the biggest men there disposed to tell you to go ahead and make out your own plan, complete it in every way and then come to the government and ask for assistance in putting it across. I think if you do that you will get wholehearted support.

As a corollary to the proposition, if the government did undertake it, the plan would be too harsh and certain things be imposed upon the industry that would not be satisfactory in the end. We would be forced to do things that we would not like to do. There would be rules and regulations introduced and the government would be too paternal if it started in.

I notice that Mr. Foisie suggests that a subscription list be drawn up whereby funds can be raised to get a permanent salaried secretary for his Section to carry on this work. I would like to make one further suggestion, in the light of experience that I have had; and if I may be pardoned for referring to what I mentioned yesterday, within the last six months, on the Pacific Coast, we have gone through the same proposition and have had to face the same thing in a small way that you are facing now in a big way.

A Subscription List Was the First Plan

We sat around a table, some 30 or 40 leaders. Captain Robert Dow, chairman of the meeting, had the biggest men of the shipping business on the coast sitting around the table and we had to consider how we were going to tackle this proposition. It didn't seem feasible for the organized bodies to undertake it out there. The answer was made very much as Mr. Welch said yesterday. "What are you going to do in an organization of steamship people when so many leaders are not in sympathy with the movement?"

There were not very many sold on the idea so the committee who finally handled the matter came to the conclusion that the only way to get started was to get a subscription list and hire some engineers and inaugurate a real program. We prepared a subscription list and when we got about 8 or 10 signatures we came to the conclusion that the people who really were progressive in the shipping business were putting up the money which was to be used for the advantage of every one; so human nature asserted itself and our group said, "Why should we put up the money to let some of the big fellows who have more than we have ride in on the big things we are putting across?"

So we said, "Let's use common sense and equalize this thing and get every one in." We then abandoned our committee work as a subscription proposition and went before the Steamship Owners Association and said, "This is really a cooperative matter for all steamship concerns. We are in this association to put it across." We were the nucleus, the people who had signed the subscription as a working body, and by presenting a united front we were able to show the logic of the situation as it should be borne by every one, with the result that the association appropriated the money.

So the thought I have in mind is that in the end you may have to come to this; it is your last resort. Get a subscription list; you must do that to put across a plan, but my suggestion is, that you organize a committee to call upon the American Steamship Association to see if we can't "attack the enemies in their lair" and see if we can't get them to undertake this as a cooperative measure.

If they were facing a strike there would be no question about the money being forthcoming to fight the strike; and it seems to me a reasonable thing to ask for a modest sum to develop protection from within. In this matter of organization I think if we get a plan to put before the American Steamship Association we will have a good chance to put the thing across.

On the Pacific Coast they all said it couldn't be done and that is why we tried the subscription list first.

I think we can put this across through an organized body on the Atlantic Coast; organize thoroughly first and then it will be a simple matter to have them all cooperate and put in a real American plan in every way. I think then if we could attack the New York operators through their association, get this thing started, it would be the only way to do it. If we can't, we can then fall back on the subscription list and get together through the instrumentality of this Section.

CAPTAIN KAIN: If we were to attempt to appropriate money and take over the work that properly belongs in another organization, or rather another group, we would not accomplish what we really want to accomplish. I think if the Steamship Owners Association could be sold on the idea we wouldn't have any trouble getting the money. The obligation is their's, not ours. There is no doubt but that we have got to show them the way, but I think it would be a mistake to assume their responsibility. As long as we did it they wouldn't have the interest unless they spend their own money.

CHAIRMAN WELCH: As you know, Captain Kain will take charge of the Marine Section the coming year, and I think he has in mind calling a meeting of the Executive Committee the first part of next month. It is quite possible Captain Kain can get in touch with Mr. Foisie and Mr. Titus at that time, if they are in New York, and maybe at that executive meeting come to some satisfactory conclusion.

We will now hear from Mr. Andrew J. Smith of the Marine Office of America, New York City.

PROTECTION AND INDEMNITY INSURANCE IN THE UNITED STATES

Andrew J. Smith, Marine Office of America, New York City

In view of the able paper on a specific protection and indemnity experience with accompanying data and comment, presented before this Section two years ago, this will be in the nature of a general commentary on the subject with more particular regard to the history and development of Protection and Indemnity Insurance in the United States.

It is probably unnecessary, but it may not be out of place to say here that P. & I. Insurance is of course, insurance taken out by shipowners to cover their liability for death or injury to seamen and passengers, for damage to cargo for which they are liable under their bills of lading, and also liability for damage to piers, etc., which is not covered by the policies of marine insurance on the hull of the vessel. These latter policies are not liability policies but cover physical damage sustained by the vessel; although it is true that in one or two respects the marine policy has been extended to cover shipowners' liability—namely, his liability for damage to another vessel caused by his vessel in collision and his liability for general average and salvage charges. It will be seen, therefore, that for complete protection a shipowner needs not only his marine insurance policy, but also a policy covering his various types of liability to third parties.

Early Times and Conditions Reviewed

To trace the beginning of P. & I. Insurance, it is necessary, as in so many other phases of shipping and shipping insurance, to go back to the early days in England. The first record I have been able to find bearing on other coverages than granted by marine policies is concerning the early mutuals or clubs in England, which were an outcome of a Parliamentary Act early in the Eighteenth Century, creating a monopoly in marine insurance in favor of two companies. This, naturally, led shipowners and shippers to seek more favorable rates and conditions than granted by the monopoly, and the result of the search took the form of mutual association. These outlaw mutuals, so far as I can learn, at first were merely used as rate-cutting devices, insuring practically the same risks as covered by the authorized companies and being permitted to exist and operate more through the influence of prominent interests than by force of law.

It should be understood that ship's liability for cargo damage in ancient times was practically nil. The owner of the shipment accompanied his goods and took complete charge of loading, protection, unloading and disposal at destination. Later, and existent at the time of the formation of the mutuals, a practice had grown up of merchants shipping to the same ports employing a traveling representative known as a supercargo to act in that capacity for them, the shipper still continuing to bear the risks not covered by the single document of insurance against perils of the sea, fire, pirates, salvage expenses, etc., which was considered of sufficient scope to protect the shipowner or operator for his liability to all concerned, as it was then interpreted. The trend, however, was to make the vessel more and more responsible for safe delivery of goods, particularly after the abolition of the monopoly about 1790.

As the extent and accompanying complication of overseas trade grew, the mutuals were the natural recipients of offerings to cover risks excluded under the marine policies, possibly such as water damage or damage to property other than another vessel. These offerings and the acceptance of at least some of them by the mutuals were the beginnings of Protection and Indemnity Insurance.

In America, from colonial times until the middle of the last century, the relations between vessel and cargo as to the former's liability were practically the same as in England; i. e., the strictly marine coverage was considered adequate, or at least all that was obtainable, and the shipper stood the balance of the risk. I can find no record of any American attempt to insure such residual risks, though in some cases the British facilities may have been used.

The aforementioned trend developed and while the liability of the shipowner of a century or less ago was in no way comparable to what it is now considered, he gradually found himself less free from liability to both crew and shipper and more subject to heavy financial obligations arising from injury to persons and property.

Realizing these facts, the shipowners in England took further steps to protect themselves and indemnify their libellants. This was done about 1860 by the formation of Mutual Protection and Indemnity Associations along the lines or as direct continuations of the old mutuels, in which each member was assessed on the basis of tonnage entered in the Association.

It is also recorded that as early as 1866, at least three British marine insurance companies covered protection and indemnity risks in conjunction with the hull insurance by the simple expedient of attaching, for an additional premium, the following clauses to the regular hull policies, which remain the basis of P. & I. clauses in both England and America:

Insurance Clauses in the Nineteenth Century

"And we further agree that if the Assured shall become liable to pay and shall pay any sum or sums in respect of any responsibility, claim, demand, damages, and/or expenses or shall incur any other loss arising from or occasioned by any of the following matters or things during the currency of this policy in respect of the ship hereby insured, that is to say:

"Loss or damage in respect of any other ship or boat or in respect of any goods, merchandise, freight, or other things or interests whatsoever, on board such other ship or boat, caused proximately or otherwise by the ship insured in so far as the same is not covered by the running down clause hereto attached.

"Loss or damage to any goods, merchandise, freight or other things or interests whatsoever, other than as aforesaid, whether on board said Steamship or not, which may arise from any cause whatever. Loss of life or personal injury and from payments made on account of life or other salvage.

"Loss or damage to any harbour, dock, graving or otherwise, slipway, way, gridiron, pontoon, pier, quay, jetty, stage, buoy, telegraph cable or other fixed or movable thing whatsoever, or to any goods or property in or on the same, howsoever caused.

"Any attempted or actual raising, removal or destruction of the wreck of the said Steamship or the cargo thereof, or any neglect or failure to raise, remove or destroy the same.

"Notwithstanding the foregoing, this policy is warranted free from any claim arising directly or indirectly under Workmen's Compensation Acts of any State or Nation."

In short, this form of insurance as previously stated, undertakes to indemnify shipowners for any sums for which they may become liable under existing civil law or practice. The clauses are the constants of the problem, the range of liability, the unknowns.

As time passed and the courts defined more and more clearly the obligations of the American shipowner as regards cargo, the situation seems to have been met by limiting to a minimum liability on his part through contracts with his shippers rather than through procuring insurance protection. This, of course, produced a situation that marked a hardship on the shipper, as it left him no recourse but to accept the conditions stipulated by the shipowner and himself stand any loss for which the ship would otherwise have been liable or to ship his goods in foreign bottoms where at least some protection could be obtained against loss uninsured by marine policies.

Congress Finally Passed the "Harter Act"

This situation is doubtless one of the contributing causes to the decline of the American merchant marine following the Civil War, for it could hardly be expected that a shipper would assume these risks when by availing himself of foreign facilities he could to a considerable extent avoid them, and to a degree this was also an indirect cause of the wane in popularity of a seagoing career for the young American.

These practices existed in this country until 1893, when Congress passed what is known as the "Harter Act," the general effect of which was to make owner and ship liable for fault or failure in proper loading, stowage, care or proper delivery of shipper's goods. The first section of the Act reading:

"It shall not be lawful for the manager, agent, master or owner of any vessel transporting merchandise or property from or between ports of the U. S. and foreign ports to insert in any bill of lading or shipping document any clause, covenant or agreement whereby it, he, or they shall be relieved from liability for loss or damage arising from negligence, fault, or failure in proper loading, stowage, custody, care, or proper delivery of any and all lawful merchandise or property committed to its or their charge. Any and all words or clauses of such import inserted in bills of lading or shipping receipts shall be null and void and of no effect."

The passage of this Act made it imperative for the shipowner to protect himself in the same manner as the English shipowner did earlier in the century and as there was no market in this country for this class of insurance he naturally availed himself of the market in England.

As the work of the National Safety Council is the protection of life and limb from accident and the avoidance of loss of time and money consequent thereto, the foregoing stress on the cargo phase may appear

somewhat out of sphere, but the personal side of P. & I. Insurance is an outgrowth of the development of liability for cargo, which has been noted at some length, and of the ancient rule of common law whereby the seaman is the ward of the vessel and entitled to maintenance and cure. The combination of the developed principles of the former applied to the latter has produced the "Jones Act" of today. It is interesting to note that, while indemnification for this type of loss has become an important feature of protection and indemnity insurance in recent years, at the time of the establishment of Protection and Indemnity Clubs to England it appears to have been considered of secondary importance and in this country even less than it was in England. The main object was to protect merchandise rather than life and limb of those handling or transporting it.

The principles of the liability on the part of a shipowner to his shipper, passenger or seaman, or in fact of any employer to third persons as we understand them today, are of comparatively recent development. It being only during the last 25 years or so that either our national or state laws have clearly recognized them.

The first market for this class of insurance in the United States was established in 1914 by the formation of the American Steamship Owners Mutual Protection and Indemnity Association, Inc., which, as its name implies, was a mutual organization to which a number of American steamship companies subscribed and were assessed according to tonnage entered, this being along similar lines to existing English clubs. A nominal assessment was made at the time of entry, which was in the nature of a fee to take care of managerial expenses, etc., followed, of course, by whatever assessments were necessary in order to reimburse members for losses.

Progress During the Years Since 1920

In 1922 the Government established the U. S. Protection & Indemnity Agency, Inc., for the underwriting of P. & I. Insurance on vessels owned or operated by U. S. Shipping Board, the functioning of which has already been ably described before this Section. This marked the establishment of the second market for this class of insurance in the United States.

Due to legislative restrictions no effort was made on the part of the old line American marine insurance companies to enter this field until about five years ago, when the restrictions were removed. Despite the fact that from the first there has been an open market in England, that is, a market where an owner could pay a stipulated premium with no chance of further cost to him through assessment, the Club or Mutual P. & I. Insurance seems to have met with more favor, until of late when there has grown, on the part of the American owner, a noticeable demand for protection other than on the Club basis.

As this demand has developed within the last five years, it might be safe to assume that it has been inspired somewhat by the Merchant Marine Act of 1920 and the resulting exceedingly large verdicts for loss of life and personal injury, based on the exclusion of seamen and marine

workers from state regulatory laws. At that time, with the Merchant Marine Act just passed, such companies as entertained this business at all did so in most conservative manner, feeling their way and practically confining their underwriting to the Great Lakes, where they had the benefit of largely permanent and organized crews, cargoes that were 90 per cent bulk, highly efficient loading and unloading machinery at both ends of voyages, and in a great many cases safety committees on the steamers cooperating toward a reduction of personal hazards.

To summarize, today there are but four or five offices in the American market writing Protection and Indemnity Insurance, all but two of which confine their writing solely to the Lakes. I use the word "offices" rather than "Companies," as several companies are represented in each office. The two mentioned write general protection and indemnity business, working in conjunction with the old established market in respect to rates and policy conditions.

The American Shipowner Has Many Handicaps

The P. and I. underwriting business in the United States is young. It is obviously difficult to initiate such an enterprise in competition with older established foreign concerns under the handicap of indefinite demarkation between scope of state and admiralty laws and the lack of a federal maritime compensation act. Such an act, you doubtless are aware, is under consideration by the present Congress, but as it is now drawn excluding the crews, it defeats the object toward which compensation should tend, i. e., definite protection of mariners and other workers on vessels at sea or in port. It still leaves both employees and employers a prey to litigation to adjust injury claims, and benefits only the legal talent prosecuting the case.

The result is long deferment of compensation payments, excessive costs to the plaintiff often nearly equaling the amount of his verdict, and higher P. & I. rates to the owner and operator where such are necessarily based on a wager against the probable action of a non-maritime jury. This situation in the highly competitive international or intranational sea carrying trades contributes heavily to the handicap under which the American shipowner operates and can not but be reflected in the long run to the detriment of his employees in the form of a curtailed market for their services and consequent increase of enforced idleness.

Outside of the personal liability end, the business is on at least a workable basis.

The Marine Section of the National Safety Council is looked upon more and more as a source of information and assistance in building up this "infant industry" on a sound basis and toward what we firmly believe will be the lasting benefit of all concerned.

CHAIRMAN WELCH: If there are no questions on this paper we will hear from Mr. Mitchell, who is with us and will read his paper now instead of to-morrow, as stated in the program. Mr. Mitchell is Director of Personnel of the New York, New Haven and Hartford Railroad Company.

MARITIME SAFETY

F. W. Mitchell, Director of Personnel, The New York, New Haven and Hartford Railroad Company, New Haven, Conn.

Marine safety, when considered from the standpoint of the average railroad operation, resolves itself into three main headings for consideration:

First: Construction and physical condition of equipment involved.

Second: The fitness, knowledge and experience of the captains and crews actually operating the vessels.

Third: The care and watchfulness on the part of these men in avoiding personal injuries.

In the consideration of the construction and physical condition of the equipment the management must accept the major responsibility.

Assuming that the operation is similar to our own operation in New York harbor—that of towing heavy car floats and shifting lighters and barges in and out of piers and slips—it is of course essential that the tug boats be structurally strong enough and sound enough to do the work expected of them with a reasonable guarantee of safety from minor collisions, grounding and other incidents of the day's work. They must be designed with proper stability for safe operation during squalls or high winds. The boilers, engines and steam piping must be properly inspected from the standpoint of safety as in the case of any other pressure power plant. The tug boats must possess enough power to perform their ordinary work with a margin of reserve so they can be prepared to respond to any demand that may be reasonably made for maneuvering to avoid collisions or other traffic accidents.

These considerations are for the most part taken care of by the rules and regulations of the United States Steamboat Inspection Service and by the rules of the insurance societies, and with careful inspection, on the part of the operating management and careful attention to repairs and maintenance, there is little reason for injury or accidents to the equipment or to the personnel from lack of consideration in this direction.

Most railroad marine operations are conducted in congested harbors or water-ways. As a rule these operations are continuous (as ours are) for 24 hours in the day. This day and night operation, during all kinds of weather, in and about busy water-ways, requires knowledge, experience, good judgment and coolness on the part of the tug boat pilot or captain and the best of cooperation from all the other members of the deck and engine room crews.

The pilot's experience must be such that he will know what his boat can do and what it is going to do under conditions requiring prompt action in slowing, or stopping, or changing course, and he must be able to rely on prompt response from the engine room to his signals.

The crew of the tug boat is literally a team, subject to the orders of the pilot or captain, and as a team they all share in responsibility for safely performing the day's work.

The captain, from his station in the pilot house, must make decisions and give the orders. The safety of those on board and of the equipment depends on the prompt and intelligent response to these orders. The captain must have a thorough knowledge of all of the peculiarities of the local waters in which he is working. In addition to his general knowledge and experience in handling tug boats and tows he must know the peculiarities of the tide in the local waters and the physical lay-out of the bridges, docks and slips in and out of which he is working day and night.

In all in-land or harbor operation there are local conditions which make the work different from similar work in other waters. For instance, in our operation of tugs and car floats between the Jersey shore and Oak Point bridges, we have the unusually strong tides running back and forth through Hell Gate at the upper end of the East River. The river here is very narrow and sweeps about in a sharp curve, so that a vessel approaching from the south can not always see another vessel that may be approaching from the opposite direction. The local rules here require that a vessel approaching this curve from either direction give one long warning whistle to indicate its approach. The local rules further require that a vessel approaching Hell Gate against the tide shall make way for a vessel coming in the opposite direction with the tide, the reason for this rule, of course, being that a vessel coming through this narrow water-way with the tide and probably with a heavy tow cannot stop or change its course as easily as the vessel proceeding against the tide.

Accidents in this particular vicinity often take place because of failure to observe this local rule.

The Large Anchoring Ground in New York Harbor

In our operation of towing car floats back and forth between Bay Ridge, on the Long Island side, and Greenville, on the New Jersey side, our course takes us directly through the largest anchoring ground in New York harbor. On the chart there is indicated a fairway 1,000 feet wide leading through this anchorage, which space is supposed to be kept clear, but this demands constant watchfulness on the part of our captains because anchored vessels often swing around across this lane.

Fog or storm on the coast turns many vessels into the harbor for shelter and they are liable to drop anchor without regard to, or knowledge of, the local traffic and it is often found that the fairway is obstructed in ignorance under such conditions.

The every-day safety rules governing the operation of tug boats and other vessels about a harbor by day and night are much the same as the rules we are learning to recognize as governing the operation of automobiles on crowded thoroughfares. The captain must know what he wants to do and signal the other fellow so that he will know what is wanted. He must watch the other vessels and try to decide what they are trying to do. It is customary to pass to the right on meeting another vessel whenever conditions will permit, or to signal in time to avoid misunderstanding, if another course must be taken.

When one vessel is overtaking another going in the same direction, the overtaking vessel must not crowd the other unnecessarily or interfere with its course. If by doing so any injury or damage is caused to the overtaken vessel, then the one approaching from the stern is responsible.

The most careful judgment and experience is required for operation at night and during foggy weather. At night it is essential that proper signal lights be displayed and that they be in good condition and clearly visible and the captain's knowledge of local conditions becomes much more important because all vision is more or less distorted.

During fog, when the range of vision is restricted and the direction of sounds misleading, the captain has to rely almost entirely on his sense of location acquired from experience in the vicinity, and when he becomes the least bit confused as to his location and the position of other vessels the only safe thing he can do is to stop and wait for the fog to lift enough for him to regain his sense of location.

In the third phase of safety, as applied to marine operation, that of personal care and watchfulness to avoid minor injuries to themselves or others, the crew is only called on to exercise the same kind of judgment that they must exercise in any work ashore.

There is always danger in loading and unloading the floats, just as there is danger in any switching operation in the yards. There is always some danger in the engine room and boiler room of the tug boats, due to moving parts of the engine and the firing of the boilers. In this regard protection must be given the men as much as possible by properly covering moving parts and by instructing them in proper carefulness to avoid accidents and application of first aid in case of minor accidents.

On deck, in handling lines for picking up and towing car floats or barges, the men must exercise care in order not to be caught in the bight of a rope and not to leave the lines carelessly coiled in such a manner as to endanger anyone else.

On the part of the management—due regard for the condition of its equipment; on the part of the operating men—careful selection of captains and crews; and on the part of the crews themselves—consideration of the welfare and safety of each other. On all these depends the safety of the whole operation.

CHAIRMAN WELCH: Is there any discussion on Mr. Mitchell's paper? If not we will proceed to our honorable friend, Mr. George A. Marr, Secretary and Treasurer, Lake Carriers Association, Cleveland, Ohio.

INVENTIVE GENIUS DEVELOPED BY SHIP SAFETY COMMITTEE WORK

George A. Marr, Secretary-Treasurer, Lake Carriers' Association,
Cleveland, Ohio

At the meetings of the Marine Section of the National Safety Council in preceding years I endeavored to point out the working method of the ship safety committee as introduced on the Great Lakes by the Lake Carriers' Association, the extent to which severe personal injuries have

been reduced, the extent to which fatal injuries have been curtailed and to show in particular how the men on a lake bulk freighter have accepted this feature of our welfare plan.

I may repeat what I said in other years, that lake sailors, like seamen the world over, are reluctant to take up an idea that is an innovation and contrary to well established, if not traditional, customs aboard ship. One might say, "they are from Missouri and have to be shown," but when once the merit of a welfare plan feature becomes a settled fact in the lake sailor's mind he gives it whole hearted support. In this connection I would like to set forth at this meeting still another side of the seaman's interest in safety first, which has not only been found helpful in a material way, but has served to keep awake a general interest throughout the fleet.

I refer to the inventive thought the men aboard ship have given to this work. When you find men who will give thought and time to working out devices to safeguard their shipmates from injury or death you may be sure they are keenly interested from a point of view other than one of dollars and cents and that is what the men on our boats are now doing in increasingly large numbers. The ingenuity displayed is indicative of the constructive thought induced by the committee work, and a gratifying phase of the whole matter is that the devices suggested are inexpensive and in every case so far have been made aboard the vessel. In this work they have exhibited mechanical skill, and some of them have proved themselves adept draughtsmen.

The Hazards of Mail Carrying in the Detroit River

Obviously nearly all the devices invented aboard ship are applicable on lake vessels only, but if these men have naturally, voluntarily and intuitively come forward with these inventions, the conclusion must be drawn that if ship safety committees were established in other waters that the seamen in those waters would likewise turn their attention to the invention of devices applicable to the type of vessel on which they are employed and which will overcome dangerous conditions with which they come in contact.

What makes for a dangerous situation, not encountered elsewhere in seafaring, is the picking up of mail matter in the Detroit River—letters, telegrams and parcels—by vessels both up and downbound. As with very few exceptions all the vessels in the lake trade navigate through this waterway, the government maintains a floating postoffice on the Detroit River and mail is delivered by a small launch to passing vessels under way. In a season of navigation 30,000 vessels pass Detroit and one and one-half million pieces of mail matter are handled. Approximately 9,000 telegrams and special delivery letters are delivered. Although the freighters check to half speed when the launch comes alongside, she is still under fair way and care has to be exercised that the men handling the lines do not sustain injuries or that the launch men are not jerked overboard. In former days the mail boat's painter was held by the sailors on the steamer and occasionally burned their hands and slipped from their grasp. If it was thrown around a timberhead the mail boat's line

was frequently parted by suddenly coming up taut, and consequently the receiving and delivery of important mail in either case was missed.

It was to overcome these last named difficulties that the superintendent of the Detroit River postoffice in 1918 suggested that snubbing posts be installed on the boats. Shortly afterward George F. Anderson, at that time second mate on the bulk freighter "Hugh Kennedy," sent in a drawing of a snubbing post he had devised. These snubbing posts are installed, two on each side, abreast of No. 3 hatch for loaded boats, amidships when the freighter is light. There is little tendency to jerk, as when the mail boat fetches up the spring of the snubbing post on the wire fence relieves the sudden strain on the mail boat's painter. These snubbing posts are now in general use.

Severe injuries were frequently sustained when men were handling the steel hatch leaves for the purpose of oiling the under side. Fingers were pinched and crushed. In order that hatch leaves might be safely lifted for oiling, a clever device was rigged up on the steamer "Augustus B. Welvin." Shortly after this, the illustration of the device was printed in our monthly *Bulletin* and suggestions came from the ships that enlarged reproductions be made and placed in the crews' hallways.

A Landing Pole Insuring Safety of Men in Landing

Also we had reports of burned feet sustained by firemen who stepped on hot ashes and clinkers while cleaning fires. These were so numerous printed in our department of "personal injuries recently reported," that the ship safety committee on the steamer "Sierra" submitted a drawing of a simple device to safeguard firemen from such burns. This device is applicable on steam boats anywhere.

Another device, commonly known in the lake trade as a landing pole, is a boom fitted with tackle for the purpose of landing men on the dock at the loading or unloading ports, or on piers at the Sault locks. Until this device was brought out the custom of landing men when making a dock was the same as elsewhere; a monkey line was used, or the men went over the rail and jumped for the shore or pier, sometimes falling short and going into the water between the moving vessel and the dock. A number of seamen have been drowned while endeavoring to get on the dock to handle lines, and these fatalities brought forth a description and illustration of a landing pole that had been installed fast to the forward bulwarks of the steamer "Michigan."

This boom not only made it possible safely to land a man in every instance, but to place him on the pier anywhere as soon as the vessel was within 15 feet of it, thus avoiding the frequent bumping of piers and damage to the ship as formerly. The original landing pole was considered light in construction by some vessel managers, and this fault together with the demand for general installation led to the designing of various other types. Under our rules these landing poles are now tested to 800 pounds weight in order that they may be safe beyond possibility of doubt and in time of need be used to hoist barrels of oil, coils of cable and other heavy ship material for which no other provision had been heretofore made.

There are now few, if any, steamers in the membership of the Lake Carriers' Association not equipped with this device. Many vessels in the lake trade and not in the membership of our association are so equipped and this extends to vessels in the Montreal grain trade, where the pole comes in most opportunely when passing through the 60 odd locks of the Welland and St. Lawrence canals.

Also suitable for general application is the attachment of a bar on the hatch engines in a manner to prevent the cables from backwinding on the drum. For a long time the fouling of cables was a source of personal injuries aboard ship. Then the ship safety committee on the steamer "Henry G. Dalton" in 1920 reported that a bar had been fitted on the hatch engine of that steamer which would prevent the cable from jerking the man carrying the bridle off his feet and possibly into the cargo hold, or, if on the dock, jerking him into the water. Numerous inquiries were received as to how the bar should be fitted to the machinery, thus indicating that the men evinced genuine interest in safety devices.

Putting his head out of the deadlight was one of the most dangerous practices a lake seaman indulged in. Resultant serious injuries were frequently reported; in fact, only a few years ago one of the most competent of our chief engineers was instantly killed when he violated the rules against such practices. As a primary result of this fatality the Lake Carriers' Association had stencils made and sent to every ship in the membership in order that a warning against putting heads out of deadlights might be placed adjacent to every deadlight. Inasmuch as all seamen do not observe warning signs we soon received sketches of devices that would serve as a prevention of such practice.

Seamen Often Think of Safety Devices Simultaneously

Evidence that the thought of our seamen runs in the same channel simultaneously was furnished about two years ago when a ship safety committee suggested that grappling irons on the order of those used by the U. S. Coast Guards be installed on all boats, for the reason that when an emergency arises it generally finds the crew unprepared. Concurrently we received the sketch of a grappling hook designed by Captain H. A. Leish and made by Chief Engineer C. H. Savage of the steamer "George Stephenson." The cost of the material to make this simple and effective device is only 40 cents.

Ladder guards, that could profitably be employed on any vessel whenever the ordinary type of ladder is used, are the recent invention of Captain Charles Gegenheimer, master of the 600-foot steamer "Homer D. Williams." When our vessels are in port loading or unloading one or two ladders are always out, and to prevent sliding he designed two kinds of guards and both work successfully. The one can be used only at one place while the other can be used anywhere on bulwarks. There are two rivets out of beading on bulwarks far enough apart for the ladder to go between and a one-inch rod bent to fit in the rivet holes and around outside of ladder. The rod is threaded on both ends with a lock nut inside

of beading. The bend in the bar must be large enough so as not to bind the ladder. This has to be adjusted to the boat, but will answer the purpose on any dock. The other guard is made with clamps. One-half of the clamp is screwed on a rod iron of three-quarter inch diameter and the other half is held up to the beading with a lock nut.

More personal injuries, often resulting in the amputation of one or more fingers, occur to men who carelessly handle the lines when tying up, or shifting at a dock, than from any other single cause. They have persisted in handling the cable by the eye, instead of the becket that is installed on every ship's mooring lines. With the hope in mind that if the man handling the lines had something solid to hold to he would use it, instead of the eye, the captains in the fleet of five steamers of the Bradley Transportation Company adopted a becket made of five-eighths inch rod-iron, bent triangle shape with 4-inch sides and ends welded together. This is fitted to the cable by a patent link of a size to slip up and down in the eye of the cable. By this arrangement in the becket the man handling the wire could slide it clear after placing it on the pile. In favor of this becket was also the contention that it could not pull out as a wire becket sometimes does.

A Contrivance That Was Severely Criticised

Less than a month elapsed, however, before several ship safety committees tore the merits of this contrivance into bits, and I am dwelling on this subject to show that our ship safety men are critical of the devices proposed. They are as equally quick to recognize the practical application and benefits of the meritorious ones. The main objections to this becket were that in the event of the eye of the cable flopping over the bulwarks or the drum and hitting some one it would result in a more serious injury than if the old style becket were used; that there was room for using only one hand and that this iron would be dangerous to use in frosty weather. As a substitute the men on the "H. S. Wilkinson" submitted the drawing of a becket that is in satisfactory use on that steamer, and which any sailor can make in a few minutes. It consists of a piece of seven-eighths inch manila line, 22 inches long, with eyes spliced in both ends and attached to the cable by means of two five-eighths inch split links placed around strand of cable.

In connection with beckets, I may add that our ship safety rule provides, where wire beckets are used, that they be suitably covered either with half-inch garden hose or canvas, and this recommendation, too, originated on the vessels.

Beyond doubt the ship invention possessing the greatest merit from a safety first point of view came to us only last year from the steamer "R. L. Agassiz." It is a jack for jacking up well plates. The cleaning of boilers is always attended by danger if carelessly done and many bad accidents have occurred on the lakes from this cause. In removing man hole plates one man was drawn in by the tremendous vacuum created, others have been scalded by escaping steam and hot water. On one vessel the second assistant engineer and a fireman came every near to being badly scalded by the use of a slice bar, which was generally used

in this work. They thought all the water was out of the boiler, but when knocking man hole plate in they found that the water was not all out. To insure against such a condition this jack was devised on the "Agassiz." It consists of one and one-half inch tee with slot cut in it; one and-half inch pipe connecting flange and tee flattened with hole in it, also hole in tee to put pin or bolt through in order to move in different positions; one and one-half-inch pipe connecting three-quarter-inch pipe slotted and three-quarter-inch pipe flattened with hole in each for bolt or pin. On boilers that are close to deck it is necessary to have the three-quarter-inch pipe in two parts, as full length can not be put on hand hole bolt. This device holds the plate up and lets the water out while cleaning out top of boiler and it has proved to be very successful.

A hatch device to keep all the men on one side of the ship and to save too frequently hauling of the cable, a wire pennant was devised by the men on the steamer "Wm. J. Olcott."

In order to bring before you another good point of our ship safety committee, I revert once more to the skepticism the seaman is apt to exhibit when a new idea is presented. At the beginning of this safety work there were many who could see behind it only an ulterior motive, hence had there then been the slightest suggestion of economy in the use of ship's material, prevention of damage and things of like nature, this feeling would have been widespread. Left to their own resources to work out this ship safety work and personally to find out where the benefits accrue, they have themselves come to the point where they recommend the elimination of waste and provide means of action to avoid damage aboard ship and to the vessel itself. Thus the suggestion for a long line reel, while not a device for the prevention of personal injury, is a protection as well as a neat way of taking care of the log when not in use.

When the Steering Engine Gets Out of Order

When our lake vessels navigate in restricted areas, particularly the rivers and channels, a sudden accident to the steering engine or gear is likely to be attended by disastrous results. In rapid succession a few years ago there were four boats that found the steering engine out of order at a time when it was badly needed. A thoughtful chief engineer, sensing the necessity for some device that would prevent such situations, wrote as follows:

"I do not know that the matter was with the engines, but I do know if they are drilled and pins put in, that about 90 per cent of the trouble would be removed.

"On most steering engines only a collar with a half-inch or five-eighths set screw set through it, holds the valves. The constant moving of the valve is very apt to loosen screw and permit the valve to blind the ports. The same is true of the eccentric end.

"The steering engine is a very important piece of machinery and should be kept in first-class shape. There is practically no expense connected with this and it can be done on most any steering engine. It is

poor policy to wait until it has done a lot of damage before rectifying, when a few hours of work might save a big bill of expense."

In passing along information of this kind to other engineers in the lake fleet great care is exercised to impress upon them that they are not to accept suggestions as rules to be observed, particularly anything involving fundamental changes that might lead to a deal of harm, and not until approved by our Industrial Committee and endorsed by the Executive Committee of the Lake Carriers' Association.

This year we have had any number of suggestions from the ships in regard to more carefully operating the deck engines in order to prevent parting of the cables and damage to the engine; also suggestions that ropes of various kinds be more carefully kept.

And only a few days ago I was much impressed with a complaint that came in from one of the big bulk freighters. The committee on this boat condemned the use of flood lights on the ground of "being dangerous to other ships, especially to ships making a dock and having to pass a ship on which the glare from such lights cause the navigator to misjudge the distance and fetch up against the dock, resulting in damaged plates and fittings." Both vessel owner and underwriter can appreciate this thought.

Ship Safety Committees Improving Their Work

From what I have recited I think it is clear that our ship safety committees are going on to better and still better work as the years pass on. While it is true that these committees are not employed on all the steamers in the membership, interest in ship safety is by no means confined to the ships that have committees. Every vessel receives its quota of each issue of the *Bulletin* and hence the men are kept well informed on the subject, this applying particularly to worthy suggestions from committees and reports of personal injuries. A few weeks ago I received two sketches of safety first devices from a steamer that never employed a committee.

In addition to the payment of \$2 to each of the six members of the ship safety committee for attending each monthly meeting, our regulations provide for a bonus of \$10 to each member if the season's work is concluded without there having occurred on the vessel a personal injury sufficiently serious to have caused a man to leave the ship. It will interest you to know that at the end of 1925 there were in the fleet belonging to one company 10 steamers on which this bonus was paid for four consecutive years; eight other steamers for three consecutive years and on still 10 other steamers for two consecutive years, while for the season of 1925 itself the committee on 39 of their boats in operation received the bonus. In another fleet 11 committees have received the bonus for three consecutive years, while in 1925 there were 24 committees that received the bonus out of 42 ships in operation.

This year the Welfare Plan Committee revised the rules to meet the conditions covering the payment of a bonus to members of the ship safety committee in the event an accident had occurred during the fit-out before the forward end crew arrived.

Under the original conditions of the bonus the forward end men were

deprived of the extra compensation if such an injury occurred, although they were not aboard ship and obviously there was no organized committee to guard against possible injury to any of the men employed in fit-out work.

In order that the men of the forward end may not be deprived of their bonus in case an accident occurs in which they are in no wise connected, the Welfare Plan Committee has added to the general rules the provision as follows:

"On the arrival of the chief engineer with his crew to fit out his vessel in the spring, he shall, within 24 hours after his arrival, appoint his members of the safety committee who shall at once hold a regular meeting, and any accident occurring during the fit-out to other than a regular member of the crew shall not militate against the payment of bonuses in case the ship's employees (regular crew) went through the season without an injury. But in case a regular member of the crew was injured during the fit-out, that will nullify the payment of bonus the same as would an injury occurring during the season of navigation; provided, however, that this last clause is applied only to such members of the committee as are in the service of the vessel at the time of the accident."

Our method of having the ship safety committees make a written report of each meeting held (which gives us approximately 1,400 reports in a season of navigation) furnishes the medium by which one committee may express its views to other committees and whenever a suggestion of value is so made it is printed in the *Bulletin*. Reports of personal injuries are also printed in order that they may be read by all the crews, discussed by the committees and measures be taken to prevent a recurrence on other ships. This method that we have constantly employed since 1918 is in complete accord with the statement made last July by Mr. George Hodge, assistant manager, Industrial Relations Department, International Harvester Co., as follows:

"No matter how much accident prevention is discussed in committee meetings, unless the information is passed along to the man on the job, little will be accomplished. The objective, therefore, of the safety committee should be the purpose of disseminating safety and educational data to employees."

Discussion Following Mr. Marr's Paper

MR. SMITH: Of what use is the grappling iron?

MR. MARR: To pick up a man when he goes overboard. A year ago a man went overboard and did not come up. The coast guard was summoned and they got there in about half an hour and then they did not have a device of this kind and they could not locate the man. If they had brought a grappling hook of their own with them they could have got this fellow out. If they had had this little device on their boat that fellow's life could probably have been saved.

MR. TODE: I want to ask, Mr. Marr, how you appoint your safety committee? Do you have a safety committee for each ship?

MR. MARR: Yes, for each ship.

MR. BUSH: Are these ship committees purely optional?

MR. MARR: We have never made it a rule of the Lake Carriers Association for the reason that some of our fleets feel that they have safety relations and safety programs of their own. That is what they claim and I never yet, in discussing this matter with the owners that make such claims, have found that they really had a systematic safety program operating on the ships.

I might say the original idea was an officers' committee. The officers of the ships held meetings on shipboard once a month and they still have their officers' committee on most ships, and some of the fleet managers that have those officers' committee meetings have never looked with great favor on the appointment of a committee exclusively of officers to make suggestions as to how a vessel should be operated. They have had to go through that educational procedure in order to bring this into an active field that was extensive enough to be worth talking about.

The Problem of Injurious Information

CAPTAIN KAIN: Have the carriers ever found that any of this data which was recommended from time to time by the association was used against them, for instance something for which you had loss or personal injury? Do they oppose these recommendations or is it considered good practice? And in the ships where they do not have it, is it considered a detriment to the ship owner?

MR. MARR: Ship Safety Committees hold their meetings once a month. Their minutes are autographed by the captain and the chief engineer without any commitment on the part of the captain and the chief engineer that they concur in any recommendation made. That is clearly understood. The minutes are made in duplicate and one copy goes to the manager and one copy to the Lake Carriers Association. I have seen evidences that the managers generally look at those recommendations but I don't recall that any manager has ever taken any action with regard to sending out a bulletin to his fleet.

Every meeting report that comes to my office is examined; many of the recommendations are of interest purely local to the vessel on which the recommendations originate. A very large majority are of that kind but here and there, scattered all through them, we find recommendations that appear to us in the office as being worthy of consideration by the Ship Safety Committees generally, and those are published in our monthly bulletin and furnish good information for discussion at those meetings. Personal experiences of interest also furnish food for discussion at the meetings in the light of conditions that arise on board ship where that meeting is being held.

We have a winter committee. As you know, our season of navigation is only during spring, summer and fall. In the winter we have a meeting of what we call the Industrial Committee which is composed of active masters and chief engineers. They take this whole stack of reports from the Ship Safety Committees and read them through and they pick out from actual knowledge of conditions and actual experience of work on the boat what appear to them to be recommendations worthy of adoption.

We have also a Shore Captains' Committee which is composed of vessel managers who have graduated from the bridge of a vessel and are holding executive positions in the various fleets.

After the Industrial Committee has made its selection and its recommendations from the mass of recommendations that have come in from the ships, the Industrial Committee's recommendations are again scanned by the shore captains. Some of those recommendations are of such a nature as to come within the scope of the Welfare Plan Committee, so those two committees scan the recommendations of the Industrial Committee, and when they have approved the recommendations that have thus far come through, the residue goes to the Executive Committee for final adoption and goes into that book and becomes a rule of our association.

Now, getting back to Captain Kain's question. At the meeting of the Executive Committee last spring one of our members raised that very question as to whether these recommendations, if not carried out on the vessel, might not involve the vessel in damages and unpreventable law suits, and it looked for a little while as though this whole safety committee movement was going to be thrown into the air. I had to make a defense of it and I told them this thing had been operated since 1911 or 1912, and we never had such a question arise. It had never militated against any vessel owner in any settlement he had been called upon to make.

Objections to Reporting Accidents on Pacific Coast

Well, the Executive Committee didn't accept the situation and were instructed to take the matter up with a general counsel, Mr. Newton Baker. I went over it with Mr. Baker and I got an expression of opinion from him, and he concurred with our policy and advised us that there was no danger in submitting to any such recommendation and that we could go ahead and follow our procedure as heretofore. In reaching that conclusion Mr. Baker made a thorough investigation of what we had been doing, including the recommendations that had gone out in rules to the business.

Mr. Titus: In our work on the Pacific Coast on this new association program we found the same objection to the member companies reporting their accidents to the central organization for the scrutiny of the two safety engineers. We took the same position that you mention in which Mr. Baker concurred, that there was no practical danger of this cooperative effort being used against the carriers; but much to our astonishment we found the attorneys for one of the very largest companies operating intercoastally, advising them not to make any accident report to our association until after the claim arising from the accident had been adjusted. We felt, however, that we should have the reports from all the associations so we could check the recurrences of certain classes of accidents, so we hit upon the scheme of reporting the accidents without any reference being made to the steamer. We just had them say they had a man fall down a hatch, or jump off a deck

to avoid a swinging load. In that way we got the nature of the accident.

I was just wondering if, in your experience, that had proved a practical difficulty? The president, vice president and general manager of that particular big company stated that much as they might personally be in sympathy with the desire of the association, their attorneys so frankly advised against it that they did not think it advisable to go against such advice.

MR. MARR: We have been receiving these reports of personal injuries since 1909; there have been no objections to any one on our fleets making these reports. I think I am getting them from every vessel in the association.

In most cases the reports come direct from the captain. In some instances the vessel owners have instructed their masters, following out a general policy which they have carried in connection with all other reports, that no reports be made by masters direct to the Lake Carriers Association or any one else. All such reports must pass through their office management. So in a number of fleets I am getting reports through that round about channel, but I am getting them. There isn't a fleet in our association that makes any objection to furnishing us with statements.

Files of Accident Reports Remain Confidential

MR. TITUS: You have never found it a practical difficulty?

MR. MARR: We have never been called upon to show accident reports to anybody; there has never been an occasion where any outside person has demanded to see my files of accident statements. My accident reports have the name of the vessel, name of captain and owner, name of man injured, age, pedigree, and everything else, and still there has never been any demand on us for a showing as to what the nature of the accident was that was reported or how it occurred.

MR. WARFEL: In connection with industrial accidents resulting from lack of proper guards on machines of some kind, frequent reports will come in to our Inspection or Safety Engineering Division of that accident. We make an investigation but our Claim Department will not allow us to make an investigation to correct the cause until after the matter has been completely settled.

CAPTAIN KAIN: My question was brought about largely because of conditions which exist in the port of New York. They may not exist in other ports to the same extent. There they are tried and brought before a jury. In every case where equipment is involved, they raise the issue of fact on some condition existing aboard ship which in their allegations should be there or should not have been on the ship.

Take a thing like the snubbing post on mail boats. I gather from your talk to us that it is almost universally used on those ships. I have in mind some similar contrivance on ocean going steamers where the owners might not have installed that feature, and in the event of an accident there is no doubt in my mind but that the attorney having that case in court would cite the fact that any association such as yourself had recommended what is almost universally used, and this owner

not having it was negligent; and I think he would convince the jury that the ship was negligent in not having that equipment.

MR. MARR: I wish I could express to you in the very fine language of Mr. Baker what he said. He covered that. It does not appear to him to be compulsory to the ship to adopt the ship safety work and abide by the published rules.

MR. STEVENS: Have you Mr. Baker's opinion printed or published in writing?

MR. MARR: No, I haven't.

MR. EDWARDS: Isn't it possible that Mr. Baker's opinion was given because you have such an efficient outfit?

MR. MARR: I think not; I think he is influenced probably by the fact that the safety movement is a very general movement. It doesn't cover ships and longshore men alone. It covers street cars, railroads, factories, automobiles and everything else. I think if any such conclusions were definitely reached, that failure of an individual to carry out a recommendation as made by the organization to which he belongs would make him liable for personal injuries, that you would throw your whole safety movement in the air. You wouldn't get automobile manufacturers or shoe manufacturers into your organization if they had to protect themselves against lawsuit because they omitted the recommendations which come from their conventions.

CHAIRMAN WELCH: Do the recommendations of those Ship Safety Committees take effect at once, immediately after the meetings are over?

Guards on Gauge Glasses on Water Boilers

MR. MARR: They do not take effect until they have been sifted and found worthy. Then twice a year we publish all the recommendations that have been adopted since the previous publication.

CAPTAIN KAIN: I have in mind one little feature that I know has come up on numerous occasions and will come up again and again. That is the matter of guards on gauge glasses on water boilers. I believe your committee recommends a guard. We have a great many accidents on ocean going steamers arising out of carelessness in renewing gauge glasses—carelessness on the part of the men doing the job. When a case of that kind comes up for trial the opposing attorney will invariably contend there should have been a guard and the owner not having it is liable for the injury.

You will find a great many steamship men who do not believe it practical to use the guards, and if they were used they would have to be made of a mesh so small, in order to be of protection, that the water boiler tenders would not be able to watch their glasses. I think that on a great majority of vessels with which you come in contact on salt water, you will find no guards being used on those gauge glasses. Notwithstanding that, those personal injury lawyers try to raise a doubt in the minds of a jury about the good will and fair practice of the owner in operating the ship under those conditions. It seems to be an open question with practically all the men who are really using them.

MR. MARR: I think you will find that recommendation in our book. My impression is that it was one of the first recommendations that came to our association. I haven't heard of a water gauge accident as far back as I can remember. I haven't heard of a man being injured by water breaking a gauge glass.

CAPTAIN KAIN: They are very numerous on ocean going steamers. It is quite serious because it involves a man's eye.

MR. TODE: Do they employ those guards universally on the lake steamers?

MR. MARR: I can't speak as to that. I have not been down in a boiler room for a long time. But the fact remains, we have not had any accidents.

MR. TODE: Are the boilers any different as to the height of gauge glass above the boiler room floor? It would be hard for us to install those gauge glass guards because of the difficulty of the water tender being on the level, because it is so high up.

Shipping Statistics Should Cover Extended Periods

CAPTAIN KAIN: I am not thoroughly familiar with boilers on the lakes. I don't believe there is any great difference in the type used there as used on the salt water. Of course, as a matter of fact, accidents do happen when gauge glasses are being removed. Even though it is quite possible to operate gauge valves before opening, you still might have these particular accidents, although some have happened while they were not removing the glass.

I have had personal experience in trying to induce engineers to use glass guards and almost invariably have met with opposition. They contend they are not practical. Nevertheless, cases brought to trial are won by opposing attorneys as they never have any difficulty in bringing some of the so-called experts to testify that guards are practical and should be adopted and are used by competent and careful steamship operators.

MR. TODE: How many ships does your association control?

MR. MARR: About 415 ships, and about 11,000 men at one time and about 15,000 including the floating element continuously; and perhaps, with turnover in the course of a year, 20,000.

MR. TODE: I think Mr. Foisie mentioned in his paper, and it has also been referred to in several other papers, that there is considerable agitation over keeping statistics on man hours lost. Have you found it so?

MR. MARR: No; however, I should prefer to go back to statistics only as they are kept over a long period of time. I don't raise the question as to how many accidents we have had in one year in comparison with another year; but if you will take a number of years and compare that period with the average of another similar period, I think you get some results. By comparing 1926 with 1925 you don't get any information of any value because 1925 might have been a fortunate year; 1925 might have had fewer vessels in operation; 1925 might have had a very small turnover, and all those conditions reversed in 1926.

In 1926 you might have a shortage of men and had to go out into the highways and byways and pick up any kind of man you could get to fill out the crew as required by law, without regard to his ability, and for that reason you are likely to have had extensive personal injuries.

MR. TODE: For the benefit of some of the gentlemen representing insurance companies, I have been asked several times, and I know other steamship companies and operators have also been asked, as to the desirability of obtaining statistics on man hours lost, and they have tried to show me how successful that has been in shore operation, but in steamship operation that is an awful hard thing to try and get.

For instance, you hire at different ports and discharge at different ports and you can't get an injury report from the ship until months after the man was put in the hospital and discharged, and there is no record kept of hours lost. So considering such incomplete statistics I think it is going to be a pretty hard matter for steamship companies to compile statistics on man hours lost.

MR. BUSH: Is your fleet of 415 vessels entirely made up of bulk carriers?

MR. MARR: No, we have one fleet of 24, another of 5 and another of 4, making a total of 33 package freighters. Then there are a couple carrying fares, and there are three Standard Oil tank steamers.

MR. TITUS: On the 33 package freighters do you get into shore safety work at all? They must discharge and load?

MR. MARR: I think all their stevedoring is done by shore crews.

Various Methods Employed in Unloading Cargo

MR. TITUS: They are paying an indirect cost on any inefficiency on the shore because it is reflected in the charge if shore accidents are numerous, and that would naturally fall upon the operator or stevedoring company and the owner would have to pay the charge. Sometimes the consignee pays the charge of handling.

MR. MARR: With our bulk freighters handling is all done by machinery; no part is hand work. We have very large and very efficient machinery and loading is done at the expense of the dock companies whether it is ore, coal, or grain. In the case of limestone the limestone companies own the boats, shore equipment and self-unloading equipment on the boat.]

With regard to unloading: in the case of ore it is the railroad that does the unloading; with coal it is the coal companies; with grain it is the elevators, and the cost goes with the grain; in the case of limestone it is unloaded by their own unloading equipment on the vessels except where vessels not so equipped are chartered. In that case they are unloaded by the purchasing company.

MR. TITUS: Do you happen to know what is the custom on the Great Lakes in regard to charges? Does the rate charged by the carrier and paid by the consignee include all the terminal handling or do you have a ship's tackle charge and does consignee pay warpage and handling as well?

MR. MARR: The Lake Carriers Association does not involve in any traffic.

MR. TITUS: Your work is ship safety work?

MR. MARR: The association has many other features in its work. We are very active in the matter of securing navigation improvements and improvements on channels; objecting to and opposing improper legislation; aiding the employees, et cetera.

MR. TITUS: No stevedoring at all?

MR. MARR: No traffic matters or shore matters. The package freighters come under the Interstate Commerce Act and also under the Shipping Board and they enter into traffic arrangements through the railroad companies. Whether there are portions of the handling of their through business not handled by through rates, I don't know.

At the close of the year when the crop movement is under way some of these boats come into the handling and carrying of grain, and then they run as wild vessels or tramp steamers, just the same as our bulk freighters; and on a port to port rate and not under the Interstate Commerce Commission or the Shipping Board. In those cases the handling charges for the grain are handled the same as our bulk freighters.

A Tremendous Lesson for Ship Safety Men

MR. FOISIE: This situation which you have developed for us so fascinatingly, of the possible conflict between good business values in safety work with the legal protection that a business wants against any abuse of those values, is a situation which, I think, is not adequately understood by business interests generally.

We had the same difficulty to encounter and have not overcome it in Seattle, as Mr. Titus mentioned, in the refusal of some companies to give us certain educational material of their accidents because of a belief that it would jeopardize them in case of suit.

To my way of thinking your staying with and believing in the value of your safety work, backed with the good fortune of Mr. Baker's opinion, is a thing which has a tremendous lesson all the way down the line. We find our business men are prone to turn to the legal opinions of their lawyers, contrary to their own good judgment at times, as your situation so clearly sets forth. The conflict seems to arise between the legal mind which interprets law in the light of precedent and the law, as it is interpreted by an ever increasing number of able minded lawyers, by its effect. I don't think that situation is well enough drawn for business men generally; and I believe if there was any possibility of getting the opinions that Mr. Baker enunciated perhaps it would be a great help to us all. We have this conflict in the Supreme Court quite frequently and the Federal Supreme Court has a majority and minority decision in many cases.

Usually a minority, and occasionally a majority of the Supreme Court differ and attempt to show a changing condition of business calls for a change of decision in the law. There is nothing that has occurred in this conference as illuminating to me as the very situation described,

plus your sense of values governing it, fortunately supported by Mr. Baker's mind.

MR. TITUS: Did you say Mr. Baker's opinion was made in the bulletin?

MR. MARR: No, we published the recommendations of Mr. Baker's opinion.

MR. SMITH: In regard to giving opinion based on precedent, we had a case recently where our lawyer dug out of his common sense his interpretation of the case. He thought it was sound, but the loss adjuster and broker said: "He can't do that; there is no precedent for it." I think if there is any possible way of getting the opinion of Mr. Baker, (at least something to pick out of it), it would be a good move.

MR. MARR: Of course I can't tell what Mr. Baker's personal opinion might be nor what the feelings might be of my own superiors in the Lake Carriers Association as to giving out a complete or skeleton copy of Mr. Baker's opinion; I will be very glad, however, if they have no objections, to endeavor in some way to give you a copy of it.

CHAIRMAN WELCH: We have a paper here by Mr. H. H. Raymond, president, Clyde Steamship Company, New York City. In the absence of Mr. Raymond, Mr. A. R. Bush will read this paper.

GENERAL OBSERVATIONS ON THE SUBJECT OF MARINE SAFETY

**H. H. Raymond, President, Clyde-Mallory Steamship Companies,
New York City**

The work which the National Safety Council is doing is a very worthy and highly commendable one. I have noted with interest the progress you have made from year to year and, as we all know, such a worthy cause, is bound by fundamental right to succeed.

There now exists a tendency of opinion that the major portion of industrial accidents are caused chiefly by defective machinery, etc., and the effort has been towards safety guards and devices. We find that the accidents which occur through defective machinery are rather a very small percentage of the total number sustained.

In the shipping industry, as well as others, I believe the majority of accidents are chargeable to hand labor, such as handling material, tools, material falling on persons, stepping on or striking against objects, falling objects and such causes which will not be prevented by more mechanical guards or better safety devices.

It is my opinion that these accidents can be prevented by better supervision and more effective education. Train the minds of working men against carelessness and chance-taking and you will eliminate a large portion of the industrial accidents which occur constantly.

We must look at safety work from two standpoints: first, humanitarian; and, second, from the viewpoint of dollars and cents as affecting business.

It is our duty to the state and the men themselves so to conduct our business as to eliminate accidents as far as it is humanly possible. A

crippled man is a burden both to himself and society. The relation of employer and employee is similar to father and child. The employee, like the child, has to be taught.

No man wants to be injured, but nevertheless many are careless and to overcome this they must be educated and particularly made to see the folly of carelessness. Likewise, the foremen must be taught to take care of men as though they were their own children. The foremen should instruct the men under them, warn them of danger, tell them the right way and the best way, and teach them to be more careful in their relations with fellow workmen.

We should also hold to strict account those to whom authority is delegated to inspect equipment. Insist on inspections being made frequently and replacements made of defective parts. Keep a record of the date when equipment and parts are installed and replaced. When equipment or parts are found to be worn out or just able to stand the strain, do not use again, but replace with new equipment or parts immediately. By waiting to replace faulty equipment until it gives way, serious injury often results.

It is also necessary to provide immediate medical attention to the injured men. This should be rendered as near the plant of operation as possible, which will save many dollars in lost time, especially where the injury does not warrant any period of disability and the man is able to return to work immediately. We are all aware of the high cost of industrial accidents, whether they are compensatable or not.

Tides Play a Big Part in the Handling of Ships

I also note, with a great deal of interest, that the National Safety Council is doing good work in other than the shipping industry. We must admit that the problem in the steamship business is different on account of the circumstances surrounding marine work, especially the 'longshore work—loading and unloading of ships. Ships must be loaded and discharged under circumstances over which the management has no control. Tides play a big part with ships having side ports, making it difficult at times to use skids. Then, again, when there is a lighter alongside the ship, discharging freight such as lumber or steel rails, the men must be very careful and be educated in performing their work in the proper and safe way.

The human element which is used in 'longshore labor is made up of all nationalities. Usually the men are uneducated, consequently placing a serious burden upon the employer. In employing unskilled labor, more care must be exercised than in any other industry that I know of. Also the labor is of a migratory character from one employment to another. For that reason, our foremen and stevedores have to be more highly educated in safety work.

By applying safety education, you will find that the reward is not merely a saving in the cost of accidents but a better relationship between employer and employee. The men become infused with confidence and loyalty to their employer.

On the whole, I would say that industrial safety is more of an educational problem than an engineering problem.

CHAIRMAN WELCH: Mr. Bush has also received a letter from Mr. William S. Wollner, General Safety Fire Prevention and Welfare Agent, Northwestern Pacific Railroad Company, San Francisco, Calif. Mr. Bush will also read his paper.

ACCIDENT PREVENTION WORK IN PASSENGER AUTOMOBILE AND FREIGHT FERRY SERVICE

**William S. Wollner, General Safety, Fire Prevention & Welfare Agent,
Northwestern Pacific Railroad Co., San Francisco, Cal.**

I have been asked to speak about safety in passenger, automobile and freight ferry service. Because my knowledge of this subject is limited to San Francisco Bay and its tributaries, what I have to say will deal only with ferry service in that section.

During the year ending June 30, 1926, the number of persons carried as passengers on San Francisco Bay ferry steamers was 57,775,456. During the year 1925 there were transported, in addition to passengers, 2,269,937 vehicles nearly all of which were automobiles and motor trucks. Practically all freight moving into or out of San Francisco must be ferried across the bay, due to the geographical location of the city, which is situated at the end of a peninsula. This also accounts for the very large number of passengers and vehicles transported by ferry, San Francisco having only one land outlet, that to the south which is not nearly sufficiently provided with highway communication facilities.

Those who have visited "The City by the Golden Gate" know that the fleets of ferry steamers there are the finest in the world and are maintained to an unusual standard of efficiency. Their cleanly appearance is the occasion of frequent remark by visitors. All passenger and vehicle ferries are of the double end type, while freight in cars is transported on both double end type ferries and barges propelled by tugs. The importance of ferry service on San Francisco Bay is demonstrated by the fact that there now is under construction for this service 12 vessels, two of the steam turbine electric drive type and ten of the Diesel engine electric drive type.

It is more than 20 years since a passenger lost his life in a San Francisco Bay ferry accident, and a report recently submitted states that more than 750,000,000 passengers have been handled during the last 15 years without the loss of a single life. I understand that you wish me to tell you how this has been done.

With one exception the ferry fleets on San Francisco Bay are operated by the rail transportation system, of which they are a part, and as the ferry which is the exception has been operating for only a comparatively short period, this paper will deal only with those operated by railroads. These are the Southern Pacific Company, Western Pacific Railroad Company, Atchison, Topeka & Santa Fe Railway Company, Northwestern Pacific Railroad Company and the Key System Transit Company. One

of these companies, the Southern Pacific, operates on San Francisco Bay and its tributaries the largest railroad ferry system in the world, its fleet consisting of seven passenger carrying steamers with a capacity each of from 2,200 to 3,500 passengers; eight automobile carrying steamers with a capacity each of from 45 to 75 automobiles; two composite steamers; three freight and passenger car transfer steamers, two of these being the largest in existence today; and a fireboat used exclusively to protect the company's ferry system.

The Southern Pacific's ferries are handling an average of 77,400 persons daily, the average number of vehicles transported during 1925 having been more than 4,000 daily. The Key System Transit Company, which handles foot passengers only, transports an average of about 43,000 passengers daily.

Unquestionably, the reason why there has been such a high degree of safety in San Francisco Bay ferry service is because of the policy of the railroad companies operating the fleets—that nothing that will assure safety is to be left undone, coupled with the high ideals of safety that have always been a part of maritime life.

At this point I would like to give the credit which is due it to the United States Steamboat Inspection Service, which, in this territory, as elsewhere, has one standard only, this being that only the highest type of material, workmanship and personnel will be permitted in any vessel over which it has jurisdiction. While its militant attitude may at times chafe the vessel owner or operator, the Steamboat Inspection Service deserves its part—and a very large part—of the credit due for the excellent safety record that has been established on the high seas and the inland waterways.

Safety of Employees

The occasion for my having been invited to prepare this paper is that the Northwestern Pacific's Marine Department went through the entire year 1925 without a reportable accident to an employee. As a matter of fact, there has been only one marine worker injured during the past 24 months. Interest having been shown in the Northwestern Pacific's marine employee safety record, I am going to tell you how this has been accomplished.

"Accidents do not happen; they are caused," is a favorite safety slogan. I am going to paraphrase this in so far as what I have to say is concerned with, "This record did not happen; it was caused," and the cause is that the value of accident prevention is fully recognized by those in charge of Northwestern Pacific activities, and the entire personnel has been educated in the value of safety and the means by which it may be acquired.

I will digress from the marine service for a moment to say that while over a period of a good many years there was a Northwestern Pacific employee accidentally killed on an average of every four months, it is now nearly 37 months since an employee on duty met his death in an accident, the no-fatality period immediately preceding the present one having been nine months which was in itself a record on this road.

The Northwestern Pacific's marine fleet consists of four large double end ferryboats plying a course of more than six miles in each direction, a smaller vessel serving points on the Marin shore, and a launch; in addition to which there are now in course of construction three steel hull Diesel engine electric drive boats which will be the last word in ferry equipment. There are 155 employees in the ferry service, not including those in the steward's department.

The ferry service is a part of the road's motive power and equipment department, at the head of which is a general superintendent of motive power and equipment to whom all credit for the safety accomplishments of the marine service must go. The general superintendent has inculcated into his subordinate officers his enthusiastic belief that safety is well worth while and makes for more efficient service and a dollars-and-cents, as well as sentimental, credit on the balance sheet. The general superintendent holds each of his subordinates strictly accountable for every accident that occurs, and this applies to the marine service as well as to the shops, locomotive and car departments. Every captain and chief engineer knows that if one of his men is injured, no matter how slightly, he will have to explain to the general superintendent personally the condition that made the occurrence of this accident possible.

A Thorough Investigation of the Accident

This interview is no perfunctory matter; it is in truth an investigation to determine the underlying, as well as the immediate, cause of the injury and there are present, in addition to the officer, the injured man, his immediate supervisors and other employees, if they are involved. A stenographic report is taken of the investigation and the points it produces are made known to all others concerned, so that the occurrence of similar accidents may be forestalled. An outstanding feature of these investigations is the fairness with which they are conducted. The general superintendent demands the facts, but just as truly as he insists upon responsibility being placed where it belongs, he also insists that discipline shall not be assessed where it is not deserved.

The procedure in investigating the one accident that occurred during the past 24 months is illustrative of the general practice in the motive power department. A deckhand received lacerations and a broken knuckle when his hand was caught in the steering gear of one of the ferry steamers. The deckhand and first officer, under whom he was working at the time of the accident, and the captain of the vessel were called into conference. The man was working on the steering gear when the tool slipped off a nut when the gear was moved, catching his hand and inflicting the injuries stated. The report covering the accident, which not only went into the motive power department's files, but was also forwarded to the president and general manager and the general safety agent, recited these facts and in addition stated, "This accident could have been avoided if this work had been done when the vessel was not under way."

In other words, there is no inclination for the department, as such, to

escape responsibility for the occurrence of an accident or to cover up such an occurrence, and this being the attitude of the department, the same spirit circulates through the organization. The underlying causes of the accident (in this case the work unnecessarily being done while the steamer was under way) having been determined, the facts are broadcast so as to avoid a repetition. The name of the first officer, under whom the deckhand was working at the time of the accident, was given in the report, and, needless to say, neither he nor any of his fellows were anxious to have this occur.

Another practice that has gone to the minimizing of accidents is that a statement of the accident and a copy of the transcript covering the investigation is attached to each employee's personal record and it is easily determined whether a man falls into the "careless" classification, or not.

A feature that has added much to the safety of workers on the Northwestern Pacific ferries, as well as fire protection, is that the boats are at all times completely electrically lighted and have full fire pressure on the water mains, even though there is not a pound of steam in the boilers. This is accomplished through the establishing of shore line connections to the vessels. High capacity electric lines are run to receptacles located in each ferry slip and at tie-up wharves. When a vessel is tied up a jumper cable, with which it is equipped, is plugged into the receptacle. This cable is carried in conduit to the vessel's electric switchboard so that all that is necessary, after the cable has been connected to the shore line, is to throw a switch on the board in order to give full electric light service to all parts of the steamer. Similarly, a hydrant on the slip or wharf is connected through a hose to the ship's fire main and this gives 90 pounds of pressure to any hydrant on the boat. Fire hydrants are generously placed about the wharf property and in addition there is at least one fire monitor placed within practical reach of each slip.

Protecting the Public

You have probably been saying to yourself that all that has been recited merely represents good management and this is absolutely true, yet it is also true that on very few properties is this particular phase of management stressed to the extent to which it is carried on this property. The same degree of care that is exercised to protect the worker is also used to avoid injury to passengers. Nothing, no matter how unimportant it may seem at the moment, that will make accident occurrence less likely, has been allowed to remain undone.

As an instance, it was noticed that when the gangways at terminals were lowered to load or discharge passengers from the upper deck, there was a space through which a child might fall. An accident of this kind had never occurred and the possibility of one occurring seemed extremely remote. It was a condition hard to correct as the space was located at the hinge of the gangway. It was, nevertheless, decided that if the proper amount of ingenuity were exercised, a guard could be devised and the road's bridge department designed an appliance that fully met the situa-

tion. It did not cost a great deal of money to safeguard this point, but it did take will and a persistency that refused to be balked because the solution was not easy to find.

The handling of automobiles offered a problem that was worthy of the best effort of any safety engineer. It should be remembered that this road's ferry steamers transport vehicles and passengers on the same trip. Its largest steamer, the "Eureka," can transport 3,500 passengers (2,590 of them seated) each trip, in addition to automobiles carried in the main deck gangway. The settees on the main deck are removable and when they are not in place 95 automobiles can be carried on this deck and 1,453 seated passengers in addition can be carried on the salon deck.

Transportation of automobiles and passengers on the same trip offers peculiar hazards, smoking being the gravest. The first problem was to isolate the foot passenger smoker from the motor vehicles and while on the "Eureka" this has been done, it is not so easily accomplished on some of the other vessels. The means used on the "Eureka" has been the installation of folding gates that can be used exclusively for the placing of automobiles. These folding gates or railings have been ingeniously placed so that space may be allotted to anything from a few automobiles to the entire capacity of the deck. Foot passengers are not permitted to go within the inclosure.

Other Hazards in Ferrying Automobiles

Another smoking hazard comes from the automobile driver or passenger who stays within the vehicle and endeavors to insist upon smoking. The solution of the smoker problem on the Northwestern Pacific, which has now been adopted by the other companies operating on San Francisco Bay, was the inauguration of a "Pyrene patrol." During all the time that there are automobiles on the ferry, even though there be only one car, one or more deckhands armed with a Pyrene extinguisher, which he carries in his hand or in a leather holster, remains in the vicinity of the car, or patrols the space where cars are placed. This is done for two purposes, first, to see that there is no smoking and, second, to extinguish immediately any fire that may occur. The second officer of the vessel makes it his business to see that the patrol is constantly alert to its responsibility and the general safety agent makes inspections at frequent intervals to see that this matter is being given the attention it deserves.

It is very often difficult to get people to discontinue smoking in the vicinity of motor cars and at times the road's police department has been used to add argument to the request of the patrol that smoking be discontinued.

Another duty of the patrol is to see that drivers do not start their engines until the boat is moored in the slip and the vehicles ready to move. This not only lessens the fire hazard, but materially decreases the quantity of carbon monoxide. A mechanical device meant to assist in solving the smoker problem is the placing of electrically illuminated signs in the gangways on the main deck of the boats. When there are automobiles in that portion of the boat the illuminated sign reads, "NO SMOKING,"

while the word "NO" is covered when that portion of the boat is not being occupied by cars. There is of course the usual complement of carbon tetrachloride extinguishers, soda and acid extinguishers, water buckets and sand buckets on the boats, while in addition the steamer "Eureka" is equipped on its main deck with two 40 gallon American La France soda and acid tanks with the usual equipment of chemical hose, etc.

In concluding this paper, I must again take occasion to say that the Northwestern Pacific has done nothing in its effort for fewer accidents that is not dictated by good management. What it has done is to place greater stress on good management features, such as safety, fire prevention and the careful selection of employees, than is usually the case. It has been only through the generous interest of every officer of the company, starting with the president and general manager, and the twenty-four hour a day supervision of those charged with this duty that has occasioned the record that has been made. Doubtless, many companies have accomplished as much or more by the same method, and it is certainly true that many other companies could accomplish as much or more if they would undertake this means of reducing accidents.

CHAIRMAN WELCH: We have one more number on the program. Mr. A. C. Warfel, supervising engineer, Safety Engineering and Inspection Department, Hartford Accident and Indemnity Company, St. Louis, Mo., desires to relate some personal experiences in stevedoring work.

SAFE PRACTICES IN STEAMSHIP TERMINAL OPERATIONS

A. C. Warfel, Supervising Engineer, Hartford Accident and Indemnity Co.,
St. Louis, Mo.

I first want to establish a background in connection with my marine work. Aside from being a mechanical engineer, I am a licensed marine engineer, having come up from wiper, oiler, water tender, and thence through the assistant's grade to first assistant; consequently I know a little something of what I am about to say in connection with safe practices in steamship terminal operations.

My early contact with things of this nature was obtained while off duty and lolling over the rail, watching longshoremen at their work, and later as an army officer in charge of discharging freight transports loaded with box car material, at La Pallier, France, during the war.

My observations were such as brought to my notice men falling down hatchways that should have been covered as they were not being worked; men having their arms and legs caught in the bight of a fall or guy rope; slipping on icy decks; improperly loaded drafts of cargo falling on their heads either while working in a hold or on a pier, as drafts jammed between side of ship and pier due to improper listing of the vessel; dropping truck handles on their feet; or severe injuries while handling scrap iron cargoes.

In some of these accidents frantic efforts were made to telephone for police patrol, ambulances and for the nearest doctor, and in the resulting

confusion all three agencies called were late, or had no first aid applications, and the man either died while waiting, or as a result of the long wait, died enroute to the hospital, so that when my company put me in charge of safety engineering work in connection with one of our stevedore assured who operated from Boston to Norfolk, Va., I had already a well formulated plan of attack and an objective to consolidate, once I attained it.

The work first was to establish at each port a doctor who had had some experience with injuries of a water front nature. A doctor was needed who was connected with a hospital to which men could be sent, if their injuries so demanded, by either the hospital ambulance or any other vehicle of transportation that could be used.

It was also necessary that the hospital be so located that it would be quickly reached from any portion of the water front. By selecting one doctor so connected with a centrally located hospital, we would be able at all times to keep in close contact with the assured injured. The element of Admiralty laws enters here and claim settlements with signed release must be quick or a tied up ship may result from injuries received while working on the ship.

A First Aid Station Fully Equipped

Having once established our major medical feature, we next set about to establish at a centrally located point, preferably on a leased pier of our assured, a well equipped First Aid Station in charge of a competent First Aid man.

The problem in selecting a First Aid man was to get one who was familiar with shipping conditions, since I was going to use him on two duties, primarily and mainly as a First Aid attendant, and secondly as an inspector. I was successful in obtaining such a man in each port from the Naval Fleet Reserve in the person of a pharmacist mate, first class.

These men were almost doctors and far superior to the ordinary nurse; they save the assured as well as the insurance company many dollars in sending men back to work with a light dressing who ordinarily would have gone to a doctor and ended in a lawsuit. These men have an acquired hardboiledness that is needed in getting water front workers back to duty.

I have just stated that the First Aid man was to be used as an inspector. In starting my work with this particular assured, I instituted a regime of rigid inspection of piers, docks, ships and men, so that by force of necessity we had to get a First Aid man that was familiar with ships and their loading.

Briefly the inspection consisted of knowing and correcting flooring or decking conditions on docks and piers, piling of cargo on the piers, inspection of slings, sleds, airplanes, ships and house falls, especially wire cables with projecting strands, and all equipment pertinent to the loading or unloading of ships; keeping decks free of strewn gear or

tripping hazards, and seeing that good illumination was provided for night work.

Another duty of the First Aid man was to observe and weed out men who, in his opinion, were weaklings and not physically strong enough for the duties of a longshoreman; men not properly clothed against freezing cold or with shoes with rubber heels or shoes that would invite splinters or nail punctures; and naturally investigate the cause of all accidents, obtain witness statements and take steps to correct the cause.

An operating company having its own ships can very readily correct conditions of an accident producing nature as reported to them, but the stevedoring and operating firm can not very well do this, because the ships do not belong to him, nor do the piers; and the frequent press of "tons per hour" is a factor that often precludes any thought of safety; however, they can effect corrections on piers that are leased to them, so if any different conditions ought to be overcome on other piers or ships the cooperation of ship captains, chief engineers, and the managers of piers would have to be obtained to correct conditions which had existed for years.

Posters, Signs and Moving Pictures All Helped

Another feature that had to be injected was the matter of education, equally as valuable as the correction of physical hazards. This was the instituting of some safety education among the longshoremen unions. In Boston, Baltimore and Norfolk we had to contend with the International Longshoremen's Association, and in Philadelphia, the I. W. W. None were found to be hostile to my efforts. In the latter city, due to a water front Beneficial Association fostered by several of the stevedoring companies, the I. W. W. did not give very much trouble, nor did the I. L. A. after serious talks were had with their business managers.

Safety posters of an educational nature were posted on the piers, at time offices and Union Halls. Caution signs in Polish and English were posted, as well as signs requiring all men to report injuries, no matter how slight, for first aid treatment. I took numerous photographs of accident producing conditions which our company later made into vivid posters that appealed to the water front element. With my own Bell and Howel portable motion picture camera I took several reels of accident causing conditions with men at work. I used a telescopic lens, so when displayed the men were at a total loss to know how and when the pictures of themselves were taken, and the benefits derived were considerable.

Talks were had with gang foremen, whether elected by their own gang, or appointed by the stevedoring corporation, or where possible, periodical assemblages were made by the longshore foremen, stevedore bosses and pier superintendents, all of which had a tendency to produce a good morale among the entire organization. Monetary prizes were offered to the gang foremen going a given length of time with a no accident record.

Regardless of the precautions taken, accidents would, and will continue to occur, but in the main, they will be of the unavoidable nature—the cracking of a boom, or giving way of a block at a point which can not very well be inspected—these accidents will continue to occur, mostly on foreign ships, as our own are better inspected and under a more rigid control of the United States Steamboat Inspection Service. However, once the men know their safety is being looked after, they report many things that would ordinarily be overlooked.

In order to obtain proficiency among the longshoremen gangs, it was successfully tried to keep gangs together under the same foreman and wherever possible to have the same gangs always doing the same work. That is, a certain number of gangs under the leadership of the same foreman would load and unload steel; other gangs would handle an inter-coastal type of cargo, while still another gang would handle automobiles or motor trucks, so that they became more efficient in their work—and efficiency is safety.

The inspection service thus instituted and carried on by our combination First Aid inspector enabled us to see that ships were properly breasted from piers; that savealls were properly used; that proper ladders were used from barges and piers to the ship, so secured as to permit of the rise and fall of the tide, and to discourage the use of a plank through a hawser pipe, or any other unsecured means of getting from or to the ship; to replace by a rope barrier any section of rail that had been temporarily removed for the handling of cargo; to lay hatch covers athwart ship on the deck instead of piling them in a wobbly fashion along the hatch coaming, where such a cover has often precipitated a hatch tender into the hold invariably with fatal result; further, to see that all hatch beams were removed from hatches being worked.

Within a Year Accident Frequency Dropped Greatly

After a year of this work, our assured found that they had so reduced their accident frequency and the cost resulting from breakage that they determined to carry their own insurance which, in itself, reflected the energetic work that we had done with this assured.

In conclusion I might say that if any number of steamship operating companies or stevedoring companies along the Atlantic Coast would combine their efforts along the above lines, they would be materially benefitted by reduced rates from their carriers, or be enabled at a later date to carry their own insurance. But, in any event, such safety work that they would start would have to continue or there would be immediate reversion to the old accident producing conditions. Further, there would have to be harmonious cooperation of all concerned or a chaotic condition would result.

CHAIRMAN WELCH: That is a very practical paper, Mr. Warfel.

CAPTAIN KAIN: If those photographs have not been disposed of they would be very valuable to the Council.

MR. WARFEL: I have one reel left; one reel was lost. But I have the

Bell and Howel portable camera and could let them have it any time they want it.

CAPTAIN KAIN: Have you any still photographs?

MR. WARFEL: I don't have any more; they were turned over to our service.

CHAIRMAN WELCH: Is your company a member of the Council?

MR. WARFEL: Yes.

CHAIRMAN WELCH: We greatly regret that Captain Asa F. Davidson, who was on our program for a talk upon safety from the operator's viewpoint, could not be here to participate in our interesting sessions. His brief remarks will, however, appear at this point in the published volume of Transactions.

SAFETY FROM AN OPERATOR'S POINT OF VIEW

Captain Asa F. Davison, Vice-President, Black Diamond Steamship Corporation, New York

From an operator's point of view, the question of safety is one of increasing importance. In the past, safety considerations have not always been given the attention they warrant. Today, from both the humanitarian and economical standpoints, we must recognize the obligations of operators to encourage every condition that will tend to promote the safety of their organizations.

As those who are familiar with ship operation know, there exists at all times a large element of risk in the handling of the miscellaneous commodities which comprise our general cargoes. For example, the carrying away of a topping lift or cargo fall is attended always with more or less damage to the vessel and cargo, and frequently with injury to members of the crew or stevedores in attendance. The obligation of maintaining cargo handling equipment in good condition is of vital importance.

Safety of life at sea is a feature that has always demanded serious attention from the operator. Safety appliances and equipment must lie on board in sufficient quantity to cope with any and all hazards which may arise. Hence the question of safety lies close to the heart of the operator.

But, in order to get results with certainty, we must have at all times the cooperation of our personnel. There exists constantly the "human element equation". Frequently men will take unnecessary risks which may result in serious injury to themselves and the owner's property. To guard against this, we must encourage "Safety First" principles.

One interpretation of "Safety First" is "First Aid to the Injured". Bearing in mind that a disabled employee is a liability (often severe) and not an asset, it should be apparent to all that the operator can not afford to neglect safety methods. Rather, he should encourage the adoption of the same, as thereby he undoubtedly enhances the security of his employers and his property.

CHAIRMAN WELCH: This closes the activities for today and for our Section. Many are going home today; therefore, I want to take this

opportunity to say how deeply obligated I feel to all you gentlemen for your presence here and the very fine program that you helped to make; it certainly was a splendid one, and I desire to state as retiring chairman that I thank every one who has helped in this movement in trying to do something in the Marine Section.

MR. SMITH: May I have the privilege of presiding at this meeting for just about a moment? I know you all appreciate the obstacles our chairman has overcome in getting this Section under way, and I think every one of us is willing to voice this in the form of a resolution of appreciation which I would like to have proposed from this floor at this time and formally recorded.

CAPTAIN KAIN: I move that Mr. Bush be asked to draft such a resolution.

(The motion was seconded by Mr. Edwards.)

MR. MARR: As temporary chairman, Mr. Smith, may I, a rank outsider, make a few remarks?

MR. SMITH: You certainly may.

MR. MARR: I want to call to your mind the opening remarks that our chairman made on Tuesday morning when this Marine Section was first called into session. He started off with an apology for his Marine Section and what it had accomplished and then went on to tell of the things it had done. It might have been a very politic thing for him to do, to start with an apology and wind up with a declaration of his accomplishment.

I want not only to compliment the Marine Section and officers on what they have accomplished, as stated by the chairman at that time, but I think the Marine Section is to be congratulated on overcoming the obstacles it has met in endeavoring to get well established. It has had an uphill road but through the persistent and effective efforts of our chairman it has vaulted over the obstacles and through the hazards to a well established Section, and I want to compliment him and congratulate him; and I also want to congratulate the incoming officers for having a Section come into their own control that is so well established. (Applause.)

CAPTAIN KAIN: Mr. Bush has requested that we give him a little time to prepare that resolution. I think that would be advisable. I, therefore, move that we, at this time, extend a rising vote of thanks to our chairman and let the resolution we are preparing be incorporated in the records later.

(The motion was seconded by Mr. Edwards.)

(In appreciation of the work done by Mr. Welch, as chairman for the Section, the assembly arose and applauded.)

CHAIRMAN WELCH: You know, gentlemen, this has all been a great pleasure to me because I have met some very fine men that I would not have met had I not been in this Section.

ADJOURNMENT

Metals Section

New Officers of the Section

CHAIRMAN: F. G. BENNETT

The Buckeye Steel Castings Company, Columbus, Ohio.

VICE-CHAIRMAN: J. A. NORTHWOOD

Bethlehem Steel Co., Johnstown, Pa.

SECRETARY: E. G. QUESNEL

Commonwealth Steel Co., Granite City, Ill.

Committees

PROGRAM: JOHN P. EIB, Chairman

Illinois Steel Company, Joliet, Ill.

POSTER: FRANK H. ROWE, Chairman

Wheeling Steel Corporation, Portsmouth, Ohio.

MEMBERSHIP: H. G. HENSEL, Chairman

The Youngstown Sheet & Tube Co., Chicago, Ill.

ENGINEERING REPRESENTATIVE: EARL F. BLANK

Jones & Laughlin Steel Corp., Pittsburgh, Pa.

EXECUTIVE COMMITTEE (The Officers and)

A. C. GIBSON

Spang, Chalfont & Co., Pittsburgh, Pa.

T. H. McKENNEY

Illinois Steel Co., South Chicago, Ill.

JOHN A. OARTEL

Carnegie Steel Co., Pittsburgh, Pa.

J. M. WOLTZ

The Youngstown Sheet & Tube Co., Youngstown, Ohio.

October 26, 1926

A. C. GIBSON, Chairman

Manager, Industrial Relations, Spang-Chalfont & Co.,
Pittsburgh, Pa.

THE first session of the Metals Section, Fifteenth Annual Safety Congress, National Safety Council, was called to order at 9:30 o'clock, in the Grand Ball Room, Book-Cadillac Hotel, Detroit, Michigan, Chairman A. C. Gibson, presiding.

CHAIRMAN GIBSON: It gives me pleasure, as chairman of the Metals Section, to welcome you to this Congress. I am very well pleased with the registration and also with the attendance this morning. It has always been the aim of the Metals Section to get started promptly.

The first thing on the program is the report of officers and committees.

As chairman of the Metals Section, I wish to report that we have had quite a busy year and the result of our work will be shown in the program that we present here. We have had a very fine spirit of cooperation throughout the meetings which we have held and I wish to thank everybody who has been in any way connected with the preparation of the program and the getting up of the present Congress.

We will now hear from the vice-chairman, Mr. Fred C. Bennett.

MR. BENNETT: I don't believe, Mr. Chairman, there is anything I can add. I haven't found that the vice-chairman has very much to do. I have always been glad to help the chairman, but I have no report as no specific duties have been allotted me.

CHAIRMAN GIBSON: Next is the report of the secretary, Mr. J. A. Northwood.

SECRETARY NORTHWOOD: Mr. Chairman, I have no especially written report. I only want to say that I have had quite a job this year, one of the biggest jobs I ever had, getting out that news letter. I am just wondering what you think of it; whether it has answered the purpose, whether we have reached the mark? I feel it is worth while, to keep us in touch with each other if nothing else, and I hope that the man who follows me as secretary will be assisted a little more, perhaps, than I have been this year. I am going to plead now that you fellows make a note in your note-books that you will help the secretary the coming year in getting out the news letter, thereby making it worth while to us all.

CHAIRMAN GIBSON: This news letter, as you know, is the life of the Metals Section, practically; it carries us over from one Congress to another and keeps us in touch with one another. It is really important work and one of the big jobs of the Section.

The next report is that of the Program Committee, of which Mr. E. G. Quesnel is chairman. I have that report here, and in the absence of Mr. Quesnel, I will read it, as follows:

REPORT OF THE PROGRAM COMMITTEE

I wish to report the completion of the Metals Section Program for the Detroit Congress, and to thank you and the officers of our Section, the National Safety Council Staff, and Metals Section members for their help and cooperation in the preparation of our program.

It has been a pleasure to me to have been associated with the activities of the Metals Section during this year and I wish you to know that I appreciate the guidance and timely advice which helped me so much in carrying out my work.

I trust the program will be received by the membership in the same spirit of service that it has been conceived.

E. G. QUESNEL,

Chairman, Program Committee, Metals Section.

CHAIRMAN GIBSON: I wish to say in regard to the fine program we are having this year, that it is due largely to the good work of our friend, Mr. Quesnel.

We will now have the report of the Poster Committee, of which Mr. John P. Eib is chairman.

REPORT OF JOHN P. EIB, CHAIRMAN, POSTER COMMITTEE

In presenting to the officers and members of this Section the report of the activities of your Poster Committee since the last Congress, I ask the indulgence of those present for a brief period.

To my mind, and I am sure to many others, especially those who have had the honor and privilege of serving on this committee, the issuing of monthly posters represents a number of important functions, chief of which are as follows:

First, a very important part of the services rendered members by the National Safety Council. Second, an excellent and in a large degree the only medium of contact between members from one Congress to another. Third, the best thoughts of the committee members. Fourth, affords an opportunity for not only committee members, but all members of this Section, to assist in and perform a real educational service in the great cause of conserving human resources.

I have often wondered just how many members of this Section realize both the responsibility of preparing such a program and also the golden opportunity for service, provided the attention and cooperation of every member could be obtained.

Having this problem clearly in mind, the selection of members of your committee was made with a view of obtaining a representation of the various industries forming the Metals Section.

We have endeavored to give you timely and appropriate posters and have presented to the Council a large number of suggestions and photographs, enough, in fact, to permit two Metals Section posters each month.

We have tried through individual letters and monthly "News Letters" to obtain suggestions from all members but I regret to state that the response has not been very large and I sincerely wish that some means might be suggested whereby this response could be obtained. We have also introduced "Timely Topic Bulletins," and I am happy to state that this introduction seems to have met with very favorable response. This item will be discussed elsewhere in our program at another meeting.

The personnel of the committee for the past year consisted of the following additional members:

- F. A. Lauerman, Interstate Iron & Steel Co.
- H. D. Herron, International Harvester Co.
- S. D. Jackson, American Bridge Co.
- A. Berquist, Youngstown Sheet & Tube Co.
- W. E. Watters, National Malleable Co.
- D. Medalie, By Products Coke Corp.
- T. J. Cordon, General American Tank Car Corp.

I wish to record and acknowledge at this time my especial thanks and appreciation to Messrs. H. G. Hensel and Arthur Berquist of the

Youngstown Sheet & Tube Company; Mr. F. A. Lauerman, past chairman of this committee; and also Mr. R. T. Solensten, formerly of the National Safety Council and to Mr. Lee H. Gardiner, his successor.

CHAIRMAN GIBSON: Regarding the work of the Poster Committee, I think they have done mighty fine work. This is another real job in the Metals Section. Both the Poster Committee and the Program Committee require a lot of attention by the chaps who are in charge. We have been very fortunate in having Mr. Eib as chairman of this committee on posters during the past year; he is in touch with a vast source of supply in the Chicago district and we are indebted to the company with which he is connected for the fine lot of posters we have had.

The next report is that of the Membership Committee.

REPORT OF H. G. HENSEL, CHAIRMAN OF MEMBERSHIP COMMITTEE

Our committee, which was so widely scattered over the United States, has tried to function as well as possible with the contact we could obtain through correspondence. No doubt many of you will be interested in knowing the personnel of this committee, which is as follows:

- J. W. Dorsey, Safety Engineer, Solvay Process Co., Syracuse, N. Y.
- C. E. Fouhy, Safety Engineer, Willys-Morrow Co., Elmira, N. Y.
- A. C. Germain, Safety Engineer, Minnesota Steel Co., Duluth, Minn.
- A. E. Matlack Manager, Comp. Dept., Wheeling Steel Corp., Wheeling, W. Va.
- J. A. Voss, Safety Director, Central Steel Co., Marion, Ohio.
- N. V. B. Ziegler, Personnel Director, U. S. Aluminum Co., New Kensington, Pa.
- M. H. Stearns, Safety Director, Duquesne Steel Co., Buffalo, N. Y.
- Fred Thomas, Safety Engineer, Keystone Bridge Co., Beaver Falls, N. Y.
- J. M. Hennigan, Safety Director, Pittsburgh Steel Co., Monaca, Pa.
- D. C. Thomas, Manager, Employment and Safety, Lorain Steel Co., Johnstown, Pa.
- D. V. Medalie, Manager, Safety Service and Employment, By-Products Coke Corp., 112th and Torrence, Chicago, Ill.
- T. J. Cordon, Safety Engineer, General American Tank Car Corp., East Chicago, Ind.
- F. T. Pulse, Accident and Safety Inspector, American Steel & Wire Co., 208 S. La Salle Street, Chicago, Ill.
- Wm. P. Biggs, Manager, Industrial Relations, Wolff Manufacturing Corp., 255 N. Hoyne Avenue, Chicago, Ill.
- F. C. Bennett, Safety Director, Buckeye Steel Castings, Columbus, Ohio.
- C. J. Kaufman, Supervisor of Labor, Standard Steel Car Co., Hammond, Ind.

I am told by the National Safety Council that the members of the Metals Section have approximately 722,230 employees, so that as representatives of the various companies who are members of the Council

you may have some idea of the vast army of employees that you are representing.

The record of memberships in the Metals Section briefly is as follows:

Number of Members in Metals Section, September 24, 1925.....	670
New Membership During Year.....	68
Memberships Reinstated During Year.....	9
Memberships Cancelled During Year.....	46
Memberships Transferred From Drop Forge Section.....	39

I wish to take this opportunity to thank all members of the Membership Committee who so generously gave their time and put forth efforts during the past year to secure members for the Council. Many of the members of this committee furnished the National Safety Council headquarters office with some very good lists of prospective members which assisted the Council greatly in their membership drives.

I also wish to say that many individuals who are not members of the committee voluntarily offered their assistance in this work and we, of the committee, wish to thank them for their efforts along that line.

CHAIRMAN GIBSON: I should like to say here that all of the members of the committee have done a very good work. It is a widely scattered field; they have to reach out all over the country, not only for new members but for those who are on the delinquent list.

Mr. Ralston, have you a report as representative of the American Society of Safety Engineers?

C. E. RALSTON (Pittsburgh Plate Glass Co., Pittsburgh, Pa.): No, I have not.

CHAIRMAN GIBSON: Mr. McKenney and Mr. Carter are our special representatives on the Executive Committee of the Metals Section. We will now hear from Mr. McKenney.

Conventions Are Very Much Worth While

T. H. MCKENNEY (Illinois Steel Company, South Chicago, Ill.): Mr. Chairman and Gentlemen, you will note from the program that it is to be "just a word from Tom and John." But that was the program committee put such an allowance as "just a word" I don't know, although it exactly fits in with my limitations. However, I don't think it was fair to John because he will need more than just a word to tell you what it's all about.

When I saw the advance copy of this program it made me think of a story of a Polish vaudeville team appearing in a London theater. They were billed as "The Great Tom and John," which, of course, has nothing to do with us except as to their being manly in size.

It seems that in this act, Tom was the first to appear. When he came out and was doing his stuff, about half the audience started to hiss and they hissed him until he left the stage. Returning to his place back of the wings he said to John, "Say, what is the matter with that audience? They don't seem to appreciate hard."

Then John strutted out to do his stunt and when he got half through, the audience began to hiss him, too. He made a stand but finally got

the hook and had to go back of the wings again. About that time the manager came in and said, "What is the matter, John?" John replied, "Don't you know what is the matter? Tom went out and only got half way through his stunt when the audience started to hiss and they hissed him off the stage; and then, when I went out, I hadn't got over half way through when they started to hiss Tom again!"

What I have just said doesn't count in my work so I should like to say very briefly that we have two questions to consider. Why do we come to conventions, and are they worth while?

To the first question, why we come to conventions, I believe we all know the answer and that we fully appreciate the intents and purposes for which conventions are called. The second question (what do we get out of them?) depends entirely upon how conscientiously we have carried out the real reasons why conventions are called, plus the degree in which we participate in the proceedings and endeavor to put forth efforts to secure that information and general knowledge which will assist us in solving some of the problems confronting us and straightening out some of the little kinks which we have back home. If we have done all of this, then I think the last question can be answered, "yes."

CHAIRMAN GIBSON: I forgot to mention, but I am sure it was not at all necessary, that Tom is our past chairman and has been a great standby in the Metals Section. He has done some very fine work for us. The next speaker is Mr. John Oartel.

Accident Prevention in the Metals Industry

JOHN A. OARTEL (Carnegie Steel Company, Pittsburgh, Pa.): Mr. Chairman and Fellow Members of the Metals Section: I think there was just a little mistake made in getting this program out. I think instead of Tom and John, perhaps it should have been Tom and Jerry. I say that sincerely for I mean our good friend, J. M. Woltz.

This is the third time a National Safety Congress has been held in Detroit; it is just 10 years since the first one was held in 1916; not a long time, 10 years, and yet a lot of things have been accomplished in safety in that time. Let us go back and see what we have done.

I know of a company engaged in the iron and steel business that in July, 1916, sent nearly 1,000 men home from work with accidents. This year they sent less than 100 men home. Ladies and gentlemen, that is what we are doing in the Metals Section in this basic industry of ours.

I was very much interested in the report given to us that we represent a million men in the iron and steel business. It used to be thought dangerous, when we used to drag them out dead and dying; I have done it, myself, and you, too, perhaps, have helped to do it, and yet today we are getting somewhere in safety and I am glad to be identified with the safety work and with this business. I am glad to be associated with this cause; it is a real work.

CHAIRMAN GIBSON: We are ready now for a motion that the reports of the executive officers and committeemen be approved. Do I have such a motion?

(The motion was made, seconded, and properly carried.)

CHAIRMAN GIBSON: Now we will start on the program.

The next is the appointment of the Nominating Committee: Tom McKenney, J. M. Woltz, and Earl Blank.

You will notice our program for the first day has been devoted to inspirational talks. Our first speaker will be Mr. Clarence H. Howard who needs no introduction to the Metals Section because he has been working for us and with us for quite some time. While he has not spoken to us in the Metals Section before, he has spoken to us many times in the General Sessions.

**POSITIVE AND CONSTRUCTIVE THOUGHTS ON SAFETY—
OR THE FUNDAMENTALS UPON WHICH SAFETY
IS BASED AND RESULTS ACCOMPLISHED
BY THEIR APPLICATION**

Clarence H. Howard, President, Commonwealth Steel Company,
Granite City, Illinois.

Well, friends, I am very happy to have my part in so worthy a cause. There is nothing more important than the safety of our people.

Arriving at this meeting put me in mind of a young fellow who asked the old man for a young lady's hand. The old man looked the young fellow all over and said, "You haven't arrived yet." The young fellow became very much concerned and hunted up the young lady and talked it over with her.

"Well," he said, "I am going out west, perhaps to Detroit, I don't know." (He was down in New England.) "I am going to make a record so the old man will have to give you to me."

So the young man went away. He went to the west and he made a wonderful record. You know how a young fellow can work when he has a sweetheart, and especially when he comes from New England.

After a while he wrote to his sweetheart, making such a report as he thought she could read to her daddy, telling her how he had really accomplished such wonderful results. He got a little poetic, too, and after the young lady had read it, she said, "Well, now, father will be delighted," and she hunted him up. While reading the report to him she forgot for a moment that he was hard of hearing and when she got to the final part where the young fellow wrote, "I builded better than I knew," the old man exclaimed: "Just what I thought!. He bit off more than he could chew!"

So I am not so sure that I am not in that class; but the safety first program is my Prince Albert, my long suit, because it is all positive.

We tried to visualize some of the negative things, thinking we could learn the positive from the negative, but we soon found out that it was impossible.

Now, the positive is the constructive, eternal side of life. If I am able to make you see what I see, I will feel that my trip to Detroit has been worth while because the positive side is the only side of safety. Take

mathematics; the only thing you are responsible for in mathematics is the principle. You don't guess numbers, you don't select numbers, you don't grab them from somebody when you are using them, but you supply the principle of mathematics and the principle gets the numbers. How does it get them? In perfect order. The wrong number doesn't come; it doesn't come upside down or wrong side out, but it just fits.

So I like to think of the mathematics of safety. There are only nine numbers but you can use more than one at the same time without their interfering with each other or becoming exhausted. They are boundless, limitless, exhaustless. You can't conceive of a number going wrong.

If you went to the bank tomorrow and asked for your bank balance and were told that Clerk No. 6 was on his vacation and that they couldn't make out your balance, you would laugh and say, "Absurd."

I liken this to mathematics because to deal in numbers is 75 per cent of any one's business. Just think it over. No one can steal a number from you. What would you say or think if a man would say, for instance, "Well, I know Howard has a lot of problems to work out tomorrow; I will lock up No. 9 in my safe so he can't use it." He would have a full man's job.

The Fundamentals of Safety Thinking

We got a big order for some tender frames from South Africa not long ago. Now supposing I had had to send some one to South Africa to calculate the stresses and strains. I wouldn't want the work. But it doesn't cost any more to think to South Africa than it costs to think sitting in my office. I can sit there and work out the stresses and strains because the same principle applies in South Africa that applies all over the world.

Radio gives some idea of this. In Washington, for instance, a message was sent around the world in a fifteenth of a second. That is going some. We don't, however, think much of a message going through the walls; there is no obstruction to principle or thought.

All of you hire a good many men, no doubt, but do you consider what kind of mustaches they have or how heavy they are or what is their general condition? No, you consider his think tank; how well he performs the duties brought upon him; how well he harmonizes and adjusts himself. That is the thing I am interested in; really I am hiring his thought. I am getting the benefit of his thinking, not how much he weighs. The little fellow can think as well as the big one; it doesn't depend upon *avoids* but upon a clean sense of the positive.

Let us go back now to the subject of safety and its fundamentals. You know, I rather like this subject because it is fundamental. I try never to think in details, for primarily that is where all your troubles come from, because any 10 men will think details differently. I bet, though, I can start out with a fundamental and everybody will agree with me.

For instance, you have all been to churches. I knew a church one time where they all agreed that they would have more light in that church and they put windows in it that let in plenty of light; there wasn't any dispute or discussion about putting the windows in, but when they began

to figure on how large and how colored and what kind of curtains they would have, I want to tell you they had some discussion before they could go ahead. But they all agreed upon the fundamental—do we want more light and what does it mean to us?

When I think of the positive, it carries me back to my real job, which is the Boy Scouts. You know the gang spirit is in any town; the leadership may be good, but if the atmosphere is bad it is negative. You take our Juvenile Court. I tried to tell the police of St. Louis once something of the Golden Rule and fellowship and they laughed at me.

"That is all right," they said, "but it won't work here."

Observations in the Juvenile Court

I went into the Juvenile Court and sat on the bench and I saw the little fellows coming up there. Fundamentally, I knew they were not bad boys. You will say, "Oh, I know a bad boy." Yes, you know a boy who does bad things, and so do I, but you don't know any fundamentally bad boys or bad men, and so the difference is in the atmosphere and the environment; whether it is positive or negative. You can have whichever you choose, the positive or the negative and you will get the positive or the negative result.

These young fellows in the Juvenile Court were there because they broke windows and so forth. They said they knew I was from the police department and they looked upon me as one of their enemies. They were a little suspicious until I said: "Boys, the only things I find on record here are the bad things you have done. That is why I am here to investigate. I want to know what are the good things you have done. I should like to have the books kept, showing a debit and a credit side. All that is talked about is the bad things. Maybe if I had the good things you have done and put them on the credit side, perhaps you are more good than bad, and that is what I want to know."

So these little fellows began to cuddle up to me, for everybody likes good things. It is only the negative that repels, the positive attracts, and these little fellows who were all the way from eight to 10 years old, felt it.

"Boys," I said, "tell me the good things you have done."

A little hand went up and a little fellow said:

"I know a woman who called me a liar and I didn't resent it."

I told him that he was kind. (I know lots of men who couldn't stand that temptation.)

Then another little hand went up and a boy said:

"A blind man was trying to find his way through the traffic and I slipped over and put my hand through his and helped him across, and he wanted to pay me something but I said, no."

I could see that that was a Boy Scout stunt, doing a good turn without hope of reward each day. Isn't that a wonderful way to bring out our boys? A wonderful atmosphere. I could tell you of hundreds of things those boys told me that would make your heart glad to help them. Their misfortune is that they are brought up on the negative; they are taught

He was not to be helped, but punished. That boy, to the policeman's way of thinking, was a prisoner.

"I will take care of that boy," my friend said; and he turned to the boy and asked, "Why did you run away? What did you do to make you want to run away?" He was opening up the way for the boy to answer in the positive; he wasn't trying to scare him or trying to punish him. "What did they do when they brought you back?"

"Well, they beat and licked me," the boy replied.

"And are you better for having been punished a little, my boy?"

"No. It stirs something up in me and I want to do something worse." Another negative.

So my friend said, "Well, I am in charge now. What shall I do?"

"Well, I suppose you will have to lick me, beat me up."

"Boy," my friend said, "I'll tell you what we will do. You and I are going to make a close friendship. I am willing to be your friend if you will be mine. I am not here to punish; I am here to help. I can see that you have good qualities on which to build. Now the first thing I want you to do is a personal favor. I want you to take this \$5 over to such and such an address and bring me a receipt."

You know there is a constant conflict going on between the positive and the negative and he got him quieted down with the positive; but when he thought of going on this errand the negative asserted itself.

Building Character in a Boy Once More

"Well, who will go with me? Don't you know that I can't go outside the grounds alone? Aren't you going to send a policeman with me to watch me?"

"No," my friend answered, "we won't watch you; we are going to send you alone and trust you."

Then the lad came back with: "Don't you know that the minute I get out of here with that \$5 I can run away?"

"Yes, I know you can, but no man or boy runs away from anyone who loves him, trusts him, who is his friend. He runs away, perhaps, from the fellows who punish him, who distrust him. They make him think negatively. But that is not true now. You can't run away because you are imbued with the positive thought of doing a duty."

The fellow stood for a moment or two in thought and then suddenly the tears ran down his face and he said, "No man ever talked to me like that before. No one ever said anything like that. The only friend I ever had was my mother and she died when I was a kid; since then I have been kicked and scuffed around and nobody cared. You are the first one who ever cared."

He straightened up and he said:

"Let me understand you. Do you mean to say that you are going to give me \$5 to pay a bill and bring back a receipt?"

"Yes."

"Well, would you mind shaking hands on it and making it a real bargain, man to man?"

He was gone on the errand about three minutes when he came back with the receipt.

Think of the joy that lad had for having done something some one could approve of instead of condemning and ridiculing him! My friend put his arm around that boy and thanked him for the service, and today that very boy is one of his best, most trusted friends; he has accomplished great things.

Don't you see that the positive is the healer, the restorative? The positive is the thing that appeals, not the negative.

When this safety first movement was started, I remember very well the work of Mr. Arthur Morey who is now general manager of our company. You all know him. He was the first man in history to be made a general manager of a steel plant merely on the human side. He is a lawyer. I hoped he would forget all his technicalities because technicalities don't get you anywhere. He saw that in industry we must have the humanics; that is, we needed human beings as well as mechanics. Machines are easy to deal with; they don't talk back; but the human with whom you have to deal has thinking ability and in view of all this we got up a little magazine. We use it with the hope that the employee and the general public will see it and become interested so that we may have unity, for in unity there is strength. I am sure that many of you have had copies of this magazine and that you approve of it.

The Little Boy Who Wanted a Watch

I remember that once Mr. Morey made a picture for one of the issues in which he showed a man falling over a car—a little car that we use for our furnace. He thought that by showing that man falling he could instill a safety thought in the minds of those looking at the picture. But if that were true, we wouldn't have war; we have had wars enough to teach us we don't want any more. It isn't, then, what you teach people in the negative that gives the positive result, but what you teach them in the positive.

The old saying about a man having to sow his wild oats is old-time nonsense; if he's tempted by it, he finds himself soured and disreputable. He may come out of it all right, but everybody has a little doubt about it. So why not start right, keep right, as the Boy Scouts do?

I am reminded right here of a little boy who used to have to give a verse from the Bible every Sunday morning; and one Tuesday, after he had given his verse, he asked his father for a watch; not only then did he ask for it but he asked so persistently that finally his father said, "Now, when you need a watch, I will get it for you, but don't let me hear you say another word about a watch." The boy, in looking up his verse for the following Sunday, found what he thought was a particularly suitable one in Matthew, so when Sunday came around and the father said, "Are you ready with your verse," he said: "Yes, papa. It is 'What I say unto you I say unto all, WATCH!'" The next day he got a watch.

By the way, the watch is a limitator. It limits you in all your thoughts. Just every time you think of it, you try to strain a point, you limit your-

self. And we don't want any limitations. The only limitations you will have in your life are those you consent to put on yourself. God can't limit anybody because He doesn't know anything about limitations. God is a great Principle; there are no limitations in Him. No one else can limit you if you don't consent to it.

I remember when I was a kid, my father was pretty strict with me; I used to be one of those "can't" fellows and I learned from him that there is no such word as can't. One must give service, service that is unselfish; service to one must be service to all.

There is a wonderful sermon in the mechanism of a locomotive. It says, "I represent fellowship, the Golden Rule, team work, cooperation, and without those fundamentals you could never make me."

Memories of a Mother and Her Advice

I had one of the sweetest, dearest mothers a boy ever had. I loved her, and when a boy doesn't love his mother something is wrong with the boy or the mother. A boy never wants to be preached to, but I remember very well the five things my mother asked me to remember when I became a business man: Remember your home. Never drink or go where drinking is done. Never gamble or go where gambling is done. (In those days it took only a six-shooter and a pair of deuces to take four aces.) Smoking is not so bad, she said, but you have to have money to get through school so you find out just how much the other boys you go with spend for cigars and tobacco and you put that much away until you can use it for school. Last, but not least, if you are invited to go anywhere, before you accept be sure that it is where your mother would rejoice to know you were, or where you could take her with you. If you couldn't do that, then don't go.

I had in mind that when I became successful I would have a private car. I don't know why I wanted that, but it listened well and I knew it wouldn't be mine unless I earned it. So I began to work in a machine shop.

During a lunch hour I went in and saw all the engines in various stages of repair and I tried to find out how the steam was generated and found its way through from the boilers and just "what made it turn the wheels around." I couldn't work it out; I didn't have head enough to find out.

So I asked a machinist who was standing there, "Tell me, how does the steam operate the engine?"

He looked me over and said, "You know it costs a lot of money to learn that."

"Yes," I said, "I suppose so."

"What will you pay me to teach you?"

I had only about \$20 then and you know a boy needs something besides eating and sleeping so I said, "I can't pay you at all;" and he said, "Then I won't tell you."

Well, I was disappointed and I might have answered in kind, but I remembered what my dear old mother told me, never to answer in kind, that those who answer in kind are destined to be failures.

You must remember I was only a small boy then and I couldn't understand why a man wouldn't help a boy who was earnest. I figured out that maybe this man was joking; that maybe he didn't know either and he got away with it that way. So I forgave him. I knew I had to be humble and meek and that if I answered in kind I couldn't feel that way. I remembered the things my mother had said and that some day, if I always remembered them, I should have my own plant, lots of friends. It was then I said, "I will do them." In the presence of God I made a real declaration that I would do them and I was in earnest about it.

A great revelation came to me at that time. The question arose in my mind, "Supposing you have your plant, a plant of your own, and some boy is answered as you were, what are you going to do about it?" I said to myself at once: "I will start a school and any boy or any man in my employ will be able to get anything that you can get for him."

Of course, that was a crude idea, but it was a fundamental and it started me so that when I got the plant I started a school. Education is wonderful for the young man; I saved my money and went to school afterward. Education is like a seed; it may grow if it is just thrown upon the ground, but plant it carefully, hoe and harrow the ground about it and it is certain to grow and multiply, but it can't be done haphazard.

Starting a School for the Handicapped Worker

So we started this school. We realized it took the average boy four years to finish high school and then four years to get a trade. "Isn't there some way," we asked school authorities of Illinois, "of helping working boys by combining that? If we give these boys a high school education, a diploma, will you enter them in your colleges?" They said they would. And so, to make a long story short, one of the greatest achievements of the Commonwealth Steel Company is their school.

We will take a boy and in four years graduate him from high school and teach him a trade. The first student we had was a man by the name of Dombrosky; he was a foreigner, of course. He was compelled to stop going to school when he was only a child. He entered into this work and he graduated from the school and on the next day he was on his way to the University of Illinois to complete his education; in the meantime he had earned his living.

I want to touch again upon the positive, the constructive. I don't know anything about time when I get on that subject, for it is one that is nearest my heart. I think how wonderful it would be if all men could work together in safety and could work together harmoniously and not spend a lot of time in strikes, in friction. You know if any of you men had mechanical friction you would immediately remove the cause. You sometimes would call the man responsible for it all kinds of names; you would make him unfit for work. If one of those fellows whom you have bawled out—not a very elegant term—meets another who is laboring under a similar grievance, you have the start of a strike. All negative, all destructive.

Now, if the foreman is a fellowship man, a Golden Rule man, he would

say, "Here is a man who has made a mistake. I will say to him, 'There has been trouble and I am disappointed. I rather looked for a better thing from you because I have intrusted you with the management of this work. You have stopped our shop, spoiled our plans, with friction. If I were to fire you, I should have to find another man who doesn't know all that you know. I shan't say anything more about it, but I want you to get on the positive side and try to do better.'" That man then becomes humble and meek and he starts out to endeavor to do what is right and he therefore is a much better man than any one else you could hire.

A man will get hurt much more quickly if he is mad or disgruntled than when he is happy and contented. The smiling man is safer. A man can't have a burden and have a smile at the same time; he must give up one or the other, for one is positive and the other is negative. So a man with a smile is worth a whole lot more than the man with a frown.

Safety is Positive; Danger is Negative

I never could talk from notes. I expect you wish I did. I very seldom write anything because I can't write very well, but some of these fellows induced me to put some of my talk in writing and I did. I started with fundamentals, tracing back to the beginning of Creation because that, of course, is where all fundamentals started.

In the Bible we find that the first chapter of Genesis gives a complete record of God's creation as perfect. In this first chapter there is no mention of evil, sin, disease, sorrow, death, danger, accident or limitation. On the contrary, we read that "God saw everything He had made, and behold, it was very good." This record of creation may be rightly called the positive for it is constructive and thus it gives one buoyancy, strength, confidence and courage. The negative is the suggestive opposite of these qualities.

In order that we may consider the subject of safety in its proper term, that of the positive, and its opposite, danger, as the negative, let me take as illustration a dark room, for darkness and danger both suggest fear, doubt and confusion, all of which are negative qualities. One enters into this dark room with a light and immediately the darkness is dispelled. Now, where did the darkness go? It did not break through the doors and windows getting out, nor did it offer any resistance whatever. It was merely annihilated for it did not really exist as an entity, but was only the absence of that which is real. Light is a symbol of the positive and the Bible declares that "God is light, and in Him there is no darkness at all." Therefore, as we understand the subject of safety in the terms of the positive, we have the light of intelligent thinking which eliminates fear and danger resulting in accidents.

I have often talked with my engineers about their difficulties, and while I often knew but little of what they tried to tell me, I found that keeping the positive in mind while they talked to me brought improvements. The improvements suggested themselves while we talked.

Another term of the negative is "counterfeit," and as there can not

be a counterfeit without there first being the true bill, we may rightly consider the positive as the true bill. A banker does not necessarily need to know all about the various counterfeit bills in circulation in order that he may be protected from accepting one as genuine. All he needs to do is to acquaint himself thoroughly with the true bill, and that which does not resemble in every respect this true bill, he knows to be a counterfeit and therefore valueless. Thus, it is not necessary for us to visualize hazards and dangers in order to impress upon the thought the idea of safety first, for we are always safe when we are thinking in the terms of the positive.

The other day I read an article that said this, and when I speak of love I speak of it not as maudlin sentiment, but I speak of a Principle. They say that "God is love," that He is a Principle, the same today, yesterday and forever, always present, always effective. Love is especially dear in time of temptation, of negatives, hatred, envy and jealousy; it will render good for evil. Think of what a changed world this would be if everyone would remember that.

Golden Rule the Boss of the Company

I have chosen the Golden Rule as the boss of our company; I am only the president in so far as I deal in the Golden Rule. I look at things in the light of the Golden Rule; if they will render service, I will use them. That is the first step. If I am thinking about some one who has disappointed me, and the temptation is to say something, to get ugly, before I do that I say to myself, "What is it that I am going to say about Bill? Would I be joyous if he said it about me?" You know this method brings up a lot of questions and you begin to think how wrong you are, and you begin to deny those negatives until you reach a point where you say the things you would be glad to have said about you. Then a sense of calm, a relaxed, peaceful sense comes over you, the consciousness of God's approval. You have thought that out successfully, and being approved by the great Principle is wonderful, isn't it? It makes you feel like you do when you see a great game, as I did recently when I saw the Cardinals play—and by the way we have a real team in St. Louis.

There isn't any joy like it. When that game was played, I listened over the radio. When, in the seventh inning of the last game, they put Alexander in, I was awfully excited, and when at last the final score was given and they gave St. Louis the championship I was like a dish-rag—no doubt I describe your condition at that time, too.

We are proud of our baseball team in St. Louis. That reminds me of what a man told me the other day of an incident that occurred when the Eucharistic Congress was held in Chicago. A fellow standing by him looked the cardinals over and said to him, "What are they?"

"Why," he said, "those are the cardinals."

"Oh," the fellow said, "which is Rogers Hornsby?"

I am sure I should rather tell stories than be serious, but really when you think of this safety movement you are thinking of a tremendous fundamental.

Now I will have to refer again to a little more of what I have written, to put on the appearance of having presented a paper. If you asked me what "safety" is, I would say, "positive thinking." You can't get hurt when you are thinking positively, intelligently.

It is not necessary for us to visualize hazards and dangers in order to impress upon the thought the idea of safety first, for we are always safe when we are thinking in the terms of the positive.

You won't learn the positive by thinking of the negative, and you won't prevent accidents by impressing them on your mind by trying to show how they happen. When the first Safety First Calendar came out, the illustrations and the warnings would have made any fellow chase his grandfather up a tree with a shotgun; it was all negative. I kept hammering at it and harping about it and now if you will look at the last one you will see it is all positive.

Positive thinking is the utilization of man's greatest gift from God—the ability to think, and he who does this in an intelligent manner is bringing himself into harmony with the law of God, the law of universal good.

The desire to safeguard pedestrians has become so general that in all cities and many towns "Safety Zones" and "Safety Platforms" are provided in the middle of streets where one may stand secure from the swiftly moving automobiles and street cars. As it is against the law for any vehicle to come within these safety zones, so it is against the law of the positive for the negative qualities of confusion, doubt, and fear to enter the thoughts of one who thinks only in the terms of the positive. In this haven of positive thinking no accidents can occur for we have the divine promise that nothing can enter that "defileth, or maketh a lie." (That's pretty good authority and I think He knows pretty well what He is saying.)

Cooperation Will Help to Perfect Anything

Only a small percentage of accidents can be prevented by mechanical safeguards; the balance must come through the practical application of the Golden Rule, which is constructive, positive safety. Safety first, when properly analyzed is the expression of fellowship.

I think we all agree there isn't anything on which we can not benefit by cooperation. Safety first, from the standpoint of the positive, results in the scientific study of the right and orderly way of doing things, and the safety first movement has proven to be one of the greatest agencies toward the realization of the brotherhood of man. It develops high individual efficiency which results in greatest service, and when service is rendered, confidence is gained and success is assured. Service must be expressed in safety, efficiency and economy, with character building as its goal, which enables one to profit with his fellow man and community, but never at their expense—to live in a city but not on it.

Do you know that service and competition have entirely different fundamentals? The fundamentals of competition are expressed in the question, who shall be the greatest? The greatest sin in the world is competition; if it goes far enough it ends in war. It is negative. Service,

however, is positive and its fundamental is, who shall be most perfect? Who shall resemble the teachings of Christ Jesus most perfectly? That is service, and it must not have one pin point of selfishness in it because when you get any selfishness in service it ceases to be service. People will find out and will be willing to pay and compensate you for the service when it is unselfish. "The hole you make in giving is the hole you have to receive through."

If you go to some man and command something of him, without offering anything in return, you are likely to get a fight out of it.

I went to see President Harding the first day after he was elected and he said to me, "Well, what can I do for you?" I said, "You can't do anything for me. I only want to fit into your program and try to render you service; I want to serve my country and I want to do the thing that will bring the greatest happiness to the greatest number of people." President Harding said, "Shake. You are the first man who has been in this room today who didn't want something."

Poise is an Important Factor in Safety Work

Another important factor in positive safety is that of poise, which has been splendidly defined as follows:

"Poise is that state of consciousness which is at rest and peaceful when no one praises, and undisturbed when opposed, censured, or misunderstood."

"Opposed or misunderstood." Anyone who can take hold of the two horns of that dilemma and still maintain his equilibrium is safe. Judge Gary was perhaps one of the greatest men in the safety movement. You know Bob Campbell; his son-in-law was your first National Safety Council president. The Judge said to me one day, "Howard, you have got to have things balanced. You can't get the best of a bargain if you don't. Just keep in mind that in a controversy, or in anything, keep your balance, your equilibrium, and you will be able to render good for evil."

A man who does something wrong is like a man with a lion attached to him; he needs your friendship and it will not help him more to put another lion there, but you want to take away the one he has. That is the brotherhood of man; that is true brotherhood. You can't get safety unless you are well balanced.

To lose one's poise because of any disturbed condition is not safe, and only makes a bad thing worse. A broad-gauged, public-spirited citizen must be consistent and compassionate. When difficulties and misunderstandings arise, he must be wise, brave and unselfish, which will awaken a spirit of fellowship and thus maintain for himself and his fellow man an atmosphere of safety.

The only problem any of you have is that of your own self. Howard makes me my only trouble; when I can take care of Howard, I am safe. If I go to you and give you a dollar and then you give me a dollar, we each have one, but when I go to you and give you an idea I enriched myself in trying to formulate that idea to give to you and so I haven't given it away. I still have it, and it is better because I tried to give it

away. Giving enriches while withholding often makes us poorer. When you give, give open-heartedly, in a spirit of "I want to render you a service; I want to help you." I learned these things through hard knocks. One of the definitions of safety is "freedom from danger."

You know, I haven't a danger signal in my plant. It is a hazard, a real hazard to call attention to the negative. I turned it upside down and made it safety. Doesn't safety mean more? I find it works much better since I substituted the safety signal for the danger signal in my plant.

The Constitution of the United States does not imply that arbitrary human force resulting in fear shall regulate man; rather does it imply that righteousness shall permeate our laws and our relations. Mankind will be rightly and safely governed in proportion to the utilization of the Golden Rule in law and its practice, in industry and in commerce, which will insure the rights of man and hold sacred the liberty of conscience, thus expressing the positive (safety first).

There is just one little thing more I should like to say: One time a man said to me, "Howard, I think you are the most sacrilegious man I know." I was surprised and said, "Why?"

"Well, you talk about God as though He were your business partner."

"So He is," I said, "and the best I have been able to choose. He keeps me always in the positive and He keeps me right."

I have thought of this safety movement a great deal, ever since I was a boy, and I have had it instilled in me. After the Armistice, I took the first boat to Europe and talked with the boys there. I knew President Wilson and Colonel House. (I used to be a partner of Colonel House in Texas where we had a gas plant.) I was a member of a committee on peace arrangements at that time and, as I said, I went to those boys and talked to them. I said, "This isn't the positive; there is some way in which we can have all our men working together in a fine, big family." I thought this over coming back on the boat and I formulated a plan.

My idea was to turn our shop into 14 counties, each county to have representatives, three from each county to represent their particular division, each group headed by a chairman. That gave me 14 chairmen and 28 committeemen. We had to have a platform, principles on which we could cooperate, and I wrote one of three or four pages; but when I had it finished, I said, "That won't do; the men won't read it." I thought of a young fellow, a smart little fellow, and I went to him with this platform I had written and told him that I thought it was too long.

He said, "Let me have it. I will fix it. I was raised on condensed milk." I am going to read the fundamentals of our business platform as they were finally gotten up:

COMMONWEALTH PLAN
(Equal Opportunity for All)

Of, By and For the Commonwealth Family.

FOUNDATION: FELLOWSHIP

Fellowship is a comprehensive, vital power. It broadens our views, increases our abilities, enriches and purifies character. Its chief foundation-

stone is cooperation, which brings the Golden Rule in practical application to all human relations and needs.

Fellowship is the Golden Rule in action, the motive power of Human Engineering, the life-blood of service, insuring equal opportunity for all.

The Commonwealth Plan recognizes all problems as mutual, wherein and whereby absolute confidence exists in the honesty of purpose and truth of character of each other, thus blending brotherly love in all activities and enabling each to develop his several talents.

Human engineering governs this Plan, and demands our being willing and able to treat men as men—not as machines. The welfare of the man is more important than tools and machinery, for man thinks, and acts as he thinks. Therefore, we must practice Humanics as well as Mechanics.

The Commonwealth Plan provides an excellent and practical basis for putting all (from the Office Boy to the President) upon the same Plane. Then as a unit we can work out the problems of the day in such a way that each one feels he or she is a co-worker in the great purpose of the Commonwealth Steel Company, which is to express Safety, Efficiency and Economy through its cast steel devices—in other words, rendering SERVICE and building character.

Giving Each Man a Chance to Increase His Abilities

We don't mean you can make all men equal, but we believe in giving each fellow a chance to increase his abilities in accordance with the abilities he already has. Our business is to make castings, but we also want to build homes, atmosphere, character. My one ambition in life is to establish a practical industrial relationship, not for my plant alone, nor for Illinois or Missouri or the United States, but for the world. So much happiness is sacrificed through the negative. The shop ought to be the most pleasant place outside of home; you are there more hours than anywhere else, and we should have a joy in doing for others. As Secretary of Labor James J. Davis has said: "You can't buy happiness for yourself without buying it for your fellow men." The important part is unselfishness.

I want to thank you very much for this opportunity to speak to you. It is a great pleasure. I was in New York less than a week ago, then I had to go to St. Louis, and I have to go back tonight. It would be a great joy for me to remain here. If I have said anything to help you, I am pleased.

Remember this: the positive is safety and the negative unsafety.

CHAIRMAN GIBSON: That was wonderful. It was inspirational as sure as white is white. Do we have any remarks? Any questions?

I am afraid I can't add anything to what Mr. Howard has said.

Our next speaker is Mr. Harry A. Schultz, Assistant Manager, Bureau of Safety, Sanitation and Welfare, United States Steel Corporation, New York City.

EVERY DEPARTMENT HEAD A SAFETY DIRECTOR

Harry A. Schultz, Assistant Manager, Bureau of Safety, Sanitation, and Welfare, U. S. Steel Corporation, New York City

Twenty years ago, when intensive safety activities were inaugurated, the belief prevailed that to prevent accidents in industrial plants it was necessary only to make certain engineering revisions in equipment design and to guard dangerous parts of machinery which had in the past been responsible for many serious and fatal injuries. Employers, working on this theory, appropriated and spent large sums of money to make necessary physical corrections.

Accidents were reduced, but not to the extent anticipated, and it was realized by those who were closely associated with the work that a more careful study of accident-causes would have to be instituted. An exhaustive investigation evinced that the human factor entered intimately into the situation and that if further progress was to be made, organized activities must be established, not only to correct physical conditions, but to secure and maintain the interest and the hearty cooperation of the workmen.

With the inception of better organization the results obtained have been very gratifying and they are growing consistently better. We could hardly have dreamed a few years ago that large industrial plants, such as steel mills with all of their involved risks and employing many thousands of men, could go a week, much less a month, without a disabling accident; yet this is today a very common occurrence, and records have been made in some of the largest operations not only of one month, but three and four successive months in which no accident occurred. To all of us in the metal industry, this is indeed encouraging. It has proven beyond doubt that accidents can be prevented, and I believe we are justified in anticipating the day when accidents will have no place in our industrial establishments.

But much is to be done before this goal we are ultimately striving for may be reached. We must not only hold the ground and maintain the reduction in accidents which thus far has been gained, but we must carry on with renewed vigor. We have ground and buffed away the rough edges, so to speak, and are ready for the polishing and the finishing touches—the refinements.

This means perfection of organized endeavor, the development and establishment of perfect cooperative interest and effort of all concerned, from the highest plant official down to the rank and file of the workers. The entire accident prevention machine, in other words, must be organized and maintained so as to function in all its parts without fail. Each and everyone must play his important part daily, and in every hour and every minute of the day. It is only through such refined organized effort, with everyone working harmoniously and cooperatively, that results commensurate with the fondest hopes may be obtained.

Those identified for many years with the accident prevention movement

are cognizant of the important position which the department head occupies in a safety organization. He has been characterized as the key-man in such an organization and beyond question is a dominant factor in its success. The department head responsible for operations and production in his department naturally is the one morally responsible for operating conditions and for the safety of the men under his jurisdiction.

Much is to be expected from him in establishing and directing the character of activities which will prevent accidents. If he is in sympathy with the movement and signifies his desire to leave nothing undone to educate and protect his men, an important advantage in the elimination of accidents is gained. If, on the other hand, the department head is not in sympathy with the movement and is a member of the old school who believes that production is the main and ruling factor in his department, regardless of the sacrifice of human life, a stumbling block is immediately encountered; and until it is removed, all efforts in the elimination of accidents, in so far as his department is concerned, will be unavailing.

Much Depends Upon this Operating Official

Any department head whose unsympathetic feeling toward his fellow men allows him to harbor such a viewpoint may be classed as a liability and not an asset to his company. He has failed to realize that, while primarily the safeguarding of employees against bodily injury is a humanitarian movement, founded upon high principles, it has also an immense economic value directly in his favor.

Now, why does so much depend upon this operating official? The department head occupies a unique position in an industrial organization; he is what may be termed the middle man in industry, the medium and point of contact between the management and the workers. He is the one particular agent who is daily in constant touch with the department and the men. He knows the practices of the department and every phase of the work. He is acquainted with the hazards and knows better than any other individual how they may be overcome.

If he gives the proper thought and study to the problem, he can do more than anyone else to educate and to influence the men to overcome careless and thoughtless habits, responsible for many injuries, and to instill that degree of caution into their movements which will go a long way towards preventing accidents. Men are naturally influenced by their leader, and the department head, by showing the proper interest, will soon gain the interest of every man which, accompanied by the necessary disciplinary measures, is bound to produce good results.

Our past experience indicates that accident prevention work is governed by two important factors: engineering, relating to the physical side, and education, pertaining to the enlightenment and instruction of employees in safe working methods. Both of these activities, we have learned, are of the utmost importance and are interdependent. Time will not permit a discussion of these subjects in all of their ramifications, but let us consider briefly some of the more important things that may be

expected of the department head in both of these branches of endeavor.

It must ever be borne in mind that the interest and hearty cooperation of all employees are of paramount importance in a successful campaign against accidents. This is a phase of organized safety work which must be highly developed, and nothing should be left undone which will bring about such a happy condition. One of the first things conducive to this cooperative interest is the development and maintenance of a high physical standard. The house must be set in order, so to speak, if the good will of the men is to be gained. This means that new construction and new equipment should embody every practical feature incident to safety; existing machinery hazards and other physical hazards should be corrected; and good housekeeping, ever a dominant factor in the prevention of accidents, should receive the utmost attention. To the management, engineering staff and department heads we must look for the solution of this problem.

The management, engineering staff and department heads all, naturally and rightfully, seek the most desirable arrangement to accommodate the manufacturing processes and to facilitate the handling of material and product in the most commodious and efficient manner. However, in the construction of a new department or shop or in the installation of machinery or equipment, it stands to reason that in this day and age safety should take equal rank with construction features, and that after the initial design of the department to suit operating conditions has been completed, a careful study should be made to ascertain whether the necessary provisions for safety have been fully taken care of.

Department Head Should Take Nothing for Granted

To this end the department head can and should play a very important part. He should always have at heart the safety of the men who must carry on their daily duties and operate the machinery in his department. Being familiar with the operations and with the machinery involved, he should never lose sight of the man at his work or of the opportunity placed in his hands to effect revisions which will relieve the possibility of an accident. By establishing close relationship with the engineering and safety departments, at the time new construction work is planned the department head will be able not only to see that necessary safety features are properly considered and included, but to secure the best of operating conditions from both a safety and a production standpoint. The department head who appreciates his responsibility will take nothing for granted, but will look after such important details himself and will make it obligatory on his part to see that any new machinery or equipment installed in his department fully provides for the safety of his men.

In the foregoing, brief consideration has been given to measures incident to new construction; but the department head must also take cognizance of the correction of physical hazards in connection with present installations. It is essential that careful study be given to machine guarding and to all features associated with the operating

processes which will permit work to be done safely. Safety engineers and committee men have been repeatedly cautioned that when making a safety survey they should study each situation carefully, taking into consideration the position of the operating man responsible for the production of a department or for a machine. This is only right, for safety as it may be construed today stands for efficiency.

But should not the department head be fully conversant with the fundamental principles of safeguarding as well as with all other remedial measures which will insure the preclusion of accidents? If he is, he will see that all guards installed in his department are equally satisfactory from an operating as well as from a safety standpoint.

There are a number of things which should be carefully considered in the design of safeguards. Primarily, they should comply with the laws of the state or community and should embody the necessary features for adequate protection against all existing hazards; but it is important that an endeavor be made to design guards which will in no way interfere with or impede operation, but which will rather increase the efficiency and production of the machine through freer and more skillful operation. Neatness is a dominating factor, and the proper weight of material and substantial construction are most important from a maintenance standpoint. A guard not properly designed is an added expense, from the standpoint of both production and maintenance. Sooner or later such guards will cause dissatisfaction and will be subjected to abuse, with the result that, after a short period, they will have served their usefulness and be relegated to the scrap heap.

Housekeeping Necessary in Maintaining a High Standard

The department head who is on the job as he should be will not wait for others to point out defects in his department or to pile up a mass of recommendations indicating a laxity in one of his most important responsibilities; but rather he will study these things out for himself painstakingly and methodically, day by day, and create a physical status in his department which not only will be beyond criticism but will harbor an atmosphere of real safety and efficiency.

Of ultra importance in line with creating and maintaining a high physical standard is good housekeeping. In no place does the old and familiar axiom, 'A place for everything and everything in its place,' apply more definitely than in the industrial plant. The degree of safety and efficiency which prevails in a plant, or shop, can usually be judged at a glance by the house that is kept.

Let us picture in our minds a plant, or department, in which tidiness and cleanliness are sadly neglected—an unsightly shop with machinery unkempt and poorly guarded, and tools and material strewn about in disorderly fashion. Let us reflect, for an instant, just what effect such discouraging environment will have upon the make-up, energy, and efficiency of the individual if he must live and work under such conditions day by day. Good housekeeping is a basic and most important factor in the prevention of industrial accidents and is a phase of the

work which should receive the special attention of department heads.

Now let us consider the other side—the human equation. Experience in the prevention of accidents indicates that, while some of the most serious injuries are due to machinery and other physical causes and that the plant must be physically fit, from 70 to 80 per cent of all accidents which occur are directly attributable to carelessness or thoughtlessness on the part of either the workman himself or his fellow workmen. It is evident, therefore, that every attention must be given to educational measures in which the workman is taught the fundamental principles upon which successful accident prevention is based, and to the inculcation of care and forethought which will overcome careless habits.

It is a matter of record that the new and inexperienced man is particularly susceptible to injury, owing to his unfamiliarity with the hazards of his new occupation. At the time of his employment, the department head under whom he is placed should take personal interest in seeing that he is carefully instructed relative to his new duties and all the hazards involved. He should be fully acquainted with the safety organization, what it is trying to accomplish, where the dangers lie in his occupation, and, above all, how to perform his work safely.

The Real Work of Education With the Department Heads

While considerable can be done generally in the way of educational activity by large safety meetings and rallies, safety bulletins and literature, motion pictures, etc., the real work of educating the man on the job must be vested with the department heads. It is the close personal contact of department heads with their men that is the most direct means of reaching and educating them and appealing to them for their interest and support in the safety work. They must be continually on the job, constantly active day by day. They must have the safety of their men uppermost in their minds and must guide and direct them in the employment of safe methods at all times. A keen eye, with a word of encouragement here and a word of caution there, as they move daily among their men, will bring the importance of the safety movement home to the men and bind them into an organization which will prevent many an accident.

The department safety meeting, at which the department head brings all of his men together periodically for the purpose of discussing accident prevention measures, offers an excellent opportunity to fix firmly in the minds of the men the position and attitude of the company and of their superiors with reference to the prevention of accidents, and to secure their cooperative interest. I believe that a great deal of the success of some of our largest companies in the prevention of accidents may be attributed to these departmental safety meetings, as they serve as a medium for the men to set forth their thoughts and ideas; and once the men are impressed with the importance of accident prevention and are impregnated with the safety spirit, many excellent and valuable suggestions are brought out for the correction of bad practices

and accident hazards which might otherwise go unnoticed for a long period, or until an accident occurs.

It is a common expression that the head of a department who has the safety of his men at heart and who does everything in his power to protect them is usually a progressive and efficient operating head. That this is the rule rather than the exception, I believe has been demonstrated time and again. Such a department head besides being a humanitarian and entertaining a wholesome respect for his fellow-men has appreciated the importance of safety. He has recognized that the prevention of accidents is not a hobby or an idle conjecture, but a proven, practical business proposition, based on business principles; that the conservation of the worker is simply another responsibility in modern industrial activity which must be faced fairly and squarely by operating officials and organized on the same plane with other production factors.

He has learned that stability, contentment and efficiency of the working force are vital factors of efficient management, that upon such a happy condition depends not only economic production, but his success and ultimate advancement. He has been shrewd enough to realize that the attitude of the worker at his daily task is as much a psychological condition as it is a matter of physical strength and skill, and will be determined to a large degree by the influences and conditions by which he is surrounded. He appreciates that his plant environment should be of a character which will contribute to his happiness, health and comfort, foster within him a spirit of contentment and cooperative interest in his work, and insure him against serious injury or physical disability which may in any way affect his earning power or standing as an efficient producer.

The Safety of His Men is a Serious Matter

The safety of his men is really a serious matter with this department head. His reasons may be analyzed as two-fold. In the first place, he is human. He has recognized that any movement which primarily has for its object the conservation of life and limb is entitled to and should receive the sincere and unqualified support of everyone who can, in any way, contribute to its success. Secondly, he has learned by bitter experience that accidents are deplorable; that they are productive only of suffering, waste and inefficiency. They wreak havoc and help to undermine the very principles upon which an efficient operating organization is constructed. To him as an operating man they are a source of irritation and a constant menace. They corrupt the morale of his men, breed discontent, and curb production. Literally to him they are bad business, morally and economically.

What is the antidote? There is only one remedy—organization. This we can safely leave to him; accidents will have no place in the domain over which he rules. Industry needs and is looking for such men, who can shoulder and measure up to all of their responsibilities; men who

can manage without accidents. And when the time comes for advancement industry will choose such men to conduct its affairs.

CHAIRMAN GIBSON: Are there any questions? The subject seems to have been very well covered.

CLINTON E. SANKEY (National Tube Company, Ellwood City, Pa.): I should like to ask Mr. Howard about the safety signs. It seems to me that in connection with the high tension lines such as we have in our plant it would be very dangerous to eliminate the danger signals.

MR. HOWARD: We do not eliminate the signals but we substitute the word "safety" and "danger," because we want to give the employee the idea that he can protect himself with the positive.

CHAIRMAN GIBSON: A question has been passed to me which reads: "To what extent are accident statistics being used by executives and what are the benefits?" Mr. Frank L. Wanzer, of The Steel Company of Canada, is asking this question of Mr. Schultz.

Post Accident Statistics on the Bulletin Board

MR. SCHULTZ: Very careful statistics are of course prepared on all accidents in all companies and this is sent out to the companies so that a general comparison can be made. The various plants are compared as to their accident record so that a sort of competition is started among the various units to reduce their records to a minimum. Does that answer your question?

MR. WANZER: It is fairly well answered. I know it is a hard question and that is the reason I took the liberty of asking the chairman to read it. The thing is to get these statistics correct beyond dispute and get them operative among our workmen.

MR. SCHULTZ: They are posted right on the bulletin board, the number of accidents in each department.

H. R. WHITNEY (General Industries Company, Elyria, Ohio): Mr. Schultz made reference to the new help and the old help in the industries. Where do you draw the line between the new help and the old? In making out statistics, what do you consider a young man and an old man? How much time do you give them to become old men?

MR. SCHULTZ: That is pretty hard to say. What I meant in my remarks is that the new man who is newly employed should be properly instructed as to his duties under an experienced man until he is fully acquainted with his work.

MR. WHITNEY: If you are drawing a line on the percentage of accidents where are you going to draw the line as to age?

MR. SCHULTZ: I think the only way you can make up statistics in that light is to take the man who is employed from one to six months and from six months to a year and from groups in such a manner as that.

DR. ETHELBERT STEWART (Commissioner of Labor Statistics, Washington-D. C.): You mentioned that 75 or 80 per cent of the accidents were chargeable to conditions other than machinery and I think later on you said something about the larger part of these accidents being due to

carelessness and thoughtlessness. I wonder whether that carelessness and thoughtlessness can be attributed to the individual who is hurt?

It has been my experience in accident work, and I have been in it for quite a while, that you hit the keynote of the accident problem when you talk of the man who is in personal control of the one who suffers the injury. I have found that the man who is foreman, or, as you call him, the director of the department, must be selected on the basis of his worth in this respect and he must be provided with the proper facilities and have the courage to use them. He must have the courage to select men who can do just the kind of work he needs done, and when he sees a man go after a job in a way that isn't safe, he must have nerve enough, rather courage enough, to show that man where to do it, how to do it, when to do it.

MR. QUESNEL: In regard to the department heads being responsible for the prevention of accidents, we have found by past experience that there is a certain amount of responsibility on the shoulders of the foreman and superintendent in the majority of cases where an accident occurs, from the fact that the greater number of accidents are the result of unsafe practices repeated. In other words, a man usually is not hurt in our plant or in any other plant the first time he does something wrong but it is the continued repetition of this wrong practice that gets him into trouble, and that is where the foreman and superintendent enter into it.

It should be their job as overseers and supervisors to see that unsafe practices are discontinued in their departments. They may not be able to prevent them from the start, but they most assuredly can prevent them from continuing; their becoming too busy, too absorbed in their own work to prevent their keeping wide awake to the activities of the men who are not so efficient allows the law of accidents to work. A careful person, working right, is immune, while those who take chances, who do things in an indifferent way and sometimes get by with it should be watched.

One of the big duties of the superintendent and foreman is to be absolutely sure that they know, themselves, the safe way the work should be done in their department and then check up to see that their men are doing their work in the right way, establish confidence, security in their department so that their men can rely upon their judgment, so they may feel sure they are doing things in the right way.

If everything that is done has the approval of the department head, the majority of accidents will drop automatically. It has been proven without question that accidents are caused by repetition of wrongdoings or unsafe practices. It seems to me that the foreman and superintendent have a wonderful opportunity to catch these unsafe practices long before the accidents occur if they will instruct their men as to the safest way in which to perform their jobs.

In our own plant this education of the men has made them better and more efficient men, and every foreman realizes that the responsibility rests strongly upon his shoulders.

ADJOURNMENT

WEDNESDAY MORNING SESSION,

October 27, 1926

The second session of the Metals Section was called to order at 9:15 o'clock, Chairman Gibson presiding.

CHAIRMAN GIBSON: We have a very good program this morning so let's not waste any time in getting started.

I want to bring out the suggestion that we are always glad to hear of any ideas you may have about improving our next year's program, or anything that will pertain in any way to the betterment of our Sectional activities. I hope you won't be a bit backward about your suggestions, either in presenting them from the floor or by writing to the secretary of the Section. It is a real job to think of all the things to be done for the next Congress in order best to benefit everybody. Of course, you know we can't prepare enough papers to cover every individual question but we are glad to have suggestions and we will try our best to arrange a program that will be suitable to the majority of our members.

The first thing this morning is the report of the Nominating Committee by Mr. T. H. McKenney.

REPORT OF THE NOMINATING COMMITTEE

GENTLEMEN: Your Nominating Committee after due consideration begs leave to submit the following candidates for your consideration to fill the respective offices for the incoming year:

Chairman, F. G. Bennett, The Buckeye Steel Castings Co., Columbus, Ohio.

Vice-Chairman, J. A. Northwood, Bethlehem Steel Co., Johnstown, Pa.

Secretary, E. G. Quesnel, Commonwealth Steel Co., Granite City, Ill.

In accordance with a resolution passed by the Metals Section at the last Congress, the retiring chairman automatically becomes a member of the Executive Committee, together with the officers and other chairmen of such standing committees and such members at large as the chairman may see fit to appoint.

We believe that the incoming chairman should have the privilege of selecting such members as he may care to appoint on the various standing committees and to name the chairmen thereof.

Respectfully submitted,

J. M. WOLTZ,

E. F. BLANK,

T. H. MCKENNEY,

Committee.

CHAIRMAN GIBSON: Now you have heard the nominations for the coming year. Do we have any further nominations? If not, I will entertain a motion that the nominations be closed.

(The motion was made by Mr. McKinley, seconded and carried.)

CHAIRMAN GIBSON: I am ready now for a motion that the secretary be instructed to cast a unanimous vote electing the officers named.

(The motion was made, seconded and properly carried.)

SECRETARY NORTHWOOD: As instructed, I have so cast the unanimous ballot.

CHAIRMAN GIBSON: We are ready now to go ahead with the first paper of the morning program, which will be presented by Mr. W. C. Wright, National Founders' Association, of Chicago.

SAFEGUARDING FOUNDRY HAZARDS

W. C. Wright, National Founders' Association, Chicago, Ill.

This problem differs from that presented by the shops usually connected with it, such as machine shop, pattern shop, etc., due to several conditions. There is much less machinery in most foundries than in the other shops, so that after all machinery in the foundry has been mechanically safeguarded, only a beginning has been made in foundry safety work. Molten iron, being rapidly handled in all directions, presents a new problem. The personal equation in the foundries should be carefully considered.

Another fact that must be kept in mind is that the time of greatest hazard comes at the latter part of the day, when the men are physically tired, for foundry operations require greater physical exertion than in most other shops. Then, too, "pouring off" causes a tense nervous strain on all those directly connected with handling the molten iron.

According to an analysis made by the American Mutual Liability Insurance Company, out of 1,176 lost time accidents, 87 per cent were classed as non-mechanical, and about 13 per cent mechanical. Of the predominant non-mechanical causes, "burns" accounted for practically 29 per cent, and "handling material" just a little less.

Can we not learn something from the foregoing facts and conditions that will help us in making the foundry safe? It appears from these figures that after all machinery has been well safeguarded, 87 per cent of hazards are still unprotected. How can we best reach this large proportion of accidents? I believe the best way is through a constant, persistent, campaign of education; from the superintendent through the foremen, "straw bosses," down to the laboring men, this campaign must be constantly carried on.

To organize for such a campaign requires that a man well up in the management must have personal connection with the effort and he must be one who thinks, talks—yes, even dreams of safety. Unless the management demonstrates that safety in the foundry is more than just a part of the day's work, it will soon amount to a few bulletin boards and will not impress the common man sufficiently to be of any material value. If the foundry is of sufficient size, there should be a safety engineer to plan and follow the campaign.

If the foundry can not have such a man, the foundry superintendent should head the campaign, and before it starts he should be carefully "sold" on safety, and brought to realize that he is the one who is mainly responsible for the health and happiness of his men. It will pay to spend

considerable time to get this man in proper condition to make this work effective, or the campaign will simply prove another "spasmodic effort" instead of establishing an entirely new condition of things.

It has been well said that the foreman is the key man in industry. He, too, is the key man in this instance. He is the man who interprets management to the men, and he is closest to the men and directly in charge of the work in hand. Unless he thinks safety, talks safety, preaches safety, and lives safety—in fact, *compels* safety, he will hardly get his men sufficiently impressed with the spirit.

The task of putting the superintendent and foremen in proper frame of mind is the work of whoever heads the campaign, be he the owner, manager, general superintendent, or "what you will"; he must keep working at it every second of the day, and working best when all is hurry and his men are physically tired, with nerves almost ready to snap.

Well blessed is the foundry whose superintendent and foremen are real leaders of men, and not simply production getters. If you have such a superintendent and foreman, your task is an easy one, and will "go over" with little effort.

Safety Committees Appointed from Among Workmen

The appointment of safety committees from among the workmen themselves, having the foreman as chairman, helps to bring the cause of safety directly to the workmen. In a case of carelessness a rebuke or talk from a fellow workman, if given in the right spirit, goes home better when coming from the foreman. Five or six watching for cases of carelessness are sure to be more effective than where the foreman only is on the lookout.

When the campaign is launched, the company must at once safeguard every piece of machinery in the most effective way possible, to demonstrate to the men that the campaign means something, and that the company is determined to do its part fully.

Most workingmen do not realize that it is the little careless acts that produce most accidents, for they see these things being done daily without accident, and do not sense that the careless act can occur 99 times without trouble, and on the hundredth time someone be seriously injured. For this reason, the committee will at first suggest safeguarding stairways, machinery, and points that they believe should be safeguarded, and the company must at once act on their suggestions or the real good of the movement will be lost.

Little by little, as this safety committee meets to talk over its work, the safety engineer or superintendent can bring to their minds the point of personal carelessness and urge the committee to watch for and correct all such acts as fast as they see them.

To show you just what I mean, a short time ago I was in a foundry watching the pouring off. A workman just in front of me was nearing the end of his floor. It was a hot day and he was getting tired. He was also getting careless in handling his ladle and was slopping considerable iron on the cement floor, which was then thrown in all direc-

tions. His foreman saw it from a distance and came up at once, saying: "Jack, be more careful with your ladle, or you will surely burn yourself or someone else."

After "Jack" had emptied his ladle the foreman showed him how he was carrying it wrong, how he should carry it, and then said: "You know, Jack, we are all trying to do all we can here to keep from hurting ourselves or each other. You know you might spill iron 99 times and do no harm, and the next time you might put some fellow's eyes out, and then how would you feel?" The rebuke was so well timed, the remedy so carefully demonstrated, and in such a fine spirit, that it greatly impressed me. I watched the man finish his floor and he did not spill one single drop of iron.

This preaching safety and demonstrating safety must go on all the time, for new men are hired frequently, new situations in handling materials are constantly occurring, so that the safety point of view is lost sight of unless someone constantly pushes it to the front and insists upon it.

But if the foreman and safety committee are constantly on the lookout for cases of personal carelessness, and then quietly, but firmly, talk to the man or men involved, insisting that safety to all must come first, there will be developed a mental safeguard among the men that will prevent more accidents than all mechanical safeguards together. Mechanical safeguards are important and must not be neglected, but getting men to think correctly with full attention as to what they are doing, is a real big job, and very important from a safety viewpoint.

Along with this should go a move for "good housekeeping." An orderly foundry is the exception, and not the rule. Still, unless good housekeeping prevails, many accidents will occur. Good housekeeping in a foundry is hard to maintain, but it can be done and should be insisted upon.

Discussion Following Mr. Wright's Paper

CHAIRMAN GIBSON: Now Mr. Fred Bennett of The Buckeye Steel Castings Company of Columbus, Ohio, will take charge of the discussion.

MR. BENNETT: The subject that Mr. Wright has just presented covers foundry work, and the committee in arranging this program had in mind to give the foundrymen, the persons connected with foundry work, a good part in this program.

Mr. Wright's paper very nicely covered the educational features of foundry work, and I agree with the last portion of that paper relating to good housekeeping. May I ask how many present are interested in foundries?

(A large number raised their hands.)

MR. BENNETT: That is what we found in analyzing the Metals Section, that the majority are directly or indirectly interested in foundries and I suppose the large iron and steel plants have many more employees who are interested, judging from the number of hands raised. I think we should get this matter pretty well thrashed out.

In the matter of good housekeeping at our plant, which is a large one, first we have the brick floor throughout the plant. That has helped an awful lot in piling the flasks, for on an uneven floor the pile will sometimes topple over. We think that has been a very important factor in bringing about a reduction in accidents. Recently we spent quite a bit of money to bring about some changes in our core room, in the handling of the cores. We have about 15 large core ovens, and the cores are made in the core room and then placed on the core rack and never removed until they are put in the molds. In that process they are carried to the cranes and placed in the core car, then into the transportation bay by another crane. (I am speaking of a large open-hearth steel castings foundry; I know there are people here who are interested in the malleable gray foundry where the pouring is done by ladles. We have only one of those.) However, it is as important in the large foundry as in the small one, that this good order be kept before us at all times.

I think, Mr. Chairman, you want each subject cleaned up. Let's hear what you men have to say on good order, or good housekeeping in foundries. You know there are always at these meetings people who come for the first time and I would say that everybody is here with the sincere thought that they find out what is new. In the open discussion is where that is brought out. Sometimes a paper doesn't cover all these points but there are a lot of fellows here who have things to say that will help us. Let us hear them.

Good Housekeeping Helps to Reduce Accidents

MR. QUESNEL: Good housekeeping has always been considered by us as extremely important in reducing accidents. It has been one of our big problems. We have a foundry that is 1875 feet long and it is a mighty big place to look after and keep clean. The nature of foundry work tends to allow material to become more or less scattered and misplaced and in a great many cases it is hard to find out just where material should be kept, especially when you have to use so many smaller pieces. In our work we use thousands of dogs, rails, wedges, short pieces of two-by-four planing and numerous other boards in holding down the forms for pouring; this is always a problem, to keep this material where it will be ready for use, out of the road, and still maintain the efficient, good order of the foundry.

We didn't solve this problem until about a year ago when the superintendent of the foundry, himself, after spending some time studying over the situation and not being able to find a satisfactory solution, determined that he was going to put the job on the men, and this is the way he did it. He told each job leader: "Now, when you finish your job, before you go off the shift, I want this form to be in readiness for each turn that comes on. I want every man on the job ready for the next; every tool in its place, all the boards piled up, and I don't want to see a moulder leave the shop until everything is in apple-pie order, everything swept up and everything piled up in neat order. Your job is not done until that is ready so that the next set of moulders finds everything ready to start working."

That worked both ways. It not only improved the condition of the foundry but it made for more safety and it also increased the efficiency of the workmen. It used to be the men went all over the shop, stealing material from each other and spending a half hour arguing about it. The way we do it now, when the new shift comes on they start immediately to working; everything is ready and it is right there where they can put their hands on it. It is a transformation compared to what we used to see when we went through the foundry a year ago. Everything looks neat and clean; there is nothing to stumble over. We have found that to be a wonderful help in our accident situation, and we have gone a considerable length of time without accidents in the foundry.

One Accident in the Whole Foundry Last Month

It used to be these accidents were to be expected, but last month we had only one accident in the whole foundry. Up to the time I left, the foundry had been operated in this manner for just about a year.

Of course, we maintain a walk-way. Everywhere men walk it is a brick walk; they do not work in the sand.

MR. SANKEY: Mr. Bennett, in your talk you specified brick. Why did you say brick in your foundry? Could you use wooden blocks?

MR. BENNETT: We tried that on a small portion. We used the paving brick, and we tried it by sections, and we now have the entire foundry floor of that material.

MR. SANKEY: Your experience, then, is brick. I know some make the mistake of using cement. The heat will destroy your flooring, if you do. There is a specified brick you can use that will stand wear and tear of the shovel.

CHAIRMAN GIBSON: What Mr. Quesnel brought out is that a foundry can be kept clean and orderly even in view of the tradition that it can't be done.

SECRETARY NORTHWOOD: I should like to ask Mr. Quesnel how long it takes for the men to fall in line for the clean-up and to keep it clean? Did you use any discipline?

MR. QUESNEL: It was rather a fly-by-night proposition. It happened so quickly that we were all astonished because, as I say, it was almost expected that the foundry should be a messy place and that it had to be; but in one week's time after the new order of things went into effect, the foundry was changed from a disorderly place to one of cleanliness and neatness.

SECRETARY NORTHWOOD: It was not brought about by a serious accident? So often after a serious accident occurs we can get a good clean-up very fast but the real prevention in safety work is to get the clean-up before the accident occurs.

MR. QUESNEL: You might be interested to know just what did inspire the superintendent. You know the scrap, to a foundry superintendent, is almost his bible. He thinks of scrap above all else and tries to eliminate the percentage of scrap. In changing his attention from scrap to safety we have almost performed a miracle, for our superintendent was,

like other superintendents, interested in production and also in his men but especially in scrap.

One day our general manager said to him: "Of course, you are interested in keeping your percentage of scrap low but I wonder if you really are more interested in your scrap than you are in eliminating all the accidents in this foundry that you can?"

Now he had been talking with this man hundreds and hundreds of times, but it just happened that he hit him this time at the psychological moment.

MR. BENNETT: You might say that we carry out that plan. The day's work is not done until the men have cleaned up so that the moulding gang is ready to go to work.

Insufficient Clearance Between Moulds Dangerous

W. J. HANFORD (National Malleable & Steel Casting Company, Cleveland, Ohio): In regard to the floors: our foundries were built during the war and wood-block walks were installed with the exception of the one man gangways, and we found that these wood-block floors would burn up so we replaced them with brick which proves very satisfactory.

In connection with good housekeeping, in regard to the moulds, I want to say that we have had in the last few months two very serious burns caused by insufficient clearance between moulds not set in straight lines. Now there is something that you can all consider in foundry work.

We have a kind of joke in our foundry that you can always tell what kind of a moulder a man is by the way he sets out his moulds.

We are making auto parts, housings. They are very high and we had a moulder who was going down between these aisles where, in some places, the parts had not been stacked straight. The foundry was full of smoke from the fire, you know how it is when they are pouring off heat, especially early in the morning, and this moulder came to one of these crooked lanes, and not being able to see, stubbed his toe and burned the off foot. Since then we have substituted a long legging for the short one on the opposite side to prevent a recurrence.

A. W. BRADFIELD (Industrial Works, Bay City, Mich.): I am interested in the floor proposition. What provisions are made for making large excavations for large castings?

MR. BENNETT: It happens that in our plant we don't have that situation. I have noticed in the National Safety Council's safe practices, they use a railing.

MR. QUESNEL: We have quite a few castings to excavate for; these forms are all shapes and sizes. There is no set way, no size of pits to use permanently for that kind of work because the location and the size are always changed. When we do excavate we put a temporary railing around the form if it is left until another is ready. Otherwise it is filled around. Those forms are about three feet from the rock walkway on each side and the space allotted for them is just large enough to receive them. When they are finished, of course they are filled up, or the hole is filled up so that a smaller one can be put in its place. The forms are,

of course, under personal supervision and we don't leave an excavation open when it is not being used.

C. W. RIKE (N. C. R. Co., Dayton, Ohio): May I inquire, referring to the pit mould, don't you have a permanent pit?

MR. QUESNEL: No.

MR. RIKE: In our foundry we have four pits and when not in use these are filled with sand, and when in use they are roped off.

There are some objections to a brick floor that I will call your attention to now. I don't think the 100 per cent foundry has been discovered. Little drops of iron when spilled on a wood floor are dangerous and when a workman steps on one of those, he is very likely to go down, especially if he is in a hurry or makes quick moves. That is one objection to a wood floor. The cement floor blows up; it explodes. It transforms the moisture in cement to superheated steam and when it explodes it throws iron in all directions.

The best floor, from a safety standpoint, in my opinion, is a properly maintained blue clay floor. It is hard to maintain and keep in shape, but from a safety standpoint I think it is the best.

Two Periods Daily When Most Accidents Occur

JOHN M. GULL (National Tube Company, Lorain, Ohio): We find we have two periods during the day when we have the most accidents; one at the time of pouring castings. There is danger connected with that and we sometimes get accidents there. The next period when we get accidents is at night when we are cleaning up and pulling the castings out of the moulds.

Just how this gentleman manages to have everybody clean up before they go home, I don't see. Our moulders finish their castings. We pour once a day. It happens we start generally about 3:00 o'clock or 3:30 to pour the moulds and when they go home the night foreman with a gang of men takes the castings from the moulds or from the flasks. That is one period of the time when we get more accidents than we do at the time of pouring. Now, we have no trained men on the job, we have laborers at night; we have no moulders, mechanics, they don't stay, we couldn't get the men to do it and I don't see how we could operate in any other way. We never do our pouring at night.

We make large and small castings.

GEORGE W. YOUNG (The Eberhard Manufacturing Company, Cleveland, Ohio): I have been listening to the talk about the foundry runways, where they have trouble sometimes, and I have heard mention of the fact that a cement floor will explode and throw iron all over the place.

We have cement runways in our foundry, and for 15 years we have never had any trouble. Of course, heated cement will explode, but if you lay your cement floor at least five inches thick, placing wooden joints every 40 or 50 feet, you are not so likely to have trouble. As far as the pitting is concerned that is really an advantage because it makes the floor rough.

We do all small work, around 15 pounds. We have never had any

trouble with the concrete and pitting. In fact I would say that a gangway, if laid properly and with the right mixture of cement, would be preferable to the brick in a lot of cases because a moulder will find the iron will cool more or less quickly when it strikes the cold floor. On clay floors you are likely to slip, and where you have sand pits, they are out of the question.

MR. BENNETT: Let's take the next two subjects, now : "Hot and Cold Metal" and "Foundry Flasks." They all relate to good housekeeping. Foundry Flasks certainly do, and there are dangerous stages in hot and cold metals and certain ways of handling them that are better than others. Can we hear from some one on this subject?

Compulsory That the Men Should Wear Goggles

SECRETARY NORTHWOOD: I just want to ask a question as to how many transfer the flasks from their open hearth to the foundry and how they transfer them, whether on small cars or just how it is done?

MR. SANKEY: I can tell you how we do it; we use a crane. It is compulsory among our men to wear goggles, and shields on their knees. Any man not wearing them gets two to 10 days' lay-off, although the feet belong to him and not to the company.

SECRETARY NORTHWOOD: The point I had in mind was this: we transfer our flasks from the open hearth down to the foundry after they are poured. We have had a very serious accident; a flask fell off a narrow-gauge car onto a man. These flasks should have been chained together before they were moved, but they neglected to do that although they had about six flasks. I wonder if any one else has a different method of transferring this material?

MR. BENNETT: It is one of the most dangerous things we have, this moving of the flasks from the pouring room to the foundry. We have eliminated some of our trouble by better piling, arranging the flasks so that we have a uniform load of flasks just so high. It is some time since we had these to deal with, but in the past they have been a bugaboo.

We can go right into this flask subject now and close up the discussion.

L. B. BIDENKAP (Metropolitan Casualty Insurance Company, Chicago, Ill.): I had a very interesting experience recently in a plant in Wisconsin. You know, the foundrymen like to indulge in a little hard liquor once in a while; I suppose it depends upon the kind of personnel a foundry has whether this is true, but this foundry happened to deal in the smaller type of castings. It has a number of Mexicans, Italians and Japs among its employees and they had a lot of accidents in connection with the pouring and handling of flasks.

They got the idea that if they could substitute something for the moonshine that was so easily available, something that would affect their minds like that does, they might get around the accident question, so they decided to fill them up with milk so they wouldn't have room for liquor. A milkman sells about 200 bottles of milk at about a penny a flask and it is going over big.

MR. BENNETT: We are using that same method at our plant, although I don't know that the same thing inspired us.

MR. QUESNEL: There is just one thing in regard to smoke. I think smoke is one of the contributory factors in accidents. It is always disagreeable. The smoke from the castings is almost impossible to eliminate, but you can improve it by seeing that the windows are properly operated. Any of you who are operating at this season of the year know that it is salamander time. We have hundreds of them in the morning when we start a fire and the salamanders make more smoke than the castings; it is especially hard on the craneman who nearly gets smoked out. However, this year we have gotten over that almost entirely by installing a steam heating plant.

MR. MCKENNEY: We sell about 5,000 bottles of milk in our plant. If the gentleman who spoke about the milk knows how much milk a man would have to drink before he wouldn't have room for more liquor, it would be of some aid.

R. N. PHELPS (Link Belt Company, Indianapolis, Indiana): I should like to hear a little discussion on the wearing of goggles in malleable foundries, the advisability of wearing goggles in pouring from ladles. Some say they are more dangerous than working without them. I should like to know what is the general opinion about that?

MR. BENNETT: The wearing of goggles in a malleable foundry is not on our program. Mr. Hanforth, have you anything to say about that? For what reason are they worn?

The Problem of Fog on the Goggles

W. J. HANFORTH (National Malleable and Steel Casting Company, Cleveland, Ohio): We have had trouble with them; they fog in the summer and the perspiration works down under the goggles. We pour everything from hand ladles, and I took some of these goggles to some of the men who pour and asked them as a personal favor if they would try them out. There were several different kinds of goggles.

I said to the men, "I will give you this pair and if you don't like them, you let me know and you can try another kind." I started them out with a clear white glass, and told them we would try colored glass if they thought they would be better. I asked these men to try these out conscientiously and make the experiment for me, and I do believe that those two or three men did wear them conscientiously. They came back to me and said they wouldn't work on account of the perspiration.

MR. PHELPS: That has been our experience exactly, and so I contend that they are not successful.

MR. SANKEY: I am a convert of John Oartel's. Three years ago a play was put on about the foundry, and he showed there, where they made the flasks and so forth, the men wearing goggles, and in his crew of moulders he had one man who had been in an accident or an explosion. He was wearing goggles and he took them off and showed what had been done to his face; it was all scarred. Another man removed his goggles; he was blind. Don't say that you can't make your men wear them. I

make every one of mine wear them. If the perspiration is too heavy they can wear a band across the head, a safety band that costs about three cents apiece. Don't let them go without these goggles; make them wear them. It may save their eyes.

I had the same experience with my men about getting them to wear these goggles; but when I saw that playlet I went home and I told my men, "Don't look too much to your output" (we pay a bonus on their castings and so forth) "but pay some attention to safety."

E. E. ARMSTRONG (Chapman Valve Manufacturing Company, Springfield, Mo.): A year ago this very same question came up. At that time I got up and made the statement that we were then trying out these goggles, the non-fogging kind. Five years ago our men would not wear goggles because the manager did not ask them to; they thought they were a nuisance; but our iron and steel foundries, employing about 5,000 men, are now strong for them, and I venture to say that we could leave here in an airplane now and arrive in that shop about 3:00 o'clock and we would find 100 per cent of the men wearing goggles.

A Foundry Thrashes Out the Goggle Question

If a foundryman who is about ready to pour his heat tells you that he can't wear his goggles, you just tell him it is nonsense.

We want our chippers to use them. Among our chippers is an old man who has chipped for 15 years and has never lost an eye. I worked for years trying to get that man to wear goggles, but he insisted there was no danger, and he kept some of the boys from wearing goggles. We pleaded with them, tried to persuade them, and when a man finally lost an eye we thought it about time to compel them to wear goggles. For those men who needed an eyesight correction we had a special pair of goggles made, for that is where the trouble sometimes occurs; in many cases a man needs a glass that is especially adapted to his vision.

We forced those men to wear goggles, and in about 10 days after that you could hardly get out of those men to start his job without them. At first it was hard for them to do their work while wearing them, but they got used to them and got confidence in them.

The moulders claimed they could not wear goggles, but we insisted they also wear them. We sent a man around to every man who was pouring heat; the goggles were wiped off and handed back to the men.

MR. STEWART: Just one second. You can't make your men wear goggles? Can you make them come to the foundry on time? What do you do when they don't come to the foundry on time?

Let me ask another question. Whenever the manager or any of the officers comes into the foundry, does he put on goggles? Do you give them to understand that a flying object is just as likely to hit the manager going through the chipping room as it may the chipper? Do you make it perfectly apparent that you believe in goggles?

With your own discussions and all of our studies, it seems to me we have got to admit that if we would do the things we know must apply to

this problem, we would put an end to 75 per cent of the accidents. So I say that this question of making the men wear goggles simply raises the other question of whether we can make them come to work.

MR. BENNETT: Tomorrow you will have the opportunity to continue this subject by your question cards in the "Your Hour" part of the program.

MR. WRIGHT: I just want to come to the rescue of this gentleman down here who specified malleable foundries. Now, there is a great distinction between pouring iron in a gray iron and a malleable foundry, and they are absolutely two different things, an altogether different proposition. I just want to help that fellow out. You see the goggles will fog about four times as much and the perspiration is about 10 times greater than it is in the ordinary gray iron foundry. It is a crime to make the men pour in a gray iron foundry without the goggles, but it is a mooted question if it meets the requirements of a malleable foundry.

MR. BENNETT: I am sorry we have no time for further discussion on this subject.

CHAIRMAN GIBSON: I understand that Dr. Ethelbert Stewart, Commissioner of Labor Statistics, Washington, D. C., is here, and we are going to hear from him at this time.

DR. STEWART: Mr. Chairman, I had expected up to a few days ago that Dr. Chaney would be here. The arrangement was agreed to three months ago.

Cooperation of the Bureau of Labor Statistics

About 10 days ago, Dr. Chaney came to me and said that the work on his report, which is due from the printers now and has been due for two weeks, was so far behind that he couldn't see his way clear at all to stop long enough to come out here. I very much regret it, as does he, but Dr. Chaney, since the death of another officer, has been a very much overworked man.

He wanted to be here; he has the material he wanted to present to you, at least he had it practically prepared when he decided he couldn't come. He is with you here in spirit, I know. This is the first Congress he has missed in years. He doesn't want you to think we are slowing up on our work. I won't want you to think that the Bureau of Labor Statistics has any less interest in your work than before. It is simply a case where Dr. Chaney himself decided that he couldn't come. I want you all to feel that the Bureau is interested in getting the best information, putting it up in the very best shape and handing it out to you, and if once in a while a man 70 years old can't meet an appointment, it doesn't mean that we are losing interest.

CHAIRMAN GIBSON: I am sure you all know how we appreciate the doctor's report from year to year. As Mr. Stewart has said, this is the first time that Dr. Chaney has missed a meeting.

I think it would be well to entertain a motion that when Dr. Chaney's report is finished it be included in the minutes.

(A motion was made, seconded and properly carried.)

CHAIRMAN GIBSON: The next thing on our program is "Electrical Hazards in the Steel Industry," by Mr. Frank W. Cramer, Assistant Electrical Engineer, Cambria Plant, Bethlehem Steel Company, Johnstown, Pa. However, because of some unforeseen circumstance, he will not be here, but Mr. C. L. Baker, the manager's representative, of the Cambria Plant, is present and will read Mr. Cramer's paper for him.

ELECTRICAL HAZARDS IN THE STEEL INDUSTRY

**Frank W. Cramer, Assistant Superintendent, Electrical Department,
Cambria Plant, Bethlehem Steel Co., Johnstown, Pa.**

The association of Iron and Steel Electrical Engineers, for several years, has been working to devise a plan that would bring home to the average workman the dangers involved in tampering with electrical apparatus. In the solution of this problem, the natural opinion was that the safety engineers could give most assistance, but since most of these men have been trained along mechanical lines, a means had to be created whereby they would be informed of the behaviour of electrical apparatus.

With this thought in view, it seemed logical that if we could induce these men to attend joint meetings, and take part in the discussions, we could all work closer together, and make more progress toward the elimination of the electrical hazards in the Steel Industry. Accordingly, this paper has been written with the idea of bringing some of these hazards to your attention, and perhaps, after a general discussion, the electrical side of the question will be better understood by the safety men.

Most of you, I believe, are familiar with steel mill practices, and know of the many traditions that have grown up with your local mills. These have been created perhaps over the past 50 years, and have been boasted about and talked over so often that they almost form the operating code of the mill. Comparisons are often made of repair work done years ago with similar work at the present time, but mills have gone through a lot of changes during that period. Some of the old timers hardly realize that the old steam drives, with which they were very familiar, and could make all repairs, have been replaced with motors which they really know nothing about, and are requested not to attempt to repair. They knew when the main valve was closed on the engine that it was safe to work on the rolls—now, we expect them to believe that by locking out some small control switch, it will be impossible for the motor to be started.

The electrical engineer has simplified the control of these motors until a small master controller or a few push buttons are the only equipment left for the operator to manipulate. If the motor fails to respond when these are used, the operator is instructed to blow the whistle for the electrician, and not attempt any repairs himself. If we can get the mill men to follow this practice, one of the so-called electrical hazards will be eliminated: but if they are curious and attempt control or motor

repairs, several dangers are created, for this strange and remarkable force, which we call "electricity," must be understood, in order to be worked with safely.

An example of this hazard happened a short time ago when an operator thought a certain mill motor was not running at its normal speed, and sent a helper to see what was wrong. In the motor house, the helper noticed a large contactor that was open, and believing he had located the trouble, forced it in with a stick of wood. Now this particular contactor was properly open, and was locked out both electrically and mechanically, and could only be closed by force. It was the main reverse switch, and as the forward switch was already in, a short circuit was made on the high tension lines. The fact that the resultant fireworks did not seriously burn the man is one of those remarkably close calls that happen every now and then. After the damage was repaired, a test showed that the motor had been up to normal speed, and the trouble had been imaginary. A few pulls on the whistle cord would have saved considerable damage.

Blow the Whistle for the Expert Electrician

Most any electrical foreman could give you similar examples of these "created hazards" which can be eliminated, if we can convince the mill men that the safest and quickest way to repair electrical equipment is to blow the whistle for the electrician.

The Electrical Department, too, is often guilty of creating a hazard in repair jobs. This condition probably had its origin in the first electrical installation in the mill. For a long time the electricians were looked upon by the operating departments as outsiders—non-producers who just kept the motors running and the lights burning. Electrical delays were looked upon in too critical a manner by the operating departments when comparisons were made with the mechanical and rolling delays which were charged to their own department. This condition, which either exists or has existed in every steel mill in the country, has served to create a spirit of pride and determination in the electrical fraternity to keep delays to a minimum, and unless you are one of the department, or have been in close touch with the men, you have no idea how deep rooted this tradition is, and the inward satisfaction the electrician gets when he can pull through a job without a delay.

Now the hazard lies in his anxiety to rush the job through, either in starting to remove guards before the equipment stops, or signalling the mill to go ahead before the job is completed. This is rather a hard problem to handle. We are in business to roll steel, and when the mill is down, the revenue stops, and sometimes delays are hard to explain. Modern equipment, with gear guards and cover plates, takes longer to dismantle and assemble than the older installations, and the mills are of larger capacity. These facts make speed in a repair job very desirable.

You will find that even though the electrical man has tried his best to buy high grade apparatus of ample rating, installed the most reliable

control he can find, protected the motor from abuse in most all possible ways, perhaps installed duplicate equipment—yet machinery is machinery, and some day it will fail. Then the “hazard” of doing the quick repair job is again present. You may also find the inspector or the man in charge of the job is a man of long experience and that he knows all the tricks of the game; but will his determination to keep down the delay cause him to start work before the equipment is stopped, or to signal to start before the job is completed?

There is a means for the removal of this hazard that is being better applied every day; the mill men and electricians are beginning to understand each other, and a fair allowance of time for an electrical repair job is being recognized. The safety men are helping bring this about, and all we electrical fellows ask is a reasonable length of time to do a job in a safe manner.

There is another item on the electrical side of the fence that is rather difficult to discuss before a gathering of this nature without creating a misunderstanding, or having the remarks misinterpreted. I refer to the practice of making electrical equipment “safe” for everybody but the electricians. Unless you are schooled in electrical work, this hazard is rather hard to see, and to attempt to show that by making a thing safe for everybody, except those whose duty it is to repair or work on the apparatus, means delving into the technical side of the electrical profession.

The “Safety” Switch was a Misnomer

Let us consider for a moment the original “safety” switch, which from the electrician’s standpoint was one of the most dangerous pieces of equipment to install that was ever brought on the market. The word “safety” put the switch across, and when the steel mill electricians back in Pennsylvania protested against its adoption, they were accused of blocking safety progress. If you believe this switch was safe, locate one, and see if you can connect it up or repair it without getting burned or shocked. But it was called a safety switch, and its adoption forced the mill men to install them. After this, we had to rely on our ingenuity and pressure on the manufacturers to force them to change the designs, until the modern safety switches, that are really safe, were brought on the market. A lot of grief would have been avoided, if the adoption of the safety switch had come through the electrical engineers, rather than from salesmen capitalizing the word “safety.”

Another example of this item can often be seen in screens and guards around electrical equipment. The outsider is protected 100 per cent, but jump over the fence and be the electrician who has to repair the equipment. Often, you will find hardly enough room to squeeze through, let alone work on the switch or bus, and a slip of the pliers, or a falling wrench or screw driver will cause a blinding flash making a short. We all believe this equipment should be protected and made safe, but we expect you men to help us in making it safe for the electrician as well as for other employees.

There is another hazard, a created hazard in the industry that is usually overlooked, yet it is present in a majority of our mills—that is the extension cord hazard. In the modern mills this hazard has been cut in half by the installation of fused plug-in boxes where the extension cords, with a permanent plug on the end, can be attached. The number of extension cords used in the larger mills runs into the thousands, in fact, we wonder how repairs were ever made in the days when torches and lanterns were in style. If we eliminate the plug-in type of cords, we still have a multitude left that the workmen take upon themselves to attach on any live switch or line they find.

The modern safety switch has reduced the number of places where these can be attached, nevertheless, a place is often found. By attaching them to the heavy lines, with heavy fuses, a shorted line or globe will cause a miniature explosion, and sometimes this happens when the second wire is "hooked on." Then, on the other end of the cord, we have the lamp, which at some time has been equipped with a guard. Common sense limits the size of lamps on extension cords to 50 or perhaps 100 watts, but in these days, workmen often think an "arc" light is required, and proceed to borrow a larger size lamp from another socket, and replace the smaller one.

If he does, the guard will not fit, and must be removed, and thus the safety valve is eliminated. Then, most all plants have both 220 and 110 volt lights and if a 110 volt light is placed in a 220 volt circuit, it blows up, and without the guard, the glass is thrown in all directions. This problem of extension cords is worthy of your serious consideration: and our suggestion would be to help us enforce the ruling that most plants have which require the electricians to replace the lamps: and give us your support to install more fused plug-in boxes, and insist on guards on all extension cords.

Electricity a Peculiar and Dangerous Power

Another line of thought that is brought to our attention might be called the "invisible hazard." Electricity is a peculiar power—it can not be seen, we know it only by its actions. There is no difference in the physical appearance of a transmission line when the power is on, and when it is off. Neglecting the corona effect on the extremely high voltage lines, you can not tell by looks whether the line voltage is 110 volts or 33,000. It is true that the construction of the lines would be different in detail, but these are familiar only to those following this line of work. Even they can not be certain, for conditions around blast furnaces and coke ovens cause a steel plant to use the same insulators and spacing on 6,600 volts that a cross-country transmission line would have for 23,000 volts.

Again, we never know if a low tension line is crossed with a high tension line by just looking at it—we must use the test sticks, or some other method before this can be ascertained. The painters, roofers, carpenters, etc., are not aware of these conditions, and all wires look alike to them. Our practice is to send an experienced lineman with these

men when they are working near high voltage lines, and, if possible, have the power shut off.

But the hard part is to have them notify the electrical department when the work is to be done. It often happens that the electrician will notice a bucket of paint hung on the wire before any notice of work has been given. These workmen have had marvelous escapes, mostly unknown to themselves, by being too friendly with transmission lines but every now and then "luck" deserts them, and a fatality is the result. You will find the modern tendency is to try to keep transmission lines high on poles, and out of buildings, but this is not always possible, and as was mentioned before, all wires look alike to those outside the profession.

A paper on this subject would not be complete without a reference to the most widely advertised of the so-called electrical hazards in the steel industry—the hazard of crane operation. As an introduction to this subject, it might be mentioned that the problem has been studied by the National Safety Council, and the Association of Iron and Steel Electrical Engineers from the time these associations were formed. The National Safety Council has brought about the adoption of a uniform set of hoisting and lowering signals that enable the crane men to understand the wishes of the ground man. The A. I. & S. E. E. has devoted its energies to the adoption of a set of design specifications that enable the mill man to buy a crane built for steel mill service, and capable of being both operated and repaired without danger to the workmen.

No Uniformity in Supervision of Cranes

We also have been able to get a safe means of access to these cranes, as well as repair platforms which formed another link in the chain. During the past year, the Safety Section of the A. I. & S. E. E. secured the adoption of a set of operating rules which will further assist in this work. Various states, with their inspectors, have aided in seeing that these various rulings were carried out. Having accomplished all these things, we would suggest that still another code be attempted by the safety men, and for want of a better name, it could be called the "accident code."

You will not find any uniformity in the method of supervision and maintenance of cranes among steel mills. In some few mills, the electrical department has complete control of the operators as well as the electrical and mechanical maintenance of the cranes. In other mills, the operating department employs the operators and maintains the cranes mechanically, leaving only the electrical equipment to the electrical department. In other mills, you will find a different division of the supervision and methods of operation. All of these schemes, are working successfully so far as operation goes.

Now, with all these schemes, we find just as many plans for recording crane accidents, so that a comparison between mills on the crane accident charts does not mean very much. Some of the accidents are due to the ground men, and should not be held against the crane or be listed

as electrical accidents. Some are due to faulty signals or other similar causes, yet, on some charts, they show as electrical accidents. A very few are due to the failure of the electrical equipment. What the electrical engineer wants is some standard way of having these crane accidents codified, so that he will have a quick way of finding out where the dangerous spots are.

Likewise, those responsible for the ground men would appreciate knowing how often faulty signals are given, unsafe loads are lifted, how many chains are broken, etc. Then, if he had this data, and could make a fair comparison with similar data from another mill, he would know if he was making progress toward the removal of these crane hazards.

The above suggestion may sound simple, but there are as many ways of tabulating these accidents as there are steel companies in the country. If we can get a standard method, and definitely locate the weak spots, then we will know where to concentrate the hardest drive.

In conclusion, we would leave with you these thoughts pertaining to the Electrical Hazards in the Steel Industry:

- (1) Train the mill operator to blow the whistle for the electrician when the equipment needs attention.
- (2) Allow the electrical department a fair amount of time for repair jobs.
- (3) Make electrical installations safe for the electricians as well as the other employees.
- (4) Look into the extension cord abuse.
- (5) Have all workmen consider transmission lines dangerous until they have consulted the Electrical Department.
- (6) Secure a uniform method of tabulating crane accidents.

CHAIRMAN GIBSON: Mr. John F. Kelly, Managing Secretary of the Association of Iron and Steel Electrical Engineers, will have charge of this discussion.

Discussion Following Mr. Cramer's Paper

MR. KELLY: Mr. Chairman and Members of the National Safety Council: Your Chairman has conferred an honor upon me which is more or less undeserving, as I came here this morning merely to listen and to learn. I don't feel qualified to lead in the discussion, but I will do my very best.

I have reviewed Mr. Cramer's paper and I feel as we say when we talk about Mr. Dooley, "it's a scream." It could hardly be improved upon. Cramer, to my mind, has a world of knowledge that he has gathered around in his operating experience and he is fully qualified to put down on paper his thoughts.

I should like to take, first, his conclusions. I think they sum up his paper.

"Train the mill operator to blow the whistle for the electrician when the equipment needs attention." In a foundry you perhaps don't have a whistle but a signal or a bell, and if you will train every one who is an

executive head, or in an executive position in your plants, to immediately call for the electrician you will eliminate about 75 per cent of the accidents.

A lot of things happen to the men because they don't know how to rely upon the electrician; if they did, many of the accidents could be eliminated. They never will be entirely eliminated, of course, but we can cut them down an awful lot if we educate the people who have anything to do near the hazards; the high transmission lines are a hazard to those who are painting, window cleaning, carpentering, or doing structural work. There is where the greatest hazard is, to my mind, in electricity—around high tension lines. Practically all electrical apparatus can be made fairly safe.

There is a point that comes to my mind, that the purchaser when he comes to buy electrical apparatus should include in his specification that the manufacturer furnish him with this stuff with all the devices to properly maintain it in order not only to eliminate failures but also eliminate hazards. In my opinion, I don't feel that has gone far enough. The manufacturer should use his ingenuity in eliminating these hazards.

"Look into the extension cord abuse." Some plants have gone into that very thoroughly and have cut down materially their men's injuries, you might say, in connection with cords. I think a good way to eliminate the accidents in this case is to instruct the men that when something happens to an extension cord, always let the electrician repair it.

Waste in the Use of Lights in This Plant

I should like to mention here the economic side of this. I used to be in a plant where we used 6,000 lights a month, not at all the correct proportion to the amount of voltage we used. There was an awful lot of carelessness and waste until an order was issued that no lamps would be given out by anyone except the properly authorized men in the electrical department. As a result, 6,000 lamps were actually cut down to 300 during one month, and the biggest lot issued was 700. So you see there is not only the elimination of accidents to be considered, but there is an economic side to it as well.

"Have all workmen consider transmission lines dangerous until they have consulted the Electrical Department." I want to bring up just one example of why this should be done.

I have in mind a case where the foreman as well as his helpers neglected to go to the electrical department before they repaired a roof. They got up on the scaffold with tools and worked along the high tension lines. It was just a miracle that some fellow came along who knew better.

"Secure a uniform method of tabulating crane accidents." I believe it would be a good scheme if the steel industry or the Metals Section of this Council, or some other society, were to prepare such a uniform method, because I believe that if all these accidents were classified as to how they happened we would be better able to approach the question by knowing the type of accident that predominated.

I should like to conclude my remarks by paying my respects to the National Safety Council. I happened to pick up a paper when I rode up here in which there was an article saying that this Safety Congress is being attended by safety executives and safety directors from all over the United States; and I felt that if that is the case then all the eyes of this nation are directed here because this, for the moment, is where greater safety is developed. It came to my mind that perhaps the safety man doesn't get all the recognition that he should, but I think the safety director and the safety engineer represent the noblest profession of humankind.

I am brought to that conclusion by this reasoning. If we study what law means we find that we honor our lawyers, for they preserve our property rights; if we study medicine we find that the doctors are honored because they keep us well. Now here is a body of men gathered together for the noblest purpose on earth; they are here for human preservation, the preserving of life and bodies. Some day you will all be called doctors; with your singleness of purpose you can go ahead and accomplish what you are aiming for. Because of your work there will be fewer legless, armless, sightless men, and no doubt fewer bodies over which to mourn.

MR. SANKEY: I noticed in Mr. Cramer's report that he said we should make better electrical installations. How are we to improve on these?

The Amateur Who Tinkers with Electric Devices

MR. KELLY: I feel that this, from a safety standpoint, requires that the electrician should be better educated to handle the things that they now know little or nothing about. I have found in my experience that men are employed in the electrical department who claim they know a great deal about their work who really aren't qualified. There should be a standard that a man must measure up to before he is employed as an electrician. A man who has had to fix a light or has worked upon an automobile will sometimes take a screwdriver and a pair of tongs and call himself an electrician and make application to a great number of plants. If he is employed, he is sent out on one of these boards with the hot stuff on it and, not being educated in that kind of work, sustains an injury.

The electrical department should educate their men just as we educate our men as to where dangerous conditions exist, because I know this from experience. Just about two months ago a man went back to the board in our plant. (We require them to wear glasses and we require that all men get an O. K. before they go back there, but this was one of the sub-foremen; they are sometimes called straw bosses, a name which I don't like to hear, for any sub-foreman is as good as a foreman.) This is what he did: he went back and put on his glasses and then he reached in with a screwdriver to make what he thought was the right move. He burned his hand dreadfully.

The man in charge of the electrical department admitted he didn't

know whom he was sending over to that board. Therefore, you can see that these men must be educated. Don't let a man tell you he is an electrician unless you make sure he is before you employ him.

CHAIRMAN GIBSON: I don't know whether Mr. Woltz will say anything or not, but we should like to hear from him. You know him better than I do; he is one of the hard-wording members of the Metals Section. We wanted him to talk yesterday but he slipped out.

MR. WOLTZ: This is rather embarrassing. I feel something like the woman who attended the funeral of her husband who was a worthless, no-account cuss who mistreated her. They had had some difficulty in getting a minister to say a few words at the services, but finally one was secured and he came in at the proper time and proceeded to eulogize, saying what a wonderful husband the deceased had been, what a wonderful character and so forth, until finally the bewildered widow turned to her little daughter and said, "Would you-all mind looking in that coffin and see if that is your father?"

But it is a pleasure for me to attend these gatherings, since in 1917 I helped organize the Metals Section and was fortunate to be its first presiding officer. I know many of you intimately, and even if it was nothing else than having an opportunity to talk to you, clasp hands with you, it would be inspiration enough to take back home.

I have to talk to you tomorrow night.

WILLIAM W. JANZE (Mayville Iron Company, Mayville, Wis.): I should like to know the method of inspection of extension cords.

MR. KELLY: Right off the bat, he asks a delicate question! I might say that the entire lot of extension cords should be kept in one place in the plant. In our plant we practically control all extension cords outside of the railroad shop. We have a man go over these about once a week. You will be up against it if you don't have regular inspection. Rubber insulated cord or cable avoids a lot of damage; you can run trucks over it without doing much damage. One of the big dangers in the use of the ordinary insulated cord is that dragging it across the ground will sometimes tear the insulation off.

Further Discussion of the Extension Cord Problem

In order that they may always be kept properly inspected, they should all be under one head. We had one man who did nothing else but go over the cord, and he was supposed to be 100 per cent efficient; it was a demerit on him unless he was.

MR. KELLY: You may be interested in this extension cord subject further. The electrical department, you know, gives out the cords to the man who uses them and he uses them over and over again until they become dangerous. Now there isn't a safety man in this room who isn't interested in this problem, but you are all sitting back thinking that some electrical engineer is going to jump in with an idea. I should like to hear from you safety fellows on this electrical subject. You are all having your accidents with it, and it is a live, a hot subject.

MR. JANZE: Now I brought up this question about the electrical extension cord. In our company the electrical department puts up the extension cords, but the trouble is that they never get to take them down. That stuff just disappears when the job is done and no one ever sees it or understands where it went to. There was a lot of fuss raised over what becomes of the extension cord, hundreds of feet of it, so we looked around to see if we could find where it went, and we found it in almost every conceivable part of the plant—even in the scrap pile, and perhaps that wasn't so bad. We cut down a big loss.

We have an arrangement now in our plant where if there is a construction job the electrical department puts the cords up and takes them down, and there is a permanent electrical repairman who comes along and looks over the cords. It is no small job to look after all these cords, but it's well worth while. If there's anything wrong with a job, the repairman immediately fixes it. It's just a little common-sense plan.

MR. QUESNEL: We have had considerable trouble with the use of the extension cord and we have found that when an extension cord is to be used, if there is no plug to which it is to be attached, they must get the electrician to do the job. Where a department uses an extension cord, and has to have one, they must tell the electrical department of what use it is to be put, for we find there are several kinds of cords suitable for different kinds of work. A cord may be perfectly safe on one job and hazardous on the other.

When an order comes in to the electrical department, they must state on that order for what it is to be used, and if it is the cord most adapted to the work, the order is filled.

Static Develops If the Motor is Set on Cement

These cords are not transferable from one job to another, and we find this prevents cords from being used for any other purpose than that for which they were designed. We will not issue a cord built out of ordinary lamp cord in the shop. The only places that kind of cord might be used would be in the office, and even there it must be approved by the superintendent of the electrical department with a special permit. We will not build an extension cord with a lamp cord as a means of connecting a light with the socket. We find by doing that we have diminished the repair of our lamp cord.

H. C. HOLFEY (Pittsburgh Plate Glass Company, Ford City, Pa.): I should like to ask whether if a motor is set up on cement you get a condition of static caused by friction?

MR. KELLY: Well, a man will get a pretty heavy shock from static current. If your motor is set on cement you may get a leak through the cement that will cause the shock, if the conduit is connected with the motor, which is supposed to be grounded, and lots of times you get against the conduit which has been grounded and, the motor frame not being grounded, probably short circuit yourself in that way. It is a case of static current.

I remember one time probably 13 years ago, in one of our plants the electrical department was called upon to find a leak. It hunted and hunted but everything was found to be clear; everything was found properly protected and grounded, but the trouble was finally found by the electrical department. A steam gasket had blown out, giving off just a vapor and causing a static current.

That condition you all know how to eliminate. Putting on a good ground from that pipe line to the ground, and making a good ground contact, straightened out our difficulty. Proper grounding should be made; some men will ground to a steel column, which probably will not be grounding at all, or maybe to a cement block which isn't in the ground. I believe if you will take the precaution necessary, you will not have any trouble.

A belt-driven machine will cause a good bit of friction. I am sure you have seen the experiment of holding an old carbon lamp up to a belt machine where it is filled with static current and then you have seen a fellow employee touched with it. There is a great deal of fire hazard connected with the belt-driven machine.

WALTER S. SMITH (Safety Director, Milwaukee, Wis.): I wonder if you have any trouble with the indifference of employees towards local hazards; these fellows who are not afraid. The reason I speak of it is that I met a superintendent who used to take hold of the 440 every morning as a sort of tonic. I just wonder how you can offset that?

MR. KELLY: It has been suggested that every wire be designated a live wire; that every wire above 110 volts be so designated. I find that to be very much the case. It is sometimes considered a marked distinction to be able to withstand the heavy voltage and it is sometimes done to win the approval of the other workmen.

ADJOURNMENT

THURSDAY MORNING SESSION**October 28, 1926**

The meeting was called to order at 9:30 o'clock, Chairman Gibson presiding.

CHAIRMAN GIBSON: Our first paper this morning in our round table discussion is on contests.

This is the educational forum. We expect that it is going to be a very lively session and that we are going to get a great deal of good out of it. This is the session we are putting a bet on that we shall get the real meat of the Congress out of it.

Mr. J. A. Voss, Director, Safety and Compensation, Central Alloy Steel Corporation, Massillon, Ohio, will first present his paper.

CONTESTS

J. A. Voss, Director, Safety & Compensation, Central Alloy Steel Corporation, Massillon, Ohio

To launch a safety campaign does not entail much effort. But to keep that campaign going under high pressure continually, month after month, year after year, and to maintain interest long after the novelty of the initial effort has worn off, is not so easy. Inasmuch as we must plan on making safety work a permanent factor in industry, we must also plan on developing a will for safety in the worker.

Among the many ways of creating the safety spirit in the worker, one which has accomplished results is the safety contest. In this, it must be remembered, it is the safety spirit that should be developed, rather than victory in a contest. The rules of the contest should be drawn to develop the safety spirit rather than to appeal to various hobbies of workers. The real purpose of contests should be the awakening of every employee to the seriousness of personal responsibility and continual alertness for the prevention of accidents, thereby establishing and maintaining an enviable safety record on the accident chart.

Personally, I do not favor individual prizes in safety contests. The reward for such contests should be in the form of honor rolls. There is nothing more enviable for a foreman to strive for, than a record of no serious injuries or deaths among the men under his jurisdiction, and such a record can be attained if the men in charge of work insist at all times that the work be done only in a safe way.

Guarding the dangerous machine to the utmost does not prevent accidents, and the making of a hazardous place safe does not eliminate injury. From the safety contest standpoint, therefore, we must work to create the will for safety in those hazardous places; and when we have placed in these jobs the best safety device known—a careful man—we shall have no more accidents.

Contests bring about a closer relation between the safety department and the superintendents, foremen and workmen and assist greatly in keeping the subject of accident prevention uppermost in their minds.

They are important factors in any well organized industrial safety organization. Industrial accidents can be avoided; not by keeping secret the accident and its results, but by giving the occurrence wide publicity in the plant. When contests are on a competitive basis they arouse a certain friendly rivalry, thereby creating an atmosphere of great interest and enthusiasm. This can be followed by a letter of appreciation by the general manager to the department head with the best record, who should post the letter where it can be seen by all employees.

Comparative Ratings Are Published Monthly

Another feature of our accident prevention work is based on departmental competition, where each department competes in the elimination of accidents. Such competition has injected an excellent spirit of team work which can only be secured through coordinated effort, rather than individual performance. To encourage and keep alive the interest in this work, comparative ratings are published monthly, showing the number of days lost on account of accidents which are divided by the number of days worked, and the department having the best percentage is placed at the top of the safety report. This report also shows the rank of the various departments to date for the year, and their percentage for the year as compared with the same period of the previous year.

In one column of this report is shown the standing of the various departmental superintendents, and the superintendent heading the list at the close of the year is sent to the National Safety Congress and all his expenses are paid by the company.

It is our opinion that these contests and reports furnished monthly to all department heads and posted in each department throughout our entire operations have been contributing factors in our successful accident prevention activities because they have injected something that is very essential in this work, which is the spirit which comes only through the pride of accomplishment. It is fundamentally right to apply the principle of cooperative effort to accident prevention, but the success accompanying the application of this principle depends upon the ability to arouse and continue the interest of all superintendents, foremen and employees in the work. No means offers itself so promptly to arouse this interest and continue it as does the placing of accident prevention on a competitive basis.

Only those accidents which result in one full day or more of lost time are counted for competitive rating purposes. All accidents, are, of course reported and studied to prevent a recurrence, but it was found necessary to base the rating only on those involving lost time, in order that there might be a standard for determining just what constituted an accident for rating purposes. If minor accidents are included in a competitive rating plan, there is always a tendency to avoid not reporting them and the fairness of the plan is thus jeopardized.

In any game of sport where the selection of the winner rests upon a score, the contestants themselves must understand and believe in the rating scheme or it will fail. In the establishment of rules governing a

contest no special consideration should be given one contestant over another because of hazard. The mill that knows all its hazards can promote safety through the very fact that they know the dangers well, and it does not deserve special attention on that account.

The contest should be planned on the basis of individual carefulness alone under whatever conditions may exist, and each contest should lead us to a better set of rules than those used in previous contests. There should be a central body to make these rules. Each rule should be understood by each workman in every mill, and its reasonableness be shown to them. This is the only way that we shall obtain universal cooperation in safety contests with all that this means to the contestants.

Contests have been a great help in minimizing accidents, and therefore have become an important part of the accident prevention program. Our experience has borne out the conclusion that contests are a valuable factor in securing cooperation and accomplishing in an effectual way the education of employees along accident prevention lines.

Discussion Following Mr. Voss' Paper

CHAIRMAN GIBSON: Now, gentlemen, we will throw this paper open for discussion before we go on to the next subject.

E. A. ARTHUR (Elyria, Ohio): How do you determine the department that wins the honor, when some departments having 50 people are more dangerous than other departments in which there are 100 or more? For instance, a punch press department with 50 people is more dangerous than an assembly room.

CHAIRMAN GIBSON: Mr. Voss' contention is (and we will get more discussion on this subject) that he does not believe in giving one department an advantage over another. The people in the punch press department are familiar with their hazards and know just what to look for and how to guard against these hazards; consequently the condition there should be no worse than in the other departments.

P. G. WOODWARD (The Viscose Company, Marcus Hook, Pa.): We have in our plant probably 4,500 employees. The engineering department has about 600. The mill proper, the operating part, does entire routine work and in that routine work everything can be well guarded, but the engineering department is here, there and everywhere on maintenance work and there is that discussion between the two groups. In my work with the engineering men, they have always complained, saying, "Well, the engineers have more dangerous work to do," and the only way out of that that I have found is to compare last year's record in each department with the record of the present year and then use as your measure a percentage reduction over the last year.

A. T. MOREY (Commonwealth Steel Company, Granite City, Ill.) I think Mr. Voss is right when he says that all accidents are avoidable. How can we set a handicap and say, "Now, this department can have so many accidents, or such and such a condition will even it up?" It seems to me that if we hang up the positive condition, the ideal condition, the department which has the fewer hazards would find that to them an accident

would be very discreditable, and in one that has the greatest number of hazards, the performance without accidents would be all the more creditable. I don't see how we can hang up the thought that some accidents are excusable, to even up the rating. We have to put the standard at 100 per cent.

MR. MCKENNEY: I quite agree with Mr. Voss. My brother over here talked about a punch press department. How would he compare it with laborers in the yards?

Every Department Should Be Placed on an Even Basis

Several years ago, when we entered into that work, the furnace people said it wasn't fair, that they were not the most hazardous; they claimed it was the open hearth. It simply meant that the department in which the hazards were great had to organize and work all the harder against accidents. Every department should be put on an even basis with every other department, and then go to it.

CHAIRMAN GIBSON: It is certainly true that, as Mr. Voss said, the only proper way to go about it is to put all departments on an even basis, especially when running a contest.

If you want to use this competition idea to get your contest across, you certainly will have to do it fairly, put it over on an even basis because as has been pointed out, when you give one a handicap you certainly are putting the rest of them in a hole. It has been suggested that in some contests you compare the accident record with the previous record and if there is any question as to just how they are doing, this comparison will clear it up.

As Mr. McKenney said, their blast furnaces seemed the most hazardous of their occupations, but their experience has brought about a condition that has entirely reversed it, so that proves what can be done in using accident records.

MR. VOSS: May I add another word to give you an idea of just how we recently merged with another plant of 7,500 men and found the railroad department in this new plant was at the bottom of the list? The superintendent thought his department was very hazardous. I know a plant that employs 3,500 men, quite a few of whom work on the locomotives, and they have gone a year without an accident.

It just goes to show, men, that you can improve the records of these departments.

CHAIRMAN GIBSON: We don't want to take too much time on one paper, but before we go on to the next subject, Mr. Morey of the Commonwealth Steel Company is here and I wonder if he has anything special to say to us.

MR. MOREY: I am delighted with Mr. Voss' paper. It holds up a wonderful standard. We couldn't have taken that standard several years ago, and I think we who came here from St. Louis are well paid by that paper alone. You have a good program and I am sure you haven't time for anything else I might say.

CHAIRMAN GIBSON: We will go on to the next subject, which is "Posters." This will be presented by Mr. Quesnel.

POSTERS

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

I am afraid I fell down as chairman of the program committee because I couldn't find any one to talk posters, so I had to be the victim myself. I hope you will excuse me if I don't make any speech; I didn't put myself down for a speech but for a discussion.

Bulletin boards, of course we all agree, must be placed so as to display posters best; they must be accessible, well lighted, and they must be kept clean and changed often; and, lastly, don't put too much material on your bulletin boards. That is a fault that I find is very prevalent; the boards have too much on them so that the value of any one display is lost.

Bulletins, posters, have got a very great part to play in accident prevention work. The eye, as we all realize, is an educator, and as our posters reflect our ideas, what a man can see and read without effort measures our success. When we stop to think that ideas have power, we must picture those ideas in such a way that they will convey the true thought to the men as accurately as possible. How to do that, we know by looking at periodicals that are gotten out by the publishers; they are displaying that to a wonderful extent. You take the Saturday Evening Post or any of our national magazines or advertisers and you will notice how they play up an idea, and it must be worth while because they are spending thousands of dollars on one issue.

So in the safety work in our plant we should capitalize on that one thought, presenting an idea as briefly as we can, covering some new development that will go a long way in backing up your other safety work as you go along.

Now these posters that I have here are going to constitute the talk I have to make, and I want to say before I start that they have not been selected by any bulletin committee or poster committee; they are not here because they are thought to be 100 per cent. They are the regular run of posters and they have been used in the plant. They are not prepared for this Congress, but they were prepared to put an idea across. Now whether or not in your estimation they do I want to leave to you.

There are four distinctive types of posters: one an inspirational type which gets over some thought, some general idea; the second is a practical type, one which will show some mechanical or material device or method that you wish to impress on those who see it; the third is an amusing type of poster, the kind that aims to put over neither an inspirational nor a practical idea, but something that will appeal to the men from an amusing side; the fourth is an unusual type, something that the men do not expect to see, something that may be entirely foreign to their business, so that they will stop to look at it out of curiosity to see what it is; in this type you have your thought woven into it so that they may get it.

For instance, the first poster is an inspirational bulletin. It appeals to the new men and to the old. In it the old employees in the shop are shown welcoming the new men. This poster was taken out of an Eliot service bulletin. It reads, "Don't wait for an invitation to say 'hello' to the new man. Get acquainted with him now. Make him feel at home on the job." This is purely an inspirational poster; it has two purposes. One is to bring to the attention of the old employees the new employees, and the other is to let the new men know that we are thinking of them and that we have asked the older men to be their friends.

In this next poster there is just one thought expressed, but it is a new thought. "The year 1926. The light of experience shows that accidents are generally the result of unsafe practices." This thought was revealed during 1926; that brings it up to date.

Here is another of the inspirational type, about sowing the seeds whose fruits are success, prosperity and happiness. Now that will appeal to certain men while others will pass it by.

The Men Will Look at the Picture

Here is one that, while it has an inspirational idea in it, is on the border line. "Stop carelessness, look carefully, listen attentively." The photograph of the entrance to the plant, at the bottom, gives it the personal touch. The men may not be attracted to this sign, but they will look at the picture because it is a very good photograph of the gates and, once stopping, they unconsciously absorb the safety thought above it.

The contrast in the coloring of this picture is one of the features of this poster, something unusual. Here is one of the inspirational type again. "Never start anything you can't finish safely." "Start everything right, work carefully and you will finish safely." You will notice now the difference in colors in all these posters; we never put up two bulletins of the same color following each other; there is always a change.

There is another service poster that has been elaborated upon: "Every man his own safety manager." I think we had at our first meeting of the Metals Section a subject which covered that. I think every superintendent is a safety director. Now this is appealing to the men that they are their own safety managers. "You alone can act so as to prevent accidents. Think before acting."

Here is another of the inspirational type. It shows action. We try to impress on the men the fact that it is necessary to do something, not only talk about it; so this is a poster to inspire them in that, to show them the way to accomplish our goal of no accidents: to get busy and actually do it. "Think, act and win."

This poster borders between industrial and public safety but it brings out the personal responsibility of the men. It is a National Safety Council poster. "Make safety your responsibility." We got a great deal of complimentary remarks about that.

In this poster is used the hand signal which all of us know but which some of us don't heed. "Stop the little accidents and there won't be

any big ones." I think we have all proved that that is the case. Traced back, we find that the majority of our accidents have been caused by little things and not some great failure. The secret of success of posters of this kind is that they must be displayed attractively and not too long; they should be taken down after they have been up for a week, sometimes less.

Now we go from the inspirational to the practical type of posters. In this one is something that the men can visualize very cheerfully as something in the shop. It is a simple type of lock that we use in the shop in the locker-rooms. Security. "Use it, it protects, you can't go wrong when you lock your locker." This lock is used on all the men's lockers where they lock their clothes. It is not used on their machinery. It's a Yale lock that has only one key. This lock is closer to most men because they use it; that is the reason why we display this rather than the safety lock. Only the engineers, the mechanics and electricians have to do with the safety lock but every employee has this lock, so in order to get it over we used this emblem to suggest the thought.

A Picture That Illustrates Good Housekeeping

This is another practical poster, on good housekeeping. It shows a photograph of material that most men say can't be piled in order and neatly. That is the first answer. We have so many little things we can't keep them piled up right, is another answer, especially when they are out in the yard where someone is always tearing the pile to pieces. This shows that piling orderly and neatly can be done. It is the stock pile where all the various sizes of material are piled neatly; in the background there are railroad trucks which reflect our own business. The men can see that this is their own plant; they can't say, "Well, that picture was taken somewhere else, we couldn't do that here." But you can see in this picture there is a steel plant involved in it.

In this poster there is a combination of engineering thought expressed in a simple, practical way—the safe pile. The thought was to bring out that the pile should be vertical or slope inward as it goes up; it shouldn't have an overhang. We tried to bring that out. Here is a pile, a safe-line piling. It inclines gradually upward—a safe line to pile to. Here is one leaning outward, the unsafe way, the overhang. Lots of times you can convey in a picture what you couldn't tell the men otherwise, especially the yard labor men who are piling.

Now we are getting into the electrical hazards. We had quite a discussion on that yesterday. "2300 Volts. Keep away from electric wires." This type of sign is used in our plant on all our high tension lines. "2300 Volt Wire." The same wording, the same proportions, and hung the same way, so that a man will recognize the sign he sees here in the shop, or if he goes down to the foundry, the same thing is seen no matter where he is in the plant, the same sign hanging on the walls. We are just speeding the educational thought along; it represents a practical idea.

This one is on goggles, an extremely important subject which has to be played up in a very great many ways. "Wear your goggles."

We just happened to find a picture of a man wearing goggles and framed it. It shows a very good fit. "Wear your goggles." it reads. "the safest thing to do." They don't look uncomfortable, you will notice, or cumbersome. When the men see goggles fitting properly it overcomes some prejudice.

Again we have the subject of right piling in this poster. The picture shows the overhanging in one pile and the correct line in another pile. "It is much easier to pile right and it is safer." We found that out several times in our plant; we put several of the larger flasks on the bottom and then when we had to get them we had to tear the pile to pieces. We keep them separate now, so when we want a large or small size we can get it without creating a disorderly condition.

A Goggle Picture with Its Important Lesson

In this poster we see something that I think we all use. There is a set of tools. "Keep the burrs off your tools." Wherever an instructive poster is brought up, wherever it is necessary to show the wrong way, it is absolutely necessary to show the right way; otherwise you have lost your opportunity and you may cause more harm than good because some men will not read the title and will only look at the picture and thereby carry away the wrong impression.

Here is one that shows how to guard against the ladder problem. A ladder shouldn't be left out unused; if it is in use it should be equipped for safety; it should have a safety sign on it to indicate that men are working above.

This is another goggle poster. It is a National Safety Council poster which has been elaborated on a little. "Eyes—take care of them; they belong to you." I think I heard that same expression here yesterday. "Your eyes belong to you; your feet belong to you," and so on. The thought seems to be pretty universal.

This one is another electrical poster, showing a large electric light bulb. These posters are not put up haphazardly just when an idea comes along. They are put up when the idea is suggested by something in the plant that we may be talking about so that it comes in its proper place at the proper time when it has the most weight and does the most good. I remember when this was put up. We were having a lot of trouble with the electric lights being broken and some of them were broken because the wrong kind of light was put in. We went into it very thoroughly and this poster came out during the time we were making the investigation.

It says: "Please do not borrow bulbs from nearby sockets; you will leave these places without enough light. Some one may stumble and an accident will result before a bulb can be replaced. If you need a lamp, get it from your store foreman or at the stockroom."

This poster was made up principally because it is a very good picture of an eye. It would be necessary for a man to get up to this poster very close in order to read it, but even if he doesn't read it all, the fact that the eye was brought out in such a splendid way would cause him to think of it automatically. "A good eye is worth a lot. As a

boy, were you a member of the knothole gang? Now, as a man and working, your eyes are even more valuable to you. Protect them." I think that was sent out by one of the optical people.

Now we are coming to the amusing type. If we put up the handle of a pick and say, "Don't use this, it's cracked," it is not nearly so effective as when we draw a picture of it and put three little fellows sitting on the end of it, discussing it. "See that crack? Get a new handle at once." The amusing part is injected by these three little men sitting on the end of the pick-handle; they say, "That is right, fellows." A fellow is attracted to the board by the pictures and he reads the message.

This one shows men sitting down almost anywhere to eat their lunch or while waiting for material; they are likely to sit on scaffolding which is not built for a seat. "Get off, buddy, a spring seat isn't always a safe seat."

Putting the Safety Thought in an Amusing Way

The idea in this one is the same, that of putting over a thought in an amusing way. "Should you see a broken board, report it at once." Here are the same three fellows, one of whom is this time going to the carpenter shop and the other doing what most of us do sometimes, saying it is too bad, it ought to be fixed, but doing nothing about it. But this one little fellow is hurrying to the carpenter shop to see that it gets fixed.

In this one is something very familiar to us all, that of a man carrying a long bar on his shoulder. He is likely to turn around very quickly with the result that the fellow in back of him is likely to be struck. What is the idea? "Think of the other fellow, too." There are the same three little fellows who are this time saying, "No place for us. Hey, look out!" "Only carry boards on your shoulder when there is a man carrying the other end. Safety pays." We got quite a lot of comment on that poster.

This one reads, "I will tell the world that it pays to work safely. Steady income; no time lost through accident." It is a kind of inspirational funny poster.

The last one of the amusing type is about something that is done every day in most shops. The men will throw themselves off their balance in order to pry something or pull down on a wrench. The result is that the wrench slips and they fall, skinning themselves or doing more serious injury. Here are the three little fellows again, down here, looking at the fellow who is hanging on to the handle of the big wrench; they are asking, "Is this a crime?" There was a big reaction to this one in the shop.

In this one we find something that can be used in any business, not in the steel business particularly because it doesn't apply to steel. It is a flower, the state flower of Oklahoma, the mistletoe. We may have some men in our plant from Oklahoma and I suppose if I asked you gentlemen right now what is the state flower of your state the majority of you could not tell me. But if you see a picture of it, you may stop and say, "Well, hello, I didn't know that. I will remember it." It is something on the

bulletin board that the men don't expect to see; when they see it they will say, "What in the world are they putting a flower on our bulletin board for? What has that got to do with steel?" So if we put that question in their minds they will go to the bulletin board and read the message, "Be ready to help and guard and protect others."

This is another state flower, that of California, the golden poppy. "Always be ready to help, guard and protect others."

Here is the state flower of Maine, the white pine cone. "Care and right thinking develop safety habits."

This is the state flower of Utah, called the Sego lily. "It is up to us. We must drive now. The old team won't take us home any more."

The last one in this series is the state flower of Illinois, Wisconsin and Rhode Island, the violet. "Safety is an integral part of the operation of the plant." There is, of course, a more complete series of these, one for each state, and you can use in the same way the birthstones, for every one is interested in his birthday. It is an unusual thought that you can't use all the time; it must be used very sparingly. But once in a while you can use it to get over ideas in a poster that you can't get over in any other way.

As I said at the start, these posters were not picked for their merit, but they are the regular run of posters. There are 30 or 40 more of them up here which you may look over after the meeting to see how we adapt other ideas to safety work.

The Poster Idea Should be Constructive

CHAIRMAN GIBSON: Now are there any questions to ask Mr. Quesnel? There is one type of poster that didn't appear and I should like to know your reaction to that poster, the kind that appeals to fear.

MR. MCKENNEY: Well, you won't find them in the Commonwealth Steel Company.

CHAIRMAN GIBSON: If you had heard our first speaker at our opening session, you would understand what Mr. McKenney means.

MR. QUESNEL: Of course, we don't approve of putting anything into the minds of our men that we don't think is constructive and that we don't want them to have. We believe that we will progress more rapidly and be of more service to a man if we tell him the right and orderly way to do his work rather than tell him of the unsafe way to do it. The only time we will display an unsafe condition is when it is accompanied by the right and orderly condition so a man can see why the thing is wrong. In other words, we are replacing fear with confidence and the right way to do things.

CHAIRMAN GIBSON: Now I think we should pass on to our next paper which is on "Committees," to be presented by Mr. G. M. Clearwater.

I understand, though, Mr. Clearwater is not here so I have asked Mr. Jacob W. Benner, Safety Director of the Homestead Steel Works Carnegie Steel Company, to give us a short talk on this particular subject of "Committees."

COMMITTEES

**Jacob W. Benner, Safety Director, Homestead Steel Works,
Carnegie Steel Co., Munhall, Pa.**

Mr. Chairman, Members of the Metals Section: This was sprung on me when I came down to get my breakfast. If some of it is more or less disjointed you will know it was on account of my not having had time to prepare anything.

The subject of safety committees is the backbone of safety work. The only way I can talk about this is to tell you what we do at our own plant, which is the Homestead Steel Works of the Carnegie Steel Company.

We employ practically 14,000 men. It is a large plant, scattered over practically 160 acres with 25 different departments. The way we are organized for safety there, we have a general safety committee consisting of the superintendent of employment, safety and welfare, who has the position of chairman; the secretary is our safety inspector. The other members of the committee consist of three department superintendents and our works surgeon. This committee's duty is to review all activities of the other safety committees, also to conduct personal investigations of all serious accidents and faults and make definite recommendations.

Our work on the general safety committee is reviewed by the general superintendent of the plant. We meet at a definite time and place; we take no vacations. We have 12 meetings a year, regularly scheduled, with a lot of extra meetings in between, I am sorry to state.

Each department has at least one committee of which the department superintendent is chairman, or the assistant superintendent. The fixed membership of the committees of each department are the foreman in the department (for instance, the mechanical foreman, the electrical millwrights) and another foreman in that department; in addition to that we bring in the men from the rank and file, the cranemen, laborers, stokers, rollers, heaters—men from every branch. Some of those committees, depending more or less on the size of the department, run anywhere from six to 36 men. They meet once a month at a fixed time and place and the men are compelled to attend, on the company's time.

Some of the departments have gone further than this. They have split up their departments into smaller committees and yet they have one large committee to represent them.

We have a definite program to be carried along at each meeting: reading the minutes of the previous meeting, new and old business, discussion of accidents. In addition to that we go around to each member and ask him if he has anything to suggest on safety. At every meeting we ask the men to feel free and frank in their suggestions or remarks irrespective of whom it hits, whether it hits the company, the foreman or his brother employee. We have our men educated on that point so that they are free and frank in their remarks.

Last year we had over 300—pretty close to 400—safety meetings.

One of the duties of the member of the general safety committee is that he must attend whenever the committee meets, and must attend the mill or branch mill safety committee meetings.

That is a general outline of the Homestead Steel Works plan, which is practically the same scheme used throughout the different plants of the Carnegie Steel Company of New York and, I believe, also of the subsidiary companies.

CHAIRMAN GIBSON: Before we throw this subject open for discussion, I am going to call on Mr. N. V. B. Ziegler, of the United States Aluminum Company, of New Kensington, who will talk to us on the same subject.

MR. ZIEGLER: Mr. Benner took my excuse away, and so I won't make any except to say, what Mr. Benner said in his remarks at the outset applies to me.

The chairman has asked me to tell something about the history of our safety work, of the safety committees in particular. Our plant is not so large as those of the steel companies. We have about 3,500 in all.

Too Many Committees May Be the Trouble

At first, some years ago, we had a safety committee in each department with a safety director over all and these committees met regularly, but somehow or other the safety director sort of dominated those committees and the men did not seem to be getting anywhere. Then we decided to get all these department committee men to merge into one with the safety director leading all, and we got a little further because in union there is strength. However, we still didn't seem to be getting anywhere and so we decided to organize this big committee, composed of all of the small ones, and then select a chairman, elect him in the general way, and this group now meets once a month. All the committees in the various departments meet now at the same time with one of their own number as chairman of this meeting and, of course, as Mr. Benner says, we ask the men to be very free and frank in their remarks on safety measures.

Since we have organized in this way, we have found that the safety work has gone forward much more satisfactorily than it has ever gone before and we are very much pleased. How long it can be kept up, I don't know. Some one this morning made the remark that we should always get something new along the line of safety and perhaps next year we shall have something new, but for the time being we are satisfied with this improvement. Our accidents haven't entirely disappeared, I am sorry to say, but they are decreasing in an encouraging manner.

We have this year put on a very extensive campaign. The safety director and myself go into every department and when the whistle blows at noon for the men to stop their work, we take certain sections of them and get them into a corner and talk safety to them. We don't lecture to them, we only ask them for their help. Our talks don't last over 20 minutes and the principal thought that we tried to get across this year was personal responsibility.

We tell those men that we want them to feel and know that it isn't enough to have a safety director, it is not enough to have a superintendent and a manager who are interested in safety, it is not enough to have safety committees appointed, but something else has to be done and that something is the personal interest of every man and woman. We

have been trying to drive this home to our people all this year, all through the summer, and we are still at it. On this subject of personal responsibility, we tell them we want every one of them to feel they are assistant safety directors, and we tell them that if they are, they will be able to conduct themselves safely through the plant and they will be doing something along the line of being their brother's keeper. We have found that this is getting results.

H. B. BENJAMIN (Haynes Stellite Co., Kokomo, Ind.): You mentioned that you took suggestions from the men in the ranks, and I should like to ask (although you don't find very many cases of it now) if you have any trouble with the foreman making life miserable for the man who happens to have made a suggestion about a hazard that he has overlooked.

MR. ZIEGLER: No, I am glad to say, Mr. Chairman and gentlemen, that we are beyond that now.

MR. BENNER: I think those days are past. I suppose there are some companies just starting in who may experience that, but I don't think it happens with many who are engaged in safety work.

CHAIRMAN GIBSON: The next subject is "Rule Books," and will be presented by Mr. J. M. Woltz.

RULE BOOKS

James M. Woltz, Safety Director, Youngstown Sheet & Tube Co.,
Youngstown, Ohio.

The company I am associated with, The Youngstown Sheet & Tube Company, has had a rule book for many years. Before I was associated with them the rule book had undergone two revisions, and the fifth revision is now on the press and will shortly be ready to issue. The first edition had 44 pages, the fourth 111 pages and the fifth has a number of additional pages.

Rule books are of many different kinds and evidently intended to accomplish various purposes. Some are combined rule books and specification schedules. Some are beautifully bound and lavishly illustrated. Some are printed in foreign languages, as well as English. Others contain the rules of all the operating departments under one cover, as well as information on correlated non-operating departments. Still others have only the general rules and specific rules for each department printed together in books. Some of these rule books are made to be observed, but some appear to have been printed more to say that the company has such a thing as a rule book than for any other reason.

It is no easy task to make up a new rule book or revamp an old one. Our new book has been about a year in the making. First we took each department's rules and sent them to the head of that department with a letter saying it was the intention of the central safety committee to revise the rules. The superintendent was asked to take the rules affecting his operations and at a meeting of his foreman go over each one, make such changes and additions as was thought necessary,

and return these to the central safety committee. Any rule that it was impossible to enforce was to be eliminated. Rules covering new operations or process were to be submitted. All specifications were to be entirely eliminated from the rules.

When a set of departmental rules was ready, the department superintendent, and such others as he might care to bring in, were asked to sit in with the central safety committee, while his rules were discussed. Each person had a copy of the proposed rules and the old rule book. Rule by rule these were taken up, discussed from every angle, not only operation, but from the medical, electrical, mechanical and safety points. It was frequently found that it would take an hour or more to decide upon one rule. Sometimes they were referred back to the department for further consideration. Sometimes a sub-committee of the central safety committee was given a problem to work out.

Rules Must Be Adapted to the Individual Plant

At times, it was found that where a rule was necessary or satisfactory at one plant, it could not be used or was not applicable at another. Old installations required certain methods and precautions that the later designs and installations made entirely obsolete.

After all departments had been given a hearing before the central safety committee, the results of the conferences were written up and the rules again submitted to department heads, asking that they go over them carefully to see that there had been no errors, that the obsolete rules had been eliminated and all the needed new rules added. When these were returned to the central safety committee they were gone over and the changes considered and the final approval given for printing.

All this requires an immense amount of correspondence and typing, as well as reading and checking. Even with these precautions an occasional error creeps in.

Now that we have a rule book, of what use is it?

It has been our custom to have these books distributed by the foreman to the new employee as he comes on the job. The foreman reads the rules of his own department and such other rules as may be applicable to the new man, and then tears out a form on the back page of the rule book, fills it in and sends it to the safety department. The top part of this sheet is a receipt to be signed by the man to whom the book is given. The safety department keeps these slips on file and we have been able to produce them when employees were called on the carpet for infractions of the rules, who claimed they had never been given a copy.

If an accident or near accident has been caused by a failure to observe a rule, this is brought out in the investigation and then the man at fault has a chance to make his explanation. Disciplinary action can follow as the case warrants. Do we actually discipline employees for failure to follow the rules? We do. This is left up to the department head. The investigator gives him the facts developed while checking up on the accident, and the department head can then go into it as deeply as the condition warrants. The central safety committee

acts as a check to see that this is done and the action taken is read in its sessions, which are held every Tuesday morning.

If a rule is impracticable or non-enforceable, cut it out of your rules.

I do not advocate anyone having a rule book. We have one and our executives are convinced of its utility. As a safety department, we feel the rule book is a real help to us in our work. Department heads make their own rules and say they want them. The foremen are not all convinced it is a good thing, but the employees generally have a very wholesome respect for it.

Of course, you must bear in mind that I am talking of a company with at least 16 years' experience with a rule book.

Manifestly, you can not go into a plant that has never had a book of rules, write one, hand it around and expect things to move smoothly under it. It is a matter of years, careful study and experimentation, education and enforcement.

Freeing Men's Minds of Outside Worries

C. A. ORTH (American Car & Foundry Company, New York City): The speaker has given us a very fruitful theory on the causes of our accidents, but he has not given us anything on how to free the men's minds properly to prevent distraction.

We must have something practical. We have in our employ about 30,000 or 40,000 men and for 15 years we have had some very bad accidents due to the cause cited by Mr. Woltz.

MR. WOLTZ: I don't think I could answer that in any better way than to say if you have a personnel department that would be part of their work. We have to educate those men to think properly and, to my way of thinking, that is their job.

There are two books published on that subject, one of which came out just recently; Boyd Fisher's "The Mental Causes of Accidents;" and Professor Swift (from your town, I believe, Mr. Morey) has written a book on "Psychology and the Day's Work." There is enough material in those books, if you will get them, to last you for years. Every man engaged in safety work should read them.

MR. BENNETT: I should like to say to the gentleman who wanted to know how he could tell if a man has outside troubles, that if a man has been working for any length of time, his foreman should be able to tell practically from looking at that man whether there is anything wrong with him.

I know from my own experience with those with whom I associate from day to day, I can tell whether a man is up to snuff and able to do his work. The whole sum and substance of the question is in the hands of the foreman.

JOHN M. GULL (National Tube Company, Loraine, Ohio): We have at the present time about 800 mechanics, most of whom can't speak English, so we have difficulty in getting over to those men what they should know so they don't get injured. What we do to care for those men is, we send them in to the foreman. We don't expect those men to understand all

the rules, it would take a well educated man to observe all that we have in the rule book, but we send them to the foreman and he places those men on some particular job on which he sees they are fully instructed in regard to the hazards. He also places those men connected with that job on their honor to see that these men do not get hurt.

When it is necessary for them to change from that job to some other job, there is a repetition of what they went through before; the next foreman acquaints each one with the hazards connected with it. He is fully instructed on every new phase. In that way, passing from one job to another, on each of which he has been well instructed, he gradually gets to know what our rule book contains although he may work there years without being able actually to read it.

MR. SANKEY: All those who were here at the opening session heard the talk by the Commonwealth Steel Company's president. Every safety man must use psychology and do unto others as he would have them do unto him. There are few problems greater than the employees who can't speak English, so it is your duty to see that they know the safety rules. Don't say, just because he is a Mexican, that he can't be helped. Teach him all you can about safety; take the attitude that you are your brother's keeper; that you are just as much interested in his welfare as you are of the English speaking employee.

Gentlemen, don't give their inability to speak English as an excuse for your not protecting them against injury.

H. M. CROGHAN (Inland Steel Company, East Chicago, Ind.): I wonder if any one here has a copy of one of these rule books?

MR. WOLTZ: They are sometimes in pamphlet form; here is one from the open hearth department.

MR. CROGHAN: As a point of information, are those given out by the employment office?

EDWARD A. YELLIS (Bethlehem Steel Company, Bethlehem, Pa.): They are not given out by the employment department; they are distributed to the men by the foremen.

CHAIRMAN GIBSON: Now, gentlemen, we have two more topics on this educational forum. The next topic is "Letters to Foremen," which will be presented to us by Mr. Frank H. Rowe, of the Wheeling Steel Corporation, Portsmouth, Ohio.

LETTERS TO FOREMEN

**Frank H. Rowe, Safety Director, Wheeling Steel Corporation,
Portsmouth Works, Ohio.**

Letters to Foremen can be conveniently grouped under four general classifications, namely—

1. Letters of Praise; 2. Letters of Criticism; 3. Letters of Information; 4. Letters of General Interest.

Each type will require a different tone and method. What would be good for a letter of one type will not be of value in a letter of another.

Letter writing should play as great a part in the activities of the well

organized safety department as any of the other well defined methods of obtaining the cooperation of the supervising force in safety measures. A well written letter on a timely subject in the hands of a foreman will sometimes accomplish what a day of talking fails to do. At the time he reads it he is usually in his office or at his desk and is wholly or partially relaxed, making him, to a certain extent, more inclined to fall in with your suggestions or criticisms. If you had paid him a personal visit or hailed him while out in his department, the chances are that he would have had his mind occupied on his work. He would no doubt greet you pleasantly and listen patiently to your suggestions and remarks but his mind would be far away from the subject in hand.

However, letter writing has its hazards as well as any other form of publicity, and because one letter goes well is no excuse for breaking loose with another immediately. A personal visit the second time would possibly be better. To choose the lesser of two evils, we would say that one letter less is better than one too many, especially to a foreman.

I will take up each classification in the order I have named and read some letters which I believe appeal to foremen and have a good effect in obtaining and holding their cooperation in safety work.

Letters of Praise to Foremen Have Their Value

In letters of praise to foremen we must be careful not to over step the purpose we have in mind. We want to convey the impression that we appreciate the fact that he has made a good safety record, and that this is due to cooperation in trying to prevent accidents. By going too far with letters of this type we can easily make their value very small. An occasional letter of praise to a foreman will have a tendency to hold his interest and get his cooperation in safety measures. I have found this the best and only way to deal with some foremen who appeared on the surface to be hard-boiled and impossible to approach from any other angle. A sample of a good letter of praise, in our estimation, is the following which the writer addressed to the foremen of the different service departments at our Portsmouth Works:

We have another system used by our safety committees at their weekly safety meetings. - We ask each safety committee member to report the number of men he has talked to during the past week concerning safety. Picking up a copy of our mechanical department safety minutes I found that the members of the mechanical department safety committee had talked to a total of 187 employees during the past week concerning "Safety." I took advantage of this opportunity and addressed the following letter to their superintendent:

I believe that the safety director who neglects to write letters of praise to his foremen is passing up a valuable opportunity to obtain the foreman's cooperation in safety work. It does not necessarily follow that because you write a letter of praise to a foreman he will always be a 100 per cent safety man with a 100 per cent safety record; but it does mean that you can go out into his shop or department and ask him to do a job and he will do it without arguing all day about it. This type of

letter should be written whenever an exceptionally good accident prevention record has been made and when a very hazardous repair maintenance job has been completed safely.

The second class of letters to foremen are letters of criticism. This class requires a different tone. The first thing in a letter of criticism is to be sure that you have correct information when an unsafe practice has been reported to your office, before you attempt to criticize the foreman for any such action. It is sometimes necessary to hold in abeyance reports of this nature until you obtain further reports of the same nature. By doing so you will make your case stronger and be better able to obtain your point. For instance a letter such as the following was written to a foreman concerning an unsafe practice which resulted in the loss of a man's eye:

A Critical Letter That Produced Results

Another critical letter to a foreman came about due to the fact that in checking up the accidents occurring at certain machines we found that the employees on two machines were having 100 per cent more lost time accidents than the employees on two other machines. These machines were in different departments. We believed the cause to be a lack of interest on the part of the gang foreman and consequently we wrote the following letter:

Since that time the foreman has been on the job and only one lost time accident has occurred. Another letter on unsafe practices is as follows:

This man is now wearing leggings and has continued to do so since that time. Another important thing with letters of this nature is for the foreman to understand that they are not forgotten. A copy of every letter of this kind is sent to the employment office and filed with the employee's card. Two complaints of this nature are sufficient to cause his dismissal from the company's employ. Of course, not all unsafe practices are handled by letter. By far the majority are taken care of by seeing the men personally, and in practically all cases the man admits his mistake and agrees not to do it again.

Another very important thing in letters of this type is to follow them up by a personal visit and a talk on the subject written about.

Under the head of letters of information to foremen we believe it is a well established fact that the head of each department should be kept informed of the accident record of his particular department. Without this information placed in his hands each month he can have little interest in safety work. It is an established rule in the safety game to issue each month accident statistics to the various department heads in the form of an accident frequency and severity report. In addition to this monthly report the writer sends out a personal report to each department head giving him as complete an analysis of accidents as time and personnel will permit. In addition to this, we take an opportunity to place in this letter a paragraph appealing to their departmental pride to make a better record. A sample of such letter is as follows:

By issuing letters of this nature the bond of cooperation between the

safety department and the operating departments is strengthened; I believe it serves to keep different foremen on their toes in order to make a better record and a better showing. Another suggestion regarding this type of letter was given the writer by a department head one day. When this particular department head receives communications from the safety department covering his entire department he has each subforeman read the letter and sign his name at the bottom of it, showing that he has read it and understands the instructions.

The last class of letters to foremen are those of general interest. Such letters will also frequently be sent out to safety committeemen and employee representatives. In fact this entire classification of letters could be grouped under the head of mimeographed letters or bulletins to all gang foremen in the plant. Sometimes the members of the various safety committees are taken in this classification. These letters include varying subjects all the way from letters written by the management at our central office concerning a serious accident to mimeographed instructions regarding safety rules.

Letters Can Be the Channel of Important Information

Our purposes in using this method of propaganda are (first) to keep the foremen informed of the records of other companies; (second) to maintain their interest in safety work; and still another purpose which is in our estimation most important, is to maintain a connection between the man who must prevent the accidents and the safety department. In other words it is a channel of communication between the front line trenches and headquarters. To show the diversity of subjects covered by this class here are a few subjects covered by these letters.

Derailers and their use—Rules pertaining to same.

Foreman's safety bulletins regarding a near accident.

Foreman's safety bulletins regarding instructions to new men and information to use in instructing new men.

Letters regarding fatal accidents occurring in one of our subsidiary plants.

A mimeographed talk entitled "THINK" by Mr. J. W. Schwartz, a foreman of the American Steel and Wire Company. This was mimeographed and sent to each gang foreman in the plant.

An article on the foreman's responsibility in safety.

An article from a power magazine entitled "They Took A Chance."

Someone was kind enough to send us a copy of a newspaper containing an account of the wonderful safety record of the Gary Works, Illinois Steel Company. We had it mimeographed and sent to all gang foremen.

Copy of a letter on accidents written by the chairman of the Board of Directors of the Wheeling Steel Corporation.

Bulletins for members of the safety committees. These bulletins were also mailed to each foreman and superintendent. This bulletin was issued in answer to a safety committeeman's query one day, as to whether or not it was worth while to attend safety meetings.

Information made up and given to each foreman to be used as material from which to make a talk to his employees and fellow workmen, just previous to a safety campaign.

Letters written to newly elected employee representatives under the representative plan in force at our plant.

LETTER I

Monthly Comparative Report of the Wheeling Steel Corporation

Gentlemen:—

No doubt you have noticed the report mailed to you which shows the standing of the various Service Departments of the Wheel Steel Corporation. Perhaps you have noticed that the first four departments listed are the Mechanical Department, Electrical Department, Brick Masons and Yard, Switching and Labor Departments of the Portsmouth Works, and all of them have a 100 per cent safety record for the month of March. A total of 1246 full time employees worked 31 days without losing a single day on account of accidents. This is the first time that these four departments have all been in the 100 per cent class during the same month. It is a record that each superintendent concerned and his foremen can be proud of. It is a record that no amount of luck can ever achieve. These things do not happen but are caused by the interest taken in safety work by the superintendents and their foremen.

The record made by these departments so far this year has been the means of putting the Portsmouth Plant in first place among all the plants of the Wheeling Steel Corporation, both large and small, for the first three months of 1926. Had certain other departments in the mill diminished their accidents in proportion to the reduction of these departments, our lost time on account of accidents would be what we would term the irreducible minimum.

You no doubt recollect that the writer made several comments in his yearly report about the various Service Departments being in last place with respect to the number of serious and fatal accidents for the past four years. It is certainly gratifying to the management to note that these same departments are setting the pace for all other departments of the mill for a good safety record during 1926.

During the first three months of this year production has been at the highest peak, which naturally tends to produce more accidents in the plant. While certain operating hazards in our Operating Departments are always present and are of a more or less serious character, the fact still remains, however, that the work done by the Major Service Departments listed in this letter constitutes the most serious hazards of the entire plant. We would like to call your attention to the fact that serious accidents are more apt to occur during the months of April, May, June and July. Just why this is we are unable to say, but the records and experience of other companies follow closely along the lines of our own personal experiences.

We are, therefore, asking you to get your foremen together and show them what they have accomplished during the first three months of this

year; also impress upon them the absolute necessity of being with their men as much as possible during the important repair jobs. Impress upon your foremen the importance of little things which if left undone will result in difficulty and trouble and possibly accidents if they are not taken care of. Discipline must be maintained among the men, but in the end discipline alone will not maintain a good safety record, nor will it make a good production record; yet a certain amount of discipline must be maintained and meted out occasionally to violators of safety and operating rules, in order to show that the management is 100 per cent for "Safety." The real foreman will lead his men into safe practice and habits. He will educate them along lines of cleanliness, efficiency and production.

We believe that by your continued cooperation and the cooperation of your foremen you will be able to bridge over the apparently hazardous period mentioned. Having accomplished this feat the satisfaction is knowing that you have prevented a serious or fatal accident to some one of your employees through your combined efforts will certainly be reward commensurate with your efforts.

I want to mention just one other fact in this letter and that is that because of the use of goggles we have been able to save the eyes of six of our employees in the past five months. One of our state inspectors who inspected the plant recently paid us the compliment of saying that he had never seen a place where the men wear their goggles as well as they do here. These two items show that the foremen are cooperating and are leading their men into safe practices.

Yours respectfully,

LETTER II

Safety Committee Activities

Dear Sir:

In looking over your minutes of the Mechanical Department Safety Committee for the week of April 17th, I notice on the bottom of both the Day and Night Committee reports that the various committeemen of your department talked to a total of one hundred and eighty-seven employees during the past week concerning Safety. This is a mighty fine report to be handed in at our safety committee meetings, and we are sure this is producing results as is evidenced by the safety record of the entire plant. Will you therefore, convey in some way, to the different members of these committees, the appreciation of the management for their interest along safety lines?

Thanking you for your cooperation, I remain,

Yours respectfully,

LETTER III

Injuries to Thos. Burton, No. 2415, and Thurman Meed, No. 211

Dear Sir:—

Mr. Thomas Burton, No. 2415, had his eye injured on March 11th, due to a piece of scrap flying up and striking him when he threw a small bundle of scrap in the scrap crate. Again on March 29th, 1926, Mr. Thurman Meed, No. 2118, had his eye injured in practically the same

manner. Fortunately Mr. Meed did not receive as serious an injury as Mr. Burton did. The nature of these injuries is as follows:

Burton—Contusion of eye with total loss of the vision. The doctor states that he may be able to save 25 per cent of the vision of Mr. Burton's eye.

Meed—Small cut on outer corner of right eye; one clamp used.

Please be advised that the loss of an eye costs this company \$1875.00. This \$1875.00 will buy 2083 pairs of goggles.

In investigating Mr. Burton's accident, Mr. Burton suggested that we furnish the scrappers with goggles to prevent a recurrence of the same accident. He stated that he would be only too glad to wear them and that he thought the rest of the men would do the same if the proposition was properly put up to them and the hazards explained by the foreman. Mr. Lee, your shear room foreman, thought that this suggestion was right. I told Walter to see you before furnishing them to these men. Later you told me that you had decided not to furnish these men with goggles.

The writer is of the opinion that the scrappers behind the shears should be compelled to wear goggles. Accordingly we are asking you to furnish each of your scrappers with a pair of goggles and issue instructions that they must be worn at all times while working behind the shears.

Anticipating your cooperation in this matter, I remain,

Yours respectfully,

LETTER IV

Accidents at No. 5 and No. 6 Picklers

Dear Sir:—

I desire to call your attention to the fact that entirely too many lost time accidents are occurring in your Pickling Department, at No. 5 and No. 6 picklers. This is so noticable at this particular place because we are not having any lost time accidents at No. 3 and No. 4 picklers.

Three lost time accidents occurred in this one place from August 27th to September 14th. This we believe you will readily admit is entirely too many accidents in one place. We suggest that you get after these foremen and see that more attention is paid these men so that these accidents will not occur.

Anticipating your cooperation in this matter, I remain,

Yours respectfully,

LETTER V

Unsafe Practices

Dear Sir:—

From time to time the company has purchased leggings for the men in the Open Hearth Pit to wear when pouring steel. Some time ago Mr. Fred Wheeler, Pit Foreman, was in your office with Ely Brown when the writer was present. We were talking about the use of leggings while pouring steel and Mr. Wheeler was advised at this time to wear leggings which were furnished him by the company. Recently while in the Open Hearth Pit, I noticed Mr. Wheeler pouring a heat of steel

without having his leggings on. On this occasion I called Mr. Brown's attention to his failure to have leggings on and asked Brown if he would instruct Wheeler that he must wear these leggings. Brown said that he would.

Notwithstanding this fact, Armour Piatt caught Mr. Wheeler without his leggings on while pouring steel on the 29th and 30th of December. He asked Wheeler to wear the leggings and Wheeler told him that the leggings were a nuisance and that his pants were ample protection for him.

I understand that Mr. Wheeler is a pit foreman. One of the chief duties of a foreman is to educate his men in safe practices by cautioning and telling them the safe way in which to do their jobs and to set an example for his men to follow. Mr. Wheeler evidently does not realize the importance of his position along these lines. It is more necessary for him to wear leggings than it is for his men. Please advise Mr. Wheeler that a continued violation of this safety rule will result in his dismissal. Please refer to Mr. Geo. W. Moore's letter of recent date regarding the procedure to be followed in cases of men who refuse to obey safety instructions.

Anticipating your cooperation in this matter, I remain,

Yours respectfully,

LETTER VI

January Accident Experience

Dear Sir:—

Following is a report of your accident experience for the month of January 1924 showing the foreman, kind and number of accidents to your men occurring in the Electrical Department.

FOREMAN	A	B	C	TOTAL
Carver	1	2	---	3
Price	1	3	---	4
Terrel	3	---	---	3
Mosley	1	2	---	3
Manley	---	2	---	2
Saxby	1	1	---	2
Milt	---	1	---	1
TOTALS	7	11	---	18

Your department had no lost time accidents during January, 1923. You are now working on the fifth month without a lost time accident. Due to a mistake in the December report the Evans accident at the Rod Mill was charged to the Rod Mill but it rightfully belongs to the Electrical department. No doubt you are interested in keeping this record up. Why not try to make it for the entire year? During 1923 you had six lost time accidents and lost 186 days time on account of accidents. Can you beat this record during 1924?

Our goal for the entire plant during 1924 is "A 50 per cent reduction in lost time on account of accidents." This may seem to be a difficult goal to achieve but, like everything worth while, it takes lots of good hard work to accomplish it. Will you please call a meeting of the foremen in

your department and make plans to achieve this goal in your department? Several of our departments have started out to go through the year 1924 without a lost time accident. So far their records are perfect. Your department should also have a definite aim to work toward.

Best results are obtained in accident prevention when you outline some specific work to be done or goal to be accomplished.

Yours for Safe Operation,

LETTER VII

Monthly Accident Statement

Dear Sir:

Below you will find listed the accidents occurring in your department together with the foreman's name, kind and number of accidents:

FOREMAN	A	B	C	TOTAL
Price	1	1	—	2
Manley	1	—	—	1
Carver	1	1	—	2
Saxby	3	1	—	4
Terrel	1	—	—	1
TOTALS	7	3	0	10

Forty per cent of our lost time cases occur to men who have been in our employ one year or longer. For the past 18 months we have been keeping an accurate check on lost time accidents in order to obtain information of this kind. A man who has been working in this plant for one year should be familiar with the hazards of his job and should be less susceptible to an injury than a green man. I believe that this high percentage of accidents among experienced men shows that closer supervision on the part of the foreman is needed to bring down the rising frequency of accidents to this class of workman. Accidents occurring to this class are usually more severe and cost the company more money than accidents occurring to men under one year's service.

Forty-eight per cent of our lost time accidents have occurred within the following occupations:

Pickler Helper	Laborer	Stocker (Jobb. Mill)
Crane Followers	Machinists	Matcher (S. Mill)
Doubler (S. Mill)	Drag Up (S. Mill)	Catcher (S. Mill)
Welders		

The other fifty-two per cent of lost time cases are spread over forty-six different occupations.

Thanking you for your cooperation in Safety Work, I remain,

Yours respectfully,

E. E. ARMSTRONG (Chapman Valve Manufacturing Co., Springfield, Mo.): I should like to ask what signature is used on letters going to the plant, whether they are signed by the superintendent or the foreman?

MR. FOWE: I sign them if I consider them important enough, then there is no chance of the buck-passing that might occur if I left it to the foreman or the superintendent.

CHAIRMAN GIBSON: If there is no further discussion on this subject, Mr. Oartel will now present some lantern slides.

LATE DEVELOPMENTS IN SAFEGUARDING

John A. Oartel, Chief of Safety Bureau, Carnegie Steel Company, President Western Pennsylvania Safety Council, Pittsburgh, Pa.

(A Series of Lantern Slides Shown on the Screen)

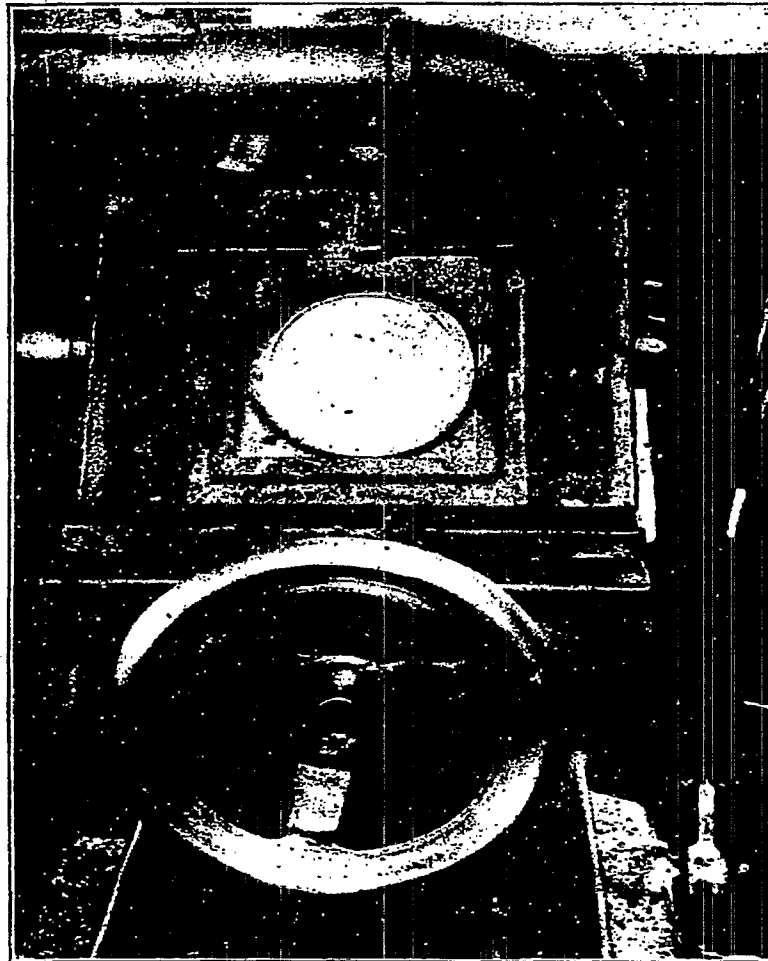


Figure 1: Guard with magnifying glass, hand milling machine.

(Editorial note: Under the above caption Mr. Oartel displayed a striking series of pictures depicting safeguarding devices that have recently come under his observation. The number shown totaled 122.

They were accompanied by a running fire of comment, made extemporaneously, and of particular value from the fact that it called attention to features of the devices with which Mr. Oartel had personal experience.

(Due to the voluminous character of these pictures, and the fact that the discussion could only be of value in connection with any particular

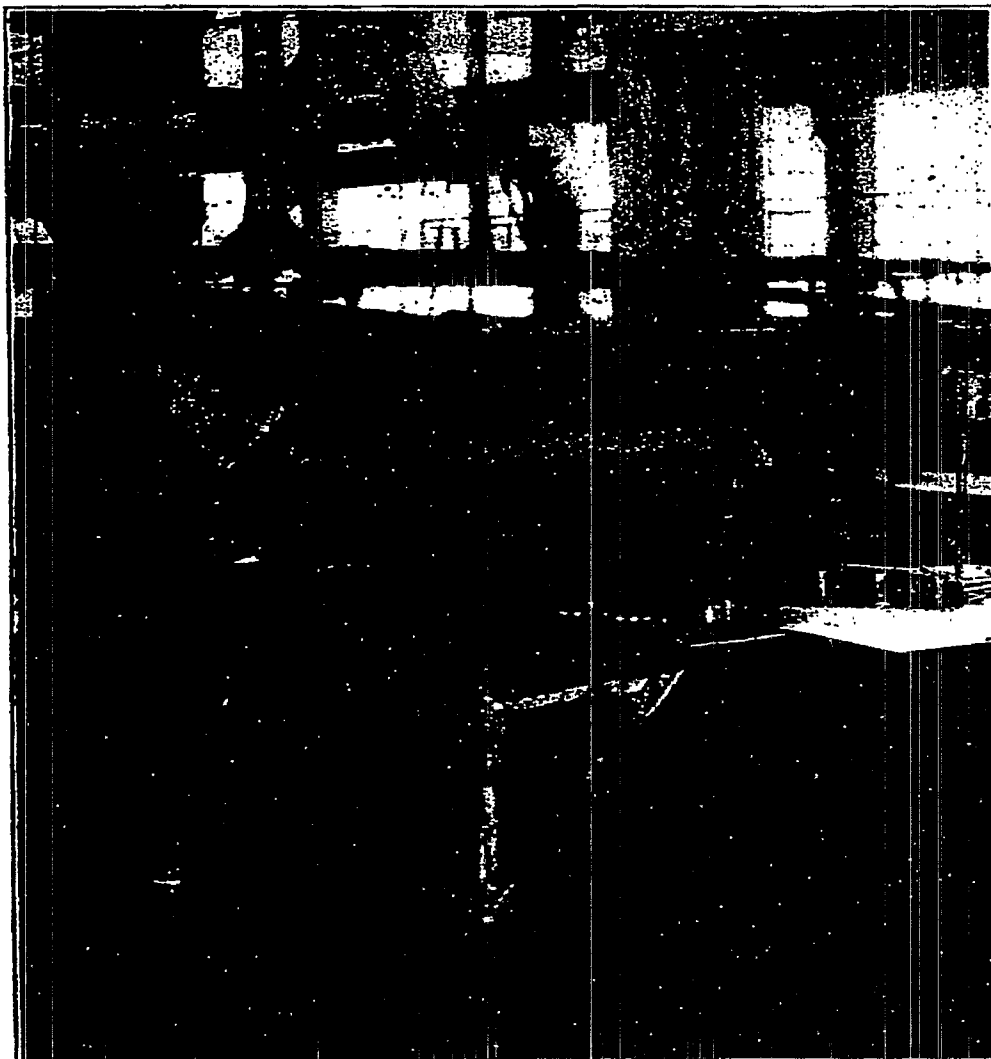


Figure 2: Fire protection hood, sheet metal annealing machine.

picture shown, the editors of these Transactions have been compelled to make a selection of a few only from the whole number exhibited, and have therefore confined Mr. Oartel's brief remarks to descriptions of those pictures now reproduced.

(It has been very difficult to make this selection. But the 12 pictures

shown will give at least a partial idea of the interest and value the members of the Metals Section found in Mr. Oartel's contribution to the program.)

Figure 1 (which was No. 12-D of the series) shows a guard with magnifying glass for the point of operation of a hand milling machine, as developed by the Westinghouse Electric and Manufacturing Company.

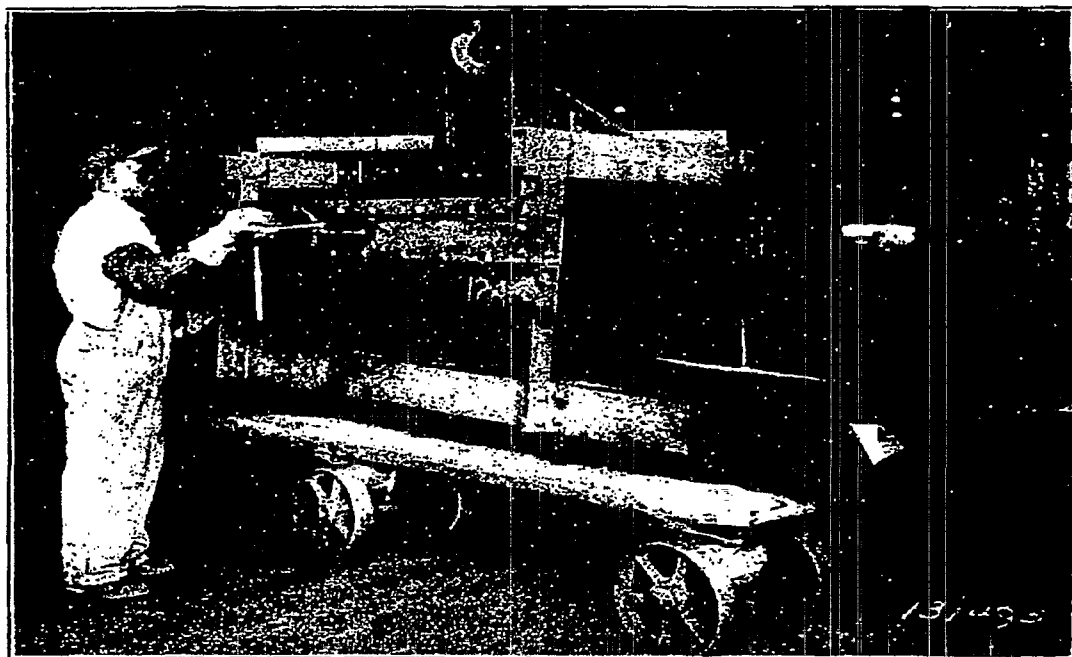


Figure 3: Device for lifting sheet material from furnace.

The magnifying glass not only protects the operator, but also enlarges the working center, thereby increasing efficiency and reducing the spoilage of material.

Figure 2 (which was No. 13-D of the series) shows a fire protection hood for a sheet metal annealing machine, developed by the Westinghouse Electric and Manufacturing Company. When the roll catches fire, the hood is pulled down, thus smothering the fire.

Figure 3 (which was No. 23-D of the series) shows a device for lifting sheet material out of an annealing furnace. The sides or jaws of this device are opened and closed by a large hand operated jack screw.

Figure 4 (which was No. 39-D of the series) shows an I-beam extension for material racks, developed by the Westinghouse Electric and Manufacturing Company. These extensions are portable and are used merely to guide the material which is being lowered by the crane. After the rack has been loaded these extensions are removed and used elsewhere.

Figure 5 (which was No. 41-D of the series) shows a modern milling machine point-of-operation guard developed by the Westinghouse Electric and Manufacturing Company. This guard is counterbalanced so that it



Figure 4: An I-beam extension for material racks.

may be easily moved up out of the way when tool adjustments are necessary. The enclosure may be adjusted up, down, in or out.

Figure 6 (which was No. 50-D of the series) shows a device for lifting bar material and placing it on racks. This device consists of two channels made of very heavy plate with welded joints. Note that the left hand fixture has an end plate to enable the crane operator to push the material into the rack.

Figure 7 (which was No. 2-E of the series) shows a modern plate shear

now used at the Chicago plant of Joseph T. Ryerson and Son, Inc. This is an 84-inch shear, having a capacity of two inches. Clutch is electrically operated and controlled from any one of the four push buttons mounted on the hold-down. This feature eliminates the hazard and fatigue of the foot-operated clutch.

Note the small roll table, directly in front of machine bed, which can be raised and lowered by compressed air. This eliminates extremely heavy manual lifting and reduces the possibility of accident.

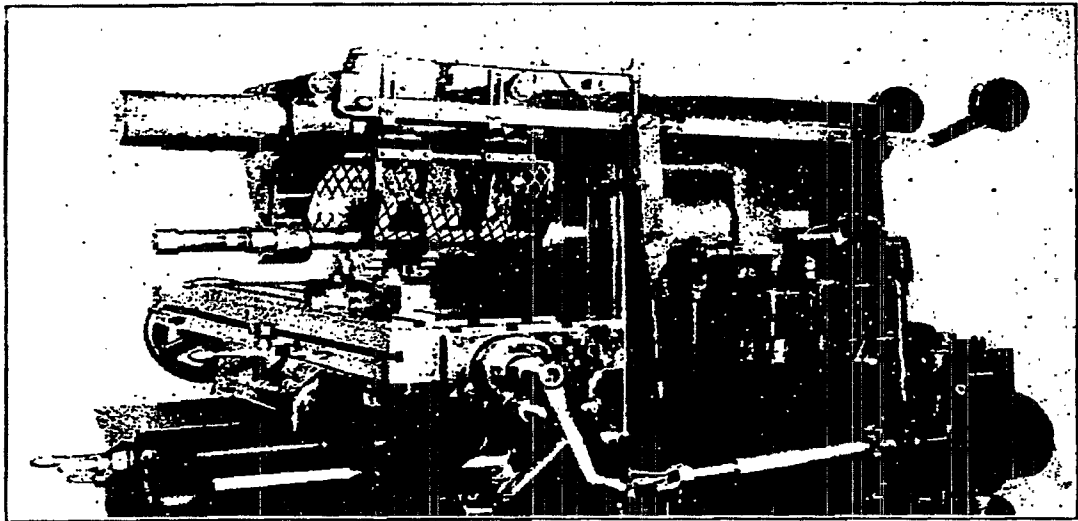


Figure 5: A milling machine point-of-operation guard.

This shear is also equipped with a magnetic hold-down in addition to the cam-actuated mechanical hold-down.

The motor controllers operate the large roll table used to feed this machine.

Figure 8 (which was No. 3-G of the series) shows a one-handed gas tank carrier now used by the Youngstown Sheet & Tube Company. They also use two-handed carriers of similar design.

Figure 9 (which was No. 24-G of the series) shows a sword used to open sheet "stickers" employed by the Youngstown Sheet & Tube Company. Note the guard for the operator's hand.

Figure 10 (which was No. 3-H of the series) shows a two-handed control for rope-drop hammer, now used by the International Harvester Company. Note the "safety latch" above the operator's right hand, which is used to block the head when die adjustments are necessary.

Figure 11 (which was No. 3-I of the series) shows a self-dumping box used by the Edgar Thompson Works of the Carnegie Steel Company. The photograph shows the box in the dumping position. In the carrying posi-

tion the stirrup is at the top of the guide. It is not necessary for a man to go into the railroad car when this type of box is dumped.

Figure 12 (which was No. 10-I of the series) shows a slab holder used for chipping blooms or slabs, developed by the Duquesne Works of the Carnegie Steel Company. Note that this holder can be adjusted to hold various thicknesses of slabs.



Figure 6: Device for lifting bar material upon racks

CHAIRMAN GIBSON: Will you please remain seated? I should like as many of you to remain who can for discussion.

I know that some of you are anxious to leave, but we have before us yet one of the most important and best parts of the program.

This part of the program is known as "Your Hour." We have here a list of questions that have been handed in, and some of them represent the real reasons for some of those members coming to the Congress.

The first question is, "Do you have any record of accidents incurred through the failure of refractories in the metals industry?" This was asked by Mr. Henry W. Perry of the Laclede Christy Clay Products Company, St. Louis, Mo.

(No response.)

"Do we not too many times attribute carelessness as the cause of injury instead of to the direct cause of ignorance?" This was asked by a Pittsburgh Plate Glass man. That might come under the paper by Mr. Woltz on "Rule Books." It's a question of becoming educated as to what the safe rules are.

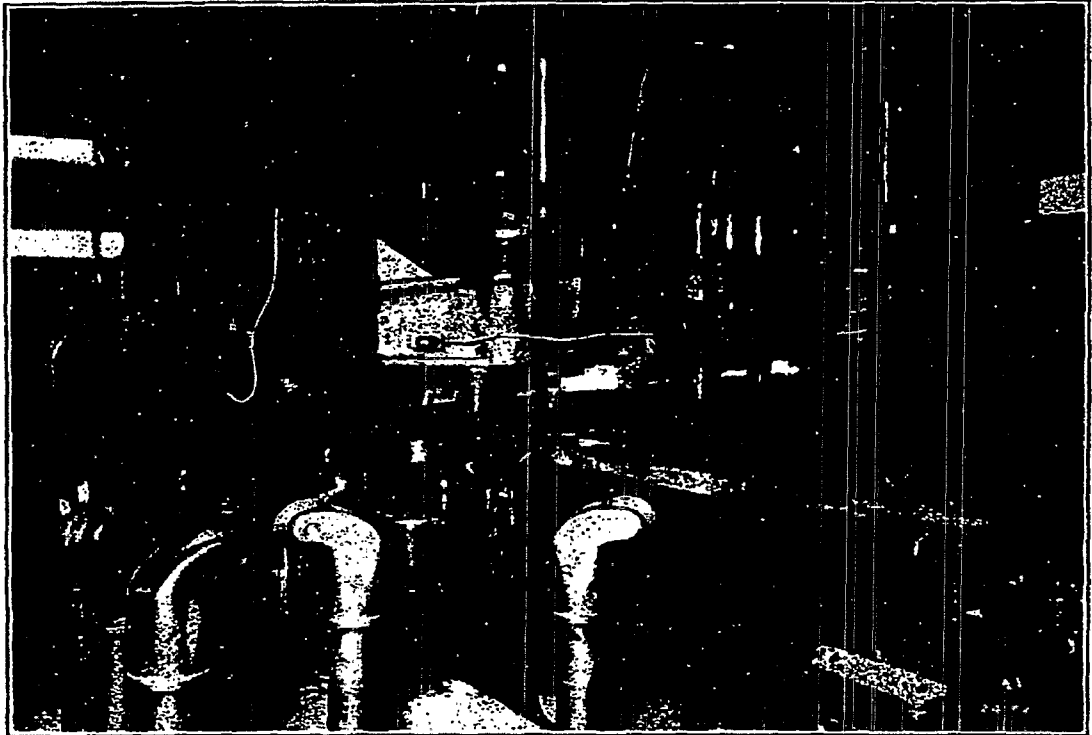


Figure 7: A modern plate shear with many safety features.

MR. WOLTZ: Ignorance is a failure on the part of the foreman, and yet a man may know and not think, or it may be for the reason I spoke of a moment ago, there is some underlying cause that is not brought out.

CHAIRMAN GIBSON: "What is the experience of coke plants that do not have railings on front and back platforms with reference to men falling from platforms?" This is being asked by Mr. A. Berquist, Youngstown Sheet & Tube Company.

SECRETARY NORTHWOOD: I might say we have had men fall from those platforms. I don't think it is practical in any way to put a railing on that coke-oven side. We had a man fall in cleaning the coke off the platform. We were then using a little arrangement with a plate and a handle on it, pushing it with a pusher bar, and in some way the handle got caught in the side railings and tangled up in the man's legs and he

Metals Section

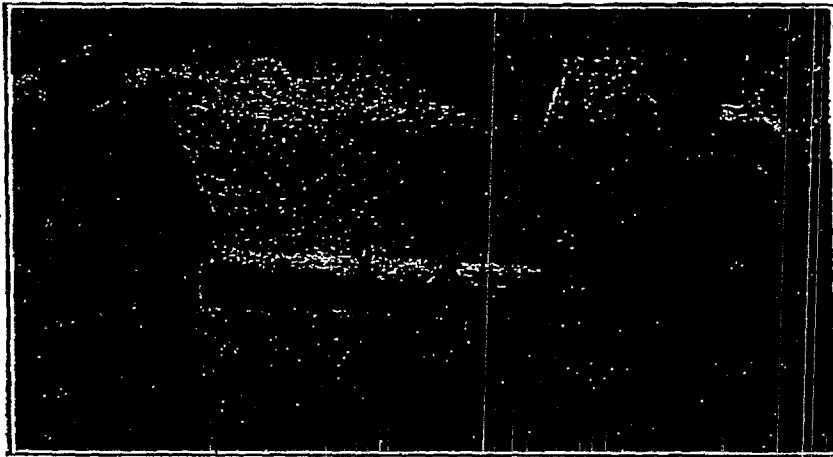


Figure 8: A one-handed gas tank carrier.

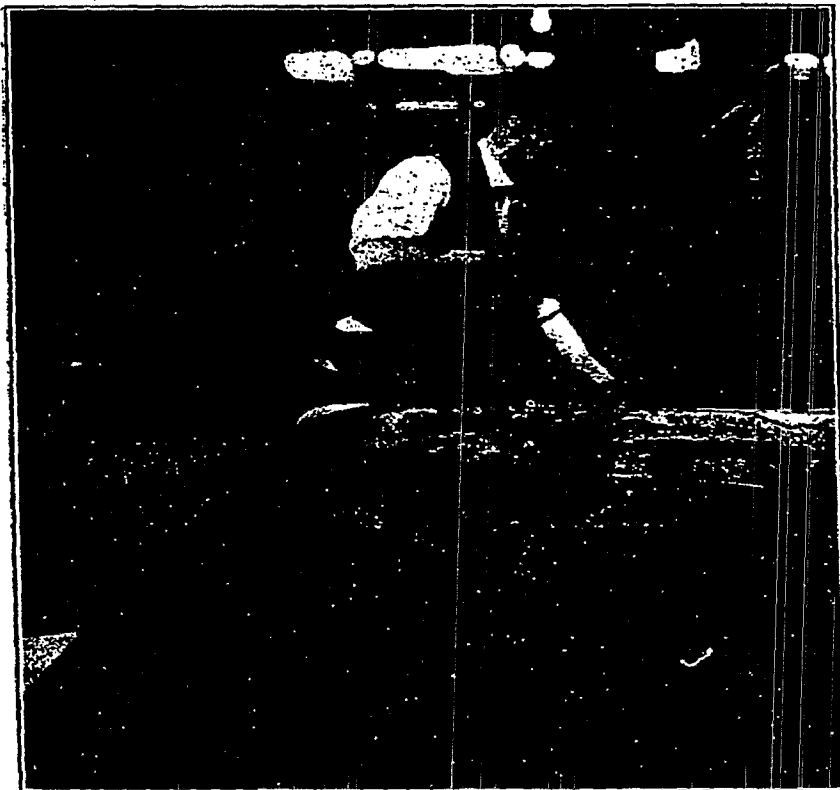


Figure 9: A sword used to open sheet "stickers."

fell into the car. We immediately made arrangements to prevent that, but I can't offer a suggestion as to the matter of rails on the coke side.

MR. BERQUIST: The reason I asked the question was to find out just

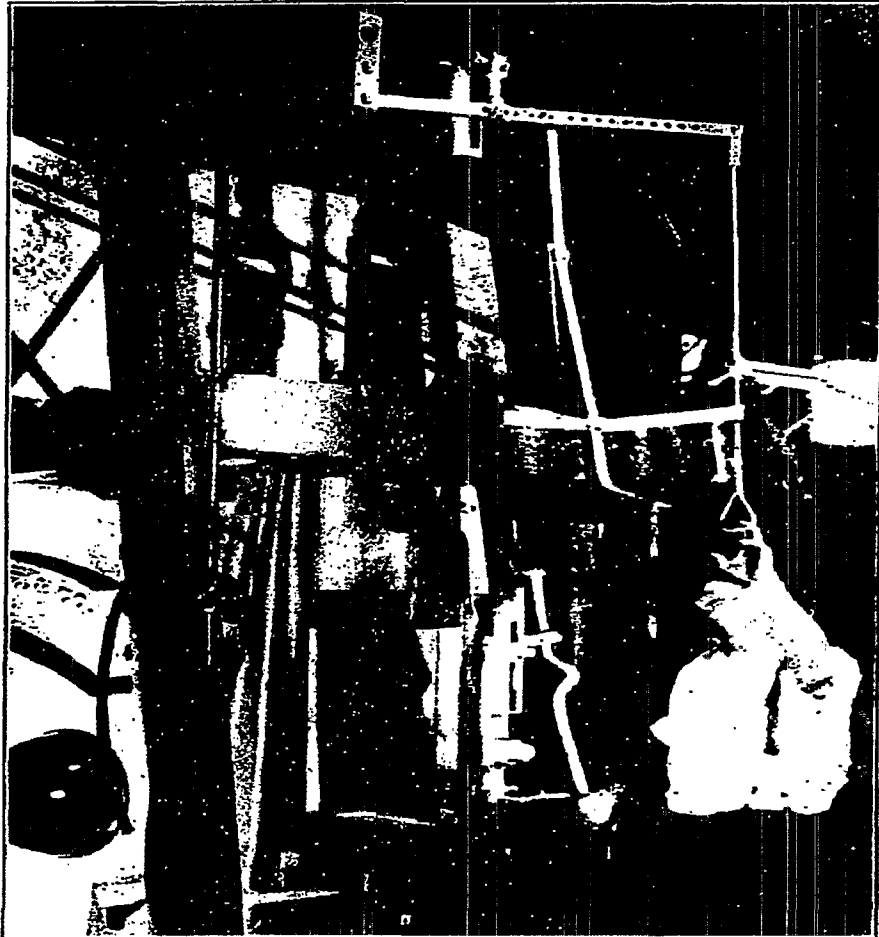


Figure 10: A two-handed control for rope-drop hammer.

what experience the others had had with these platform railings. I should like to know if there is any one here from the Bethlehem plant at Lackawanna. They have railings on their platform and have cut them down so there is only one section, 18 inches high.

In our plant we have railings on front and back and offsets in between. There is a great tendency for the men to sit down between the offset of the railing and they may fall.

We have been contemplating removing the top of the railing and leaving a railing 18 inches high, although our conscience isn't quite clear in creating what we know will be another hazard, that of a man tripping over that small railing.

D. MEDALIE (By-Products Coke Corporation, Chicago, Ill.): We have talked over the question of railings and the hazards connected with them.



Figure 11: A self-dumping box, shown in the dumping position.

There is a certain sense of security that the men get from these railings which I don't think they should have. By having no railings at all they must be careful. We have had very few accidents in this respect.

CHAIRMAN GIBSON: "Regarding transfer cars in foundry shops, and so forth, what means of locomotion are being used? Electric locomotives, gasoline tractors or manual labor? With what result?" This question was submitted by Mr. James L. Mills, Illinois Steel Company, South Chicago, Ill.

MR. MOREY: We simply pull them over with the crane. We tried the motor to pull them over, but they got so clogged with dirt from castings and core ovens that we went back to the old method.

MR. BERQUIST: But does it particularly apply to core ovens?

MR. MOREY: No, in our core ovens we use the electric transfer cable; the trucks come out and run along opposite the ovens from the foundry to the finishing department.



Figure 12: A slab holder used for shipping blooms.

CHAIRMAN GIBSON: Is that a sufficient answer to your questions?

The next is a question that is unsigned: "What is the experience of those using a toe guard as a means of preventing injuries to feet? I understand some people use a guard that is worn over the shoe. It is found to be clumsy and do the men object to wearing this guard?"

MR. SANKEY: Safety men some years ago found that by taking all of the accidents in a plant and classifying them, there were more accidents to the fingers and toes than to any other part of the body. There was nothing we could recommend as a remedy at that time and it was not until we came home from the war with our metal helmets that we realized that if they could protect the brain with one of these helmets then it should be a simpler matter for us to protect the feet.

We tried first several grades of iron; we tried different sizes; we tried ridges in the tops, and finally we perfected a foot protector. Now the problem is to get the men to wear them. We put the responsibility on the department superintendent. We asked him to give us a list of the occupations in his department where these protectors should be required, and we went over that together. One fellow handled brick, another fellow handled couplings, and so on. But they shed the responsibility, they blamed the safety department. They always belittle the safety inspector, anyway.

Making Good Use of Toe Guards in the Mills

These toe guards will stand a weight of 300 pounds. I want you to see them so you can take the idea home. Some of them protect only half the foot, and the safety shoes protect all the foot.

MR. BERQUIST: To what extent do you use them in tube mills?

MR. SANKEY: First, in handling couplings and things of that nature. The men in the annealing department use them; anywhere that conditions exist where anything may fall on the employees' feet.

You have heard me talk a great deal, but I love the safety work because it is building up mankind, what God has made. You are saving what has been given to them with which to earn their daily bread. We should do our utmost to save the men from losing their hands and arms and eyes. If God had seen fit to make one-armed men He would have done so, but He didn't. He made them in His image and likeness and found them perfect. It used to be, years ago, when I first started in safety work, that when a man lost an arm it was considered that "it had to be," but the work of the safety men has changed that viewpoint, and I could pin an honor badge on all you men for it.

CHAIRMAN GIBSON: The next question is one from Mr. Medalie on the advisability of using a Burrell gas mask in extremely hot weather.

MR. BERQUIST: How do you mean that?

MR. MEDALIE: Any kind of gas mask. We had a fatality from a man using a gas mask; he was overcome by the heat. It was one of the hottest days we had in Chicago. He fell off the ladder and broke his mask and was gassed.

If you have a man who has a little blood pressure or who has a defective mask, there is danger.

CHAIRMAN GIBSON: You don't attribute that to the Burrell mask?

MR. MEDALIE: Not particularly.

MR. BERQUIST: We have used the Burrell gas mask without trouble.

CHAIRMAN GIBSON: Our session is running quite long, but we want to cover all we can.

The next question is submitted by Mr. A. S. Carr, of the Bessemer Gas Engine Company, "How often should crane chains that are in constant use be annealed?"

Another question, which we will consider first, is submitted by Mr. John M. Gull: "Are you not committing a crime by compelling a workman to wear goggles not suited to his vision, and while blinding this man with such goggles are you not endangering his life in other ways, as you compel him to wear goggles he can not see through?"

MR. WOLTZ: He should have lenses ground to suit his vision.

CHAIRMAN GIBSON: I think that is the procedure of most large companies. If they find his vision is impaired they will, free of charge, have goggles prescribed for him.

Has any one any experience with goggles in the die casting foundry?

JAMES F. FOURY (Smith Service, New York): I asked that question and was referred to Mr. Herrin of the International Harvester Company. I will write him.

CHAIRMAN GIBSON: "In pouring steel from electric furnace to ladle, what is the experience as to use of goggles?" That question was discussed yesterday. "In filling moulds from bottom of ladle are goggles generally used?" I don't know exactly what is meant.

MR. MOREY: He refers to the ladle man and those immediately around.

SECRETARY NORTHWOOD: We use dark goggles.

MR. FOURY: What kind of ladles do you use? I have in mind a large ladle with a drop of two feet before it hits the top of the mould.

SECRETARY NORTHWOOD: I referred to the ladles in the open hearth furnace, pouring in the mould.

MR. BERQUIST: They all insist on wearing goggles and leggings.

ADJOURNMENT

Mining Section

New Officers of the Section

CHAIRMAN: HOWARD I. YOUNG
American Zinc, Lead & Smelting Company, Mascot, Tenn.

1ST VICE-CHAIRMAN: C. A. McDOWELL
Davis Coal & Coke Co., Thomas, W. Va.

2ND VICE-CHAIRMAN: GEORGE MARTINSON
Pickands, Mather & Co., Hibbing, Minn.

3RD VICE-CHAIRMAN: A. W. DICKINSON
The Union Pacific Coal Co., Rock Springs, Wyo.

4TH VICE-CHAIRMAN: J. P. HODGSON
Phelps Dodge Corp., Morenci, Ariz.

SECRETARY AND NEWS-LETTER EDITOR: DANIEL HARRINGTON
U. S. Bureau of Mines, Washington, D. C.

Committees

POSTER: JOHN L. BOARDMAN, Chairman
Anaconda Copper Mining Company, Butte, Mont.

PUBLICITY: THEODORE MARVIN, Chairman
The Explosives Engineer, Wilmington, Del.

PROGRAM: R. V. AGETON, Chairman
Tri-State Zinc & Lead Ore Producers' Assn., Miami, Okla.

MEMBERSHIP: H. W. GIESSING, Chairman
Commerce Mining & Royalty Co., Baxter Springs, Kans.

STATISTICAL: H. G. HENSEL, Chairman
The Youngstown Sheet & Tube Co., Chicago.

ENGINEERING REPRESENTATIVE: R. DAWSON HALL
The COAL AGE, New York City.

EXECUTIVE COMMITTEE (The Officers and)
B. F. TILLSON
The New Jersey Zinc Co., Franklin, N. J.

T. T. READ
American Institute of Mining & Metallurgical Engineers, New York City.

October 26, 1926

B. C. YATES, Chairman
Superintendent, Homestake Mining Co., Lead, S. D.

THE first session of the Mining Section of the National Safety Council, held at the Tuller Hotel, Detroit, Michigan, ~~commenced~~ at 9:30 o'clock, Mr. B. C. Yates, superintendent, Homestake Mining Company, Lead, South Dakota, presiding.

CHAIRMAN YATES: We will ask Mr. J. W. Reed to ~~act as secretary~~ in the absence of Mr. T. T. Read.

We have no minutes of the previous meeting to read and ~~approve~~, since our regular secretary is not present. Our first ~~committee report~~ will be the report of the Program Committee, Frank A. Pollock, ~~chairman~~.

REPORT OF FRANK A. POLLOCK, CHAIRMAN, PROGRAM COMMITTEE

When I received the appointment to this program committee, Mr. Yates asked me to make some recommendations for next year's Program Committee, and I have a few here.

The first is, the chairman should be appointed, I believe, directly after the officers are elected, for this reason—he may be able to get in touch personally with the new officers and the other members of the committee as to what to do for the next year's program. It is quite a strain on a man to go ahead and do things on his own hook without knowing what the other members want done. The committee this year thought, as the walls of our room were always bare, it would be a good thing to have an exhibit, and decided on the one you see here. This Section is showing twice as many posters as the Metals Section. Planning for an exhibit should be taken up for next year, I think, by the Poster Committee rather than the Program Committee.

Another thing that slipped up this year, we had no meeting of the Executive Committee. I think there should be at least one meeting a year, whereby the officers or a few of them get together and decide the policy of the meeting.

The last thing to decide is whether or not in the future meetings we should have a luncheon. All the other Sections are doing that. We come here and only meet half the bunch. You go to the Metals Section and in one meeting you know them all.

I want to take this opportunity, in closing, to thank the men who worked with me on this committee, also Mr. Sherman and Mr. Yates, Mr. Read, the secretary, also the men that are going to take part in this program, who have put in their time and have come here to give their papers; and lastly, the company that I work for that let me take the time to go ahead with this program.

CHAIRMAN YATES: The next in order will be the report of the Poster Committee, Mr. R. V. Ageton, of Miami, Oklahoma, chairman.

REPORT OF R. V. AGETON, CHAIRMAN, POSTER COMMITTEE

It might interest you to know that during the past year, for the first time, the Mining Section has put out all of our 24 small size posters and the one large size poster.

The distribution of posters to the mining companies has increased more than 25 per cent the past year, and Mr. Gardiner and I feel that that is a sort of way you people are helping us out and saying you think our work is acceptable. You perhaps have noticed, but if you have not you can look around here at some of the posters that were put out by the Mining Section. We have tried to use positive suggestions and in fact have used that in the majority of instances rather than the negative, or suggestive of fear psychology.

Mr. Gardiner had to make special trips into the field with a photographer, in order to get poster material, due to the fact that he did not receive sufficient suggestions from the Section members. This is a matter that should receive the attention of the next year's chairman. Mr. Gardiner refers laughingly to what he calls his "fan" mail and says every time he gets out a poster that pleases he does not hear a thing about it; but every time that he gets out one displeasing he hears all about it.

I would suggest, for the benefit of the men in the National Safety Council headquarters, every time a poster pleases you write a little more quickly than if it displeases you, because the fan mail he gets does not help him to do his work a whole heck of a lot. However, he did wish to thank the members of the Section who have cooperated with him in sending him poster material; and he hoped all of you would get behind him this year so the 24 small posters which were allotted to this Section and the one large poster would be more pleasing to all than they were last year.

Regarding the luncheon of which Mr. Pollock spoke, I wish to concur in that. I do not see why the members of the Mining Section could not get together and have a luncheon the same as the other Sections do; in fact, we are the only organization I know of in the country where the miners do not take the lead, and I am wondering what is the matter with the members of the Mining Section of the National Safety Council that we do not get out and show some pep.

CHAIRMAN YATES: The next report is that of the Membership Committee, Mr. Joseph W. Reed, chairman.

JOSEPH W. REED (Director Department of Safety, Consolidation Coal Company, Fairmount, West Virginia): The Membership Committee was very fortunate in having a very good committee although they had an exceedingly bad chairman, but through the assistance of the members of the committee and the officials of the Mining Section we made a gain.

REPORT OF J. W. REED, CHAIRMAN, MEMBERSHIP COMMITTEE

We began the year in September, 1925, with 218 members. Between that time and September, 1926, we lost 26 members and gained 41 new members, or a net gain of 15, making our membership at present 233 active members.

Although the net gain shows only 15 additional members, we have made a net gain in new-member employees of 10,940 over those cancelled.

I desire to thank W. L. Wheeler, Director of the Business Division, National Safety Council, through whose courtesy the above figures were obtained from the records.

Some few cancellations of membership were due to the sale or transfer of member companies to companies who were not members.

Such cancelled memberships as I was able to investigate personally I found were not due to complaint on the service of the Mining Section, but rather to the necessity of curtailing every possible expense during a rather severe business depression. I feel that most of these members will be back with us again next year.

The fact that under the existing conditions we made even a small gain was due to valuable assistance from the officials and members of the Mining Section and the vigorous efforts of those in the main office of the National Safety Council.

CHAIRMAN YATES: Is Mr. E. E. Criswell, chairman of the Publicity Committee here? In the absence of Mr. Criswell, we will call on Mr. R. Dawson Hall, for any reports he has to make as Engineering Representative.

REPORT OF R. DAWSON HALL, ENGINEERING REPRESENTATIVE

I have not been extremely active because I have had no call. I attended one meeting only of the A. S. S. E., and that was a business meeting. I was put on a committee on drafting, at that meeting, owing to a suggestion I made that every drawing for new machinery should be looked over specifically by somebody who really represented the safety interests in the organization, so that these drawings would reflect safety and would result in machinery being made safe. I think that is quite an important matter, that every drawing for a new piece of machinery should be inspected by somebody and should be designed for safety. I think if we just would get a signature on every drawing of a mechanical nature, that it is safe or that it is designed with the idea of safety, it would bring to the minds of those doing that designing the necessity of having everything safe for those who have to use it.

However, I was not called to any meeting. I do not know whether they have gone any further with that drafting committee or not. I went to a dinner that was held at the Country Fair in New York City, but other than that I have attended no meetings.

Another activity is the Mine Collating Committee which is preparing standards of various kinds for submission to the American Engineering Standards Committee. That Mine Collating Committee is headed by E. A. Holbrook of State College, State College, Pennsylvania, and I attended two of the meetings of that organization. The main safety question that came up was the approval of the program of the standards for safety in auxiliary ventilation. The Bureau of Mines, the N. S. C., the American Institute of Mining Engineers and a number of other organizations were on

that committee. The committee brought in the recommendation that the standards be adopted. Mr. Harrington, of the Bureau of Mines, brought in the recommendation that the standards be not adopted until they had been boiled down; the Power Club objected to certain phases of the standards but were not prepared to make those objections definite at the time.

I may say that the other representative of the Bureau of Mines approved the auxiliary ventilation program. However, Mr. Rice, who was there, said he did not approve of them, that he thought they ought to be returned for further examination by the committee, and as a result they were returned to the committee for examination; but a rather interesting thing happened. The following day Mr. Roberts who is chairman of the Mine Collating Committee, submitted this statement to the Engineering Standards Committee—that the standards had been disapproved by the Mine Collating Committee, but in his belief they had absolutely no right under the rules under which they operated to refuse to accept anything from the committee that they had appointed, that they were not a revisionary committee, that the only revisionary committee existing was the American Engineering Standards Committee, and consequently the American Engineering Standards Committee accepted these standards for submission to their various members. They did not consider it final acceptance so they sent these standards around to their various members, and when the time came to count up the votes they found under their rules these standards had been rejected.

So that is the position of the auxiliary ventilation standard. It has been turned down by the American Engineering Standards Committee. I do not know what will happen to it now. The Mine Collating Committee does not seem quite ready to submit it again to the judgment of the committee that it will appoint, because they think there should be a little time given to discuss the matter and think it over. I was present at a meeting held by the A. I. & E., and they decided that they would not submit it just at present, but that they would give opinion an opportunity to be further crystallized on this subject.

REPORT OF B. C. YATES, CHAIRMAN OF THE SECTION

Your chairman has not very much to report this morning. When this job was wished on me last year down in Cleveland I really did not know what I was getting into, but I know now, and I compliment the gentleman who is to follow me, on having some work to do if he carries out the work of this Section, because we have work before us.

I attended two meetings of the Directors and Executive Board in Chicago, also a conference of the Sectional Chairmen in Chicago. There is one recommendation I would like to make. The Mining Section needs a paid secretary. I believe Mr. Tilson, of the New Jersey Zinc Company, brought that up several years ago, and I believe the same condition exists today as at that time, that it is a matter of finance. The national organization has not the funds. I have no recommendations to make

as to how to secure the necessary funds to pay the secretary, but I do know that his services are needed.

The members of the Nominating Committee are R. V. Ageton, chairman, C. A. McDowell and Theodore Marvin. This committee will get together some time during the day, as our election takes place at the session tomorrow.

The first paper presented to you will be by Mr. James L. Davidson, Secretary, Alabama Mining Institute, Birmingham, Alabama.

SAFETY PRACTICES IN AND ABOUT ALABAMA COAL MINES

James L. Davidson, Secretary, Alabama Mining Institute,
Birmingham, Alabama.

In making this delineation, myriads of measures of equal magnitude clamor for precedence. However, because of its sweeping destructiveness and annihilating effect when fired, I will speak first of the suppression and neutralization of coal dust.

In machine mining, water is applied along the cutter bar while the coal is being undercut;

In pick mining, the gob¹ and face are thoroughly sprinkled with water before shooting, and the loose coal and undercuttings watered down before loading on cars.

Empty cars are flushed with water either on the top house or elsewhere before loading; and the tops of all loaded cars are made wet before leaving the rooms, the slope side track or gathering sections.

Furthermore, the employment of rotary dumps, tight cars, precautions against overloading to prevent spillage of coal along the haulageways, the use of gob rock instead of fine coal as ballast under the tracks, together with frequent cleaning of haulage ways, have done much to reduce the production and accumulation of coal dust in Alabama mines. Supplementing this, rock dust stemming is used at some mines as a suppressant of coal dust, as well as to smother the flame in shooting.

In treating the coal dust to render it inert, the prevailing method is sprinkling with water² (the sprinkling systems in some of the Alabama mines are among the best and most thorough in the Nation)². However, rock-dusting is fast supplanting wetting as a means of eliminating the black powder from the magazine to the working places, and fibre (pocket) boxes for detonators, has served to prevent explosions from these sources.

The removal from the slope and haulageways of high tension electric cables; the installation and maintenance of trolley wires so as to prevent arcing; the placing of mine machine cables under the track when it has to be crossed; the fastening and keeping connected of the ground

¹goaf

²I recall now, a mine that has installed around forty miles of pipe lines for sprinkling. Others have proportionate installations depending on the size of the mine.

wire of mining machines to the water pipe while the machine is in operation, and the grounding of all electrical apparatus; the introduction of storage battery locomotives; and the use of explosion proof motors, connections, plugs and switches; have done much to reduce to a minimum the danger of setting off the gas or dust from electric arc as well as injury to the workmen from electric shock.

The proper placing (or balancing) of the blasting holes, and clearing them of dust before loading, restriction of the amount of charge of explosives, the tamping of the holes to the collar with clay or rock dust, the undercutting of the coal, or abandonment of solid shooting⁴; the use of permissible explosives,⁵ firing of shots with electric batteries and by shot firers, are the prevailing precautions against gas and dust explosions from blasting and blownout shots.

The inhibition against going into worked out or abandoned places and against lighting fires in the mine is universally enforced.

The above and other practices to prevent explosions have materially contributed to the bodily security of the coal mine employees of Alabama, to an extent hardly thought possible a few years ago.*

Escapeways: Directions for Escape and Rescue

As a precaution against the workmen being cut off from the regular manway or slope, in case of explosion or mine fire, at many mines additional escapeways other than those required by law are provided. Furthermore, instructions are given the men how to escape in safety, and in the use of self-rescuers, the number of which now in use in Alabama has increased considerably during the past year. Signboards in the shape of arrows, are posted along the passageways and escapeways indicating the best way out of the mine. It is customary to keep at a number of places underground maps of the mine, with the routes of escape and live workings marked in red thereon for the use of the men in emergency. Several copies of these maps are kept available the place made safe before the miner is permitted to return to work. On pillar work, by means of wing brattices, the air current is kept sweeping over the falls of roof, which are examined frequently each day for gas, the inspector going as far up on the falls as possible. Every few days inspections are also made of falls in old workings, as the prudent operators maintain adequate ventilation throughout such old workings so as to guard against dangerous accumulations of gas in any part of the mine. Under provisions of the Mining Law, old workings must be fenced off and "Danger" boards placed at the entrances.

⁴In 1925, 65 per cent of the coal mined in Alabama was undercut by machine and a large portion of the remainder undercut by hand.

⁵In 1925, around 30 per cent of the coal was shot with permissible explosives. Consequently the number of mine fires has been proportionately reduced as the use of permissible explosives increased.

*198 coal mines in Alabama have operated for the past 5 years and 194 have operated for the past 10 years without a major explosion (5 or more killed). 193 of these mines have operated for the past 5 years and 186 of them have operated for the past 10 years without any explosions which resulted in any loss of life at all.

The requirement that the gas inspector or fire boss, in marking up his visits, use a different colored chalk from that used by foreman or safety inspectors, in making their inspections; that he check in and out of the mine with brass check all men on each shift; that he or his helpers must have no open light of any sort while making inspections, or while removing gas³, from the mine and that only approved explosion proof (permissible) flash lights or electric cap lamps and magnetically locked permissible flame safety lamps be used in making inspection for or on removal of gas; and that all flame safety lamps be inspected, lighted and locked before leaving the lamp house, so that the lamp can not be opened or unlocked while inside the mine; are all important precautions against gas explosions. But the most important of all is, that, previous to each shift, all places in the mine be freed of accumulations of gas before the workmen are allowed to enter. Although the Alabama Mining Law requires that accumulation of gas be removed, the principal reason for adopting the practice of removing the gas before the workmen are allowed to enter is, that a large portion of the disasters from explosions in Alabama mines have been occasioned by accidental ignition of standing gas, even though the place was marked out by the fire boss and the workmen thereby given knowledge of its presence; or while the gas was being removed during the shift. Where sudden outbreaks of gas or "feeders" occur all open lights are withdrawn from that affected split or portion of the workings. However, recently the failure to observe this practice in one Alabama mine, cost the lives of nine men. In a number of mines the use of electric cap lamps has eliminated the open light hazard. In these mines prohibition against lighting matches, smoking, or the use of open flame is strictly enforced.

Mining Law and Rules Are Carefully Observed

Here let me interpolate, that in handling explosives, the provisions of the Mining Law and the rules and instructions for handling explosives prescribed by the safety engineers of the explosive manufacturers are generally observed; and that use of powder jacks for carrying coal dust hazard; there now being in the state 31 mines completely rock-dusted and several others where the work is well underway.

Where rock dust is used, systematic sampling and testing is done monthly, to make sure of the non-combustibility of all accumulations of dust in the mine; a record is kept of the tests and a report is made to the management both at the mine and the head office.

Accompanying the matter of laying coal dust much attention has been given to ventilation, and the prevention of gas explosions.

The ventilating systems of Alabama mines are well planned and projected to meet the requirements, as the work progresses. One or more

³That in removing gas, all except the nearest cross-cut to the face be closed and that a wingbrattice be run from this cross-cut so as to carry sufficient air to the face of the working place.

fans of excess capacity are universally provided, many of which are equipped with a gasoline or steam power auxiliary drive that can be changed over with a minimum interruption of the flow of the air. Recording pressure gauges are used on them to indicate and record the fan performance during each period of the day and night.

These fans are offset from the mine opening a sufficient distance to guard against injury from explosions from within the mine. They are also protected by explosion doors on the fan house and in the tunnel leading from the mine to the fan house.

Also at many places fan stop signals are used. These are in the form of electric lights, placed at key positions, which indicate that the fan is operating; or in the form of sirens which indicate when the fan stops, thus warning the surface force to start the fan, or by telephone and messenger to withdraw the workmen from underground. If the fan is stopped for any appreciable time all workmen underground are withdrawn and not allowed to re-enter until the mine is inspected and reported free of gas by the fire boss.

Ventilation Knowledge Has Replaced Guess-work

In aid of the regular fire bosses required by law, at some mines a ventilation superintendent and crew of helpers are employed, to check the fire bosses' inspection, see that all brattices, cross-overs and doors are tight, aircourses sufficiently large and free of obstructions, break-throughs driven at proper intervals, ample air-current on each split; and to plan for sufficient ventilation as the mine workings are extended. Knowledge of actual ventilation conditions has replaced guess-work. At many places readings in each air-split are taken daily, or every few days, together with samples of air, which are analyzed: and in no case is the methane content allowed to exceed one-half of one percent. If in making his rounds the ventilation inspector finds a door propped open, he must leave it so; and having withdrawn the workmen from the part of the mine affected, he must immediately report the matter to the mine foreman; and see that ventilation is restored and the section affected is free of gas before allowing the workmen to re-enter.

It is common practice to have the face of each place examined for gas previous to loading blasting holes, and again after they are fired; and able at the mine office for use of rescue crews from other places, should the necessity arise. At some places a map of the active workings is posted at the mine entrance, upon which colored headed pins are stuck to indicate the approximate position, class and number of the workmen inside the mine on each shift.

At practically all of the gaseous or dusty mines, self-contained oxygen breathing apparatus is kept in good condition and readily available for use in rescue work; and it is rare to find a mine that does not have a large number of men trained in first aid and in the use and care of breathing apparatus. At several large operations these men are trained for the

work at their central rescue training station⁷. Some of the large companies have a modernly equipped mine rescue truck, but most of them are trained at the Birmingham station of the United States Bureau of Mines. These men readily respond to the call when a disaster occurs at any mine in the district.

Transportation and Haulage Ways Accidents

First, provision is made for adequate manways, free of water and obstructions, to obviate the necessity of the men using the slope or main haulageway in going to and from work. This, added to the increase in illumination resulting from rock-dusting the roadways, has rendered traveling on foot in the mines safer than under previous conditions. Prohibition against riding trips; the placing of refuge holes at frequent intervals to eliminate danger of getting caught by trip of cars or motor⁸; sufficient clearance at side tracks and passing places to allow spragging in safety; blocking switches and frogs to prevent those walking the haulageways from catching their feet in such wedge-shaped places; parallel lever switch throws, with ample space between tracks and wall to prevent the trip rider from being struck by moving trip or rolled against the rib; the use of block signals, together with trip lights and markers where two or more locomotives are operating over one track, and block system for protecting trips; automatic signals⁹ indicating the approach of trips around curves and at trap doors to protect the men who are required to travel the haulageways; the employment of underground dispatcher of transportation and motor foreman; and the application of drags on rear of trips being hoisted on the slope, to cause derailment of trip in case of breaking of the rope or the couplings between the cars; the modification of curves and turnouts, easing of grades, proper alignment or gauging of the tracks, the use of heavy rail and crossties, crushed gob rock for ballast, rigid frogs and point switches for slope and mine locomotive tracks; all these are among the things done to prevent haulageway accidents.

In order to prevent damage resulting from runaway trips on slopes, the following devices are used; automatic derails for loaded cars on slope so spaced that they are less than the trip length apart; open derail for empty trip on each tipple approach, causing the operator to hold the switch closed to let the empty trip enter the slope; automatic stopping devices on the hoisting engines to protect the trip, whether being hoisted or lowered, by stopping the engine in case anything happens to the hoisting engineer; the use of gongs or sirens at the foot of all hoisting slopes which give a warning signal in case of runaway trip on the slope.

The following rules are also enforced: No one, except the trip rider, to ride any but man trip. Trip rider must not ride elsewhere than on the front or back end of trip. Couplers or brakemen must not couple cars

⁷Some of the large companies have modernly equipped mine rescue trucks.

⁸These holes are whitewashed, together with a strip along the rib, where the workmen are allowed to travel, indicating the direction of the hole.

⁹In any case, motormen must sound signal gongs when approaching curve in track or at door where men are at work.

while in motion and motormen must not back locomotive upon the trolley pole. No one shall attempt to run a locomotive without permission of the foreman in charge of transportation.

(In handling man trip, the safety rope couples on the main haulage rope above the socket and passes through each car, and is fastened to the draw bar of the rear car. When this trip is coupled to the main hoisting rope a special clevis and coupling pin are used. The pin is threaded, a nut is screwed on and a cotter key put through the pin below the nut. All of which, including the hoisting rope, is inspected thoroughly before starting to lower the trip and a record is kept of those inspections. Two engineers must be at the throttle when the man trips are operated.)

In the up-to-date mines all trolley wires are guarded the entire length on branch entries and at other places where employees have to work or pass; and when making extension of the trolley wires it is guarded before being connected to current.

All trolley wires are placed on opposite sides of cross entries from the rooms.

Accidents From Electric Shock

The last statement brings before us the matter of preventing injury from electric shock. Among other things, the use of explosion proof equipment (and appliances such as oil switches and indirect switch throws), the proper grounding of the cases, frames and supports of all these; insulated seats and platforms, rubber mats for the workman to sit or stand upon and rubber shoes for him to wear; reduction in voltage used inside the mine; the use of armored cables for conveying high voltages; the proper bonding of rails on locomotive track; safeguarding bare, exposed or live wires, switches and connections, and drainage to make dry* the floor and walls under and surrounding these sources of danger; are some of the precautions employed; together with the posting of "Danger" signs, warnings and the like. However, much is gained by observance of the Rules, Specifications and the Code of Standards of the Coal Mine Rating and Inspection Bureau of the National Council on Compensation Insurance, respecting the installation and maintenance of electric equipment in and about the mines.

All Alabama coal mines are operated under an effective State Mining Law. This law was drawn by experts qualified in mine accident prevention and was prepared with the supreme object of protecting the lives and limbs of those engaged in the coal industry. Supplementing this law are comprehensive "Operating Rules," authorized to be promulgated and enforced under the law. These rules and an abstract or digest of the safety provisions of the Mining Law are kept posted at the entrance to the manway, on the top house, and at other conspicuous places in and

*The use of rock dust in the mines has eliminated the moisture hazard and has served to prolong the life of the insulation connected with electrical installations and equipment.

about the operations; and a copy of the rules (after having first been read and explained to him) is given each employee. When additional rules are made they are likewise posted, and a copy printed on a placard which is hung on a nail inside of each empty mine car where it can be readily seen by all. (This means is also used to emphasize other rules and to display safety slogans, the same being changed or renewed every few weeks, to prevent staleness and obliteration.)

Careful Inspections Are Frequently Made

Under the law careful inspections are frequently made of all coal mines by competent officials employed by the state, which, when augmented by the Inspection Service of the Compensation Insurance carriers, have operated to remove many of the physical hazards, much of the neglect of management and carelessness on the part of the workmen; as well as, to cause a more general observance of the safety provisions of the law and the rules above mentioned. The greater portion of the operators employ a chief safety engineer and one or more safety inspectors or bosses and committees, who make continuous inspection at each mine and confine their activities entirely to accident prevention. These men have performed signal service in this line; and it is conceded generally that they are the most important human agency that can be conceived to protect the workmen in and about the mines from accidental injury.

At other places deputy foremen and face bosses, whose duty it is to examine frequently the working places, are employed to great advantage.

Another valuable agency in reducing accidents, is the employment of section foremen, who have charge of from 12 to 25 men. They look after the timbering, security of the roof, handling of explosives and other safety measures outlined herein; especially inspection of each working place before and after shooting. At mines where the "Contract System" is used the contractor acts in the capacity of a section foreman, performs the duties mentioned and is held responsible for the safety of the workmen under him. Both of these systems have proven particularly efficacious in the enforcement of discipline and the elimination of physical hazard and are therefore much in favor in the mines of Alabama.

The actuating force behind these activities, by whom the work is directed and to whom all working forces are individually and collectively answerable, is the safety organization at the mine and at the head office. These committees are composed generally of the manager of mines, the chief safety engineer (where employed), local mine managers, superintendents, foremen, safety inspectors, and section foremen or contractors. Often to these is added a committee of workmen and officials.

Meetings of these are held monthly and oftener if necessary or desirable, at which time reports and recommendations are made to the president regarding the accident record for the past month, provisions for their future prevention and safety measures in general. Where

the section foreman or contractors are not members of the safety organization, they are called together in a separate meeting each month for consideration of these matters.

When a lost-time accident occurs a committee makes immediate investigation to ascertain the cause, place the responsibility for the same and to make recommendation to prevent its recurrence.

In many instances, a drawing is made showing how the accident occurred and beside or under this a picture of how similar accidents can be avoided. These drawings or pictures are then posted where all workmen can see them.

Accidents From Falls of Roof and Coal

The most prolific cause of fatalities and serious bodily injuries to the coal mine worker, in Alabama, as well as elsewhere, is falls of roof and coal. These are occasioned almost universally through the failure of the workmen to observe the provision of the law and the mine safety rules. The reduction of accidents from this cause is effected by the forceful combination of:

(a) Strict application of discipline and compliance with the timbering rules and other regulations regarding roof control, which require the workmen to make safe and keep in safe condition at all times his working place:

(b) Constant supervision and frequent inspections of the roof by the safety inspector, assistant mine foreman or contractor, as outlined herein;

(c) Education and instruction in safety practices and personal appeals to the individual coal digger or loader to refrain from working in an unsafe place and to exercise care and prudence at all times.

Rules as to testing the roof upon entering the working place and often during the shift; systematic timbering; pulling down loose rock; spragging or propping the face coal while it is being undercut and likewise the loose coal after shooting; as well as blocking cars in both directions while the coal is being loaded; precautions against overloading the shots, replacing blown out timbers and the like at many mines where they are unfaillingly observed; have practically eliminated accidents from falls of roof and coal¹¹.

A potent help in educating and instructing the underground employee

¹¹As proof of this there are 86 coal mines in Alabama that have had no fatal accidents from this cause in the past 5 years, and 141 mines that have had none in the last 2 years, since these rules have been relentlessly enforced and since the contractors, section foremen and safety inspectors have been particularly charged with the duty of seeing that they are enforced.

However, this has only been accomplished where provision is made for a plentiful supply of suitable timbers and capboards to be delivered without fail to each working place before the same are needed by the miner; so that he will not have to wait for them, or to work under an insufficiently supported roof. And then, too, the foreman or inspectors are no content with simply warning the miner of the dangerous condition or ordering him to remedy same. He stays and sees (or returns shortly to see) that his orders are carried out and the place made safe before the miner or loader is allowed to work therein. Otherwise, the miner or loader may delay or fail totally in carrying out the order and the injury follow in consequence thereof.

in prevention of accidents from falls of roof and coal, has been the distribution among them of illustrated pamphlets, on the subject, graphically showing and telling him the safe and dangerous ways of performing his work. Many thousands of copies of these pamphlets have been from time to time broadcasted throughout the mines by the Alabama Mining Institute. Following this, each time, a marked decrease in this class of accidents has been noted.

Here let me mention also that shields or guards on the cutter-bar of mining machines and revolving parts of machinery and guard rails or fences, beside pulleys, belts, electrical apparatus, and around openings of dangerous depth, hand rails and safety treads on stairs and passageways are commonly in use.

Accurate Accident Records Are Appreciated

The value of keeping accurate accident records is appreciated by the management of Alabama coal mines and the practice prevails especially at the larger operations. These records prove that over 90 per cent of the accidents are due to the carelessness of persons rather than physical conditions. Therefore, if carelessness could be eradicated coal mining would be one of the safest occupations in which men can engage. Carelessness can only be eradicated through rigid discipline and timely education, (Here is where the section foreman or contractors prove most valuable in accident prevention).

Discipline consists in enforcement of the Mining Law, Safety Rules and Practices, and the instructions given by those in charge of the work. But discipline without education is futile; and education without the willing inclination and favorable disposition of the workmen to profit by and apply the knowledge gained therefrom, is useless.

Discipline is maintained by reprimand, suspension or discharge. For the first infraction or offense, a reminder is served on the malefactor; for the second, suspension; and for the third, discharge.

In connection with the enforcement of discipline, a continuing notice by the management to all employees as follows, has proven effective:

"That the compliance with the mining laws, the observance of all safety rules, the exercise of prudence and care to prevent accidents, are conditions of employment at this mine; and these conditions apply to all operating officials and every person in the employ of the company. That accident prevention is the paramount policy of the management and that dismissal will follow the failure of any official or employee to fully and properly support this policy; and that no person will be employed or retained in the service of the company, who does not give voluntarily definite assurance that he will support this policy."

However, even when the management and operating officials fulfill their duty, to the utmost, and after all possible physical hazards have been removed, little can be accomplished without the constant cooperation of each individual workman. Such cooperation, to a great extent, will eliminate the "human element" in the causation of accidents. Or

in other words, the whole hearted interest in safety and unceasing alertness to prevent accidents, of every one working in or about the mines, is necessary to attain the desired end.

This, as I have said, is a matter of education or instruction and personal appeal to the workmen individually and collectively. It is done through the distribution of tracts and pamphlets¹², display of posters,¹³ motion picture reels and lantern slides¹⁴; and lectures on accident prevention.

Magazine and Prize Contests for Employees

One large Alabama operator publishes monthly an excellent magazine for the benefit of its employees, whose columns are devoted principally to accident prevention. This company also conducts prize contests among the school children and Boy Scouts under 16 years of age, for the best essay written on Safety Practices In and About the Mines. Of course these children know nothing about the subject they are to write on and have to get all their information from their father or some relative who is employed in the mines. The results of these contests have been quite noticeable. The safety engineer goes into the schools, talks with the children, and puts out safety propaganda through them to their parents. Each school child promises that each morning, before a member of his family who works in the mines goes to work, he will caution him about being careful while at work that day. The children are taught safety songs and to draw pictures of accidents showing the cause and how these accidents could be prevented.

In addition, actual photographs of the location of the accidents underground are taken and lantern slides made from them, are thrown on the screen. At each picture show three or four slides with safety slogans are run. Another method of putting over the safety slogans is printing them on the pay envelopes.

An advantageous and effective means of reaching the individual workman, and of enlisting the earnest aid and effort of every one (including the wives and children) in waging a relentless fight against carelessness, is through frequent community meetings¹⁵ of the operating officials, employees and their families at each mine.

¹²Prepared and issued by the U. S. Bureau of Mines and the Alabama Mining Institute.

¹³Of the National Safety Council.

¹⁴Of the U. S. Bureau of Mines and others.

¹⁵The formation of a chapter of the Holmes Safety Association (one for white and one for colored employees) at each mine is a desirable and satisfactory medium through which these meetings may be held and interest in accident prevention aroused and maintained among the workmen.

The chapters which have been functioning during the past year and a half have proven their worth; not only in the maintenance of safety and stimulating prudence and individual responsibility among the workmen; but as an instrumentality for wholesome entertainment for all the people in the community; and for their contentment and good will toward the management and toward each other.

See "Appendix" to this paper.

With the realization that the physical and mental condition of the employee has a material bearing on his prudence or negligence (or the accident frequency among the workmen), the Alabama Coal Operators have done much to provide comfortable and pleasant living accommodations, sanitary and healthful surroundings, including bath or change houses for their employees; together with excellent medical and hospital services and attention for them and their families, at a nominal monthly cost¹⁶. The cost of living is made reasonable through the company stores, and gardens are provided for raising fresh vegetables, fruits and poultry. Good schools and playgrounds are furnished for the children. A square deal and just treatment accorded by the management, coupled with satisfactory working conditions and reasonable safe-guards against injury, enable the worker to go to his work "with a song upon his lips and hope in his heart." This operates for tranquility, stability, responsibility and efficiency of the working forces, and is reflected in a cleaner record for safety, with greater production and fewer accidents.

Furthermore, the coal mine employees of Alabama are, as a rule, intelligent and susceptible to instruction, appreciative of and responsive to the efforts of their employers to provide for their safety and welfare; and consequently loyal and amenable to discipline.

All told, the safety practices obtaining generally in and about the Alabama coal mines, have placed them in an advanced position with respect to accident prevention¹⁷.

Safety Standards Should Be Universal

All of this requires the expenditure of a large amount of money and adds greatly to the cost of production. Therefore, the disregardful operator, who fails to employ ordinary safety standards, may have an unfair advantage in selling his product over the progressive and humane operator, who increases operating expenses by using these precautionary measures.

It has been suggested that the observance of safety standards can be made obligatory, on all producers alike, only by the operation of a Federal Law; and not through legislation whose authority is limited to the boundaries of each state. Even so, it is practically impossible to draft a general law which will be efficacious and yet sufficiently flexible to meet varying conditions; and which will not bear too heavily on some or too lightly on others.

I agree with what was said by Mr. T. T. Read, on the eve of his retirement as Safety Service Director of the United States Bureau of Mines, in substance as follows:

¹⁶Under the "Medical and Hospital Contract System."

¹⁷One hundred fifteen coal mines in Alabama for the past two years and sixty-two of them for the past five years, have had no fatal accidents. One of these employing several hundred men, last year had only four minor accidents causing loss of time to the injured employee.

"We can not hope to do anything effective in regard to getting the safety practices recommended by the Bureau adopted by the industry without first securing the cooperation of the operators. I have no faith at all in making mines safe by laws. If regulations are made that the operators regard as not being necessary, you will merely have a situation like that created by certain sumptuary legislation which people joyously and openly disregard. State officers can not be expected to enforce laws unless the sentiment of the operators is behind them. . . . Even the best qualified mine inspectors find it difficult to make the operators and the workmen comply with the law unless they believe that the regulations are reasonable and effective."

Operators Promptly Adopt Safety Recommendations

My observation is that the Alabama coal operators do not wait for the enactment and invokement of laws, but where possible and applicable, adopt promptly the recommendations of the United States Bureau of Mines, the State Mine Inspection Department, Safety Service of the Insurance Companies, National Safety Council and of the safety engineers employed by them and by operators in other coal fields. For instance, a large portion of the safety practices obtaining at Alabama mines are not covered by the State Mining Law at all and had not been thought of when the law was passed. On the other hand, several of the provisions of the law are now obsolete and ineffective from a practical operating standpoint. And again, certain provisions of the law are applicable in one mine and not in another.

However, law or no law, you may rest assured that the Alabama coal operators and their employees will continue to wage a relentless fight against carelessness and spare no expense when human life is at stake. But those who have to do with raising revenue, levying taxes, fixing liabilities by law (such as Workmen's Compensation), and making regulations which increase the cost of production, should consider the already impoverished condition of the industry, the competition from other coal fields, other forms of fuel and other sources of power before enacting measures or applying regulations which may, by reason of their cost, become burdensome and consequently cause the abandonment of more important precautions and activities for safety that would otherwise be carried on.

This writing would be incomplete if I failed to mention that a number of lives have been saved and the seriousness of many injuries reduced by the prompt administration of first aid to the injured. Several thousand¹⁸ of these men have been trained for service in the coal mines of this district during the last few years by experts of the United States Bureau of Mines and by instructors employed by the individual operators. Some of the operators have a large percentage of their employees trained in first aid and mine rescue work. It is also a rule at some places that all foremen and contractors must be certi-

¹⁸Nearly two thousand were trained in 1925.

fied first aid men. It is unusual to find a coal mine in Alabama that does not have a large number of men (women, girls and boys) trained in first aid and safety methods. Aside from its value in saving lives and benefit to the injured person, the training has proved of great worth in the prevention of accidents. It has been truthfully said that when you train a man in first aid, you automatically make a safety man out of him. The records of one of the large concerns here which employs several thousand men and operates a number of mines, shows that accident frequency was eight times greater among the untrained men than among those who had received first aid training.

First Aid Stations Well Equipped

It is usual also to have equipped and maintained approved first aid stations near the tippie, and at many places these stations are established inside the mine. First aid kits and supplies are kept at convenient places within the mines and about the works. To give and keep up this training entails the devotion of a great amount of time by the employees involved, and a heavy expense to the operator. The interest in the work is kept up through the Holmes Safety Association meetings and by inter-mine or company contests; and each year the Alabama Mining Institute donates the prizes and defrays the expenses of holding a contest for all the mines in the district. These annual contests are largely attended and much enthusiasm for the work is aroused not only among the contestants but among all the employees in and about the mines.

Let me also say that one of the most impelling influences that have made for progress in protecting the people engaged in coal mining in Alabama from personal injury, has been the officers and members of the Mine Casualty Committee of the Alabama Mining Institute. The members of this Institute are deeply grateful for the assistance and helpful information, suggestions and recommendations which have been furnished them by the officials of the United States Bureau of Mines, the Mining Departments and Coal Operators in other states. In appreciation of this the operators of Alabama stand ready to reciprocate in kind and like measure, as occasion may require.

NOTE:

There are 222 coal mines in Alabama being operated on 30 different seams of coal; each of different thickness, and each mine, even on the same seam, encounters different operating conditions. A few of these are strip mines, several are shaft mines, others are drift mines and the remainder are slope mines operated on seams of varying degrees of pitch. Some of these mines are gaseous more or less, and others free of gas. Some are naturally wet and others dry. Some are electrified and others are not. In some the roof is weak and in others strong. Some employ a great number of men and others only a few. Therefore, the writer does not assume or mean to say that all of the safety practices enumerated here are employed at all or in any one mine, as many of them are impracticable, inapplicable, unnecessary and not in use at certain mines but are employed at others.

(Appendix)

THE HOLMES SAFETY ASSOCIATION

H. E. Mills, Assistant to the Secretary, Alabama Mining Institute

In the mining districts of Alabama we now have 35 active chapters, including all mines operated by the State of Alabama with convict labor. Each chapter is self-supporting and self-governing, with a president, vice-president, secretary-treasurer and safety director, elected by the members.

The Newcastle Chapter No. 2, with Frank Parker as president, was the first organized in Alabama and is tied for first place in the United States, as Newcastle and Butte, Montana, were organized on the same day, April 15th, 1922. The records of the Butte Chapter are not available but if their record is superior to Newcastle they have achieved wonders, as this chapter has produced nearly one and three-quarter million tons over a period of seven years without a fatality.

The Alabama Council of the Holmes Safety Association is composed of representatives of the United States Bureau of Mines, Alabama Mining Institute, State Mine Inspection Department, Insurance Carriers, Coal Operators and others interested in the prevention of accidents and promotion of health. It meets in Birmingham each 90 days to discuss future policies, appoint committees and suggest subjects for the consideration of the program committee.

The program committee selects the subject to be discussed each month in each chapter, also assists the chapters in securing speakers and entertainers from other operations elsewhere in the district.

During the past year the following subjects have been thoroughly covered:

1. Accidents from Fall of Roof and Coal and Means of Prevention.
2. Electrical Accidents and Means of Prevention.
3. Haulage Accidents and Means of Prevention.
4. Handling of Explosives.
5. Unusual Accidents.
6. Necessity for Discipline.
7. Food and Care of Children.
8. Mining Camp Sanitation and Personal Hygiene.
9. Care of Machinery.
10. Value of First Aid Training and Rescue Work.
11. Mine Gases and Ventilation.
12. Surface Accidents and Value of First Aid Training.
13. First Aid Training in preparation for Field Meet.
14. What a Miner Should Do After a Fire or Explosion in a Mine.
15. How to Prevent a Mine Explosion.
16. The Careful Miner.

The speakers are selected for their knowledge of the subject, and in addition local officials are called upon to speak, while the members themselves join in a general discussion. To maintain interest and

increase attendance amusement features are also provided, such as moving pictures, music, readings, playlets, and in most cases refreshments are served, so that the entire family attends. (The use of local talent and school children where possible is a good drawing card and many attend through personal interest in the performers.)

The Alabama Council is issuing a series of safety and health papers prepared by competent men and these are read before each chapter and copies presented to all members present. In this way a first class safety library is being built up.

The first safety paper issued under this plan was entitled "What a Miner Should Do After a Fire or Explosion in a Mine," and told, in a very dramatic way, the experience of miners entombed by an explosion and how they saved themselves by erecting a barricade deep under ground where they were finally rescued 13 hours later.

The second paper tells "How to Prevent a Mine Explosion." The Association is indebted to Mr. S. L. Morrow, Birmingham representative of the Link-Belt Company, for these two very excellent papers, which are based on years of experience as chief engineer of a large coal and iron corporation where he was in charge of all safety work.

Other books distributed under this plan were:

"The Careful Miner," by William Goodwin, Associate State Mine Inspector.

"Prevention of Accidents from Falls of Roof and Coal" (Illustrated), by Jas. L. Davidson, Secretary, Alabama Mining Institute.

"Typhoid Fever and How to Avoid It," by Jas. L. Davidson.

The next safety paper originated from such an unusual source that numerous requests for copies were received from all parts of the country.

The paper was written by a negro convict in the Aldrich Convict Mine, who was awarded first prize in a safety essay contest held among the inmates. The title, "And Teach Others," was selected because the writer, Alex Mitchell, used that expression, underscored, many times, thereby showing his appreciation of the fact that "No Man is safer than the most careless man in the mine." The original of this essay is now filed in the Department of Archives and History at the State Capitol in Montgomery, Alabama.

Essay Contest Among Children of the Schools

Following this contest, the DeBardeleben Coal Corporation offered cash prizes for the four best essays written by school children under 16 years of age, dealing with safety conditions in and around coal mines of Walker county.

Among the many excellent papers received, that of Gwendolyn Gentry, Coal Valley, Alabama, and the joint paper by Dorothy Davis and Louise Smithers, of Sipsey, Alabama, divided first honors and are being printed for distribution among the coal mine employees of Alabama.

The State Board of Health and the various county Boards of Health have rendered unstinted help and cooperation in the promotion of this

work and during the months when sanitation and hygiene were the subjects covered they supplied speakers for all of the chapters.

Although with the exception of a few chapters the Alabama organization is only a little over a year old, accidents have been materially reduced, and the Alabama Council plan is being used as a model for organizations in other states.

The Alabama Mining Institute defrays the expenses of printing the pamphlets. Also all other general expenses connected with the work, including transportation of the speakers and entertainers. All administrative and clerical work in connection with the Central Council, together with the arrangement of programs and setting of dates for speakers and entertainers, has been done by the office force of the Alabama Mining Institute.

Discussion Following Mr. Davidson's Paper

CHAIRMAN YATES: We will take about 10 minutes for discussion of this paper. There are a great many coal miners here and they are the ones who are able to discuss it, although we would like to hear from any of you.

J. J. FORBES (Mining Engineer, U. S. Bureau of Mines, Pittsburgh, Pennsylvania): Spending in the neighborhood of five years with Mr. Davidson in Alabama, I was certainly pleased to see this splendid paper. There is one feature of this paper I think he should have harped on more and that is the activities of the safety association. He has it in his paper, but I do want to call attention to the splendid work that has been done through the Holmes Safety Chapters throughout the state of Alabama.

There are 40 of these chapters now operating in the state. This is the first district in which we tried out the council plan of the Holmes Safety Association. The district council is made up of all the forces in that state that work for safety, operators, miners, insurance carriers, state mine inspectors and Bureau of Mines representatives. Every once in a while this council gets together and lays out an appropriate program on some phase of accident prevention work and health. In addition they help to secure speakers that will go out and put on some real live talks on some phase of accident prevention and health. I think Mr. Davidson will agree there has been some very splendid results in accident prevention work that have come from the formation of these chapters throughout the state.

J. T. RYAN (Vice President, Mine Safety Appliances Company, Pittsburgh, Pennsylvania): I have just one criticism of my good friend, Davidson's paper, and that is his modesty. He told you all about the activities for safety in the mines of Alabama, and it is a very wonderful paper, I think. You naturally assume there is something back of this safety organization, some particularly outstanding individual that is responsible for this, but he did not tell you. That individual is Mr. Davidson himself. I think that it ought to be mentioned.

I had occasion this year in the summer to go down to one of his

meetings. I really was astounded. I think there were about 800 at this safety rally, representatives of practically all the coal companies in the state, most of their officials, some had all of their officials at this meeting. I was interested in finding out what agency was responsible for their being there, and I inquired as I went around the following week visiting the mining companies. There was but one answer—Mr. Davidson had practically commandeered them to come.

Another activity, he has a vaudeville troupe he carries around to these meetings. I do not know of anybody that works as hard in the safety game as this man does. He is out almost every night on some safety work and to make it attractive he has developed this vaudeville troupe he takes with him.

MR. DAVIDSON: I will bring over a set of our publications tomorrow morning so you may look them over if you desire.

I certainly appreciate the remarks these fellows made. I am at this time about like the boy at the university when he went to sign his examination pledge. He said, "I have not been given any assistance on this examination, but God knows I need it."

Lake Superior Companies Conducting Safety Campaign

C. S. HICKS (Technical Representative, E. I. Du Pont de Nemours & Company, Wilmington, Delaware): I want to mention the iron mining companies in the Lake Superior district are conducting a safety campaign in connection with the public schools and they have gotten some good results from it.

R. DAWSON HALL (Engineering Editor, McGraw-Hill Publishing Company, Coal Age, New York, New York): Alabama was possibly a little later than some of the other parts of the United States in taking up rock dusting. I am glad to hear so much is being done in that connection now. In some way Alabama could manage to go ahead of almost any other district in that respect. Alabama has a lot of mines which as we know them are captive mines, that is to say they are run by industries, and consequently it does not need to care so much how its coal looks when it goes into the market. Of course those who are in the commercial business have to have good looking coal; those who are supplying coal for coke ovens can supply good coal and that is all that is required. It seems therefore that it would be possible to rock dust the rooms extensively in Alabama, and thus carry the defense clear up to the face.

Limestone dust possibly is a good thing to put in the coke; it is something which will entrap the sulphur in the coal right in the coke and will form a calcium sulphate which will prevent the sulphur getting into the iron, and I think it is well worthy of consideration, this possibility of limestone dusting the rooms. It is being done in some places, I presume mostly in places where the coal is going to be used for coke, and therefore where its appearance does not matter.

Limestone, as you know, is put into every furnace and there is no reason why some of it should not be put in the form of limestone dust in the coke. Then there is the matter of dusting the cars or the rooms; it can

not be done by the stone dusting machinery conveniently because they can not carry the power up into the rooms and it is not desirable in many cases to do so, but it can be done with shovel and done effectively by the men.

MR. DAVIDSON: When Mr. Forbes was with us we built up a dual system, that is the roadways and the hauling ways slopes are thoroughly rock dusted, but the water line is kept in the live workings and water is applied to the cutter bar to keep the dust down; the car is also sprinkled down to prevent the coal dust from accumulating and we find the application of rock dust lasts much longer under that system than where the single system is employed, although the single system is in use, rock dusting applied at the face.

F. M. CORNELL (Safety Engineer, Consumers Mining Company, Harmarville, Pennsylvania): Regarding the statement Mr. Hall made about rock dusting rooms completely, we have a machine that goes to the face of the room and keeps our rooms rock dusted to the face.

MR. FORBES: I think there is another point that should be brought out forcibly. About four years ago I visited one of the first mines of Alabama where water was applied to the cutter bar mining machine. I want to give a contrast; for a number of visits I made to that particular mine prior to the application of water to the cutter bar of those machines. from the shaft bottom back 50 feet you could hardly see your hand in front of you; after the application of the water to the bar you could go out and stand right over the rotary dumps and there would be no dust; at the tippie there would be no dust at all; over the chutes there was no dust in the air. There is a large production of the state now coming from mines where water is applied from the bar, and of course that is supplemented with rock dusting.

The Problem of Water on the Bar

J. W. SMITH (Safety Supervisor, T. H. Mastin & Company, Kansas City, Missouri): I would like to inquire, when you put water on the bar, what effect does that have on slack? Does it run the slack up in the cars? In commercial mining we have to sell clean lump. If we require them to use water they complain of the water carrying slack over into the car.

MR. FORBES: You probably would have some of that. I suppose when the car reaches its destination the water has dried out and the slack is on the bottom and looks bad.

MR. DAVIDSON: In commercial mines that prepare coal, practically all the smaller sizes are washed; in fact, we wash over half the coal in Alabama that is washed in the United States. We have an elaborate cleaning and preparation system and of course the small coal and the undercutting and dust are taken care of in what we call "wash slack," which is clean and good coal and is used for certain purposes. In the coke making mines of course that is worked on in the ovens and along with the other coal because it all has to be crushed to the proper size.

We do not find application of water at the cutter bar makes any dif-

ference as to the amount of fine coal that is loaded out, because (one thing I left out of this paper but it is presumed) if you want to get rid of the dust you have to load it out. It should be loaded out and not left in the mine because after it is wet it dries out and becomes dust again.

MR. REED: Perhaps if you explain how much water you put on the cutter head, as to whether it is sufficient to make mud out of the cuttings or whether it is dampened to make it moist might answer his question.

MR. FORBES: I can answer that question. I will tell you one thing it does, it cuts down spilling along the haulageways and that is another big factor in its favor. In this particular mine I have reference to, six months after the water was applied at the cutter bar, the superintendent told me the road cleaners had been cut in two; in other words, 50 per cent had been eliminated due to the fact that the fine stuff did not sift through the cracks in the cars. I think Mr. Davidson has answered the question—about 65 per cent of all the coal mined in Alabama is washed after it reaches the surface. The amount of water used on the bar in Alabama is 20 to 30 gallons per hundred square foot of running face.

Protecting the Trolley Wires with Guards

CHAIRMAN YATES: Might I show my ignorance in asking Mr. Davidson one question? What means do you use to remove gas from a room? I am a metal miner and consequently I do not know.

MR. DAVIDSON: That is a matter of ventilation. If you have the proper volume of air that takes care of it. Of course you have to close up all the crosscuts in a room except the last one, and very often run a wing brattice to the face to get the gas out.

J. D. KERR (Assistant Superintendent, Oakfield Plant, United States Gypsum Company, Oakfield, New York): I noticed the statement by Mr. Davidson that in all the up-to-date mines in Alabama the trolley wires are guarded. I would like to have a little information on that, because this question came up with us, a man coming in contact with 250 volts, and the question arose whether it was practical to guard the trolley wire? I would like to know what method you use.

MR. DAVIDSON: That matter has given us a great deal of concern, because it has been extremely expensive to guard and maintain the guards in the proper condition, because it is worse, we might say, to have part of them guarded and have them torn down and the men rely on their being guarded when they are not; and for that reason the most up-to-date mines (perhaps I was a little strong on that statement, we have not as many mines that have all their trolley wires guarded as we should have because it is extremely expensive), but in the most up-to-date mines they are guarded.

Our experience is that when we follow the code of standards of insurance carriers by putting the old fire hose and stuff like that on them it does not serve the purpose, and we have just as many accidents as if the wire was left bare and the men know they are going to get killed if they get into it. But it is very important, if you can afford to do it, to guard them all the way where the men are liable to pass.

MR. KERR: They thought all the trolley wires in our mine should be guarded, and in figuring it up in a rough way they found it would cost something like 20 cents a foot, and with 12 miles of trolley wire in a mine it runs into quite an outlay.

MR. DAVIDSON: On the other hand, it costs you \$4,000, \$5,000 or \$6,000 a man for each man killed. That takes the profit out of several hundred tons of coal, perhaps.

MR. HALL: I was wondering what the effect of the trolley wire coming down, when you have a lot of wood there, would be? When you have hose, the hose is a non-conductor and there is not liable to be a fire at that point. If the wood happens to be damp or even wet you will have a fire because the arc will go along the wet wood and ignite.

MR. DAVIDSON: It goes right through it. I expect Mr. Harrington could answer that question better than I, and I think we had better discuss that question when his paper comes.

MR. FORBES: In my paper on "Safety Kinks," I think I could offer some suggestions to help this man from the Gypsum Company.

J. P. HODGSON (Manager, Phelps Dodge Corporation, Morenci, Arizona): I was requesting information from this gentleman who made the inquiry from Mr. Davidson, how high they carried their trolley lines? He said four to five feet. In my opinion, if they are carried only to that height they ought to be compelled to guard them. The law in Arizona compels them to be carried to a height of six feet; if they are below six feet the mine inspector might let us through if we put an inverted board on each side of the trough.

CHAIRMAN YATES: The next paper will be read by Mr. C. S. Hurter, Technical Representative, E. I. du Pont de Nemours & Co., Duluth.

SAFE PRACTICES IN BLASTING

**Charles S. Hurter, Technical Representative,
E. I. du Pont de Nemours & Company**

As my experience in the use of explosives has been gained in metal mines and outside work, this paper treats of safe practices in blasting in operations of this character only. I am not familiar with the latest developments in coal-mine practice and consequently that subject is not discussed. Many of the safety rules given in the catalogs of all explosives companies are so well known that it seems unnecessary to include them here. Likewise the subject of storage of explosives has been thoroughly covered in existing publications. Some repetition is unavoidable but I have endeavored to reduce it to a minimum. Inasmuch as I have spent the last year in the Lake Superior Iron District all specific illustrations of safety practice are drawn from this part of the country.

The need for care in handling explosives begins with unloading them from the railroad car for transportation to magazine or work. The cases and kegs should be unloaded and loaded without rough handling and men engaged in this work should not smoke nor carry matches. Explosives, blasting caps and fuse should be protected during transporta-

tion from sun and rain and sparks from steam shovels or locomotives. Covers for bodies of trucks or wagons can be built of nonflammable materials or tarpaulins of nonflammable cloth can be spread over the cases. Cases should be braced in place so there is no chance of their moving or sliding about in transit. Detonators should never be carried in the same conveyance with explosives.

The route for delivery to the work should avoid towns or at least the thickly populated districts. It should also avoid sparks and hot cinders that might be blown by the wind from steam shovels, locomotives or dinkey engines.

In some outside work it is feasible for the vehicle which takes explosives from the railroad car to deliver them direct to the place where they are to be used. In underground work, however, and frequently in large outside operations, a system of distribution from a magazine or other central point is necessary. Some good systems in use are described later under the headings of Outside and Underground Work.

Opening Dynamite Cases

The cases of dynamite should be opened by means of hardwood mallets and wedges. This rule seems to be lived up to in the Lake Superior district with few exceptions. A few mines use copper wedges. In the past phosphor bronze chisels were used very extensively but because of the brittleness of this alloy and the greater safety of wood, they have been almost completely discarded. Excellent wedges can be made from broken pick and shovel handles. Wedges for opening dynamite cases should be kept clean and free from grit. In fact, friction from grit must be avoided as much as possible all along the line in the handling and use of explosives.

Cases should never be opened in a storage magazine nor close to a large stock of explosives. Some companies have a rule that not more than 100 pounds (two cases) shall be opened at one time before being loaded. Some have a rule that there must be a distance of 100 feet between cases opened for loading and unopened ones. Dynamite should never be exposed to direct rays of the sun for any length of time, no matter what the temperature. The sunlight decomposes nitro-organic compounds, thus not only lowering their efficiency, but also creating the hazard of acid dynamite.

Proper priming of the charge is of first importance, both because of the possibility of accidents in making primers and because of the chances of premature explosion or of misfires from improperly made primers.

Special care should be taken in the handling of detonators because they are the most sensitive materials used in blasting. The lid should be kept on a box of blasting caps at all times except when a cap is to be taken out for use, and every other precaution should be taken to prevent grit or dirt from falling into the cap, for even small particles of grit or dirt might cause enough friction when the fuse is inserted to produce an explosion. Blasting caps should never be extracted from the box by means of a stick, wire or any similar implement. Tip the box

over the left hand and shake it gently until the caps begin to slide out so that one can be removed with the fingers.

If the end of the fuse is distorted do not try to force it into the cap. If it can not be rounded back into shape by the fingers, or squeezed into shape by a cap crimper, make a fresh cut. With a sharp knife and a piece of wood for a base it is easy to make a clean cut end.

The end of the fuse should be brought into contact with the cap charge gently. The cap should not be twisted while being placed on the fuse because of the extreme sensitiveness of the charge to friction. A properly designed crimper, such as is sold by the principal explosives companies, should always be used. Tests have shown that a blasting cap is much more effective when fastened on fuse properly than when it is held in place by the dent from the teeth or the heel of a knife blade or when no crimp at all is used. This shows that even a violent quick explosive like fulminate of mercury requires "tamping" to exert its full explosive force.

The end of a fuse exposed to the air for any length of time should never be placed in a blasting cap, because the powder train may have absorbed enough moisture at the end to impair if not destroy the end spit of the fuse into the cap. Where there is a misfire and fuse removed from the cap shows even a very small shred of the center core thread it means that the end was damp and the fire did not burn through.

In wet work it is advisable to waterproof the joint between cap and fuse. This can be done by smearing it with hard cup grease or tallow, or even hard yellow bar soap; or by dipping the cap and a few inches of the fuse in P B or other asphalt paint or in one of the special compounds sold by the explosives and fuse companies for this purpose. Neither vaseline nor cylinder oil nor any of the lighter oils or greases should ever be used because these attack the waterproofing compounds. When the liquid protectors are employed, the primers should be made up and used immediately because these compounds become so brittle after drying for a few days that they are likely to crack and admit water.

A large majority of the primers are made with the cap in a hole at the side of the cartridge. This is the safest type. The hole for the cap should be large and deep enough to allow the cap to be inserted without resorting to force and it should be as nearly as possible parallel with the axis of the cartridge. The greatest effect of a detonator is in the direction in which the loaded end points. Therefore, placing the detonator in the priming cartridge so that it will point along the charge instead of against the side of the bore hole aids complete detonation and reduces the possibility of poisonous fumes from burnt or incompletely detonated dynamite or unexploded dynamite after the blast.

Some Practices to Be Condemned

The hole for the detonator can be punched with the pointed leg of the cap crimper, and some types of crimper are made with curved leg to facilitate punching the hole parallel to the axis of the cartridge. Hardwood punches are used by many. These should be destroyed periodically

as they absorb nitroglycerin in time. A very serviceable punch can be made from a piece of copper trolley wire of the proper diameter by sharpening one end and bending the other into a rough handle so that it can be hung up. Large nails are not recommended as punches because men have a tendency to drop these when they have finished with them and thus create an accident hazard for anyone passing by. Cutting a gash in the side of a cartridge, laying the detonator in this and then closing the cartridge around it is not a good practice but with some of the delay electric firing devices this is the only practicable method.

The usual method of making cap and fuse primers is by lacing the fuse through the cartridge. This is pretty generally followed except on the Mesaba and Vermillion Iron Ranges in Minnesota and in some mines on the Michigan Ranges. It is a bad practice because it introduces two sources of trouble. The first is sharp bends and kinks in the fuse which may break the powder train, or in the case of wet work may admit moisture to the powder. Very few men employing this method take pains to avoid sharp bends in the fuse. The second source of possible trouble is fuse in contact with the explosive. This may result in ignition of the dynamite by side spit of the fuse before the powder train burns through to the blasting cap. With the less inflammable types of explosives, such as the ammonia dynamites and gelatins, and the improved fuse now supplied, there is little danger of burnt charges from this source, but with straight dynamite care should be taken to have as little of the fuse in contact with the explosive as possible. With straight gelatin, unless this precaution is observed, the highest quality of fuse obtainable should be used even if the work is dry.

In making primers with electric blasting caps, the practice of hitching the wires around the primer cartridge is almost universally followed in spite of all recommendations to the contrary. The principal danger in this is possibility of injury to the insulation on the cap wires when drawing these hitches tight. Most miners realize this danger and use care in this operation.

Placing the Primer in the Charge

When loading the charge, the common practice throughout the east and middle west is to place the primer at or near the top of the charge. This allows the detonator to exert its full force against the bulk of the charge, prevents fuse from coming in contact with the charge and gives the greatest measure of safety in loading. In the west the common practice in underground work, particularly in drifting, is to place the primer in the bottom of the hole or next to the bottom cartridge. The reason for this is that when a round of holes is fired in rotation, there is always a chance that the explosion of one may cut off the collar of the hole intended to follow, thus generally spoiling the round and leaving unexploded dynamite in the broken rock or in the bottom of a partly broken hole. I have been present when a shot of this kind has thrown the primer out into the muck and it has exploded there. If the primer is in the bottom it will be undisturbed even if the collar of the hole is

blown off and usually the fuse will already have burned down below the point where it is severed. Cut off holes are more likely to occur in small dimension faces than in large ones. Where they are feared, it is best to use the least inflammable type of dynamite adapted for the work and the best quality of fuse; load one cartridge in the bottom of the hole so that it fills the space as completely as possible; and put the primer in next with the business end of the detonator pointed toward the collar of the hole.

Complete detonation of a charge is essential to avoid poisonous fumes after blasting and the possibility of unexploded powder being thrown into the muck or left in unbottomed holes.

While the perfecting of low freezing explosives has rendered the thawing of dynamite practically obsolete, there are one or two explosives that have not yet been made fully satisfactory on a low freezing formula. Therefore occasion may some time arise to thaw dynamite. The

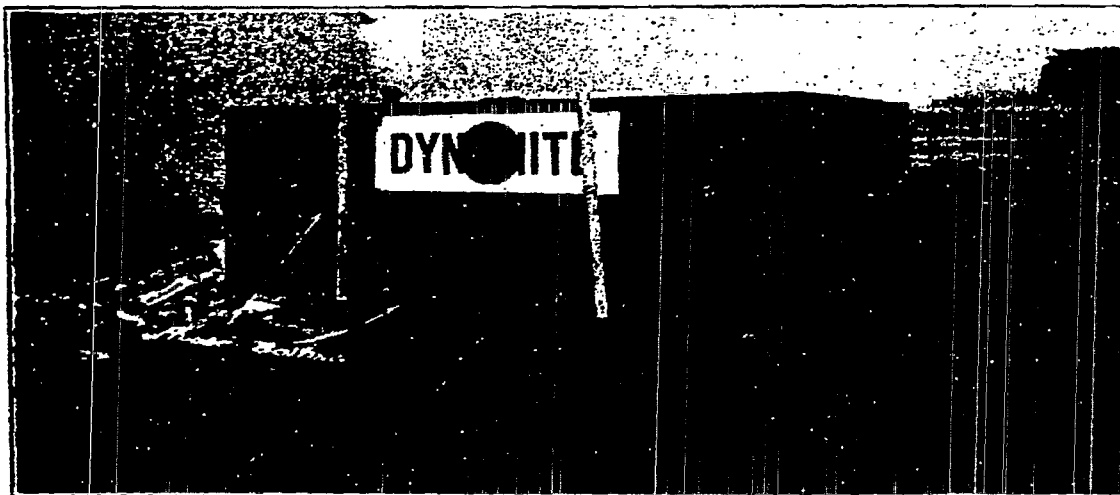


Figure 1. Covered car with insulated body used by Oliver Iron Mining Company in transportation of explosives in underground mines.

principle in thawing dynamite safely is to thaw slowly at a moderate temperature with the cartridges lying flat. When dynamite freezes the nitroglycerin separates from the dry ingredients and congeals into small crystals. If these are melted very slowly, the nitroglycerin will be reabsorbed in the dry ingredients as thoroughly as it was before being frozen. If the nitroglycerin melts more rapidly than it can be reabsorbed, it tends to run downward and if the cartridges are standing on end, may collect at the bottom of the shell and leak out. Leaky cartridges are always dangerous.

The recommended temperature for houses or rooms where thawing is done is 90 degrees Fahrenheit. The dynamite should never be placed directly over the source of heat. First, this may cause too rapid thawing with attendant leakage. Second, it is a fact that a drop of nitro-

glycerin falling from the height of one foot on a hot metallic surface will explode. Dynamite should never be thawed in front of an open fire. In addition to the hazard involved in having explosives near an open fire, there is danger that the intense radiation will thaw the dynamite too fast and cause leakage of nitroglycerin. Furthermore, there is the possibility that the outer layers of explosive will be heated to a sufficient temperature (360 degrees F.) to produce accidental explosion.

The old practice of thawing dynamite cartridges in hot water can not be too strongly condemned. Water, particularly when hot, will replace nitroglycerin in dynamite and cause it to leak out—and free nitroglycerin is always very dangerous. In spite of the greatest care, nitroglycerin will occasionally leak from dynamite that is being thawed and, for this reason, where water jacketed kettles are used for thawing dynamite, the water should never be heated in them but should be warmed in another receptacle and then poured into the water jacket of the thawing kettle.

Thawing by manure is very efficacious but the dynamite should never be placed in direct contact with the manure because of the high moisture content of the manure and the chemical action taking place in it which generates the heat. The dynamite should be placed in a moisture proof container and this be banked around with the manure.

Use of Explosives in Pits, Quarries and Other Outside Work

Protecting Explosives from Sparks

In large pits and quarries one of the principal sources of danger with explosives is from sparks from steam shovels and locomotives. If conditions permit, this danger can be reduced almost to nothing by use of an explosive of low inflammability. Explosives should be conveyed to the place where they are to be used in well covered trucks or cars. (Figure I shows the type of car used by the Oliver Iron Mining Company in their open pit operations.) Where there is danger from sparks and hot cinders, primers should be made up only as needed and should be kept covered and at a distance from the main supply of explosives. Detonators should be kept in closely covered boxes until needed.

Loading Holes

In loading deep well drill holes it is a wise precaution to lower large cartridges instead of dropping them. The simplest method of doing this is to place the cartridge on a corrugated wooden peg to which a sash cord is attached. The peg can easily be jerked out after it reaches the bottom. Some operators use a special pair of tongs for lowering large cartridges. If cartridges are to be dropped, it will be found that those 10 and 12 inches in length keep their alignment better and are less likely to hang up and get stuck in ragged holes.

Sometimes the holes are so ragged that it is necessary to remove the dynamite from the paper shell. When straight or ammonia dynamite is poured from the cartridge into the hole, it runs into the cracks and crevices and there is danger that small quantities of unexploded dyna-

mite may be left in the broken rock after the blast. Furthermore, if there is any water in the bottom of the hole, the dynamite will become intimately mixed with it and the effectiveness of the explosive will thus be reduced at the point where greatest strength is needed. Therefore, for loading ragged holes where the explosive must be removed from the wrappers, gelatin is by far the safest and most economical. Having a consistency like putty, it can be cut into chunks and dropped into bore holes, little if any being caught in side cracks and fissures. As gelatin is highly water resisting, especially in the 60 per cent and higher strengths, water in the bottoms of the holes will not lessen the explosive force.

Some blasters have recommended increasing the efficiency of the blast by placing extra blasting caps at intervals in an extended charge. This

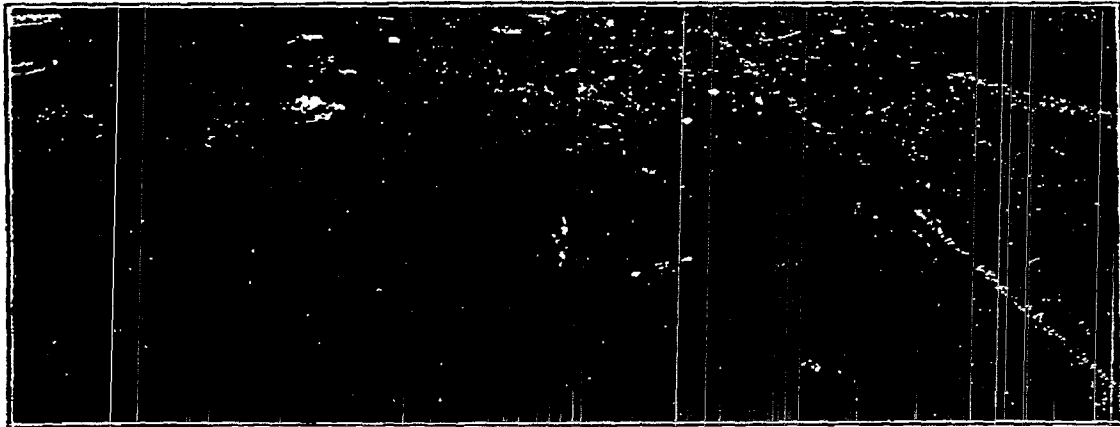


Figure II. Chain blasting mat placed over bore hole before springing the shot.

is not necessary with the present types of high explosives and adds appreciably to danger in the operation of loading. If the explosives used are so insensitive as to require a boosting effect to produce proper detonation throughout the charge, it is more effective and safer to use Cordeau-Bickford.

Some operations, such as the open pits on the Mesaba Range, are large enough to require one crew to spring holes while another is loading the blast. A few accidents have been caused by the springing crew hooking on to the wrong set of wires and firing a main blast instead of a spring. The Oliver Iron Mining Company has a rule that as soon as a hole is loaded the ends of the detonator wires shall be twisted together and taped and shall remain so until it is time to connect up and fire the blast. If a springing crew finds any wires twisted together and taped they know they are to be left alone. There is also a rule in all the pits on the Range that no springing shots shall be fired in the immediate vicinity of holes that are being loaded.

The tamping of charges should be done firmly but not violently. For deep well drill holes, a block of wood attached to a rope is one of the

best tampers devised. The block should be from 18 to 30 inches in length and of proper diameter to move up and down easily in the hole. If there is much standing water in the bore holes, a hole can be bored into the lower end of the block and melted lead poured in to give it weight. One large cement company of this country, as a safety precaution, provides a mat made of old cement sacks on which the tamper can be placed when removed from the bore hole. This prevents small particles of rock and grit from sticking to the block and getting into the bore hole. Such particles constitute an additional element of danger in loading because they are likely to create a dangerous amount of friction.

The stemming material should be a clay loam, if possible. It should always be free from coarse pieces of grit for these are likely to injure the insulation or cut the cap wires and cause misfires. The first foot above the charge should be tamped very gently, if at all. Above this the packing can be firmer. To reduce friction and wear on detonator wires, the tamper should be moved through the minimum space necessary to insure good packing. The wires should be kept along one side of the hole and not allowed to cross it.

Springing Holes

Where it is necessary to spring holes it is of utmost importance to be sure that the chamber is properly cooled each time before a subsequent charge of explosive is loaded. Some blasters test the temperature of the hole by leaving the tamper in it for five or ten minutes and feeling it to see if it is hot when withdrawn. Others leave a sprung hole several hours before loading it. One large limestone company provides special thermometers for testing the temperature of sprung holes and no explosives are introduced if it is possible to get a reading above 90 degrees Fahrenheit. Where conditions are favorable, water tamping can be used for the springing shots and this serves to keep down the temperature of the bore hole. Some operators even pour water into the hole after the springing shot to cool off the chamber. Others blow compressed air into the cavity. Paper, sawdust or other inflammable materials should never be used for tamping springing shots as they may leave sparks or embers in the chamber. Investigations of the operation of springing holes tend to show that the danger of loading explosives too soon after the springing shot is due to hot pieces of rock in the chamber and, in the case of cap and fuse firing, of embers from the fuse rather than too hot walls. Therefore it removes one source of danger to fire all springing shots by electricity.

Prevention of Misfires

Misfires are about the most serious source of danger involved in any kind of blasting. The possibility of a misfire is greatly reduced if more than one detonator is placed in each hole. With electric blasting, if the current is not sufficient for these extra blasting caps, they should not be connected in the circuit but left as a reserve in case of trouble.

A frequent cause of misfires, especially misfires of center holes in a long line, and in particular in the presence of certain earthy salts in the ground water, has been leakage of electric current. Even minute

traces of some earthy salts in solution will increase the electrical conductivity of the ground enough to cause excessive current leakage from the wires of ordinary electric blasting caps. The only sure way to prevent misfires where such salts are present in solution is to use electric blasting caps with enameled wires. The enamel on the wire under the cotton winding provides extra insulation. Waterproof electric blasting caps are regularly made with enamelled wires.

I have seen cases where it was necessary to use waterproof caps on what would be called dry work. In fact, the problem of current leakage makes it necessary to limit the number of ordinary electric blasting

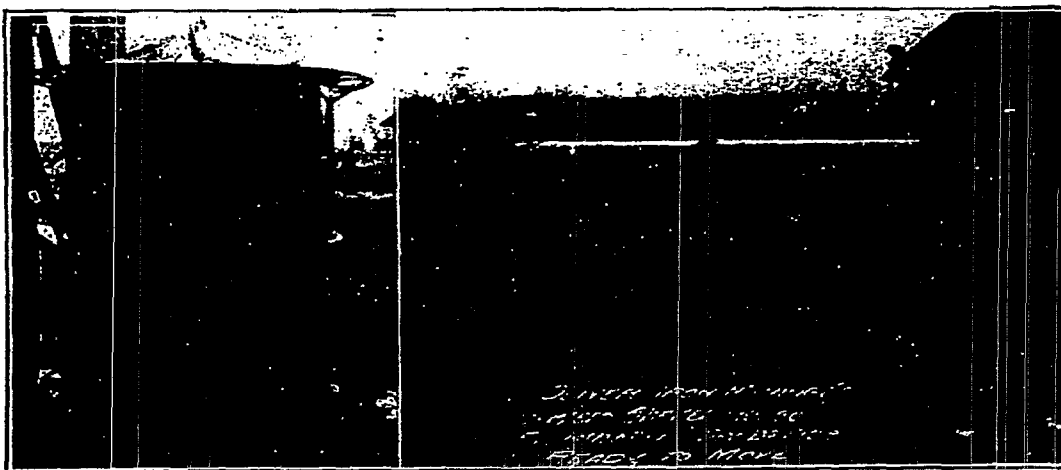


Figure III. Portable shelter house used by the Oliver Iron Mining Company. Left, the house in position; right, tipped on its side it is ready to be rolled to a new position.

caps that should be connected in one series, regardless of whether the work is wet or dry and of the source and amount of firing current available. One explosives company puts this limit at 50. Where it is necessary to connect longer lines of electric blasting caps in series, nothing but enamelled wire caps should be used, no matter how dry the work may be.

The surest method of firing electric blasts is to connect all detonators in parallel and use a power current. I would advise that the parallel method be used whenever possible and the connections from the firing line be made cross cornered across the blast to insure an even distribution of current.

While all electric blasting caps are tested within very close limits for bridge resistance, it is impossible for all bridge wires to have exactly the same resistance. Consequently some caps are bound to be more sensitive than others. This makes it undesirable to use a firing current that builds up after it enters the blasting circuit. Such a current is likely to cause the more sensitive caps to explode first and destroy the circuit before others receive enough current to fire them. This build-

ing up of the current is the cause of the failures that so frequently occur when attempts are made to fire more than one shot at a time by means of dry cells or storage batteries. For this reason blasting machines are short circuited until the end of the rack bar stroke, the current being thus built up to full intensity before being thrown into the firing circuit. For the same reason there should always be a load on the dynamo that furnishes current for a firing circuit when a blast is about to be shot.

This phenomenon of building up effect in an electric current also has a bearing on the use of alternating current for firing blasts. The shortest interval of time between the application of the firing current and the explosion of an electric blasting cap is 0.014 seconds. Now, in the 25 cycle current, the half cycle is 0.02 seconds, which is a longer period of time than 0.014 seconds. Consequently, there is a possibility that a current of 25 cycles may be thrown into the blasting circuit in such a manner that a building up effect, similar to that of the dry cell, will take place and cause a misfire in a series blasting circuit. To avoid possibility of misfires, the crest of the alternation must always pass through a series connected blasting circuit in 0.014 seconds. As the half cycle of the 50 cycle current is 0.01 seconds and of the 60 cycle current 0.0083 seconds, which are both less than 0.014 seconds, the 50 and 60 cycle alternating currents can be used for firing series circuits with the same assurance as direct current. The 25 cycle current can be used for parallel connections with perfect safety because the explosion of one electric blasting cap in this type of connection does not instantly destroy the circuit.

Handling Misfires

The handling of misfires is a serious problem. The safest procedure in outside work seems to be always to measure the distance between the top of the charge and the collar of the bore hole and then, if a hole misfires, to remove the tamping to within a few inches of the charge, load a fresh primer and shoot again. One quarry superintendent in the east always measures the distance in his well drill holes and uses a good loam tamping free from grit. If a hole misfires, he takes a sharp pointed wooden stick of about one and one-half inches diameter which he moistens from time to time with water, makes a hole to within a few inches of the top of the charge, loads this with several one and one-fourth by eight-inch cartridges of dynamite and a fresh primer and fires this charge. So far this procedure has never failed to pull the missed shot. Where a missed hole can not be reached, the greatest care should be taken in working around it until the powder charge can be located and either fired or removed.

Secondary blasting requires a number of safety precautions. In the past, it was customary for a man to continue lighting pop shots as long as he thought it safe to do so. Now, most companies have a rule limiting each man to lighting five fuses at one time. Very few allow less than two and one-half feet of fuse to be used and a great many place the shortest length of fuse at three feet.

Some people consider the tamping of pop shots as unnecessary. From

the economy standpoint this opinion has been proved wrong and it is wrong from the safety standpoint also. As fuse burns it twists around and I have known of several premature shots caused by burning fuse twisting in such a manner that the fire from it was directed against the explosive in untamped holes. To prevent accidents all pop shots should be tamped or covered in such a manner that fire from burning fuse can not strike the explosive.

One of the greatest dangers in outside blasting is from projected debris. As a rule this is not so great in large primary blasts unless they are overloaded, but with block holing, mudcapping, hole springing and smaller blasts, care must be taken to guard against damage from



Figure IV. Type of covered car with insulated body, Oliver Iron Mining Co., for transporting explosives in some open pit mines.

fragments thrown by the blast. The first precaution is to see that all approaches are properly guarded to keep people from coming too close. The second is to prevent fragments from being thrown, if possible. This can generally be done by placing rope or wire mats, piles of logs or railroad ties or brush over the hole before firing. (Figure II shows a chain mat which it is the practice in the Oliver Iron Mining Company to place directly over a bore hole before a springing shot is fired.) To prevent spalls from being thrown from springing shots in snake holes, some operators use cylindrical blocks of hard wood bound around with two flat steel bands and provided with two handles. The block is placed directly in front of the snake hole and two or three feet distant.

The Oliver company also uses a very practical portable shelter house. This is cylindrical in shape with a rim set out from the top and another from the bottom to serve as wheels. (See Figure III.) When it is

desired to move this shelter a short distance it is a very simple matter to tip it over on its side, roll it to the new position and set it up again. This shelter also has a ring in the top so it can be picked up by a wrecking crane and placed on a flat car. It is a rule that one of these shelter houses must be kept immediately back of each steam shovel so that there is no reason for anyone taking shelter beneath a shovel when a blast is fired. Additional shelter houses are provided at convenient places where track crews and others may have a place of security at all times.

Underground Work

Transporting Explosives

If explosives have to be transported any distance underground, a covered car insulated from the rails should be used. Insulation is sometimes secured by a layer of thick rubber matting; sometimes by glass insulators. (Figure IV shows the type of covered car with insulated body used by some mines of the Oliver Iron Mining Company.) Where there is an electric hauling system with overhead trolley it is safest to shut off the current and push the car of explosives by hand or pull it by means of a horse or mule. If necessary to haul the powder car by motor, it should be located so that sparks from the trolley can not fall on it.

Storing and Distributing Explosives

Some operators prefer central distributing magazines where the miners receive, each shift, the dynamite and capped fuses necessary for their work. The advantages of this system are that it reduces the time explosives are in the mine before being used, prevents blasting with old dynamite, fuse or caps, assures proper capping of the fuses, and, in short, makes it possible to keep close watch over the entire storage and handling of explosives and blasting supplies.

The dynamite and the detonators should be stored in separate magazines located at such a distance apart that any explosion in the cap magazine will not be communicated to the dynamite. This distance will depend on the maximum number of detonators to be kept in stock at any time. For calculating the proper distance the weight of the detonator charges can be considered equal to the same weight of 40 per cent dynamite.

Where underground magazines are lighted by electricity, the wires should be enclosed in substantial conduits. The lamps should be of the double bulb vapor proof type. In case these are not available, it is best to cut a hole in the front wall, fix on the outside over this hole a box with a glass side next the magazine and place the lamps in this box, thus avoiding having any live wires inside the magazine. Furthermore, a place should be provided at a safe distance from the magazine for the miners to leave their lamps while getting blasting supplies.

Some companies prefer to have the miners keep their explosives in individual boxes, near the working places. This saves time that would be spent in a long trip to a central magazine and does away with the

hazard involved in having a great many men carrying sacks of explosives along haulage ways and up ladders. I believe that where a central storage magazine is maintained with a properly qualified man in attendance, there is less danger of an accidental explosion. However, if an accidental explosion should occur in a central magazine, it would do more damage than an explosion where the men have widely separated individual storage boxes. Mining companies base their practice in underground storage upon their opinion as to the relative importance of these two considerations.

The safest means for carrying explosives in small lots underground is a heavy canvas sack, with a flap and snap to prevent dynamite from falling out enroute and shoulder straps so that a man will have both hands free in climbing ladders. Where central magazines are used there is always a rule that miners must not carry dynamite and detonators at the same time, but as miners naturally dislike to make two trips instead of one, about the best that is accomplished is for them to carry their dynamite in such a sack and their capped fuses or electric blasting caps in their hands.

Since the carbide lamp has largely replaced the old oil lamp and candle underground, the spark hazard has been greatly reduced. A miner when preparing his primers should never wear his light in his hat but should place it at a safe distance from the dynamite and caps and in such a position that it can not fall on the explosives and that the air current will carry any sparks away in the opposite direction. Most of the mines in the Lake Superior district have staples in the timbers so that the lamp can be hung at least 25 feet away from the place where the miner makes up his primers. At no time during the handling of explosives should a lamp be carried so that there is any danger that sparks or flame will come into contact with the explosives or that the lamp may fall into them.

There is much greater likelihood of too violent tamping in underground work than in heavy outside blasting, such as well drill shots where the tamping is done by raising a block of wood and dropping it



Figure V. Blow pipe with brass tip, for blowing out tamping by compressed air, used in the Eveleth district, Minn.

on the explosives in the bore hole. The tamping of charges underground should be done by means of a wooden rod cut square across and having no metal parts. The principal source of danger in tamping holes is from grit. Consequently it is of great importance to clean a bore hole as thoroughly as possible before starting to load. No matter how well a hole may be blown out, however, there is always some grit present. If the tamping is done too violently, so that the rod penetrates the cartridges, there will also be some explosive smeared on the sides of the bore hole. The grinding of a heavy metal or metal tipped rod against the grit may strike a spark which will explode the powder smeared on the sides of the hole and lead to premature explosion of the charge. Some metals, such as iron and steel, are more likely to strike a spark than others, such as lead, copper, brass and bronze, but the weight of any metal or metal tipped rod makes it a dangerous implement for tamping explosives. Even with a wooden rod there is still some danger from grit grinding on grit and on the rock sides of the bore hole, so the tamping stick should never be wielded with great force. A short, firm, but not violent stroke is best. Aside from the safety reasons for operating a tamping stick with care, too violent tamping also makes pockets or air spaces in the charge which reduce its efficiency.

The best material for tamping consists of clay, sand or fine dirt, free from grit or sharp particles, made up into dummy cartridges. The use of dummy cartridges reduces abrasion of the fuse or electric blasting cap wires to a minimum and thus reduces the possibility of misfires. Paper wads should never be used for tamping. I was present on one occasion when the paper wad was used for tamping was found burning out in the open immediately after a blast with a permissible explosive. Such an occurrence would create a grave fire hazard in a dry timbered place. For the same reason, sawdust, bark from the timbers, or other inflammable material should never be used.

Misfires are the bane of all people using explosives and in particular of underground miners. There is no fully satisfactory method of handling them. If the tamping can be picked out carefully down close to the explosive, a fresh primer will generally explode the charge. The Oliver Iron Mining Company in its mines in the Eve-

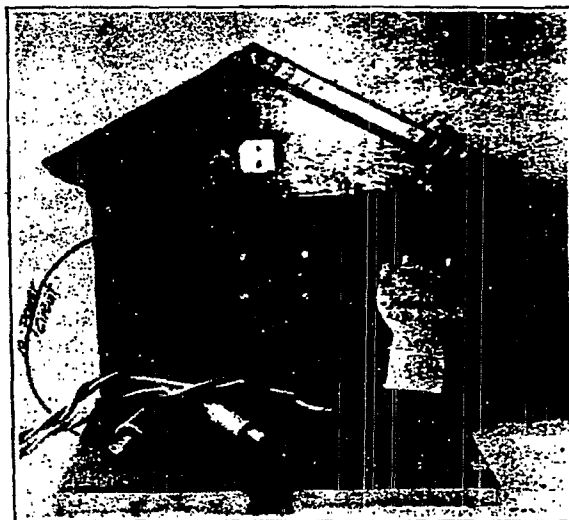


Figure VI. Blasting switch with padlocked box; handle and cord are separate units.



Figure VII. Two views of blasting machine fitted with Yale lock, of night latch type, used by Oliver Iron Mining Company.

leth district in Minnesota, uses a blow pipe with a brass tip for blowing the tamping out by compressed air. (Figure V.) Whatever the means employed, it is always best to keep the hole drenched with water while the tamping is being removed. A common rule for handling misfires is to drill a second hole alongside at a safe distance, this distance depending upon the size of the charge in the missed hole, load the second hole with dynamite and fire by means of an electric blasting machine. This will generally explode the missed hole. Some companies keep a record of all misfires and classify them as to cause. This has sometimes led to discovery and correction of improper practices when it was found that a large number of misfires were traceable to a common cause.

The Oliver Iron Mining Company has an excellent system of safety precautions for electric blasting by means of a power current. In most mines the regular 250 volt trolley current is used. A cut out switch is located between the firing switch or switches and the source of power. This switch is provided with a chain and padlock, and the key is in the possession of the blaster only. When the switch is open, there is a wire connecting the far side of the trolley line with the rail to take care of any current that might possibly leak across the switch.

The wires then lead from the cut out switch to the blasting switch which is enclosed in a padlocked box (shown in Figure VI), the key of which also is always in the possession of the blaster. This switch consists of two sockets containing metallic terminals and a fibre handle with two copper points. The bringing together of the points and termi-

nals at the proper time closes the circuit and fires the blast. The principal safety feature of the switch is that the fibre handle falls away as soon as the blaster lets go. There is no possibility that he can thoughtlessly leave the switch closed, return to the face to investigate a misfire, mend a broken connection and be caught by the blast—an accident that has happened in more than one mine where safety switches were not provided.

As an additional precaution the circuit is provided on the blast side of the firing switch with two sets of trailer connectors. When not in use, the circuit is broken at this point and the wires from the firing switch and the connectors at the end are locked up in the switch box. This connection is the last one made before firing the blast.

Making Use of the Firing Switch

The method of firing is as follows: first the wires of the electric blasting caps are connected properly at the face either in series or in parallel. Next the cut out switch on the trolley line is opened and locked in place and the ground wire on the dead side is connected to the rail. Then a delay electric igniter is connected across the ends of the leading wires at the face. If this flashes it shows that a dangerous amount of current is leaking into the line from some source and this must be corrected before the leading wires are connected to the wires at the face. After the connections at the face are made, the firing switch box is opened and the handle is connected with the leading wires to the blast by the trailer connectors. The terminals of the firing switch are next brought together, thus firing the blast. The trailer connectors are then taken apart and those with the wires to the switch handle are placed in the box which is locked once more. Finally the trolley cut out switch is closed.

In some of the districts of the Oliver Iron Mining Company blasting machines are fitted with a Yale lock of the night latch type. It does not interfere with the downward stroke of the rack bar but it must be opened by the key before the rack bar can be raised to fire a blast. (Figure VII shows two photographs of a blasting machine equipped with such a lock.)

Pickands, Mather & Company also have a good system for guarding against accidental explosions from stray current. The electric current is taken from the trolley wire of the haulage system, a 250-volt D. C. current in which the two rails are used for a return. As the haulage load is heavy, there is a considerable drop in the voltage in the rail return, which gives rise to voltage differences between the rails and the neighboring pipes, and often between the two rails, with consequent leakage of current from one to another. This is taken care of as far as possible by cross bonds between the rails themselves and between the rails and pipe lines, but careful provisions are also made to protect the blasting circuit from stray current.

The blasting switch is composed of two double pole switches mounted in a cabinet and operated by handles on the outside. The switch, which has its blades connected with the blasting cable, is equipped with two

sets of clips so arranged that in the off position the blades are short-circuited. The other switch is the firing switch proper. It is held in the off position until the moment of firing the blast. When the two handles are pulled, this second switch is thrown in, the short circuit in the first switch is automatically broken and the current flashes into the blasting circuit. Both switches are held in the off position by springs and by gravity and are provided with a locked cover over the handles that can not be closed until the switches are in the off position.

A 20 ampere fuse is used in the leading wire from the trolley wire to clear the line in case of short circuit at the blast. For still further protection, there is a safety jumper in the circuit between the switch and source of power, consisting of a short piece of cable provided with special attachment plugs at each end. This jumper is removed and carried by the blaster until the time comes to fire the shot. As long as it is out, the switch is entirely disconnected.

Instead of ordinary cotton covered leading wire, a duplex covered portable cable is used between the face and the switch, and standard rubber covered wire installed on porcelain knobs for the remainder of the blasting circuit. At the face the caps are connected in series or in parallel as desired, and then a loop of connecting wire is spliced to the two end cap wires. The two leading wires are both joined to the connecting wire loop and this is then cut between the two joints, a galvanometer test being made for closed circuit in the leading wire before these joints are made.

The chief feature of this system is that the blasting circuit between the face and the switch is short circuited up to the moment of firing. This feature together with heavily insulated wiring, a switch that is practically fool proof, the safety jumper, and cross banding between rails and pipes, greatly reduces the hazards of electric blasting underground.

In closing this paper, limited chiefly to safety precautions in handling explosives that, perhaps, are not so widely known, I wish to express briefly my thanks for the assistance and information given me by Messrs. G. J. Barrett and Frank A. Pollock, of the Oliver Iron Mining Company, George Martinson and Lyle Hendrickson, of Pickands, Mather Schaus, of Oglesby, Norton & Company.

Discussion Following Mr. Hurter's Paper

DR. E. M. PARLETT (Safety Director, Pittsburgh Limestone Company, New Castle, Pennsylvania): I was always under the impression the safest method was to connect up the fuse last, I mean from your direct line of battery; therefore just what advantage is that short circuit?

MR. HURTER: My idea is to start at the face and work back.

GEORGE MARTINSON (Safety Engineer, Pickands, Mather & Company, Hibbing, Minnesota): I wish, Mr. Hurter, you might explain to these men the short circuit is in the switch itself.

MR. HURTER: The Pickands, Mather switch is a double switch that remains in the proper position by gravity except when operated. There are two handles which drop unless they are picked up. If you are shoot-

ing on the right side, the right handle automatically closes the short circuit in the lead wires coming from the direction of the face; the other one opens the circuit at the source of the power. When a man operates that switch and pulls up both handles, the right hand one opens the short circuit to the firing switch and the left hand one closes the connection to the source of power. The Oliver people use a different type. They have about 10 feet of wire, with this little contact arrangement, fiber handle with two points on one end and trailer connectors on the other, with their layout. This short wire with the contact and half of the trailer connection is locked up in the box when the firer switch is not in use; the other trailer is connected from the short circuit, the same principle, only applied with a different apparatus.

MR. DAVIDSON: I mentioned in my paper, but ran over it in reading, in handling black powder we have found the use of the powder jack is very valuable to prevent accidents, and also the use of fiber pocket boxes to carry the detonators is also very valuable in connection with that. We have had a number of accidents in our section to children, who have been seriously injured or killed by explosion of dynamite caps, and we procured from the Du Pont Powder Company their little tract dealing with the danger to children and other people from handling the detonators, and we sent those pamphlets to all the schools and superintendents in the mining districts and the public schools in our immediate vicinity. We had so many calls for copies that the Institute printed 5,000 copies and we are receiving extra calls for it every day. I would suggest to you gentlemen to procure copies of that pamphlet and distribute it to your people on the outside.

Detonators Set Off by Extra Current

MR. GRABOWSKY: Mr. Hurter made a statement that the Oliver and other companies in the Lake Superior district go into considerable expense in protecting men in the use of explosives. I wondered if you referred to the use of black powder in that connection?

MR. HURTER: Yes, sir. I want to say I am a metal miner and not a coal miner. I would like you men that are coal miners to get up and give your ideas in connection with blasting and make this thing as complete as possible.

MR. RYAN: In connection with this extra current hazard, I would say it is more of a hazard in the coal mines than in the metal mines. You have the possibility of starting a dust explosion if the mines are not rock dusted. One of our large companies had an explosion which they attributed to detonators being set off by extra current; they made an investigation and found they had about eight or nine volts extra current, so they got one of the powder companies to develop a detonator that required about 11 current to fire. They carried their investigation to another mine, which did not have electric wiring, and they got as high as 150 volts, extra current, so they decided there was not much use going to 11 volt detonators; so I will point this out, that in addition to the direct hazard the indirect hazard also exists.

A. H. TRESTRAIL (Range Safety Inspector, Pickands, Mather & Company, Caspian, Michigan): In connection with Mr. Davidson's remarks about those pamphlets sent out to school children. When I was about nine years of age I found a stick of dynamite laying along a railroad track and I had quite a time with it. I did not know what it was. The superintendent of schools out in our district got hold of a lot of dummy blasting caps, placed them on a large poster with words to this effect: "This is a blasting cap—very dangerous—do not play with it." A lot of children would not know a blasting cap if they found it.

MR. DAVIDSON: I should have said we are distributing dummy caps along with the pamphlets.

If you will permit me just a moment more—the rules of the mining law require when a man gets ready to fire he will holler "Fire!" and we adopted the practice of having the next man to him answer back, to see that he has heard him. Sometimes the man is coming through and does not hear him and he will get hurt.

MR. GRABOWSKY: In connection with Mr. Trestrail's remarks I believe it is the practice of all safety companies on the Mesaba range to work in cooperation with the schools. I believe many schools are members of the N. S. C., and are the proper places for illustrating the dangers of blasting caps.

Cooperation Among the Mining Experts

MR. HODGSON: I wish to say in regard to Mr. Hurter, gentlemen, I have known him for 20 years. My first attention was called to him when I was operating in northern Michigan in underground iron mines. I became acquainted with him in a casual way and asked him if he would come down to my mines and investigate our use of powder to see if any economy could be effected. Of course he is in the game to help his firm sell powder, I presume, but he is a technical man, and he acceded to my request, came down and made a survey for me in the mines I was then operating and as a result of it we cut down on our use of powder and effected a saving of 25 per cent of our explosives.

Again, after going to Arizona, and finding there was an extreme wasting of powder there, I asked for Mr. Hurter to be sent down. This was out of his territory and they had a representative in California, but the powder company acquiesced. He made a very exhaustive investigation and repeated the operation. I want to express appreciation of Mr. Hurter as not only being a safe man to have around to show you how to handle powder but also how to economize in its use.

MR. SMITH: I would like to ask if any one here has had experience in tamping holes with limestone dust?

MR. HURTER: You mean the safety feature of blowing the limestone dust out?

MR. SMITH: Yes.

MR. HURTER: I think the general opinion has been against that because if you have a hole where the tamping is blown out it is not proper. The amount of limestone you get from a tamping blowout is not a drop in the bucket as compared with what you get from rock dust.

DR. PARLETT: Amplifying Mr. Hodgson's remarks, we develop what we call blasters' schools at our plants. We are subsidiaries of the steel corporation, and we invited Mr. Hurter to address these blaster schools. Not only has he helped us to economize, but he has gone into the various safety figures, handling dynamite, transporting it, and matters of that sort, to such an extent that it is an annual feature now to have Mr. Hurter come back to us. Our men now look upon Mr. Hurter as practically the last word in handling dynamite. He has made friends of all our men and the men themselves have learned a great deal about the hazards of dynamite in a way that they never could have learned otherwise.

R. V. AGETON (Safety Engineer, The Tri-State Zinc and Lead Ore Products Association, Miami, Oklahoma): I do not know Mr. Hurter, I am sorry to say. I hope to meet him before the Congress is over; but we find all the powder companies will help us at any time in instruction work of that nature, and we have taken advantage of that down in the Tri-State Zinc district and have held a number of these meetings for the foremen and for men who handle the explosives.

Protecting the Shots for Blasting

We have a little rig along with us today; one of my co-conspirators of the Tri-State district developed what they call a "safety shot." This development is by a couple of men in the ground, and is the result largely of our having been able to get men like Mr. Hurter from the powder companies to talk directly to our ground men and to our shift bosses. I think this proposition of putting your primer in your stick of powder (indicates), and putting that in your container, and then if you notice there is a hole in the end of this dummy that they use to put the spike of the tamping bar, makes it safe. Now our holes down there are 25 to 30 feet deep and through caves and we have to use a spike in order to get the powder in the hole at all; otherwise it will go off to one side; and I think probably this method of protecting your shot, as we will call it, that is the powder and primer, will help a great deal in protecting against that rubbing that Mr. Hurter was speaking about. This is merely one of three different methods of attempting to protect our shots for blasting.

I wanted to call your attention to these in connection with misfire and premature explosion. The big point of the whole business is the giving of these lectures by the men of the powder companies, that has made the men develop these explosive prevention measures.

CHAIRMAN YATES: I presume we ought to stay here until about 1:00 o'clock, as we have no afternoon sessions, and we will have to stay until 12:30 in order to complete our program for today. The other days will be just as full as today, so if anyone has to be excused I presume it will be all right, but we want one more talk on this discussion from Mr. Davidson in regard to the limestone tamping.

MR. DAVIDSON: Some one asked about the use of rock dust tamping. The Bureau of Mines puts out at Washington a pamphlet entitled "Factors in production of lump coal," and in that pamphlet it discusses the use of

rock dust tamping; also in the pamphlet on "Rock dusting coal mines," of the Carnegie Institute of Technology of Pittsburgh, Pennsylvania, there is a discussion of that matter. We have tested it out to some extent in our coal mines and some of the operators favor it and think it adds to the safety from blown-out shots and also increases the production of lump coal where permissible explosions were used.

It is not especially recommended for use with black powder as a safety measure, although it may have some factors; in other words, do not rely on rock dust tamping as an absolutely safe measure in use with black powder. The practice seems to be to make up a loose cartridge out of loose dust and put it on the power as a cushion and the other cartridges are tamped in as tight as possible. A great many of our people still favor the use of clay over rock dust tamping.

CHAIRMAN YATES: We will now have a paper by A. J. M. Ross, General Mine Foreman, Homestake Mining Company, Lead, South Dakota.

METHODS OF PROMOTING SAFETY INTEREST AT THE HOMESTAKE MINE

A. J. M. Ross, General Mine Foreman, Homestake Mining
Company, Lead, South Dakota

The Homestake gold mine is situated in the city of Lead, Lawrence county, in the southwestern part of South Dakota. The mine was discovered April 9, 1876, and with the exception of three periods has been in continuous operation since its discovery.

The Homestake company has always taken the attitude that men's lives and bodies are too valuable to be sacrificed. They have never hesitated in the expenditure of money when it meant protection for their employees. Even with this benevolent attitude on the part of the officials it was not until about ten years ago that a systematic effort was made along safety lines.

The first thing done toward systematic effort was the employment of a safety engineer. This was met with a storm of disapproval on the part of nearly all of the employees, including most of the bosses, who felt it was unjust to hire a stranger to tell them how to work safely when they had been doing it for years. I think I can truthfully say, however, that through education, etc., this feeling has almost disappeared. Our employees as a whole are now at the point where they feel the safety engineer is their friend and that it is to their interest to do all they can to aid him in his work.

Committees are considered an important part of our safety work. At present we have two committees, known as the central safety committee and the workmen's safety committee. The first is composed of the superintendent, assistant superintendent, general mine foreman (this company has never had a general manager, assistant general manager, or mine superintendent), chief metallurgist, chief electrician, master

mechanic, attorney, chief surgeon, employment agent, timber agent and safety engineer. The superintendent is chairman and the safety engineer is secretary of the committee, which meets on the first Monday of each month.

The second committee is composed of nine men from the mine and one from each of the following departments: metallurgical, electrical, mechanical, carpenter and timber supply. The members of the workmen's committee are elected by secret ballot. In the mine, on election day, at the beginning of the shift the boss hands each of his men a blank envelope containing a blank slip. On this blank slip each man writes the name of the employee he wishes to have serve on the committee. He places his vote in the envelope, seals it and turns it back to the boss at the end of the shift. The only restriction placed on the voter is that he must not vote for a boss, but for a man working on the same level or division as the voter.

Meetings of the Employees' Committee

After the ballots are gathered up, two workmen and one of the time-keepers act as judges, counting the votes and making a written report over their signatures of the results. This report is posted at the shaft collar so that the men may see how many votes their favorites received.

This committee meets once in two months with the central committee. A short time before this meeting, tours of inspection are made by the workmen's committee either through the surface plant or through the underground operations. At the committee meetings, all members are encouraged to make any criticisms and suggestions which in their opinion will aid safety.

The safety meetings are open to the public and the State Mine Inspector has a standing invitation to attend them all.

Complete records are kept by the safety engineer of all injuries. Copies of these records are sent to the State Mine Inspector, the U. S. Bureau of Mines and the Commissioner of the South Dakota Workmen's Compensation Board. From the records kept, reports are made showing frequency and severity rates. Copies of these reports are sent to all underground bosses and officials.

Safety suggestion boxes are placed in each shaft house, with a sign above the box reading as follows, "Mine Safety. This box is for safety suggestions. Any suggestion you wish to make for your own or fellow workmen's safety and welfare will be given careful consideration."

A first aid and helmet instructor is employed whose business it is to train new men and give "certificate" men extra training at regular intervals. All classes of workmen are represented among the men trained or being trained, but naturally the largest percentage are underground workers. In addition to the above duties the instructor must see that the helmets are kept in first class condition so as to be ready for any emergency.

We are thoroughly convinced that a bonus system among the men and bosses is one of the best things we have done for safety, and while the amount paid to each person is not large it seems to raise the interest taken in safety work to a marked degree. Each underground employee (not a boss or an official) who has worked 300, or more shifts during the year without a "lost time" injury received for a bonus a ten dollar gold piece. The pride shown by the average man, displaying the gold piece to his acquaintances and fellow workmen, leaves no doubt in our minds that he will be a careful worker during the ensuing year.

Shift bosses, assistant foremen and night foremen are also paid a bonus for good safety work.

Thursday afternoon is known as "visiting day" among the division foremen. On this afternoon they go through a part of a division together, discussing safety, methods of mining, etc. In this way they are kept in touch with what the "other fellow" is doing.

During the winter months, on each "change Sunday" afternoon (twice a month) all of the shift bosses get together and make a trip through the "territory" of one of them. The part of the mine to be covered during this trip is not designated by the general foreman until just before the trip is taken, because, previous to this arrangement, it could be seen that considerable time had been spent "cleaning up" and getting ready for "company" when it was known in advance where the bosses were to visit.

As the shift bosses are not accompanied by any of their superiors they talk freely, criticizing anything they do not approve of. Many good natured arguments take place during these trips on safety. Two and one-half hours are spent on one of the trips. The bosses are paid for this trip and while we like to see them all present it is not compulsory. From a safety and educational point of view I think this is the best thing we do.

Accidents Are Investigated Immediately

Regardless of the hour, day or night, all accidents, such as broken legs, broken arms, or others of a more serious nature, are at once investigated at the place of accident by the state mine inspector, safety engineer, bosses on duty, and general foreman. At such time a member of the engineering department makes a sketch, for filing, showing conditions under which the man was injured.

When a man is accepted by the employment agent he is turned over to the medical department where he is given a thorough physical examination, particular attention being paid to the condition of his eyes. We have in the past had men who were hurt as many as three times a year. After being sure that the men were trying to work in a correct manner they were sent to the medical department for an eye examination. This examination disclosed the fact that a large percentage of the men who were being hurt regularly had very poor eye sight.

In the mine on each level, at the shaft, a bulletin board, with an ample supply of chalk is placed for the purpose of reporting missed holes, etc. Previously it was the custom to cover this board and the station timbers with safety first bulletins. At present no bulletins or posters are put up in the mine. Instead, on top, at the carbide room a board is placed in such a position that any bulletin tacked on it is seen by the man while getting his carbide supply. On the level station, beside the bulletin board, we allow to be posted only the cage signal board—a notice informing the men what to do in case of fire, accident or other emergency—and notice of warning against touching the "bell line."

As protection against fire in our main hoisting shaft, a sprinkling system has been installed at the surface. Once a week this system is thoroughly tested.

Water is piped into each working place in the mine for drilling purposes. This supply is drawn from the city mains which means that practically every working place in the mine has pure water for drinking, besides having water under pressure in case of fire. In addition to this supply, an independent system of four inch water lines has been carried into the mine through our "up coast" air shaft and from this air shaft throughout the different levels to hydrants. The "up coast" air prevents the mains from freezing during the winter months. The hydrants and all lines are tested and inspected at regular intervals by our first aid instructor.

Safeguards in Time of Fire in the Workings

At the surface we have a ventilating fan which is capable of drawing from the mine 225,000 cubic feet of air per minute. Underground there are smaller fans for "boosting" purposes. In case of a fire in the mine these fans if allowed to continue in operation would probably be the means of forcing gases through the working places with deadly effect. As a safeguard against such a possibility orders have been posted to the effect that the fans must be stopped at once in case of fire and can not be started unless orders to that effect are given by the general mine foreman. In case the general mine foreman can not be found the fans can be started again only on orders from the superintendent or his assistant.

Most mines are dirty. By using the term dirty I mean that old or broken timbers, pieces of rails, battered sheet iron and what not are scattered generally throughout the mine. In this matter we have done considerable educational work and now I can safely say the Homestake is a clean mine. The fact that we have a clean mine has, without doubt, been a large factor in cutting down our accident rate.

In finishing this paper I wish to bring before you a thought which has often occurred to me. Do we spend too much of our time making things "fool proof" and too little time on the education of the individual in the matter of protecting himself? I imagine most of you will take

the stand that you are doing all you can along the lines of educating men to be safe workers. Perhaps that is true, but the reason I bring up this question is the fact that most of the safety efforts I have seen are to make things "fool proof." If I am right, then many of us are, in my opinion, going at "Accident Prevention" in the wrong way.

CHAIRMAN YATES: Have we any discussion on this paper?

Keep Men with Bad Eyes Out of the Mines

R. DAWSON HALL: I was very much interested in the remarks made about bad eyes. I noticed in looking around the room 13 people or maybe more who wore glasses. I was at a board meeting recently in which half the man wore glasses, and they were talking about accidents of people due to the fact that they have bad eyes. I do not suppose the miners have better eyes than the generality of us and yet you rarely see glasses.

I think there is a situation which confronts us, that you should try to keep men out of the mines who have bad eyes. It is particularly bad because the glasses steam and it is a disadvantage from that point of view. On the other hand, a man wearing goggles is more or less protected from flying coal or mineral and possibly helped in that way. Most of them are ill disposed to wear glasses because of the film which is apt to coat the glasses when they wear them. We make no attempt to find out whether a man's sight is good or whether he has glasses when he needs them.

I am sorry Dr. Parlett has gone, but he has a little stunt in the Pittsburgh Limestone Company. They have a button along the line of the \$10 gold piece, which a man can wear in his lapel. It is won if he has gone five years without an accident or being the cause of an accident to another man. I think where the company is too large it would be difficult to carry it out. The man gets this button, and perhaps once a year they give him a chicken dinner and the general managers and other officials pat him on the back and keep up the general morale.

H. C. HENRIE (Manager Labor Department, Phelps Dodge Corporation, Copper Queen Branch, Bisbee, Arizona): I would like to ask Mr. Ross what the idea is in having the workmen's safety committee meet by themselves at certain times, and secondly, whether at those meetings there are questions other than safety discussed?

MR. ROSS: The workmen's committee does not meet alone. In years gone by they did meet alone, but they changed it; when they did meet they were free to discuss other things but that rarely happens; they only talk on safety.

WILLIAM CONIBEAR (Safety Engineer, Cleveland-Cliffs Iron Company, Ishpeming, Michigan): What was the advantage of a secret ballot? Do you get better men?

MR. ROSS: The idea of the secret ballot is, it stops the fellow who is always knocking. There are a certain number of men under ground (and I think that holds true in the metal mines), who are always looking for opportunities to say that things are framed and that the safety com-

mittee has been picked by the company; for that reason we try and avoid having anything to do with the election, other than furnishing the paper for the men to vote.

MR. HODGSON: Many physicians are talking to us today about preventive measures in medicine. This organization primarily is organized to prevent accidents and save human life and limb. We have found it advantageous to our property and the same thing is being done to the properties in Bisbee, in hiring all of our new men—they have a physical examination and careful attention is given to their eyes, but beyond that we have a man who is a proven man both in safety and in operations, and all of these new men are put into a certain working place or stope under this particular man's directions, where they are taught the methods that we use in our work, both in regard to operations in general and safety in particular. These men stay in this particular place from two to four weeks, according to their adaptability and their brightness in picking up different points, and are only taken out of this particular stope after the boss in charge says they have learned the ropes and are fit to go into the regular operations.

W. MOOREHEAD (Safety Engineer, Phelps Dodge Corporation, Dawson, New Mexico): We have in our coal mines certain districts set apart to teach new men how to mine coal safely. We have those new men in that certain district, I would say, from four to six weeks, sometimes more, depending upon the adaptability of the men to pick up coal mining, and we have found this a great success.

Conferences for Mine Foremen Were Valuable

MR. AGETON: I was very interested in the last paragraph of Mr. Ross' report where he wondered if we were not attempting too much to make things fool proof and not along educational lines. I do not think from his paper that could be true at the Homestake, but in this regard down at the Tri-State district, in the last year through the cooperation of vocational education boards of Kansas, Missouri and Oklahoma, we got foremen conference leaders and we conducted conferences for our mine foremen, ground bosses we call them, for about six months. One hundred fifty foremen attended these conferences and reports were printed and given to them. I do not know whether all of you are familiar with this work or not, but we found it is a big thing, and at least one of those conferences deals with accident prevention work entirely. Those of you who have not tried your Vocational Board in your particular state, try out one of these conferences. I think I can recommend it very highly as a very efficient means of putting over accident prevention among your ground bosses or your foremen and trip bosses.

B. J. DRYER (Manager Safety and Casualty, Woodward Iron Company, Woodward, Alabama): The Birmingham Safety Council at Birmingham put on one of those industrial schools last year and all of our foremen from Woodward Iron Company whom we could get enrolled in the school went. We noticed right after that conference a large reduction in the

accidents at all the operations, including the furnaces, coal mines and oil mines.

So far as education is concerned, Mr. Ross says you have to depend mostly upon education. We found that out from experience. We have regular safety meetings at each operation, and all the foremen and shift leaders come into these meetings. We teach them to get up and talk, and the meeting is handled much on the order of this meeting, and we have one of those monthly in each department; that is in addition to the meetings of executives and committees and is held at the mines.

MR. GRABOWSKY: I might say most of the people here are coal miners, and perhaps a little word from the metal mine might be of interest. I think the system used by the Oliver is fairly general among the ranges of the iron mines as to the building up of safety organizations. We are operating in Minnesota and Michigan. We have a general safety committee made up largely of the general superintendents and the claim agents. The meetings are held there monthly, attended by the casualty clerks, safety engineers, master mechanics and men from the operating department. All accidents from the mines are reviewed and discussed.

A District Committee for Each Mine Group

At the mines we have a district committee of each group of mines or each district who hold monthly meetings. They make monthly inspection trips, and at these monthly meetings they have in attendance mine foremen and men from the works. This committee is made up of some of the executive heads and men from the mines, so they have some discretionary powers in taking up matters and determining what action should be taken on the ground without going to the management. If it comes to a considerable expense, that question is taken up. Aside from that we have monthly meetings around the works, where the men themselves are brought in, especially men who have been hurt through injuries, and at that time the proceedings of the general safety committee are read and discussed and preventative measures discussed by those present. Suggestions are called for at the same time.

We feel that educating the employee to the fact that he is his brother's keeper is the biggest thing in the movement. There is a conservative purpose, one of the primary factors back of the whole thing, from the top of the management down through the organization. A very intensive campaign was started about four years ago, and the organization I just pictured to you was built from that. I have a few figures here that might be of interest, just a little in the way of a comprehensive statement of what has been done since 1918.

In 1918 our average accident rate per hundred men employed was 17.69; for the first nine months of 1926, it is 1.94. There has been a constant drop since 1918, with the exception of one year immediately following. That is based on the employment of an average of 10,000 men. I think largely the best part of that is being accomplished by the matter of education from the top right straight through. We do not

have the workmen on our district organizations, but they are frequently invited in, and I think education is the big thing.

MR. DAVIDSON: I should have said in speaking of rock dust tamping that Hercules Powder Company also has out a pamphlet on that subject. In connection with keeping up the interest in safety work and education along that line, I suggest that you get in touch with Mr. J. J. Forbes, Safety Engineer for the Bureau of Mines, who is in charge of the Holmes Safety Association work, as we have found that means the most valuable and effective way of reaching the individual.

CHAIRMAN YATES: I would like to add one word to this discussion, and that is, we must begin, I think, with the children, not only in the school but in the home, and what you have said about the Holmes service is something we need. The home is the place to begin safety education—it is a part of our life, something we are living every day.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The second session of the Mining Section of the National Safety Council, held at the Tuller Hotel, Detroit, Michigan, convened at 9:30 o'clock, Mr. B. C. Yates, presiding.

CHAIRMAN YATES: The first business in order is receiving the report of the Nominating Committee, Mr. R. V. Ageton, chairman.

R. V. AGETON: Your Nominating Committee met yesterday at luncheon with our president, and I regret to report that after about an hour's argument we were unable to get the present president to accept renomination; consequently that put before us the task of getting another man. We canvassed the field very thoroughly with this thought in mind—that we have five general mining districts in the United States; we have the southeastern consisting of Tennessee, Georgia and down through there, largely metal, some coal; we have what we call the northeastern, Pennsylvania and that country, coal; the Lake Superior district; the Tri-State Zinc district, and the southwestern district; and we tried to get representatives from all those districts for our officers next year. We also tried to nominate men who, we thought, would do the most toward putting the Mining Section of the N. S. C. ahead in the way in which it has been carried on in the past year.

Your committee has nominated Howard I. Young, general manager, American Zinc Company, Mascot, Tennessee, for president, or chairman.

C. A. McDowell, Manager Industrial Relations Department, Davis Coal and Coke Company, Thomas, West Virginia, first vice-chairman.

George Martinson, Safety Engineer of the Pickands, Mather Company, Hibbing, Minnesota, second vice-chairman.

A. W. Dickinson, the Union Pacific Coal Company, Rock Springs, Wyoming, third vice-chairman.

J. P. Hodgson, Manager Morenci Branch, Phelps Dodge Corporation, Morenci, Arizona, fourth vice-chairman.

Following the precedent set by other nominating committees, we have nominated for secretary of the Section Mr. Daniel Harrington of the U. S. Bureau of Mines, who now holds the same position with the Bureau that Mr. T. T. Read did when he was elected secretary of the Mining Section of the National Safety Council.

This, Mr. Chairman, is the report of your Nominating Committee, and I move you the report be accepted and your committee discharged.

The motion seconded and properly carried.

CHAIRMAN YATES: Are there any other nominations?

MR. GRABOWSKY: There being no further nominations, I move the nominations be closed and the secretary instructed to cast the unanimous ballot for the officers nominated by the committee.

The motion was seconded and carried, and the secretary cast the unanimous ballot for the officers named.

CHAIRMAN YATES: Yesterday I brought up the suggestion that we should have a paid secretary, either full or part time. What is your opinion in regard to that?

MR. HODGSON: Mr. Chairman, I fail to see how unless we have a secretary engaged at least part time, how this Section can properly conduct its business, and personally I feel very much in favor of such a secretary.

CHAIRMAN YATES: Perhaps it might be a good plan to appoint a committee at this time to arrange the financial end of the matter. That is the sticking point, of course, and I presume the National Council would help us out to a certain extent. We might be able to receive donations from some large companies who are interested, or from individuals, as some of the other Sections are doing. We would like to have the suggestion of any one who feels interested in this matter. I might add, the officers of this Section are usually men who are busy. If we had a man whose business it was to work all the time for the interests of this Section, getting new members, working up local meetings in various sections of the country, we could get every mining company of any importance in the United States into the organization. We have not those companies now.

MR. POLLOCK: I make a motion that this committee be appointed by the chairman, to do what it may think is right. It will cost between \$7,000 and \$10,000 a year to handle such a thing and finance the whole proposition anyway.

(The motion was seconded and properly carried.)

MR. HODGSON: I would like to suggest that the present chairman be a member of that committee.

MR. POLLOCK: He ought to be chairman of that committee.

CHAIRMAN YATES: We will now have a paper presented by Mr. H. C. Henrie of the Phelps-Dodge Corporation.

EMPLOYEES' REPRESENTATION AT THE COPPER QUEEN BRANCH OF THE PHELPS DODGE CORPORATION AND THE RELATION OF INDUSTRIAL REPRESENTATION TO THE SAFETY MOVEMENT

H. C. Henrie, Manager, Labor Department, Copper Queen Branch,
Phelps Dodge Corporation, Bisbee, Ariz.

Employees' Representation, which has been designated as "a method of settling peacefully and by joint action all matters that mutually concern employees and management," is no longer an experiment. Recent statistics indicate that over 800 American industrial concerns employing one million workmen are now operating under some plan of representation.

My purpose in presenting this paper is to outline the Employees' Representation Plan of the Copper Queen Branch of the Phelps Dodge

Corporation, its method of development, and to discuss the relation of Industrial Representation to Safety and Accident Prevention Work.

The mining and milling operations of the company are located in the Bisbee District and consist of the underground mine, which produces direct smelting copper and lead ores; the Sacramento Hill open pit operations, which produce concentrating and leaching ores; the Concentrating Mills and Leaching Operations, as well as the mechanical shops, power plants and other service departments. These operations furnish employment to approximately 2,000 workers.

Labor Conditions

The company has been operating in the Bisbee district since 1881. During these 45 years labor disputes have been rare and an organization more permanent than is usually found in mining operations has been developed. At present 92.1 per cent of the underground employees are American citizens. Mexicans are employed for unskilled surface labor and constitute 18.5 per cent of the total force. Exclusive of Mexican labor, 95.1 per cent of the total employees are citizens. Sixty per cent of the employees are married and have their families residing in the district.

The inauguration of Employees' Representation at the Copper Queen was a natural step in the development of satisfactory relations between management and the employees; since various employees' committees had been functioning with limited authority since 1910. At intervals since that date the employees' committee, known as the "Grievance Committee," has been enlarged to provide for additional representation and the scope of its activities broadened.

In 1920 the employees' committee requested the management to outline to that committee its powers and authority. This request not only emphasized the need of a workable plan which would define the powers and authority of the employees' representatives and provide machinery for administration, but also afforded the management an opportunity to correct certain unsatisfactory conditions which had developed, due to expansion of operations. The management advised the employees' committee to appoint from its membership a special committee to investigate the question of employees' representation, and to make recommendations.

This committee after a period of six months' study of various plans in effect throughout the country, recommended a plan which, except for minor changes, was approved by the directors of the company with the proviso that it must first be ratified by two-thirds of the employees before becoming effective.

At a special election held for this purpose 90 per cent of the underground employees and 82 per cent of all employees voted in favor of its adoption.

The plan was inaugurated under extremely favorable conditions, namely; the previous policy of the company had developed an unusual feeling of good will and loyalty; the organization was composed largely

of employees who had long service with the company; the majority of the employees were English speaking and American citizens; the plan was not adopted as an emergency measure, but was inaugurated at a time when there was no labor agitation; and finally, the plan was drafted and sold to the employees by representatives elected by them, only after the employees had been trained for a number of years in committee work.

The Representation Plan

The representation plan is modeled after our Federal Constitution and provides for three departments: legislative, executive and judicial.

The legislative department consists of a House of Representatives and a Senate.

The House is composed of representatives, one-half of whom are chosen every six months at elections conducted by the employees, to serve a term of one year. Electoral divisions, based on the natural divisions of operations and arranged so that every department is represented, were created. The various electoral divisions are allowed representation on the basis of one representative for each 100 employees or major fraction thereof, provided, however, that each division shall have at least one representative.

Foremen, bosses or other employees whose duties are of a supervisory nature can not vote for or serve as a representative.

The House of Representatives assembles at least once every month and special sessions may be called by the manager. The House elects its own officers, appoints its own committees, adopts its own rules of procedure and through its election committee, conducts all elections.

After organization, the House created the following standing committees: election committee, rules and procedure committee, wage and bonus committee, safety and working conditions committee, employees' magazine committee, and a recreation committee. Matters coming before the House which require investigation and study are referred to one of these committees for recommendation.

The Senate is composed of members chosen by and from among the foremen and bosses. The method of organization and election is practically the same as that followed by the House of Representatives.

The purpose and object of the plan is stated in the preamble which reads as follows:

"The employees and officials of the Phelps Dodge Corporation, Copper Queen Branch, in order to promote closer relations between employees, the management and the stockholders, to insure a square deal to every employee, official and the company, to encourage loyalty, cooperation and efficiency, to promote our mutual welfare and insure the blessings of industrial peace to ourselves and to this community, do hereby adopt and establish this Constitution of the Employees' Representation Plan for the Copper Queen Branch."

The Constitution provides that:

"The employees of the company shall have a voice in the adoption

of the rules and regulations governing their work and the conditions of their employment through representatives chosen from among themselves by secret ballot."

"No legislation shall become effective until it has passed both Houses of Congress and has been approved by the manager of the Copper Queen Branch. If a measure does not meet with the approval of the manager, he shall return it with his objection to the House in which it originated, who, after noting the objections, may proceed to re-consider it or revise it, but any measure may be passed over the manager's vote and become effective by a two-thirds vote of the members elected to each House."

In addition to the general powers and authority granted, following are some of the specific powers embodied in the Constitution:

Congress shall have the power:

1. To enact a code of Safety Rules and provide for the enforcement thereof.
2. To enact a code of rules for the employment and discharge of employees and provide for the enforcement thereof.
3. To pass such measures as may be necessary to establish a Benefit Association and maintain a fund, to be contributed jointly by the employees and the company, from which sickness and accident benefits may be paid to employees.
4. To pass such measures as may be necessary to establish an Apprentice Plan whereby the young men of the community may be given a chance to learn a trade under proper supervision.
5. To pass such measures as may be necessary to provide for Bonus Plans, whereby there is an equitable division between the employees and the company of any saving in the cost of operations as a result of increased labor efficiency when compared with a fair standard of efficiency for the same.
6. To pass such measures as may be necessary for the peaceful settlement of all differences arising between the employees and the company.

In order to provide against possible discrimination or curbing of activity, employees' representatives are guaranteed protection by a clause in the plan which reads as follows:

"No Senator or Representative shall ever be penalized by the company or the officials thereof for any speech, debate or activity in the performance of his duties as representative."

Method Provided for Settlement of Grievances

The expansion of operations had made it necessary to delegate considerable authority to the supervisory staff, who had not been held accountable to any great extent for proper use of that authority. Consequently, it was often abused, favoritism was not unusual, men were subject to the whims of bosses and unfairly treated, discharge without just cause was common, and no means had been provided whereby these

conditions and grievances could be easily reviewed and adjusted. One of the most difficult problems which the management had to contend with was the settlement of minor grievances, and since there was no satisfactory method for placing before the employees the facts relating to specific grievances, agitators and malcontents had unlimited opportunity to present their own versions of these matters and employees rarely ascertained the real facts in a given case.

To provide a means for promptly investigating and settling individual grievances of employees, a "Grievance Committee" was established. The powers of this committee are defined as follows:

"Congress shall have the power to appoint a standing committee to consist of three members from the House of Representatives and two members from the Senate to be known as a 'Grievance Committee.' It shall be the duty of this committee to hear grievances of employees and to decide upon settlement of same. Decisions made by this committee shall be submitted in writing to the manager. If he concurs, he shall see that the decision is promptly enforced. If he does not concur, he shall promptly call the committee in conference for further consideration of the grievance. If a majority of the committee and the manager fail to reach an agreement as to settlement, the grievance shall be submitted to the Supreme Court for final decision, and if the employee submitting the grievance is not satisfied with the settlement of his grievance, he may appeal his case to the Supreme Court."

The Executive Department

The executive powers of the organization are vested in the executives of the company. The Constitution provides that the executive department shall consider all measures passed by Congress and shall, through the manager, approve or disapprove the same within ten days after presentation to it. The manager may attend the meeting of either House at any time and may participate in a discussion of any measure before either House, but shall have no vote.

The judicial powers of the organization are vested in the Supreme Court which is composed of three judges appointed by the manager by and with the consent of Congress.

The Supreme Court has original jurisdiction in all cases where the constitutionality of a measure is in question and has appellate jurisdiction in all cases arising out of grievances between employees and those in authority.

Appointments to the Supreme Court are made as follows:

One member is a representative of the employees, one represents the company, and the third is a well-known citizen of the community who has no connection with the company.

The procedure in handling matters coming before the employees' Congress can best be illustrated by sketching several actions of this body.

Shortly after the inauguration of the plan, several representatives requested that a definite code of rules concerning the employment and

discharge of employees be enacted. After discussion of this matter in the House, this was referred to the safety and working conditions committee for investigation and recommendation. This committee drafted and presented to the House our present code of "Employment and Discharge Rules," which was passed by the House of Representatives, the Senate, and approved by the management without amendment.

In the consideration of this legislation, the rules of the company relating to employment, furloughs and transfers were accepted without question and the principal effort of the committee was confined to formulating rules for insuring fair treatment to employees by those in authority. This legislation had the effect of establishing a definite policy and eliminating subsequent discussion concerning physical examination, open shop and similar controversial questions. The following specific rules of this measure may be of interest:

Specific Rules Insuring Fair Treatment

"Before obtaining employment, all applicants shall be required to pass a satisfactory physical examination."

"The right of the company to select its employees shall not be questioned."

"Ten offenses were specified for which an employee may be suspended or dismissed from the service without further notice."

"For other offenses not included in the list, an employee shall not be discharged without first having been notified that a repetition of the offense will make him liable to dismissal. Such notice shall be given by the foreman or boss in charge of the work and a written copy thereof forwarded immediately to the labor department."

"Any employee who feels that he has been unjustly treated, subjected to any unfair condition, unjustly discharged, or has a grievance of any nature may appeal his case to the Grievance Committee."

The procedure in the event that the management desires to make certain changes in policy or present for consideration a specific condition is illustrated by the following action of the employees' Congress:

In August, 1922, the manager met with the House of Representatives and stated that the wage schedule of the company needed revision in order to correct certain discrepancies and iron out all points of difference. It was pointed out that this revision might increase certain occupational rates and possibly reduce other rates, but when the revision was completed we should have a wage schedule which would be satisfactory for some time to come, and thereby avoid the necessity of discussing minor adjustments in certain occupational rates every few months.

This matter was referred to the wage and bonus committee of the House, who met with representatives of the management and assisted in the revision. As a result, a new wage schedule was recommended, passed by the House and Senate, approved by the management, and accepted by the employees.

This legislation has proven very beneficial in settling minor wage questions. The House of Representatives, in handling requests involving an increase in the wage rate emanating from individuals, particular crafts or other small groups, has taken the position that, "Unless it can be established that the wage now paid is not in accordance with the established wage schedule or does not apply to the particular class of work being performed, the House of Representatives will not recommend an increase in the established wage schedule for any one individual, craft or group unless all occupations and departments are considered."

Individual grievances of employees which are not satisfactorily adjusted by the foreman or the labor department are settled by the Grievance Committee.

This committee consists of three workmen appointed by the speaker of the House of Representatives from among the members of that body, and two members of the supervisory staff appointed by the president of the Senate. This committee holds office for six months. The frequent change in personnel of the committee has brought a number of employees, both workmen and foremen, into contact with the work, thus eliminating criticism to the effect that the committee was dominated by the company.

Naturally, the great majority of cases involving a legitimate grievance are settled before reaching this committee. Since the inauguration of the plan, 33 hearings have been conducted by the Grievance Committee. In one instance the case was dismissed because of lack of jurisdiction. Twenty-three cases were decided against the employee presenting the grievance, and in nine instances the decision was in favor of the employee.

The Supreme Court has held six hearings to consider cases appealed. The court sustained the decision of the Grievance Committee in four of the cases and reversed the decision of the committee in two cases.

The decisions of the Grievance Committee and the Supreme Court have been accepted as fair by the employees and management. Many of the foremen have stated that the plan of adjusting grievances was an aid to discipline and of assistance to the supervisory staff, since the employees now ascertain all the facts regarding a given case. As a result, malcontents receive little consideration other than being told by their fellow workmen to present their complaint to the Grievance Committee where they can obtain a fair hearing.

Copper Queen Bulletin

The employees obtain complete information concerning the business transacted by the employees' Congress through publication of the *Copper Queen Bulletin*, which is issued each month. The minutes of the House and Senate meetings, committee reports, decisions rendered by the Grievance Committee and Supreme Court, as well as minutes of the various departmental safety committee meetings are published. This

publication also affords an opportunity for the management to discuss specific conditions, outline company policies, and thus maintain a contact with the employees.

Regarding Results

The plan has not been changed since its inauguration and during the five year period over 500 matters bearing on questions of wages, efficiency bonus standards and payments, working conditions, and safety have been investigated, discussed and settled.

That the plan is popular with the employees is apparent from the fact that at a recent election held for the purpose of selecting employees' representatives, 86.5 per cent of the men working that date voted.

We believe the employees have grasped the idea that the interest of the employer and the employee are mutual and experience thus far indicates that when the complete facts in a given case are presented to the representatives, they can be depended upon to reach a logical, just and sane decision.

When the plan was inaugurated, there was considerable doubt regarding the possible effect on the supervisory staff and plant discipline. It was evident that certain foremen and bosses of the "old school" would be unable to adjust themselves to a labor policy of this type. It has been necessary to make some changes in the supervisory staff, but the result is a more efficient, broader minded and higher calibered foreman and boss. Since members of the supervisory force have an opportunity to present their views on all questions coming before the employees' Congress, through representatives elected by them to the Senate, little or no criticism of the actions of this body is heard.

As there has been no labor agitation since the inauguration of the plan, we cannot say how it would function in the event of a general labor disturbance. Our principal interest has been in its day by day operation where problems arising have been settled satisfactorily to all concerned.

Need of Better Relations in Industry

When the idea of employees' representation first attracted the attention of industrial managers, the dominant note was the development of a plan to insure industrial peace. With growth and development has come the realization that by creating a spirit of confidence and cooperation, industrial representation is more than a means of preventing labor disputes; it is also an important factor in securing better safety and production results.

There are many who question whether American industry, as at present organized, affords an opportunity for industrial cooperation between employer and employee and hold that there is an inherent antagonism between the two groups which will prevent development of mutual confidences and genuine cooperation. It is perhaps difficult for

those committed to the policy of "Organized Employers" versus "Organized Employees" to realize that while there may be certain conflicting interests between employers and employees, there are also many activities in which their interests are mutual. Industrial representation places emphasis upon the mutual rather than the conflicting interests, upon cooperation rather than conflict.

It has been said that the viewpoint of the average employee, his mental attitude toward his job, is the most neglected asset in American business today. This thought is not new, yet we have been slow to recognize its truth and importance. Since the physical and mental accomplishments of a man depend a great deal upon his state of mind and the environment in which he does his work, a workman who is convinced that a policy of fair dealing exists in his organization is not only a better workman, but will generally cooperate on matters of mutual interest. Industrial representation, by developing a cooperative rather than a combative spirit in the organization, is changing the viewpoint of many workmen toward their jobs and industry in general.

There is also an economic side to this question. With keener competition in business from Europe and at home, the increasingly higher standard of living of the American workman, together with the prospect of a comparative dearth of labor, due to our restrictive immigration law, we face an era of competition in American business which will touch the labor problem very closely during the next few years. We are coming to realize that our safety and industrial relations work must tie in more closely with the whole production process. If, through proper methods, we can change the viewpoint of the average employee by providing right environment and necessary education on industrial problems, it will materially aid us in meeting the competitive problem with which we are faced.

At the Copper Queen the labor efficiency has increased in recent years. The production costs have been good, due in a large measure to this improvement in labor efficiency. Just how much of this increased labor efficiency is due to the improved relations with our employees and how much is due to improvements in our production processes is difficult to determine. We do know that we have had no difficulty in securing sufficient American labor and that our labor turnover for the past year has been the lowest in the history of the company.

Satisfactory Industrial Relations Necessary for Effective Safety Work

One of the important by-products of the safety movement has been its tendency to bring about better industrial relations. Mr. Arthur Morey, past president of the National Safety Council, has said, "The Safety Movement was the beginning of a necessary better day, a closer understanding and relationship between worker and employer. The safety movement was the entering wedge for the present better industrial relations situation in this country."

It is natural that a close relationship should exist between our safety

and industrial relations work, since the success or failure of the safety movement is largely dependent on the degree of cooperation existing between employer and employee. The inauguration of proper safety methods, together with the necessary mechanical guarding will, when administered by an effective safety organization, enable a company to decrease materially its accident rates, but it is extremely doubtful if any company can secure satisfactory safety results without the cooperation of its employees. Most certainly genuine cooperation can not be developed in an atmosphere of discontent and abnormal labor turnover.

The importance of satisfactory relations is illustrated by the problem confronting a manager of a large coal company, who recently discussed with me conditions existing at his property. Due to the lack of a constructive labor policy, competent workmen are avoiding the camp. The labor efficiency has decreased and turnover is abnormal, resulting in a serious economic problem. The plan of safety organization and the general conduct of safety work at this property are based on sound practice; however, the accident rate is bad and, due to the heavy labor turnover, little progress in safety education can be made.

Safety Work at the Copper Queen

Safety work was first inaugurated at the Copper Queen Branch in 1913, when a definite safety policy was formulated, a safety department organized, and a safety inspector employed. While there had been an appreciable reduction in the accident rate during the 12 year period, 1913-1924 inclusive, it was evident that we were not securing maximum results and that expenditures for compensation on account of personal injuries were excessive. There was a pronounced inclination on the part of the members of the supervisory staff to allow the safety inspector to carry the whole burden. The workmen, while interested in having safe working conditions, were inclined to view our accidents as "an act of God," and one of the risks incidental to the occupation of mining.

In order to correct these conditions, the safety and accident prevention work of the Phelps Dodge Corporation was reorganized in January, 1925, and the committee form of organization was inaugurated. The manager of each branch or subsidiary company of the corporation was made responsible for the safety work of his branch. Operating superintendents and department heads were made responsible for the proper conduct of safety work in their respective departments. The essential features of the organization plan are as follows:

A. Corporation Safety Committee:

The vice-president and general manager of the corporation is chairman and each branch manager a member of this committee. This committee has general supervision of the safety work of the corporation.

B. Branch Safety Committee:

Each branch or subsidiary has established a general safety

committee of which the branch manager is chairman. This committee is composed of the various superintendents, department heads, and representatives elected by the workmen, and has supervision of the safety work of the branch.

C. Departmental Safety Committee:

Departmental safety committees of which the departmental superintendent is chairman were established in each department of the branch. These committees are composed of equal representatives from the foremen and bosses and representatives of the workmen employed in the department, and supervises the safety work of the department.

This form of organization was adopted in order to secure the cooperation of managers, superintendents, foremen, bosses and workmen, and to bring them into direct contact with the safety problem. The delegation of definite responsibility and the interest and cooperation of all concerned have resulted in a marked decrease in the accident rate. The results secured afford a striking illustration of the importance of proper organization, sincerity of purpose, strict enforcement of the safety policy by the management and the value of sound industrial relations as an aid in securing the interest and cooperation of the employees in the safety movement.

COMPARATIVE ACCIDENT STATISTICS

Years 1924—1925				
All Departments			Underground Mining Operations	
Year	Number Lost Time Accidents	Accident Rate Per 1000 Shifts Worked	Number Lost Time Accidents	Accident Rate Per 1000 Shifts Worked
1924	710	1.04	268	1.18
1925	330	.56	170	.70

Year 1926 to Date				
All Departments			Underground Mining Operations	
Year 1926	Number Lost Time Accidents	Accident Rate Per 1000 Shifts Worked	Number Lost Time Accidents	Accident Rate Per 1000 Shifts Worked
January	23	.452	8	.343
February	14	.308	10	.482
March	12	.235	8	.339
April	14	.293	7	.310
May	10	.213	5	.235
June	5	.108	3	.142
July	1	.023	0	.000
Totals to Date....	79	.24	41	.27

It has been especially gratifying to note the interest and cooperation prevalent in the departmental safety committee meetings. The various safety problems are discussed in a frank manner. Employee committeemen express themselves freely without fear of intimidation or retalia-

tion by their foremen and bosses, and no difficulty is experienced in securing safety suggestions from the men.

While this discussion of the safety and accident prevention work is necessarily brief, I believe it is evident from the results obtained that industrial representation, when administered with sincerity of purpose, does assure the cooperation of employees in safety work, as well as in other activities of mutual interest to employees and employers. The labor conditions prevailing at the Copper Queen were not brought about over night, but are the result of a gradual development and the strict enforcement of our labor and safety policies by the management.

In view of the general labor conditions likely to prevail during the next few years, it is probable that the largest contribution to profits in industry will come from a more perfect adjustment of relations between employer and employee. I believe that an understanding of the economic benefits to be gained will do more than any one thing to bring about this better understanding and relationship.

Discussion Following Mr. Henrie's Paper

CHAIRMAN YATES: I presume a number of men here would like to discuss this paper, and if so, this is your meeting.

MR. HALL: I would like to know whether this has been adopted by the Phelps-Dodge Corporation in Dawson, New Mexico.

MR. HENRIE: It has not, Mr. Hall. Our Morenci branch is strictly a Mexican camp and Dawson, also. They are not ready for a plan of that type yet at Dawson, although some improvements have been made there.

MR. CONIBEAR: You mentioned a committee on wages and bonuses. Will you please explain your bonus system?

MR. HENRIE: I am afraid I can not do that this morning. It is a rather complicated system. We have a production bonus whereby miners underground secure a bonus if they exceed better than the average performance. The bonus plan differs from those usually in effect in that it was taken from the records compiled over a number of years together with time studies; it is rather complicated and it would be entirely beyond me to explain that in our limited time.

CHAIRMAN YATES: I would like to ask you when these different bodies meet, the legislative body for instance? Do they meet at a special time outside of their working hours, or during the working hours, and are the men paid for their time when engaged in legislative work?

MR. HENRIE: The men at present have 20 representatives in the various departments. They meet on the second Wednesday of each month at 1:30 in the afternoon. The men come up at noon, change, they are paid their regular shift, that is they are allowed time for attending the meeting. There is no separate cash payment made. They meet by themselves and conduct their own business, but the regular meeting date is set the second Wednesday in each month.

MR. KERR: After this plan was adopted was there a change of labor to the extent of drawing more American laborers to the plant?

MR. HENRIE: We have always been an American camp there. I think at the time the plan was inaugurated 85 per cent or 88 per cent of our underground employees were American citizens. At present 99.2 are Americans. It has always been practically an American camp, outside of a few aliens who are old timers.

MR. KERR: I wondered if you had a larger percentage of foreign labor, whether the plan could be used?

MR. HENRIE: I have my doubts whether such a plan could be used in a strictly Mexican plant. Your men would have to become sufficiently Americanized and have a sufficient degree of intelligence to work properly under such a plan.

MR. CONIBEAR: You stated that any law passed by the Congress and vetoed by the general manager can be passed over his veto by the Congress. Is that true regarding the wages and bonuses?

MR. HENRY: There is no restriction on that at all. That question has never come up. It is rather difficult (although there is a possibility of course), to foresee where such an action would be taken. I have discussed that with the manager a number of times. You see your Senate is composed of your supervisory staff. The House is composed of the men. We take the position that if he can not go in front of those two bodies with sufficient facts and argument to convince them that he is right and they are wrong they are probably right and it would have to stand.

Most Grievances Are Settled by the Foreman

C. A. McDOWELL (Manager Industrial Relations Department, Davis Coal & Coke Company, Thomas, West Virginia): What is the procedure of a grievance, Mr. Henrie? Does your employee take his grievance directly to the committee who in turn takes it to the legislative body?

MR. HENRIE: The ordinary grievance of course the man takes up with his immediate boss and foreman. Of course 90 per cent are settled right there. If there is difficulty he will generally see the employees' representative in his division. The representative then will take it up with the boss. Now the great majority of grievances which get beyond the foreman and boss are questions on which the foreman himself may be a little bit dubious as to his authority or the policy of the company. In that case the representative would then come to the Labor Department and see me. Again, the great majority of those matters are settled right there. We do, however, have cases where a man feels he has a legitimate grievance and nobody can satisfy him.

I may tell him, for instance, so far as you are concerned, you have had four or five trials; you are through; we have nothing more to offer you. He decides he would like to take the case to the grievance committee. All right, it is arranged. There are three workmen and two foremen on this committee. The man appears and states his case. They ask him any questions they want to ask and get to the facts as near as they can. They also have power to subpoena any employee of the company. They have asked the individual foreman to come in on numerous occasions.

The foreman simply tells his side of the case. There may be essential witnesses and they may be called in. This committee then renders a decision. Generally it is accepted.

I think without question the men look upon the committee as being fair. They may think they did not get all the facts sometimes, but they regard the decision of the committee as fair. Even then, some men are not satisfied, and they can appeal their case to the Supreme Court, which you might say is really a board of arbitration, having one member of the company, one working man and an outsider. This court of course will review the grievance committee case, talk to the man and anybody else they may require, and that decision is final.

Grievances Handled by a Mutuality Committee

MR. GRABOWSKY: We have no industrial relationship committees such as Mr. Henrie has outlined in his very excellent paper. We do have what is termed a mutual committee, the chairman of which is appointed by the president of the company. He selects from a list given him by the heads of the different underground and open pit operations a committee known as the mutuality committee. The grievances can be handed to the committee or the chairman of the board. Those grievances are considered, the chairman having power of accepting witnesses for both sides and that committee renders its decision in any case. If the decision handed to the general superintendent is agreed as all right the action is taken by the committee. If not agreed upon it is returned to the chairman of the mutuality committee and the man has a right of appeal to the general manager, but the same action is taken one way or another, and if the committee have recommendations not concurred in by him the man has a final right to appeal to the president of the company whose decision is final.

We have had decisions rendered both ways. I do not know of a case that has gone to the top for final decision. We generally settle them before they get to the top. I do not know what effect that has had upon the dealings of the organization. In our particular district we are operating about 1,800 men and have about 29 nationalities involved. I do not know what Mr. Henrie refers to as an American citizen, whether he refers to what might be called a white man and a Mexican.

MR. HENRIE: No, these are citizenship statistics as listed.

MR. HODGSON: From 1912 to 1926 I was superintendent in general charge of operations at the property of the Copper Queen Branch, Phelps-Dodge Corporation, and inaugurated the original safety work which in general gave very satisfactory results but not as satisfactory as are being obtained today. I have been manager of the Morenci branch since 1918. The labor of my branch comprises about 56 per cent Mexican labor, the balance mixed nationalities and Americans. I have very carefully watched the working of the representative plan at the Copper Queen because I am a great believer in cooperation between management and employees.

I watched it critically, if you please, but I have not yet been able to

see where in an organization such as I have, comprising miners, millers, smelters and industrial railroads, and with the type of labor that I have, that we are ready for this plan yet. However, we have welfare committees, our general safety committees, we have our departmental safety committees, and we are working year by year in an effort first to obtain the full confidence of our men in the management and in the company, with the view that in the future we may extend our plan along the general line of that in operation at the Copper Queen branch, because I consider that plan is working out very satisfactorily there. But we must bear in mind that, as Mr. Henrie says, they have there over 90 per cent American citizens, a high class of labor, men who have been in the employ of the company for a large number of years, and that it is one example that is very hard to duplicate. It can not be duplicated in any other mining property in the southwest—I mean in the general labor conditions. However, I think the plan has succeeded admirably.

CHAIRMAN YATES: We have with us a representative of a manufacturing establishment making machinery for mines. I wonder what kind of a plan they have in the Cleveland Rock Drill organization, Mr. Hall?

GEORGE H. HALL (Sales Manager, Cleveland Rock Drill Company, Cleveland, Ohio): We have a varied industry, because we have both a manufacturing plant making machinery and a large drop forge establishment with 52 drop hammers. In the machine shop our accidents are very minor, mostly confined to cuts and small bruises. We have a first aid man always on hand and a doctor coming into the plant about 8:30 every morning. Every man is invited to visit the doctor at any time.

We have no regular organization outside of the first aid kit and two or three well trained men under the doctor. However, in the forge shop we have quite different accidents and very serious when we do have them. We have no system of grievance or working out any proposition of complaint the man may have other than going directly to the management.

CHAIRMAN YATES: The next paper, upon the "Value of Rock Dusting as a Safety Measure in Preventing Coal Mine Explosions," is by Mr. J. S. Jones, Safety Engineer, Old Ben Corporation, West Frankfort, Illinois. Mr. Jones is not with us and his paper will be read by Mr. J. T. Ryan.

THE VALUE OF ROCK DUSTING AS A SAFETY MEASURE IN PREVENTING COAL MINE EXPLOSIONS

J. S. Jones, Safety Engineer, Old Ben Corporation, West Frankfort, Ill.

Personal safety is one of the most important problems of the present generation. This is especially true in the coal industry. It becomes of greater importance as hazards increase with the more difficult winning of deeper seams and the consequent development of bigger mines, requiring the employment of larger numbers of men in each mine. As depths to coal seams increase the tendency is to greater gaseousness and dryer conditions, necessitating greater precautions against hazard of explosions.

Explosion disasters are the result usually of two distinct phases or actions. First is the primary explosion resulting generally from the ignition of gas by open flame; and second, the propagation of the explosion by coal dust. Safety measures to prevent the initial explosion are many, their chief weakness being that so much depends upon the human equation. A thoughtless action or mistake by one person may result in this initial explosion which may develop into a disaster if the natural or artificial conditions of the mine are not such as to compel the initial explosion to spend itself and not be propagated by coal dust.

Our mining industry has been concerned since quite early in its existence in preventing the small explosion from developing into a big one. It fully realizes the weakness of the human element as an absolute prevention against the initial explosion. This is manifest in the frequent explosions that do occur, and occasionally under what are termed the best of regulated conditions. An opened flame lamp, a bad shot or blast and an electric arc each adds percentage of hazard to the usual cause of ignition by an open light.

Our problem then, with rock dusting, is to stop this second phase or action of the explosion. Rock dusting is not concerned in preventing the initial explosion for this comes under other safety measures. Its duty is to reduce the human equation of the hazard so as to eliminate it insofar as possible and make the resultant mine dust inexplusive. The use of rock dust is to prevent a mistake from developing into a disaster.

The value of a proposed safety measure can be theorized upon and an estimate ascertained as to its worth. The true value, however, can only be determined by what it has done in actual operation. There has been considerable theorizing about the value of rock dusting as a safety measure, largely because of insufficient performance, but we have now progressed sufficiently to determine its value from actual experience and to foretell what may rightfully be expected from complete installations of this safety measure in our coal mines.

Demonstrations of Efficiency of Rock Dusting

The value of rock dusting as a safety measure in preventing coal mine explosions under actual operating conditions has been demonstrated to me upon more than eleven occasions. The brief facts of each I will narrate here in their order:

(1) A coal dust explosion from gas ignited by an open light in a mine employing 600 men on the day shift. Explosion occurred at night killing all working on the night shift, 17 in number. The flame penetrated into every corner of this mine except two small sections which were unintentionally rock dusted. This rock dusting was from grading into the floors of the entries, resulting in a high ash content of mine dust at these locations. Additional ash content was supplied by accumulation of sand used on the steep haulage at these grades.

(2) A gas explosion; ignition by open light in a mine employing 450 men on the day shift. Explosion occurred while mine was operat-

ing and three men were killed. Mine was rock dusted by the barrier system and troughs were overturned and dense cloud of shale dust thrown into suspension ready for flame had it reached the barrier location.

(3) A gas explosion probably developing into a coal dust explosion, ignition by open light in a mine employing 530 men on the day shift. Explosion occurred while mine was operating. There were no fatalities. Mine was rockdusted by the barrier system, the origin of explosion being less than 100 feet from the barriers. The flame was extinguished by the rock dust.

(4) A gas explosion which developed into a small coal dust explosion which was extinguished because of expansion due to large open territory. Ignition by open light. Mine employed 500 men on the day shift and explosion occurred while mine was operating. There were no fatalities. Mine was rock dusted by the barrier system and coating of roof and ribs by hand in the vicinity of barriers. The barriers operated and dense clouds of shale dust were in suspension ready for flame had it reached the barrier location.

(5) A coal dust explosion from black powder shot, killing two shot-firers. The propagation of the explosion was stopped when it reached the older workings where the soft roof shale had fallen giving the mine a natural rock dusted condition.

Flame Extinguished by Clouds of Shale Dust

(6) A coal dust explosion from gas ignited by a match in enclosed light mine. Explosion occurred at night when 41 men were working. This explosion occurred on the haulage entry between two shale dust zones, the mine being dusted by the barrier system and coating of ribs and roof by hand in the vicinity of the barriers. Two fatalities resulted to men who were at the origin of the explosion. Flame was extinguished by the dense clouds of shale dust at the first barriers reached in both directions.

(7) A gas explosion of terrific violence in a shale dust zone on an idle day when 30 men were in the mine. Gas ignited by electric arc. Dust troughs were demolished and I-beam was blown down but flame did not get out of dusted zone. No fatalities.

(8) A coal dust explosion, the coal dust ignited from dynamite charges on top of coal bench. Explosion occurred on idle day when 37 men were in the mine. There was one fatality. The mine was dusted by the barrier system and coated by hand in vicinity of barriers. The distance from origin of explosion to barriers was 700 feet, permitting the explosion to develop into one of terrific violence and flame. The evidence of flame disappeared before it had penetrated ten feet into the shale dusted zone.

(9) Two gas explosions on different days in a mine that was operating with about 550 men on the day shift. The gas was ignited by open lights, the origin of the explosions being in shale dust zones. The flame did not get out of the zones. There were no fatalities.

(10) A gas explosion on an operating day; ignition by open light in a mine employing nearly 600 men on the day shift. The origin of explosion was in a shale dust zone and flame did not get out of the zone. There was one fatality.

(11) A coal dust explosion from gas ignited by an open light on an operating day in a mine employing about 300 men. The mine was not rock dusted. The explosion came out of a panel and had three directions in which it could travel. It took but one of these directions, omitting the other two. The ash content of the two omitted was high because the floor had been graded and the locations unintentionally rock dusted. Twenty-one lives were lost.

(12) A gas and coal dust explosion, gas ignited from attempting to relight flame safety lamp with match near face of entry. Mine rock dusted by coating method to within 250 feet of face. The mine was operating and there were 1079 men in the mine. The flame penetrated into the rock dusted area a distance of about 25 feet and was extinguished by the rock dust. Five men were killed.

Approximately 165,000,000 tons of coal have been produced in Franklin county, Illinois, since the beginning of the industry there in 1903. There have been 228 deaths due directly to explosions. Two hundred eighteen of these occurred in the production of the first half of this tonnage, or the first 82,500,000 tons of coal and 10 occurred in the production of the second half. We are not justified in attributing this great improvement entirely to the use of rock dust but rock dust and enclosed lights unquestionably have been important factors in this reduction of explosion fatalities. At the present time nine-tenths of the coal production in Franklin county is obtained from mines that are rock dusted and operated on an enclosed light basis.

The value of rock dusting has been shown in press reports of mine explosions occurring in other parts of the nation. These reports have been given wide circulation and need no further comment here.

Further value of rock dusting is the unlimited quantity of acceptable rock for pulverizing in almost every mining community. Shales, lime-rock or adobe are in abundance near all mining locations, making the possibilities of rock dust supply a simple problem.

Redusting Required One to Three Times a Year

Another important value of rock dust is its stability. It does not evaporate and only a very small part of it is blown away. Redusting is required only after spalling has caused it to fall and to be covered or when it has been coated to such an extent with coal dust as to make the resultant mine dust too high in combustible content to guarantee a sufficient factor of safety to prevent the propagation of an explosion. Redusting from one to three times per year will fulfill the rock dust requirements of almost any coal mine. This value of rock dust is reflected in the small cost per ton of coal production for this important safety measure, this cost varying from a quarter to three-quarters of a cent per ton of coal produced when considered upon a yearly basis. The

cost varies of course with the size of the mine and the amount of coal produced.

Important factors in the value of rock dusting are the ease and simplicity of its application. Where track is installed it is a simple matter to rock dust the mine surface of the haulage ways and nearby passage ways by mechanical rock dust distributors. Good distributors are being manufactured and may be obtained at reasonable prices. Where such rock dusting can not be effectively applied in each mine the entrances and exits to such territories can be protected with rock dust barriers, these being so designed and constructed that dense clouds of dust will be easily thrown into suspension in the event of an explosion.

The value of rock dusting is acknowledged by insurance companies and compensation bureaus, as shown by charges made for explosion hazard in mines not rock dusted and credits given for mines that are rock dusted.

Rock Dust Can Not Protect by Name Only

Rock dust, when properly applied is a real safety measure. Like all other safety measures it can not protect by name only. There possibly will be a time when a so-called rock dusted mine will have a coal dust explosion. It seems to be human nature to try to "get by," and getting by with rock dusting may not be an exception. Fortunately the application of the dust to assure a big factor of safety is of no great labor cost and of but slight increase in material cost. The chief concern is to rock dust at sufficiently short intervals of time to insure that the dusted territories are kept sufficiently high in ash content and that the newly developed territories are not permitted to go too far without rock dust protection.

In conclusion I wish to emphasize the value of the peace of mind to the workers and those in authority because of the reliability of this safety measure in a well dusted mine. None but those who have experienced the dread of an explosion disaster can fully appreciate this value. May we by education, discipline, courtesy and example spread the knowledge of the value of this and other safety measures and hasten the day when human and mechanical hazards will be reduced to a minimum.

CHAIRMAN YATES: I would like to ask, is there any more dust formed in undercutting with machinery than formerly by hand?

MR. RYAN: Yes, there is; that is, more fine dust. Mr. Davidson in his paper yesterday pointed out the way in which they are very effectively overcoming the dust hazard, the dust that is developed at the face in the cutting operations, and that is by putting water on the cutter bar.

MR. GRABOWSKY: We have no dust hazard or gas hazard; this is a matter of information only. You spoke of rock dusting in periods of one to six months. Does that apply to the adits or does it apply to the working face as well?

MR. RYAN: That applies more particularly to the adits or entries.

Rock dusting the immediate face is not being done except in a very few mines. I will put it this way, that 85 per cent of your explosion hazard is in your narrow workings; the 15 per cent of your hazard is in your rooms—what we term our wide workings. Now the illustration I painted here of this large room for studying dust explosion is a very remote possibility because there is so much room for expansion here that it would be difficult to throw the dust in a thick enough cloud for the flame to pass through it.

If this room was sufficiently narrow the chance of building up the pressure is much greater and in addition to that we are more liable to find our gas in the narrow advance workings than in the rooms, so our hazard is 85 per cent in our narrow workings, and we do try to keep the dust of those up to what we term the last break through. They are not dusting in the rooms because the cost of keeping the dust up to the working face of the room is greater than dusting the rest of your mine, so the expense of taking care of that 15 per cent of the hazard has kept the most of them from doing it. Some of them do it, as explained by Mr. Correll yesterday, by keeping the dust at the working face and having the men distribute it.

Dust Hazards Also Found in Metal Mines

I want to answer your other question. You say in the metal mines you do not have dust hazard. I want to surprise you by telling you that you do have a dust hazard, and some of you are going to have a dust explosion in the metal mines. It is almost unbelievable the dust that will explode, if you get a high sulphide dust, get it ground, have it pulverized enough, and have the other elements as we have in the coal mine. You know we do not always have to have gas. I pointed out the picture of getting the explosion started from gas; that is the way 85 per cent start; but 15 per cent start direct. You can ignite the dust from an arc without any gas present—and there are certain sulphide dusts that will explode, and if you have them scattered along as we have in the coal mines they will propagate. That is only a prediction, but it is possible to find, and there are some dusts in the metal mines that are just on the danger zone.

GEORGE FORDHAM (Gulf Smokeless Coal Company, Wyco, West Virginia): Mr. Ryan remarked that 85 per cent of the hazard existed at the face—am I not right?

MR. RYAN: Eighty-five per cent of our hazard is in what we term our narrow workings, the haulageways, entries and the advance working. I include haulage entries because that is where you have your electric wires which are considerable hazard.

MR. FORDHAM: It seems to me rather than considering the safety end of it they are looking more to the cost of it. Our costs are much higher than the figures we note in the records, but we are working successfully, I believe, and I consider the hazard at the face. We have the mining machinery at the face, the rooms are filled with coal dust, the entries are full of coal dust, and if coal dust is a hazard, why not have the rock

cost varies of course with the size of the mine and the amount of coal produced.

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dusted face? For my part I am unable to see where the danger exists at the mouth of the mine entrance and of course while it is necessary to rock dust along the haulageway, I believe the main point of the place is the working face. We have the dust there—the dust is in suspension and there is where you should have the rock dust.

I fear many of us are holding back on account of the costs. We are trying to get away from that and look to the safety of it, and are rock dusting the room workings, and at the present time we are going over the mine not only four times a year but continually rock dusting the workings every night, and it amounts to something.

MR. SMITH: I had occasion to inspect the Superior Smokeless that blew up last month and make recommendation on it and I want to know if I overlooked anything. They are going on closed lights, adjusting and putting in their barriers, and we recommended they put water on the bar and wet the cars. What else can we do?

Rock Dusting Unavoidably Whitens the Coal

MR. RYAN: I do not think you missed very much. If they do all those things effectively, I think you have practically eliminated the danger.

Another thing I want to emphasize particularly in anything to do with coal mining hazards, "Watch the ventilation."

MR. SMITH: You perhaps are familiar with the Oklahoma situation on that.

CHAIRMAN YATES: Have you been doing this before?

MR. SMITH: Yes, this mine was rock dusted before it blew up.

MR. RYAN: I did not mention that particular mine that just blew up about six weeks ago. The vice-president of the company told me there were 16 killed and 141 in the mine. He said he was quite convinced that if the mine had not been rock dusted they would have lost all those 141 men.

MR. SMITH: There is no doubt of it.

MR. HALL: I think one of the difficulties of rock dusting at the face, the coal has to be sold and it is very hard to sell coal that is white instead of black, and that is one thing that interferes very largely with those people in the commercial business. Those people who are mining coal for coke are washing the coal before they put it out, and may possibly manage to get away with coal which has been covered with rock dust, and they can well afford to rock dust their narrow entries and in that way attain a very large degree of protection. They have in some cases, however, rooms that are only 15 feet wide, and in those cases there is considerable danger because the places are narrow; at the same time the coal that would be rock dusted would have to be sold, and they might have some trouble with it. The public in the United States is very particular about having black coal. They are not so particular in Germany. I understand that in Germany they throw on the tops of their railroad cars a body of lime, slaked lime, and in that way if anybody steals the coal they will be found guilty of having stolen it, and apparently the public is willing to accept that coal.

A second objection to rock dusting coal from a commercial point of view is, even in a metallurgical mine, you can not tell whether the miner is putting out dirt or not if he is going to make his coal white so you can not satisfactorily see the coal. It is unfortunate we are not doing more rock dusting than we are in the rooms. In some cases it is being done. I understand there are about 12 cases near Pittsburgh.

I was going to say a few words about Mr. Ryan's remarks about the Old Ben Corporation being the first one in this country to rock dust. I presume Mr. Ryan had reference to the first company to rock dust in the present successful rock dust effort. Prior to that there had been some work done by several people, the Victor American Fuel Company, after their explosion and fire, and Delagua had put rock dust barriers along the sides of their roadways. The Gallatin Mine, I believe, of the Pittsburgh Coal Company was rock dusted a little about the same time. A rock dust machine was introduced by McMurray of the Victor American Fuel Company and the Reliance Mine of the Union Pacific Coal Company was dusted with adobe dust.

That was way back in about 1912; and then for some reason or another the practice was dropped. I understand the Victor American Fuel Company dropped the practice during the war because they were anxious to get out the coal and had no trouble and so ceased to rock dust any more. But it was Mr. Jones' working at the Old Ben Coal Corporation which reinaugurated this practice of rock dusting coal mines.

Gas Explosions Also Occur in Metal Mines

O. N. WAMPLER (Safety Engineer, Eagle Picher Lead Company, Picher, Oklahoma): Mr. Ryan made the statement that some of the metal mines might expect a dust explosion some day and most of us smiled. If he had told me three years ago we would have a worry from gas I would have smiled the same way; but last December we had a gas explosion in one of our mines, some eight or 10 men were injured at the time and one fatality. We have two mines now where we have to use safety lamps, and since that time we have had one other explosion where two were injured; this is close to the coal section of Kansas and also a few gas wells further on. We have some open water course caves we strike in the ground and I would judge this gas has accumulated in these caves, so we now have the gas troubles along with the coal men.

MR. GRABOWSKY: I might say the smile originated with those who are in the iron mining game.

CHAIRMAN YATES: I might say I smiled also as a gold miner.

MR. HURTER: Mr. Grabowsky, I investigated a few years ago where two men in the Chapin mine got singed by gas accumulated in a raise, that came from decaying timber.

MR. AGETON: Mr. Harrington went out to a mine in Dubuque in 1915, where six men had been injured from methane explosion, two of them fatally. We had a 1,250 foot shaft, about 1,000 feet full of timber, a mine filled with water and the shaft filled with muck and dirt. There was an accumulation of methane from this decaying timber under the water,

and when they were cleaning out the shaft and got down to the 1,050 foot level and one man working over the skip pocket with his carbide lamp, the whole thing blew up; so it is possible to have a methane explosion in nearly any kind of mine. Mr. Wampler neglected to say this was a zinc mine where this methane explosion occurred.

MR. DAVIDSON: I have one other suggestion that might be valuable to Mr. Smith as recommended for that mine. Some of our people are rock dusting the old workings 500 feet back from the live workings and main entry, and reinforcing that with rock dust barriers at all openings from the old works into the live workings, and we think that is a very great safeguard against explosions originating in old workings. The miners will go in there in spite of the prohibition against it and strike matches and smoke and are liable to set off gas. It is a very good precaution to take. As to rock dusting your rooms, if you have your entries and narrow working thoroughly rock dusted and then rock dust the gob and ribs and floor and roof of the rooms reasonably close to the working face you have a fair degree of security.

The Human Element a Big Factor to Contend With

H. T. BANNISTER (General Safety Inspector, Madison Coal Corporation, Chicago, Illinois): We fellows in southern Illinois have the human element to contend with as much as anyone else, and the explosion Mr. Ryan referred to a short time ago is one where a man was working with a closed light and had a flame testing safety lamp with him and he lit a match and lit the gas. There would have been a repetition in mine No. 11 had it not been for the rock dust. At the Orient mine a year ago a mine examiner was sent in to remove the gas. There were over 1,200 men in the mine at that time. The mine examiner's lamp went out for some unknown reason and he took a match and lit it, and the explosion killed him and his crew, but the mine was well rock dusted and it confined it to a very small area. Those are the things we have had to go up against in southern Illinois.

Mr. Jones and I have been working together for a number of years, and he made a trip east with Mr. Ryan in 1915, and when he came back he was very enthusiastic over rock dusting. On Thanksgiving night, 1917, No. 11 mine of the Old Ben Corporation blew up. Mr. Ryan said there were 18 men—there were 22 men in the mine and they were all killed. It would have been impossible for anyone to live in that mine, and Mr. Jones at that time converted Mr. Buchanan to the view that rock dusting was the thing; and in our opinion we have saved a lot of lives by that in southern Illinois.

MR. FORDHAM: I would like to ask the gentleman in regard to the health of men that are continually exposed to rock dust. Have you noticed any increase in the sick rate?

MR. BANNISTER: We think it improves their health. We have found no ill effects in our examination or tests of the men employed.

MR. AGETON: In answer to the gentleman's question, I noticed Mr. Ryan specifically said "Limestone and other dusts without silica content or

low on that." The main causes of respiratory diseases among miners is inhalation of fine particles of siliceous dust and not inhalation of limestone dust. It is the sharp edges of silica after being inhaled into the lungs that cause the trouble; furthermore the dust causing the greatest trouble is dust less than one-tenth of a micron in diameter, and that one ten-thousandth of an inch, so it has to be pretty fine dust to cause the trouble. So I do not think your adobe dust having no silica content will cause any trouble.

MR. HURTER: The Pittsburgh Limestone Company has some large underground operations getting out limestone and I do not think there has been a case of silica poison in the history of the company.

CHAIRMAN YATES: This is all very interesting and the time is rapidly going. We have with us Miss Marion Telford, Field Secretary of the National Safety Council, who will talk to us on safety work in the schools.

An Interesting Trip Across the Mesaba

MISS MARION TELFORD (Field Secretary, Education Division, National Safety Council, New York City): I hope I am right in assuming you want details, and since this is the Mining Section, I want to tell you about a trip I had across the Mesaba a few weeks ago. Due to the interest of Mr. Pollock, of the Oliver Mining Company, we were asked to go up there to make some suggestions as to what might be done in the way of safety education in the range schools. We had two thoughts in mind; the first is to decrease the actual accidents occurring to all children themselves. Our child fatalities last year, you know, amounted to over 23,000. We were to decrease the accidents and fatalities occurring to children; and, second, to influence that child when he gets on up as an individual, a motorist, pedestrian, miner or whatever his job, so that safety will be something in which he is interested.

In the various districts of the Mesaba Range schools and in the independent school districts, consisting of a city like Eveleth, Hibbing or outlying locations, the superintendent has been asked to cooperate by appointing a safety supervisor, not suggesting that he add a paid person to the existing staff, but some good, live, practical, interesting sort of person already on the staff to become supervisor of the safety work. When introducing a new thing in schools the matter of personality is extremely important, and that is something to keep in mind when you say to the superintendent of schools, "Can we have some one to be responsible for the introduction of safety education in the school system?" I have seen in some schools where the thing has gone across because of the personality of the person that introduced it, and vice versa.

When suggesting plans for that supervisor, one is the safe direction of child activities, in the organization of student councils, the safe conduct on the street, health patrols, publicity patrols and things of that sort; and to introduce class room instruction, by issuing bulletins, by making suggestions to teachers, by presenting statistics for the teachers, by getting current information to them, to keep wherever possible a record of the accidents occurring to children. The Mesaba Range is doing one

of the finest pieces of work of this type with which I am familiar. They are contributing to us actual information concerning the accidents to their children. One school I visited in Minnesota recently, where 1,883 children were enrolled in the nine months of the last school year, they reported 92 broken bones. That may not look serious to you if you are talking in terms of fatalities; but think what that means, 92 broken bones of one type or another in a school enrollment as small as that!

What we want to ask you to do, wherever it is possible, is to follow that general scheme of things—get a supervisor, have the supervisor get a picture of existing conditions and then give to the teachers material that they can use. The Education Division of the Council can help you out there somewhat, and I think Mr. Pollock would tell you that in his Range schools it has been of value and importance for many for us to offer certain publications; and so I want to call to your attention a manual for the teachers, with an introduction by Harold Rugg. The Education Division is reached at 120 W. Forty-second Street, New York City. I also call your attention to a Junior Safety Council hand book which tells the story of child activities and a monthly publication which we have, "*Safety Education*," printed the 10 months of the school year, dealing with child activities, a play, stories and current material a teacher can use.

Where the School Safety Problem is Rough Play

We are glad to come into your communities and make suggestions as to the proper procedure, talk it over with your school people, and we make available certain publications. Mr. Pollock's experience on the iron range is of extreme importance. I think it indicates, first of all, something must be and can be done. In these communities where such various elements of population are collected, where your children represent probably every type of nationality you can think of, in communities of that sort the play is rough. The outstanding impression I got of the school safety problem on the range was rough play, and it sometimes has disastrous results. Not only that, but there is a question of being able to do something through the schools located in the small towns.

This problem of safety is not limited to our large centers of population. The people of North and South Dakota may sit back and say: "Yes, your traffic problem is limited to large centers of population and also your safety problem:" but such is not the case as shown by statistics, that is in proportion to the population.

CHAIRMAN YATES: How do you connect up this work of the school children with the work of the child as it grows up and goes out into the field of industry?

MISS TELFORD: Education is founded on the conviction that the instruction of the child as to morals, safety, health and on down the line, all child instruction influences the conduct of the adult. One of the best ways to fight the automobile problem, our traffic problem, is to influence your child. have him be a traffic patrol and get an attitude of mind that will make him conscious of that part he has. We admit it is intangible;

we admit there is a break between the majority of the safety work now carried on in our schools, in the first six or eight grades—there is a break between that and the same boy coming into your plants. But the whole scheme, the whole safety educational scheme, is based on the firm conviction that there is a relationship between the direction of the child activities and child thought and his conduct as an adult.

MR. POLLOCK: It is a sort of selfish measure on our part that we got the safety education in the schools. You go through and talk to the miners like I have at many safety meetings and they will tell you what their children told them about blasting caps and other things. I do not know whether the boys here realize this service of the National Safety Council Education Division is free. Miss Telford is sent wherever she is asked for and has time to go. I think the insurance companies are paying expenses.

MISS TELFORD: It takes interest on your part to get this thing started. If the people in the local community do not try to put this thing across our efforts are not going to help you out a bit.

Accident Rate High in the Upper Peninsula

MR. TRESTRAIL: I want to support one fact Miss Telford brought out. A lot of us living in the small districts of population believe the majority of accidents occur in the large centers of population. I was asked to give a talk before a Rotary Club and I had to get some facts to sustain my arguments. I wrote to the Secretary of State of Michigan and received a comprehensive statement from him. They have their accidents, automobile and other public accidents tabulated according to the districts in which they occurred, and I was surprised to find in the upper peninsula there were more accidents per thousand than in the city of Detroit; so if we think we have not a problem we are badly mistaken.

D. W. DANIEL (Safety Supervisor, U. S. Gypsum Company, Chicago, Illinois): Until this summer I was in school work myself and I know it can be done. I have worked around some of the smaller coal mining regions in southwestern Virginia. I am now with the U. S. Gypsum people in safety work. I started in September at safety work and there is not a child in that vicinity that is not a booster. I never go through the Gypsum mine but what some miner tells me something I said over at the school that his child has brought home to him. They are the biggest boosters to put the safety education over at school.

MR. HALL: I thought it might be well if Miss Telford would put us right on how the appropriations are made for her employment. We may think the National Safety Council is using money for general educational purposes, and that they might help us a great deal more if they spent more on our own Section.

MISS TELFORD: I am glad to clear up that question. The Education Division of the National Safety Council is very distinct from the other part of the Council. It is supported primarily by the National Bureau of Casualty & Surety Underwriters; Mr. Albert W. Whitney of New York is the Vice-President in charge of education. My traveling expense,

my salary, etc., are paid indirectly by the National Bureau of Casualty & Surety Underwriters. It means they pay into the treasury of the Council every year the money necessary to cover the operating expenses of the Education Division, with the specific understanding that the money that Bureau contributes to the Council shall be used for the maintenance of that Division.

If some one else says they will give money to study traffic problems, it will be used for that purpose. This arrangement is made because of Mr. Whitney's interest in education, I believe, and his very firm conviction of the value of this thing. Mr. Whitney was formerly Professor of Mathematics at the University of California. Naturally he should think of safety work as it should be worked out in a school, and naturally he should consider what the school people can contribute to the movement.

I am the only Field Secretary who travels all the time. We arrange the itinerary by suggestions, indications and requests from various school people, chambers of commerce, local safety councils and industrial members who write to us and ask us to come down and make suggestions to their school people. We can not always arrive on the date we are asked, but in so far as we possibly can our itinerary is arranged so it will fit the plans of the people who are interested in the work. Incidentally, we do not know whether you are interested or not in this particular angle of the problem in your community unless you indicate it, take the initiative in letting us know. We can not send letters to every one asking if they are interested, but we make every possible effort to accommodate the people who take the initiative in letting us know they are interested.

CHAIRMAN YATES: Our next paper is by Mr. Daniel Harrington, Consulting Engineer, Salt Lake City, Utah, but now with the Bureau of Mines. This paper will be abstracted by Mr. R. V. Ageton.

MR. AGETON: Mr. Harrington has asked that it be made absolutely plain that this paper was written by him as a Consulting Engineer in Salt Lake City, and at a time when he was not in the employ of the United States Bureau of Mines, and the statements and ideas presented in this paper are his own personal ideas, and are not the authorized ideas of suggestions from the Bureau of Mines.

SAFEGUARDING ELECTRICAL EQUIPMENT IN MINES

Daniel Harrington, Consulting Mining Engineer, Salt Lake City, Utah

During the past 18 years I have had an opportunity to make examination of 21 coal mines after explosions resulting in loss of over 800 lives, and it was fairly definitely determined that the original ignition in nine of these explosions was due to electricity, causing the loss of over 300 lives.

The igniting agencies in these nine explosions were trolley locomotive arc and gas, trolley locomotive arc and dust, electric hoist and gas, electric under-cutting machine and gas, electric over-cutting machine and gas, ruptured pick proof electric cable and dust, electrically-driven

booster fan and gas, electric shot firing and gas or dust, and electric pump and gas. In several of the other 12 explosions electricity was blamed at one time or other but finally the cause was placed elsewhere.

During the above-mentioned 18 years, eight serious fires in coal mines and nine in metal mines were studied at first hand; four of the coal mine fires were of electrical origin with property loss of several million dollars and loss of life of five persons; five of the nine metal mine fires were directly or indirectly of electrical origin, the loss of life being approximately 250, and property loss much more than one million dollars. The four costly coal mine fires of electrical origin were all caused by electric wires, two in contact with timber and two under coal falls; of the five serious metal mine fires caused by electricity one was due to an electrically-driven fan, one to an electric cable, one to an open type electric switch, one to an electrical junction box, and one to an electrically-operated pump (at least it occurred in the neighborhood of the pump).

Many Disasters Charged Against Electricity

Hence of the 38 disasters with which I had close contact, practically 50 per cent were charged to electricity. This fact together with the knowledge that at nearly every mine disaster in either coal or metal mine which I attended, electricity has been tentatively given the blame by nearly all those interested, until or unless other cause was definitely placed, has convinced me that electricity is now one of the most distrusted agencies in mining, and deservedly so, notwithstanding the fact that present day mining demands an increased use of electricity and that in general electrical installations in mines continue to be carelessly placed and even more carelessly maintained.

Available statistics charge electricity with 75 to 100 lives out of a total of 2000 to 2500 lost annually in our coal mines, this including only those killed by direct contact with electrical devices and not including those deaths brought about by explosions or fires of electrical origin. A tabulation of 100 coal mine disasters from 1915 to 1924 (all but 18 having occurred since 1915) on pages 22 and 23 of Bureau of Mines Bulletin No. 251 gives a total loss of 4770 lives and of these over 1500 were from disasters known or suspected to have been of electrical origin. Hence it is conservative to place average annual deaths in our coal mines from electricity at 200 or over.

Of 10 major explosions in the coal mines of the United States in 1924 with total loss of 459 lives at least five with death list of 97 were of electrical origin. In one incomplete list of 10 major explosions in 1925, six were held to be of electrical origin, deaths numbering about 106. Hence during 1924 and 1925, 11 major explosions out of a total of 20 were of electrical origin. In other words, electricity caused more than 50 per cent of our coal mine disasters during those two years.

I have spent much of the past 26 years underground in coal or metal mines averaging from 50 to 75 days annually, and the one outstanding

impression as to possible personal injury while underground is in connection with electricity; I always give electric wires or equipment in mines as wide a berth as possible.

Underground workers have been killed by coming in contact with 110 volt light wires; by touching bare or poorly insulated, hence "leaky" 220 or 440 volt A. C., 250 or 500 volt D. C. wires; many workers have been burned, several have been electrocuted in attaching or detaching the "nips" of mining machine trailing cable to bared places on power lines 250 or 500 volt D. C., 220 or 440 volt A. C.; contact with 250 or 500 volt trolley lines has killed many; even bare signalling lines have caused several deaths due to power-line short circuits; and burnings or electrocutions at various kinds of underground electrical equipment, such as switches, fans, pumps, mining machines, locomotives, etc., while not extremely numerous are by no means rare. Explosions have been started by arc from ruptured "pick proof" power cable and dust; by trolley line arc and dust; by trolley line arc and gas; by arc from electric light wires and gas or dust; by incandescent globe and gas; by mining machines and gas or dust (both top-cutting and bottom-cutting types and away from the face as well as at the face); by arc from nips and gas; by trailing cable and gas; by pump motor and gas; by hoist motor and gas; by electrical drill and gas; by trolley line, black powder and dust; by stray currents and electric detonator; by electric shooting wires and gas or dust or both; by storage battery locomotive and gas; in fact almost every kind of electrical equipment used in mines has taken its toll of life both by explosions and by burnings or electrocutions by contact.

Mine Fires Are Ignited in Many Ways

The mine fire menace in mines in the past was largely from use of open lights and black powder blasting in coal mines and from use of candles in metal mines; electricity has largely superseded these in present day mines as the cause of fires, and an increasingly large percentage of present day fires in both coal and metal mines is chargeable to electricity. The ignition method is of great variety. Open types of electrical switches attached to timber, with leading wires in direct contact with timber, have caused many destructive fires in both coal and metal mines; abuse of safety devices, such as locking circuit breakers, or no voltage release devices on fan or pump motors, has been a fruitful source of fires; misplaced or poorly devised or constructed but unattended safety devices (to cut operating costs) have caused expensive fires; rupture of power cables in shafts due to abrasion by falling material or to shaft movement has caused fires; falls of coal or rock or timber on power cables are a frequent source of mine fire; trolley wire contact with timber cap has caused several fires and seems especially dangerous when the timber is damp; defective rail bonds or lack of sufficient bonding undoubtedly causes fires (and very likely some fires and explosions of "mysterious origin" are due to poor

bonding condition); power lines passing through timber or cloth brattices have caused fires which have resulted in loss amounting to hundreds of thousands of dollars, and power lines insulated or uninsulated allowed in contact with coal roof or rib or timber cap or leg or fastened to timbers with wooden cleat or with track spike, or with nail or with piece of wire or hemp rope (all more or less prevalent practices) are likely to cause fires; and fires originating in both coal and metal mines at underground places which house electrically-operated equipment such as hoists, pumps, fans, compressors, motor generators, etc. are only too numerous and have cost many lives and property loss aggregating millions of dollars. Mine fires of electrical origin are of almost daily occurrence, usually resulting only in property loss, but the terror from the cry of fire in a mine is but little less than exists among those who have survived an explosion.

Safety Suggestions Based Upon Personal Experience

There is absolutely no question that the tendency of the times is toward the more extensive electrification of mines and while the above skeleton outline of some of the deaths and disasters due to electricity in mines indicates that electricity is potentially of much danger in mine workings, those dangers can be greatly lessened if reasonable precautions are taken in connection with installation, use and maintenance of mine electrical equipment. Many mining men as well as makers and salesmen of electrical machinery appear not to realize the potential dangers of electricity in mines, or at least they seem to be determined to minimize the possible dangers and even to decry or censure those who call attention to those possible troubles. This is the wrong attitude and much better ultimate headway would be made with electricity in mining if all concerned would strive to ascertain the facts as to the dangers and when they were learned take the necessary steps to prevent loss of limb or life, on the one hand, or of property on the other hand. I am not an electrician nor an electrical engineer, nor am I particularly well informed as to electricity, and the following suggestions are largely personal conclusions as a mining engineer after more than 25 years of observation in and around coal and metal mines. Many if not most of the suggestions may not be in accord with the ideas of most mining men as well as of most electrical engineers, yet all of the suggestions have behind them some specific occurrence or condition, recurrence of which it is aimed to avoid.

Power lines should be heavily insulated, preferably with lead and steel armor, and if possible, held on intake airways, preferable buried in a trench or cement box on the floor. Bare cables for power lines are dangerous and poorly insulated ones are but little safer; the widespread practice of using bare stranded cables as feeders for trolley lines is anything but safe. Power lines, unless extremely well insulated, should not be allowed to touch coal or timber and should be held by efficient insulators instead of wooden cleats, or spikes, nails or wire.

Power lines should not be taken into rooms or beyond the last cross cut in entries in gassy mines, and power to the face for pumps, mining machines, etc., should be passed through well insulated types of trailing cable. It is unsafe and unfair to have power lines in manways unless they are well insulated cables so located that men or animals will not come in contact with them; especially is it unsafe to have power lines in manways which are damp or wet unless those lines are very well protected. In passing power wires from one rib or side of a mine opening to the other, it should be done in such manner that men or animals are not forced to crawl through or under or over those lines, a good method being to use a trench either in the roof or the floor.

Where high voltage (2300, 4000 etc. volts) cables are brought into a mine if at all feasible it should be done through a bore hole. Bare wires are necessary for signal lines but voltage should be held as low as possible and every possible care taken that there shall be no short circuiting of high-power cables and signal lines by falls or wrecks; it is of decided importance that bare signal lines on haulage slopes or shafts have minimum voltage, since haulage wrecks may stir up clouds of fine dust which may be ignited by electric arcs from wrecked signal wires if high voltage is present. Weather-proof wires are not suitable for underground purposes and the protection afforded by this sort of insulation in comparatively short time is of little real value.

Power lines, including trolley lines, should be sectionalized by switches at intervals of about 1200 feet, and preferably each cross entry or panel should be capable of having its electrical current cut off by a switch at the entrance to the cross entry or panel. Power should be cut out of a mine or of any part of it when men are not working in it; it is dangerous to have pump or other electrical equipment running without attendance either constant or at least periodical, and many fires have been caused by falls upon power lines in unworked or untravelled parts of mines.

Trailing Cable and Incandescent Globe Hazards

The practice of securing transfer of current from power lines to the trailing cable of mining machines by attaching bare metallic hooks or other bare metallic devices, called nips, to bare places on the power lines is decidedly dangerous, both as to possible contact burnings or electrocutions and as to possible explosions. There are now available enclosed connectors which give assurance of safety in connecting and disconnecting the trailing cable and power lines. Where system of bare places on power lines and open hook or other "nip" continues in use, the bared places on power lines should be dropped to a point approximately one foot above the floor, hence in case of arc in connecting or disconnecting the nip there will be less danger of igniting gas than if the bared places were close to the roof. The trailing cable of mining machines should be high-grade rubber insulated concentric cables and

there should always be two men to a mining machine, otherwise arcing will very frequently take place with trailing cable in detaching it, running over it by cars, etc.

A distinct electrical hazard which is becoming increasingly prevalent is the use of incandescent globe electric lighting, now being introduced into the face regions in connection with the new so-called intensive systems of mining. There is danger of explosion from these lights even on intake haulage roads in case of wrecks or falls causing dust cloud and electric arc; the hazard is much greater at the face as there is greater likelihood of falls or of being struck, and not only dust but explosive gas may be involved. The hazard is readily apparent but the remedy is not so readily found. Until some permissible flood lighting device is at hand similar to the permissible electric cap lamp, the best precautions seem to be that the installations shall be carefully made to prevent the involvement of the wires or lamps in falls or wrecks; there should be extra precautions as to ventilation and the lights should be protected by guards and be located where there is minimum chance of them being broken by flying coal or by men or material during working operations. This system of lighting should not be allowed where much explosive gas occurs; a better system would be to have at "strategic" points extra lamps of the permissible electric cap lamp variety.

The Individual Employee Lamp Question

Permissible electric cap lamps are now in use by more than one-third of our coal miners and to date have not been responsible for loss of a single life (so far as I am informed) nor have they started a single mine fire, while the open carbide lamp has caused numerous explosions and fires with heavy loss of life and property in coal mines. The open carbide lamp is one of the greatest hazards as to fires in metal mines and users of this lamp have been asphyxiated by gases in both coal and metal mines. The permissible electric cap lamp is by far the safest and most efficient miner's lamp now in use; it is far safer than the flame safety lamp, which has taken toll of hundreds of lives in our coal mines. While our metal mines turn a deaf ear to even the slightest hint that the electric cap lamp should be used in metal mines, the fact of the matter is that the up-to-date permissible electric cap lamp gives a better light, a cheaper light, and by far a safer and more efficient light than the open, hand acetylene lamps to which the metal mining fraternity clings so religiously and tenaciously. Progressive conscientious "up-and-coming" coal miners now use the permissible electric cap lamps and find them far safer and more efficient than the open type of lamps. It is my opinion that all mines, coal and metal, should be required by law to use permissible electric cap lamps exclusively for miners' light.

Trolley lines should not be placed in return air courses nor should they be located in intake entries which have open workings which give

off explosive gas or out of which gas may be forced in case of fall or cave. Trolley wire less than six and one-half feet above track rail should be protected by box or other means to prevent men who walk on the haulage road from coming in contact with the wire. While this boxing is particularly desirable with high voltages such as 500, 550, etc., it should be done even where voltage is around 250 and the boxing should extend wherever the wire extends, not be confined merely to crossings or partings. Any entry which has a trolley line or any mine workings into which trolley locomotive or combination trolley-reel locomotive goes should be kept securely rock dusted at all times, inasmuch as the combination of coal dust on haulage ways plus electric arc which is likely to occur in case of haulage, wreck, or fall of roof or timber on trolley line, may cause an explosion. It also is anything but safe to utilize the reel type of electric locomotives to gather cars at gaseous faces and one frequently sees reel locomotives going to faces where line brattices are held necessary, this being a decidedly unsafe situation.

All trolley locomotive track should be securely bonded and bonds kept in good condition. While expensive, all joints should be bonded (by welding, if feasible) and there should be cross bonding at frequent intervals, possibly every 400 or 500 feet. Poor bonding is a fruitful cause of stray electrical currents which may "put off" blasting charges prematurely; also poor bonding or bonding in poor repair may cause fires or explosions or burnings or other electrical injury to men or animals.

Electrical Blasting the Safest Method

Electrical blasting is undoubtedly the safest of present-day methods of bringing down coal or rock, yet it has its possible dangers. The danger from stray currents is ever present and the loose ends of the detonator wires should be twisted together on the surface before being taken into the mine and kept twisted together until ready to fire, and great care should be taken to prevent the loose ends of the lead wires from touching coal, rock or track rail at any time. Preferably the charging as well as blasting of holes electrically should all be done when electric current has been cut out of the mine. Shot firing batteries which fire more than one shot at a time are capable of igniting methane, hence the only "permissible" shot-firing battery fires but one shot at a time. I firmly believe that the safest system of coal mine blasting in the United States is the one in which all shots are fired by electricity from the surface after all persons, including the shot firers, are out of the mine, all explosive having been excluded from the mine during the working shift and all loading having been done after all persons but the shot firers were out of the mine and all electric power had been cut out of the mine during the loading period. Where feasible, explosives should not be taken into a mine when electricity is in use there; if this is not possible, explosives should be placed in specially constructed, thoroughly insulated cars and, if possible, the explosive should be

removed from these special cars in some place free of electric current or open lights.

The present day mine telephones may ignite methane, hence care should be taken to install mine telephones in intake circulating air. At any rate, it would be dangerous to place a telephone at any point where there is likelihood or even remote probability of having an accumulation of methane. The danger of gas ignition at a telephone is present while ringing from a distant point as well as when ringing at the phone in question.

Hazards of the Electrically Driven Fan

The mine fan in general is now being driven by electricity and this entails numerous dangers: In very gassy mines an exhaust fan may be dangerous if the return air passes a sparking motor or an arcing open-type switch, hence care should be taken first to prevent the arcing or sparking and secondly to locate or ventilate the region of motor, switch, etc., in such manner that mine return air will not come in contact with the electrical equipment. Very gassy mines should have an auxiliary fan or a fan drive separate from the usual one and in some instances this is a steam, gas or oil engine readily connected to the fan. It is very desirable that the power line to operate the fan be separate from the mine power line in order to prevent fan interruption when there is power-line trouble in the mine, and especially to insure that the fan can be kept operating in case of mine explosions or fire, which would partially or wholly destroy the underground wiring system.

Some very gassy mines now have automatic cutting of electric power from the mine when the fan stops. I am decidedly opposed to the use of so-called booster fans or to any kind of auxiliary fan underground in coal mines, even when the fan is operated by steam or compressed air. When electricity is used for underground fan drive such installations are absolutely out of place in coal mines. Where used in metal mines these auxiliary fans driven by electricity should always be in thoroughly fire-proofed housing and there should be available fire extinguishers, water and sand for emergencies wherever these electrically-driven fans are placed, even if the use at any point is but for a few days.

One of the most serious problems confronting present-day coal mining is what is the best way to insure safe use of electric coal cutting machines in mines which "make" explosive gas. When electric coal cutting machines are used at faces which give off any methane, only permissible types should be used and they should be kept in permissible condition; the precautions as to nips heretofore given should be taken, there should be at least two men to a machine, the faces cut by machine or region through which a machine must pass should be well ventilated and water should be used on the cutting chain while cutting. Places in which machines are expected to cut should be examined for gas imme-

diately prior to entering the place, the examination to be made by fire boss or some person fully qualified to make the examination safely and efficiently, and under no circumstances should the machine be allowed to enter the place if explosive gas is found, even if the cutting machine is of the permissible type. In this connection it should always be borne in mind that "permissible" equipment is not designed for continuous service in a gaseous atmosphere, but merely with the idea that unexpected or occasional occurrences of methane will not be ignited; mines which have continuously gassy air at faces, or mines subject to heavy outbursts of methane, should not use electric cutting or other electric equipment where such gas condition is found.

Electrically operated pumps and hoists are frequently seen in mines in unventilated places, an extremely dangerous situation, especially since the motors are almost invariably of open, non-permissible type. Where it is at all feasible this class of equipment should be held in circulating intake air, and placing such equipment in the return in gassy mines is essentially as dangerous as if they had no air circulating around them. Lack of numerous gas ignitions from pump motors in our coal mines is much more a matter of good luck than good practice in installation or operation.

Intensive Systems of Mining Increase the Hazards

The newer so-called intensive systems or methods of mining involving loaders, scrapers, conveyors, etc., nearly all of which are electrically operated, offer new hazards to our coal mines and there is much probability that they will increase rather than decrease the sum total of mine hazards, notwithstanding claims to the contrary. However, if our mining men will take common-sense precautions there is no real necessity for any increased hazard due to the new methods. Instead of calmly (one almost might say cold bloodedly) ignoring the dangers of placing at gassy or dusty or both gassy and dusty faces a multiplicity of electrical equipment and devices, such as uninsulated or poorly insulated wiring, incandescent globes, open switches, non-permissible electric motors of various kinds, operating fans, hoists, conveyors, scrapers, and loaders, also open fuse boxes or fuses, starting boxes, etc., generally with attendant neglect of ventilation, rock dusting, fire proofing or sprinkling—if, on the other hand, these new methods were planned and operated with due regard to safety there is no good reason why the newer methods can not be made safe.

It should be kept in mind that with the concentrated methods there is also concentration of personnel, and a gas or dust ignition which under old hand methods in room and pillar workings might burn or possibly kill the one or two men at the face region affected, a similar ignition under concentrated mining might involve a score or more persons.

For these new methods wiring should be very carefully installed; motors should be of permissible type where such are available; water

should be used around or on mining machines, conveyors and loaders to prevent dust from flying into the air; loading of blasting holes or shooting should not be done with the shift in the mine; single entries should not be driven; electric or other auxiliary fans should not be allowed and ample circulating air should be furnished by ordinary ventilating methods; in fact, there should be extra safety precautions taken instead of this actual existing relaxation of safety precautions.

Fire-Proof the Stationary Electrical Equipment Underground

Underground stationary electrical equipment, such as hoists, pumps, motor generator sets, switch boards, switches, etc., are a fruitful source of fires, explosions, burnings, and electrocutions, chiefly because of slipshod methods of installation and maintenance. All places which house this stationary electrical equipment even if only for a few weeks should be well fire-proofed by gunnite, rock dust, cement or rock walls or other good method. These places should be well ventilated; should have fire proof doors which when closed isolate this equipment. The vicinity of such equipment should be held free of inflammable material, such as oil, oily waste, papers, brattice or canvas or other loose flammable material; wiring should be attached to efficient insulators and held free of timber or coal; the equipment should be thoroughly grounded and guarded with plenty of room around rotating parts or bare "live" metal parts; foundations should be of solid, fire proof material; there should be ample provision for prompt fighting of fire, such as fire extinguishers, sand or rock dust or hose and water located preferably just outside the electrical station on the intake air side.

While direct current is generally supposed to be more dangerous than alternating current at like voltages as to ignitions of gas or dust and less dangerous as to shock, the evidence as to relative danger is not very definite either as regards physical contact or ignitions of gas or dust. The greater number of "permissible" certificates appear to apply to direct current motors, on the other hand alternating current is becoming much the more popular for use in mines. It is my opinion that voltage above 250 should not be allowed on movable machines which operate at or near faces, this to include pumps, cutting machines, drills, conveyors, loaders, hoists, etc. Where the higher voltages 500, 2300, 4000, etc. are used in cables, pumps, motor generator sets, etc., extra care should be taken to make grounding and other precautions thoroughly effective and practically fool proof.

One of the most difficult features in connection with electrical equipment in mines is to keep safe the safety features installed surrounding or inherently placed in the equipment; fuses are replaced by heavy wire bridging, circuit breakers are locked, no voltage release devices are locked into starting position, etc., and these very dangerous practices are "winked at," even engineered in many instances by the local operating officials and many disasters have been initiated by these practices. The remedy is not readily at hand, especially where mine oper-

ating officials are so indifferent to the safety of their men and of the mine placed under their jurisdiction.

Competent Electrical Inspection Is Badly Needed

One of the greatest "wants" in our mines (coal and metal) at this time is competent electrical inspection and supervision. Electrical installations are usually planned by copying after some other mine, the conditions frequently being entirely different; very often an electrical engineer plans the installation on paper but never goes underground to see whether or not the underground installation is safe, complete or effective. Few mines have inspectors of underground electrical practice or equipment and in most instances the inspections which are made are of the most cursory nature and by men incapable of making a real electrical inspection. Very few state inspectors, safety engineers, mining engineers, company inspectors, or operating mining men know enough of the theory of electricity or of up-to-date methods of safe electrical practice to realize what is an unsafe method, installation or practice when they encounter one.

Each state should have at least a sufficient number of inspectors well grounded in the safest, up-to-date methods of electrical usage to make at least an electrical inspection of all mines in the state once annually; every company should have a man who is up-to-date in safe use of electricity and who makes at least one thorough inspection of all electrical equipment in every mine at least once every three months, and his report should go to the highest operating official of the company with copies to local operating officials; local mine officials should be acquainted with safe as well as warned against unsafe practices and conditions with electrical equipment; and underground workers who persist in unsafe practices as to electricity should be given the strictest discipline available.

Underground workers should be taught not to work on live power lines or to come in contact with them even where voltage is low; men who must work around electrical equipment should be carefully instructed as to their duties and as to the possible dangers in the work, with suggestions as to what to do to avoid those dangers; where feasible, underground workers should be excluded from electrical stations, entries having electrical power lines, etc., except when engaged in work on the electrical equipment; workers should not tamper with electrical equipment in such ways as bridging fuses, locking circuit breakers, etc.; all electrical equipment, but more especially permissable electrical equipment, should not be repaired by face workers and repairs should be made only by a competent mechanic who has a full knowledge of safety in connection with electricity; playing jokes with electricity is so inherently dangerous that anyone caught doing it should be discharged and if feasible prosecuted.

Whether electricity should be used in gassy mines is a much-debated question; if used, all available precautions, including those heretofore

described, as well as any others to be found, certainly should be taken and it appears that one of the probable solutions to the question is the application of the permissible storage battery to the various activities in mines, including locomotives, cutting machines, pumps, drilling machines, etc. The storage battery of permissible variety appears to have very great possibilities as to both safety and efficiency, and it now seems as if future safety in application of electricity to mining will tend largely to broaden the use of the storage battery which now is so very successful in application to individual lighting in mines.

The Safest Electrical Machinery Is None Too Safe

"Passing the buck" seems to be the order of the day as to safety in connection with the use of electricity in mines. Machinery manufacturers make electrically operated machines known to be unsafe in gas or dust, others which are fairly safe and others which are as safe as present day knowledge goes; however, they seldom hesitate to sell a machine even if they know that the place in which it is to be used is very likely to have conditions which make the machine unsafe. Mining machine salesmen cold bloodedly admit that their business is to sell and don't hesitate to invoke the Latin phrase "caveat emptor," let the buyer beware. Usually the mining company buyer has only a distant association with the mine and if he can save a few hundred dollars by purchasing one kind of electrical equipment as against another, he will almost invariably purchase the cheaper, provided it is essentially as efficient as the more expensive and irrespective of the fact that the more expensive one is probably more expensive because it has been made more safe.

Safety in electricity in mining will not be attained until it is realized and recognized that present practice is by no means good and that the safest available is none too safe; this to include equipment as well as practice. The use of electricity in mines is increasing much more rapidly than is our knowledge of safety in its use and it certainly is time that due thought should be given the matter of safety, before disasters from electricity arouse the public to a demand that our mines be operated without it.

CHAIRMAN YATES: The paper is now open for discussion. I might say one way to get away from electrical haulage underground is to use compressed air. It costs a little more money but I believe in the long run it is safer. Our electrical equipment consists of pumps and lighting. All of our cables going down to the shaft are armored; all of our lighting wires are well supported and a matter which may not be of so much interest to you gentlemen, but we have a practical electrical engineer who does go underground and inspects, and not only inspects but sees that things are in proper shape.

MR. DAVIDSON: I make this observation, too, that if the mine is properly ventilated, a gaseous mine is properly ventilated in the manner in which it should be to permit open lights, you will eliminate a great deal

of danger from electrical equipment, and in addition to that in the use of electrical cap lamps it should not be forgotten that you can not depend on the electrical cap lamp as the whole safeguard. You have to continue to ventilate your mine the same as if you were going to use open lights.

MR. SMITH: I would like to know if you consider it safe to use mining machinery in a very gaseous mine, where they use enclosed lights? Do you think the ventilation can be kept up to the point where it is safe to use them?

MR. DAVIDSON: That would depend upon the conditions of that particular mine. If you are able to ventilate your mine where the gas content is not dangerous it would be safe.

MR. SMITH: This one is so hot you can hear it all the time, and you can see it coming up through the water.

Adequate Inspection of Electrical Equipment

MR. DAVIDSON: I doubt whether you can ventilate it to make it safe.

MR. READ: I believe Mr. Smith's question could be answered from an electrical point of view rather easily, that the development along storage battery equipment, application of storage battery tanks to the handling of mining machinery, also pumping propositions and gathering the motors, will take care of a gaseous mine just as well as your safety lamps do, as far as the electrical hazard is concerned; but whether any friction type of mining machinery can be used in a gaseous mine is entirely different from the electrical part of it.

MR. POLLOCK: I worked in two mine fires in our own mines in the last two years, caused by defective wiring, short circuits. That is in an iron mine.

MR. HURTER: I do not know whether it is applicable to mention a certain piece of apparatus standardized on the Benjamin proved vapor lamp number 601, to be used in dangerous places or its equivalent.

MR. AGETON: Discussing Mr. Harrington's paper, the big thing I find in there is the insistence on adequate inspection of electrical equipment. Too often I found the electrical man is under the direction of the surface superintendent or boss or whatever you call him, and your mine foreman or mine boss is unable to tell him anything. He has to go to the surface man. In Butte, in 1916, 1917 and 1918, we got away from that by putting in what we call the mine electrician who was responsible to the mine foreman only. I have seen similar arrangements worked out in coal mines. It seems to me that is the very important factor and that a very efficient method of solving it is to have at least one mine electrician under the mine foreman so he can tell him where to go and what to do and be sure it will be done.

MR. MARTINSON: This is not in connection with this paper, but as long as we are talking about fires I want to report an incident which may be of benefit to some men. This is a new way of starting a fire underground. A short time ago we had a fire that was caused by the taking into the mine of an acetylene torch to cut out some steel plates and chute

in the repair of it. The men went away thinking the job was done, and the next morning we found the mine full of smoke caused by the heat generated in the wood under the steel plate.

CHAS. F. HASELTON (Safety Engineer, Pickands, Mather & Company, Cleveland, Ohio): I find it seems to be a general opinion among the operating men and also some electricians as to the danger from taking lights off trolley, for instance. Take the power off the trolley and ground the other leg. They seem to think the ground wire does not make any difference where it grounds; they do not take any particular pains to insulate the ground leg; they say it grounds anyway.

MR. CONIBEAR: I would like to ask what hazard there is in the open light carbide lamp in metal mines containing no gas and having high humidity?

CHAIRMAN YATES: We have had two very serious fires in the Homestake Mine caused by burning timbers; of course gas formed afterward to drive the men out of the mine. I think both of them undoubtedly were caused by explosives, either burning fuse or burning dynamite. The explosion occurred, ordinary blast, in such a position that it was not accessible after the blast; in other words, it brought down old cave country and covered up the fire so it could not be reached, and the fires kept on burning. I do not think we have ever had a fire start from a carbide light. Mr. Ross could either correct that or substantiate it, and we have used the carbide lamp for years.

MR. ROSS: I do not know of a fire started from the use of carbide in our mine, but it is a constant source of worry that some day a man cleaning his lamp or recharging it will dump the contents, containing more or less escaping gas, against the timbers, in spite of the fact that we have cans placed in position for them to dump the old carbide. You know yourself they will dump it any place. Some day a man is going to be careless and I am afraid that the partly used carbide will become ignited. The first thing a man will do will be to throw more water on the carbide and I think that will start a fire.

ADJOURNMENT

THURSDAY MORNING SESSION,

October 28, 1926

The third session of the Mining Section of the National Safety Council, held at the Tuller Hotel, Detroit, Michigan, convened at 9:30 o'clock, Mr. B. C. Yates presiding.

CHAIRMAN YATES: I am sorry that our new chairman is not present this morning, as I would be very glad to give up the chair to him. Inasmuch as he is not present I will try and preside at the last meeting.

The first paper on the program is by Clyde McDowell, Manager Department of Industrial Relations, Davis Coal and Coke Company, Thomas, West Virginia.

GENERAL SAFETY IN AND ABOUT THE MINES

**C. A. McDowell, Manager, Industrial Relations Department,
The Davis Coal & Coke Company, Thomas, W. Va.**

This extremely interesting subject has so many different angles that it is difficult to write a paper on the general phases of safety. We are covering considerable ground when using the word "Safety," but will endeavor to do so in a manner that may be clearly understood. Our interpretation of the increasing phases of safety problems must be fairly correct and conform to the ever increasing worldly intelligence and probably the over increasing speed of our industrial activities, which means, that those following this accident prevention work must actually be a little ahead in progressive thought of the industrial problems of today.

We realize that all accidents are expensive to somebody and for that reason should be absolutely avoided. The human element must be considered and therefore it is a duty of all mankind. Accidents will disorganize a mine force, cost money, run up the compensation-insurance rates, may take life and leave orphans, or produce cripples for stated periods. Therefore, the first requisite in prevention of accidents is the saving of life and suffering.

Our first thought of safety can possibly be exemplified by the three "A's"—Accidents Are Avoidable. We see this slogan portrayed daily by the automobiles whose radiator emblems glisten with these three letters representing the Automobile Association of America. It might be a good symbol for any industry to adopt by linking these three letters together, with but one objective—Accidents Are Avoidable. You will contend, however, that this would not literally be true or stand a 100 percent test, but neither will the so called pure oxygen used in a self-contained oxygen breathing apparatus.

We read of wonderful safety results accomplished by some industrial

enterprise, but upon inquiry learn authoritatively that such bold type proclamations were the results of a short campaign of activity, probably the first six months or year of such work within this industry. Or we may learn of the wonderful results obtained through a short campaign of a week or a month by an industry which has had a so-called safety organization for years. Again we are reminded by a picture and beautiful caption of some special achievement in this safety movement, which is one small phase of what the word safety means. I contend, however, that the above is meaningless in one sense. I am not belittling the value of these minor accomplishments but my idea is that unique comparisons should only be accepted in their places, and accomplishments of such industries along industrial relations activities should be compared through a long time period in measuring their success.

It is true that an organization with safety committees has accomplished excellent results but not without the ever changing of personnel and the inspirational new ideas put behind such committees by wide-awake safety leaders. Safety and community gatherings have produced their good work but not without the constant changing of programs and the discontinuance of same for stated periods. New ideas must be gathered from outside sources, from attendance at meetings of this type, from the different mining institutes, first aid contests, and the like.

First Enthusiasms In Safety Effort Seldom Last

The inspiration garnered from an epochal effort in eliminating accidents is truly wonderful and the immeasurable results generally obtained over the first birthday anniversary of such an undertaking are exemplified by startling figures; but results noted after many years of anniversary birthdays in this work, in many instances reveals the fact that the good work has not progressed and is not even holding its own in comparison with the first year's record.

What's the trouble? The interest manifested at the beginning seems to have waned as the years rolled by. Why? The point of contact seems to have lost its spark. The dynamo of energy is run down, so to speak. What's the answer?

The answer is not difficult. If an industry desires to establish industrial relations activities which include more than the word "Safety" implies, it should bear in mind that an organization is necessary which will function actively over a long period of time.

By an organization, I mean literally an active human being, as it were, that really has life and not merely a name; an organization that has more than a luke-warm feeling for activities, but a being with a seventy-two well balanced pulse, always strong and at times an overabundance of energy. Such an organization has complete cooperation from the president to the most humble laborer.

The first problem in this kind of an organization, if the word means

anything, is an understanding between the president and his officials. These are the back bone of any worth-while organization, no matter what any one says. These are the men who study the problems of the day and should first receive the information gathered from time to time by the organization. These are the men who are always meeting the employees and know without contradiction just what they are doing. They are the key to our personal contact. A passing word of good cheer to the men means much, while an "I don't care attitude," or an "I don't have time" talk means little. An understanding between the president and these men that they must do their part as an example for those employed for the company, means the beginning of a complete success.

The industrial relation activities should then be under the constant supervision of a leader who has the unqualified support and cooperation of the industrial organization. But a man of this type means more than the mere word "Safety" implies. To be a success, he must be a man possessed with knowledge of the industry in which he is a part and know the characteristics of the men and their families in that industry. His knowledge of compensation, relief and insurance matters is an asset. His understanding of labor turnover and the statistics of same is worth while. Accident and other statistical records must be made and be part of his study. He must be able to make inspections of mines and other parts of the industry for safety and efficiency. His knowledge and experience of first aid and rescue training and contests is imperative. He must be able to grasp new ideas for helping the officials and men to keep keyed to activity at all times. He must be active in community welfare.

Compare Safety Results Over Long Periods

Our organization for industrial relations activities was effected in the latter part of 1917 and, therefore, we are in our ninth year of safety work. We feel that we have been successful. We have had unequaled results in certain phases of the activities and set backs in other ways. Short periods of so called campaign activities have shown wonderful results, but we like to compare or think of our activities on a basis of what has been accomplished over the entire period.

Personal contact, we have found, is the most satisfactory manner of cooperation. This is brought about in many ways; superintendents' meetings, meetings of superintendents, foremen and assistants, occupational meetings, advanced rescue trained meetings, employees meetings, and first aid classes. To all of these we present statistics and have discussion of what has happened and what may happen. We have found that a great deal is accomplished by our cooperation with the employees' committee of each mine who are elected through our working agreement between the company and its employees. These committees are instrumental in various ways in putting across our cooperative programs. We find that we have had excellent results through these programs and especially through the personal contact of this

department and other officials with the employees themselves at their place of work.

We have stated meetings at the different plants for the employees and endeavor to have a program that will be educational and instructive. A Baloptician picture machine is used to portray various charts and other information relative to working conditions, safety and general activities. Moving pictures are shown. We also distribute pamphlets to employees at such meetings. For example, we were recently favored by the United States Bureau of Mines with a demonstration of the explosibility of coal dust in a glass gallery at all plants, at which time the Bureau of Mines pamphlet No. 27, "Causes and Prevention of Fires and Explosions in Bituminous Coal Mines," and Bureau of Mines pamphlet No. 25, "Erection of Barricades During Mine Fires or After Explosions," were distributed.

In the matter of statistics, our accident records for each year are compiled in 17 forms as follows: Accident Analysis, Summary of Accidents, Nationalities of Employees, Summary Classification of Nationalities of Employees, Accident Analysis by Plants, Causes of Fatal and Non-Fatal Accidents, Ages of Employees, Terms of Experience of Employees, Fatal and Non-Fatal Accidents as to Hours of Occurrence, Percentum of Accidents by Hours Through Actual Producing Periods, Percentum of all Accidents as to Severity and Natural Deaths, Inside and Outside Accidents, Comparisons of the Fatality Rates of the United States, State of Pennsylvania, Bituminous field of Pennsylvania, State of West Virginia and our Company, Number of Weeks lost per Non-Fatal Accident by plants, Fatal and Non-Fatal Accidents by days of Week, First Aid Analysis, Comparison as to Frequency and Severity Rates. On each of these reports we show the record for the current year as compared with the previous year and also the compiled record of the same information for the entire period of our activities. This is all shown in a percentum basis.

The Procedure in Case of Accidental Injury

Under statistics we also run a chart for each mine, one page of which portrays three years, showing the number of fatal and non-fatal accidents by months. Other charts showing four year periods of hours of occurrence, frequency rate and severity rate. Also charts showing fatality rate per one million tons and fatality rate per one thousand employees. Labor turnover charts are also compiled.

A brief outline of the procedure in case of accidental injury may be of interest. The safety department is called immediately and a preliminary telephone report made. The department investigates most of our accidents. Probably a drawing is attached to the report of the accident sent to the head officials and recommendations are made with this report. These reports are used in our occupational meetings. Naturally, an accident report is made by the foreman for all accidents no matter how slight the injury. Our accident records are absolutely correct, inasmuch as we record every accidental injury case where the

employee loses any time beyond the day of accident. We have many accidents in our records yearly for which no compensation is paid. Our frequency rate, therefore, may seem high when compared with many companies who do not report accidental injuries for which no compensation is paid. Last year we reported to the Compensation Commissioner and the State Department of Mines, 28 accidental injuries to employees, each of whom lost less than a week's time and naturally received no compensation. No accident statistics are correct unless these are recorded.

For any accident where no time is lost, an injury card showing first aid treatment is sent in to our department. Of course, a card is also sent in if treatment is given to a lost time accident. A follow-up is made of all lost time accidents by our department in the matter of compensation and relief, and when an injured employee is able to resume work, the question of occupation is considered for his physical welfare. Our physicians cooperate wonderfully in this follow-up work. In fact our physicians are to be commended at all times for their cooperation in any success that we may achieve in safety work.

Upon investigation of an accident, we usually find that the injured man, or someone else, did not observe our rules; or if we observe any employee, whether official or others, disobeying the Mining Law or our established safety regulations, we immediately make up an "Always be Careful" card showing the mine number, check number, name, place of accident or observation, a description of what happened or was observed and what the result was or may have been. This card is signed by this department and placed in his envelope on the next pay day. Our employees endeavor to keep these out of their pay envelopes.

A monthly accident report is compiled with a description of each accident showing the mine where it happened, name of person injured, date, age, nationality, time of accident, cause, result, loss of time and remarks, which are exceptionally plain. This report reaches every superintendent, foreman and physician and can be studied as to what and how accidents are happening at the other plants. A summary is attached showing many interesting phases for study. A monthly report of compensation paid for accidental injuries also reaches these officials.

First Aid Men Have Helped Materially in the Program

Our first aid training has been a successful help in our program. Since 1920, we have had approximately 75 percent of our employees trained and holding United States Bureau of Mines and company First Aid certificates. It was only last year we adopted the plan of 100 percent first aid training. Every employee, when he completes this training, receives our special "First Aid Pocket Packet" which was our own make-up and has been used extensively by other companies. This packet belongs to the individual, and through our personal contact and injury cards received, we learn that he treats injuries in the mine, on the street, in the home and elsewhere. We often get letters from former employees with cards attached asking for assistance to get the

packets refilled. We gladly send material and record the injury treated.

With such a percentum of first aid trained men at all times, we know that they have helped materially in our excellent record. The same accident cards are placed in our cabinets in first aid stations, both inside and outside of mines, and in the schools. Last year 70 percent of our lost time accidents received first aid treatments. It is interesting to note that 278 of our employees rendered 574 first aid treatments last year. We also received 146 injury cards from 63 school children. Company, state and international first aid contests have no doubt contributed to our progress. Boys' and Girls' first aid teams have been appreciated by the employees, and recognized as part of a definite program by many other mining organizations.

Mine First Aid Stations Are Taken to the Injured

In the mines our stations are of the moveable type; that is, we cut a standard size opening in the rib in a certain section in which is placed a wooden platform, install lights and hang on two hooks a large canister containing a stretcher, two blankets (rubber and woolen), a complete set of splints and a small cabinet containing first aid material. This canister, which is really the station, may be carried or transported upon a motor, and thereby we literally can take the station to the injured man which really is where you need it. Then we bring the injured man to the outside where an ambulance owned by the community transports him to the hospital or home.

Our first aid training in two of our high schools has been noteworthy. We have trained three of the largest classes on record and they have received American Red Cross certificates and small first aid pocket packets; but these classes were not so large that they could not be handled efficiently by the excellent help at our command.

Rescue apparatus training has helped considerable in our work. We always have more than 10 percent of the total number of employees at each plant trained and holding United States Bureau of Mines Rescue certificates. We maintain two well equipped rescue stations which contain Gibbs breathing apparatus, Burrell All-Service gas masks, M-S-A self-rescuers, inhalator with electric pads, Burrell methane detector, carbon monoxide detector, life line and reel, safety lamps, Orsat apparatus for gas analysis and the pyrotannic acid method of determining carbon monoxide in blood and air. An emergency box containing hatchets, axes, saws, chalk, buckets, nails, hemp rope, flame safety lamps, flash lights, trowels, hammers, shovels, picks, and copper hammers, is also part of the equipment. All officials carry M-S-A self-rescuers.

We have 59 of our employees holding United States Bureau of Mines certificates for advanced training in recovery operations. We have printed and posted at all mines, a mine fire or explosion procedure which shows the equipment and general directions in case of a mine fire or explosion, and also a definite schedule of procedure in case of a mine fire or explosion. In addition, we have a chart showing the

employees designated for specific duties at the respective mines in case of mine fire or explosion. These charts were originated and posted before we received this advanced training.

We are firm believers in rock dusting and have therefore established this safety measure in our program. We have two machines and at present have two mines completely rock dusted.

Periodical inspections of all mines are held and a report form compiled for each inspection. These are distributed to all superintendents. In addition to this, periodical inspections of the mines are made for safety and efficiency.

A great deal of interest is noted in the safety reminders, or small cards, placed in the pay envelopes. The National Safety Council and other posters, placed in well lighted conspicuous safety bulletin boards, are appreciated. Our new safety bulletin printed on the 15th and last day of each month has brought out considerable comment. These bulletins show each accident by mine, name, cause and extent of injury and the circumstances of each. They also give striking, snappy safety reminders as to what we should and should not do. Our employees stood 100 percent in signing the safety pledge cards put out by the West Virginia Department of Mines.

The Annual "Safety Congress Trip Contest"

We established a National Safety Council Trip Contest, planned in September, 1924, which was very successful the first year and is progressing nicely so far this year. A superintendent, a foreman and an employee, other than an official, are awarded a trip to the Annual Safety Congress each year. The superintendent with the lowest severity rate, the foreman with the lowest frequency rate, the employee who received the highest number of points for meritorious first aid work and safety suggestions are selected. Each injury card must have the O. K. of the superintendent or physician and points are given in accordance with a scale of credits awarded by a committee of three, the chief medical director, the employees' commissiomer, and the manager of the industrial relations department. Points are awarded for safety suggestions by the same committee, if they are accepted.

Our fatality rate per 1000 employees has been reduced from the high peak of 6.35 in 1918 to 1.38. The fatality rate per one million tons of coal produced has been reduced from the high peak of 6.45 to 1.65. The severity rate (days lost per one thousand hours worked) has been reduced from the high peak of 25.8 to 10.5. The frequency rate (number of accidents per one million hours worked) has been reduced from the high peak of 83.1 to 51.1.

H. W. GIESING (Safety Engineer, Commerce Mining & Royalty Company, Miami, Oklahoma): In Mr. McDowell's paper he states the injury is posted, the nature of the injury, the name of the man and various other items; does his company ever have any unfavorable reactions for the reason that they post the man's name that has been injured, especially if it becomes necessary to discharge that man?

MR. McDOWELL: That would really go back to one other part of my paper, which was brought out yesterday by one of the other members of this Section. We have what is called a working agreement and the workers themselves elect a committee of three to each mine, one a year, and they serve for a year. The chairmen of these committees meet once a year and elect their commissioner and this commissioner is their boss. We have nothing at all to do with that man. He handles all their problems.

Procedure in Handling Men's Grievances

As to small grievances or large grievances, disputes or cases, I might give you an outline procedure while we are on that subject. The man who has this grievance takes it to the foreman; if not satisfied he takes it to the superintendent; if he is still not satisfied he takes it to his committee; this committee meets with the foreman and superintendent, and if possible irons out and makes a disposition of the grievance. If it is not settled at that point, the committee takes this grievance to their commissioner, while the superintendent takes the same grievance to the employer's commissioner (and in this case I am employer's commissioner). The two commissioners then endeavor to settle the grievance by meeting with the party concerned and any witnesses, the committee foreman and superintendent. If it is not settled at that point (of course it is written up when the commissioners get hold of it), it goes to the general manager.

But I might say here, we can settle that grievance. The two commissioners have absolute authority to settle that grievance, but if they can not agree it goes to the general manager. If it is agreed upon, then it is settled. If not, it goes to a board of review. A board of review is composed of six employees, three of whom are selected from the committee (that is the committeemen, and the other three by the vice-president and general manager. Those six men sit on that case. The commissioners present their side the same as lawyers do. But this grievance can be settled there and whatever the decision is it is final. I might say though, here, that that decision must be unanimous. For instance, we have the unit vote—the employees have one vote, the employers one vote—so it must be unanimous.

But if the question is not settled it is then presented to an umpire. If the board of review can decide on an umpire it is perfectly satisfactory and his decision is absolutely accepted by both sides. If they can not decide, the senior Federal Judge in our district acts, or he appoints a man to act, and that decision is final.

Now, in answering Mr. Giessing's question, if this man feels that he is not justly dealt with in this way or any other, he goes through that procedure.

CHAIRMAN YATES: Is there any further discussion on this paper?

Yesterday you voted that the Chair should appoint a committee to arrange if possible for a paid secretary for the Mining Section. That committee will consist of Mr. Dan Harrington, the new secretary of the

Section; Mr. J. P. Hodgson, and Mr. W. H. Cameron of the official staff, Managing Director of the National Safety-Council. The other members of the committee might talk with Mr. Cameron before they leave, if possible, and arrange a meeting, or the work might be done by correspondence.

CHAIRMAN YATES: It has been suggested that all the men who signed up cards in the Mining Section are to receive the *Monthly Bulletin*. How many are in favor of that? (Unanimous.)

MR. POLLOCK: I do not know how many of you have seen a series of cards which Mr. Forbes got out at my request, showing number killed in coal and metal mines.

The Record of Fatalities in Metal and Coal Mines

I wondered whether safety was getting anywhere in our mines. It does not look as if we were getting far. The card for metal mines shows that in 1920 3.2 men were killed per thousand men; 1915, 3.5 men killed per thousand men. It does not look like we are getting very far in the last five or six years. Of course back in 1911, the record is 4.4 men. I suppose that was when the Bureau of Mines started working. Another card for 1911 shows men killed in mine fires, 4.08 men killed per thousand men employed.

Here is the record for coal miners: 1920, 3.8 men killed per thousand men employed; 1924, nearly five men killed per thousand men employed. Are we getting anywhere? It does not look like it. It seems we are getting worse. In 1911, 1.5 men killed; and in 1924, practically 4.8.

M. H. HUNTER (Safety Director, U. S. Gypsum Company, Fort Dodge, Iowa): How does that compare with production?

MR. POLLOCK: Production has probably gone up but this is on the basis of men employed.

The reason I got this out was to satisfy myself that we were not getting very far yet, and maybe that would be a good reason for us to have a paid secretary to round up these people that are not practicing safety.

MR. TRESTRAIL: I think you will find the production in the iron mines in the last three or four years practically doubled. Naturally, while we do not like to admit it, there has been an increase as far as our accidents are concerned.

MR. POLLOCK: The metal mines are probably a little better, but the coal mines are not.

MR. WARDROP: Since we have made such an extensive study in our accident severity rate and frequency rate I think there are more accidents being reported in the last three years than were ever reported before, and for that particular reason the curve chart may not be right.

MR. POLLOCK: These are fatalities. You can not get away from a fatality.

MR. DAVIDSON: I think the point is in your last remarks; we are getting somewhere with the mines that are doing the things they should do; and I think that by far more mines are taking safety measures now than they did two years ago and very many more than 10 years ago.

We are making great progress, in my opinion, if you will base your figures on the number of mines and the record for a particular mine rather than the total production and total number of men employed. I think that is really a fair way to get at it to see if we are getting anywhere. Just think of what the result would be if Mr. McDowell and others were not doing the things in the management of their mines they are doing to protect their men. The death rate would be appalling.

MR. HALL: I do not think people realize our mines are getting more dangerous, our coal mines, every year, getting further underground, and consequently developing a lot more gas than they used to. That is making a considerable difference. Then there is a risk in a very large mine. If you have 1,000 men in a mine there are 1,000 risks and there are 1,000 people exposed to those risks, and so it varies as to the number of men in the mines. Very large mines, consequently, unless very carefully managed, are a greater hazard than the small mines, because there are more people to make the hazard with gas or dust and there are more men exposed to that hazard; therefore it varies, as I have always said, although I could never get people to agree with me, as the square of the number of men who are employed.

CHAIRMAN YATES: I think Mr. Forbes is ready now and we will postpone the rest of this discussion until Mr. Forbes has finished.

J. J. FORBES: In the first place, I want to thank members of the Institute and those companies that contributed "Safety Kinks" that made possible this collection. About eight months ago Mr. Read, who was then Secretary of the Institute, asked me if I would act as a kind of clearing house for safety kinks. I agreed, but I have had some difficulty in getting the fellows to send in kinks. I have done the best I could under the circumstances; some are very good, others not so good. I think we have a sufficient number here to bring out a pretty good discussion.

SYLLABUS ON SAFETY KINKS IN MINING

J. J. Forbes, Supervising Engineer, Instruction Section, U. S. Bureau of Mines, Pittsburgh, Pa.

(Editorial Note: This "Syllabus" by Mr. Forbes comprised one of the most interesting and valuable features of the Mining Section program; but, due to the peculiar nature of the matter presented, it is impossible to reproduce all of it in these published Transactions.

(The pictures shown alone numbered 108, each of them presenting some safety device in practical use to lower the accident possibilities in the mines. Mr. Forbes accompanied each of these pictures (as thrown on the screen by lantern slide) with brief descriptive sentences and a running commentary upon safety appliances. It is valuable to note that all of these pictures were taken from the records of the Bureau of Mines, and that they, together with a multitude of other pictures and descriptive matter on safety appliances, are available in the Bureau for reference and examination by all who may be interested.



Figure I. A guard for end of trolley wire.

(It has been very difficult to select from this mass of material a moderate number of the pictures for reproduction in these Transactions. The editors have used their best judgment, in view of the fact that all Sectional activities of the National Safety Council in the Annual Congress are so very voluminous, and have sought by a presentation of a selected group of the pictures to indicate the wide range and importance of the whole program feature.)

Figure I, as shown here, was No. 22 in the Syllabus, "A Guard for End

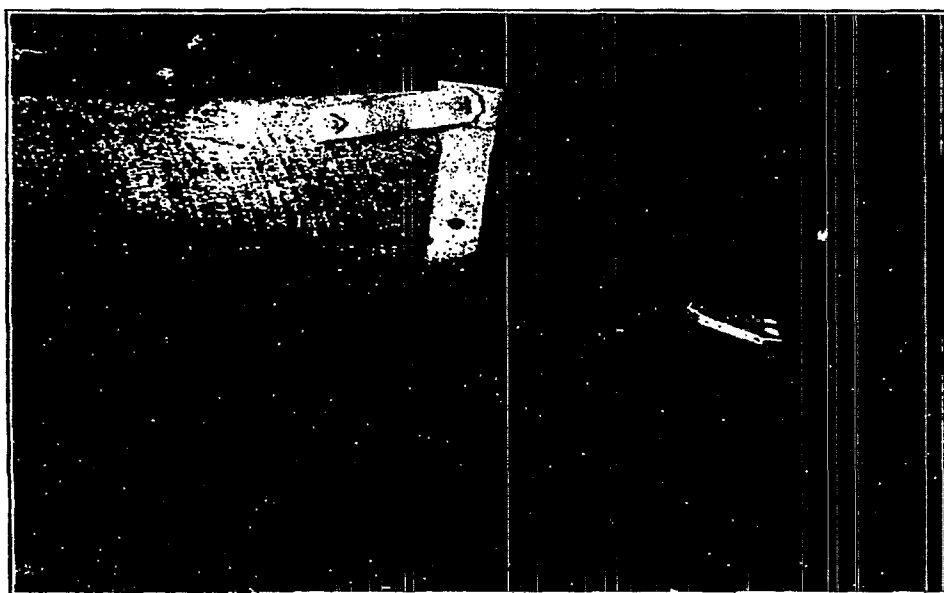


Figure II. Guards on motor bumper.

of Trolley Wire." The Consolidated Coal Company of West Virginia uses a box, open on top and held in place by wood pins to protect the end of the trolley wire in an entry. The box is easily moved forward when additional wire is put up and it prevents the possibility of workmen being injured by end of the wire protruding from last hanger.

Figure II, which was No. 23 in the Syllabus, shows "Guards on a Motor Bumper to Keep the Cars from Jumping on Deck." This practice is followed in its coal mines by the Consolidated Coal Company, of Fairmount, West Virginia.



Figure III. Automatic cut-off for rope haulage—open position.

Figure III, which was No. 31 of the Syllabus, illustrates an "Automatic Cut-off for Rope Haulage—Open Position." The Consolidated Coal Company of West Virginia uses an automatic cut-off on slopes for rope haulage. The automatic cut-off is arranged so that it opens when slack is made in the rope by the haulage engineer, but will remain closed as long as there is the slightest pull on the rope. The view shows the automatic cut-off in the open position and gives a good idea of its construction. The device has been in use for about six years and has proved to be a very safe and effective device for uncoupling trips at the tippie.

Figure IV, which was No. 34 in the Syllabus, shows an "Interlocking Door Lock for Heading Air Lock." The Bethlehem Mines Corporation of Pennsylvania uses interlocking doors on heading air locks. By using

a device of this kind it is impossible to open both doors of the air lock at the same time, thereby preventing short circuit of the air.

Figure V, which was No. 35 in the Syllabus, shows an "Insulated Coupling for Mine Cars." This device is also employed by the Bethlehem

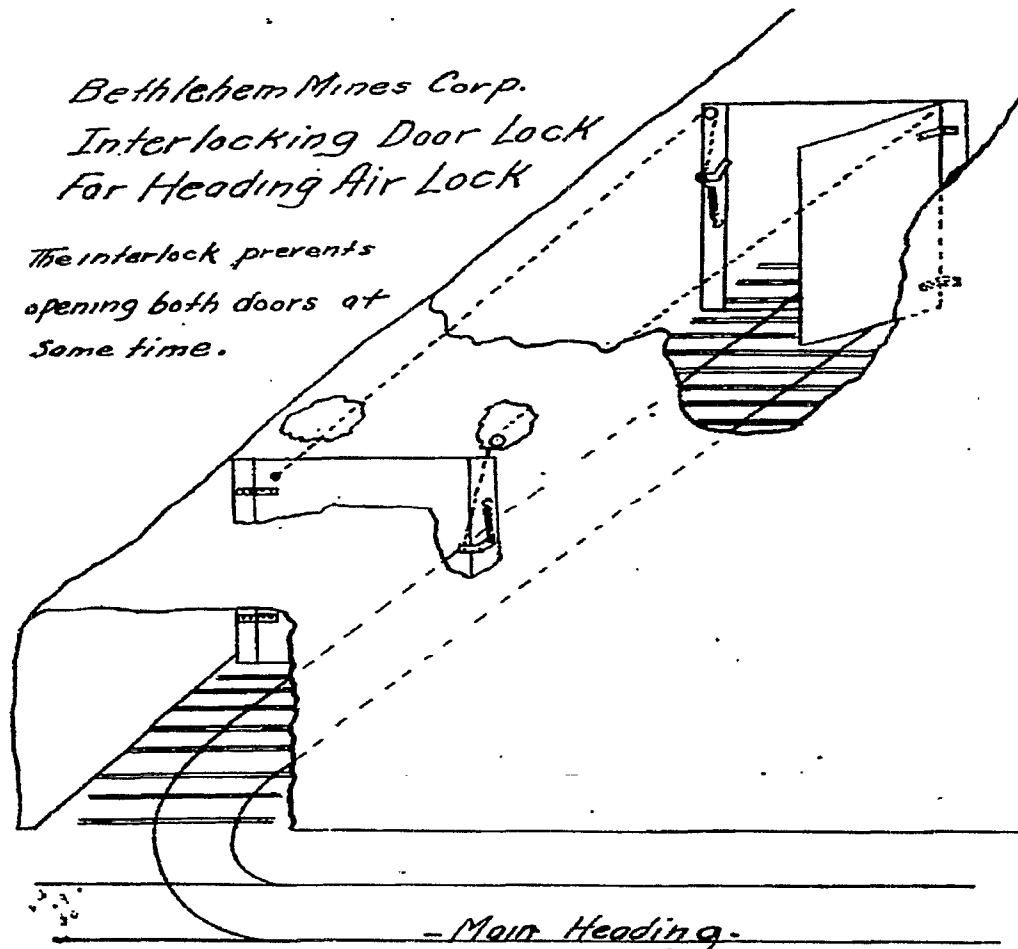


Figure IV. Interlocking door lock for heading air lock

Mines Corporation of Pennsylvania, and is used on cars of all man trips and explosive cars. The view shows the coupling attached to a car.

Figure VI, which was No. 49 in the Syllabus, illustrates a "Mine Car Safety Coupling for Hoisting on Slope." This is a view of a safety coupling used by the Wilkes-Barre Colliery Company of Pennsylvania.

Figure VII, which was No. 56 in the Syllabus, shows a "Safety Coupling for Man Trips." This close-up view of the man trip coupling shows the

clevis pins, hoist coupling and safety rope. The rope passes along the bottom of each car and is clevised to main hoisting rope. This device is used on the man-trips of the Woodward Iron Company and other coal mining companies in Alabama.

Figure VIII, which was No. 59 in the Syllabus, shows a "Carrying Case for Capped Fuses." The Penn Iron Mining Company, Vulcan, Michigan, uses a special carrying case for capped fuses. This case was devised for miners who have to carry their capped fuses or primers through raises or small openings. The general practice is to coil the fuse in a roll and stick it over the forearm. Where a steep ladder is to be



Figure V. Insulated coupling for mine cars.

climbed there is danger of bringing the primers in contact with the miner's lamp or of striking them against some piece of rock or metal. This carrying case is made of heavy galvanized iron, is nine inches in diameter and three inches deep, with a flange one inch deep around the top and it has a hinged cover which is also one inch deep. The entire case is lined with heavy felt and a soft rubber band is placed around the inside edge of the flange. In this way there is no metal exposed which the caps can touch during transportation. The case is carried over the shoulder by means of a strap and does not impede the progress of a person climbing ladders.

Figure IX, which was No. 67 of the Syllabus, shows a "Lock for Trolley Wire Switch." The Oliver Iron Mining Company of Minnesota uses such a lock on the trolley wire switches. It consists of a heavy leather strap of sufficient length to go around a standard switch. To this strap is

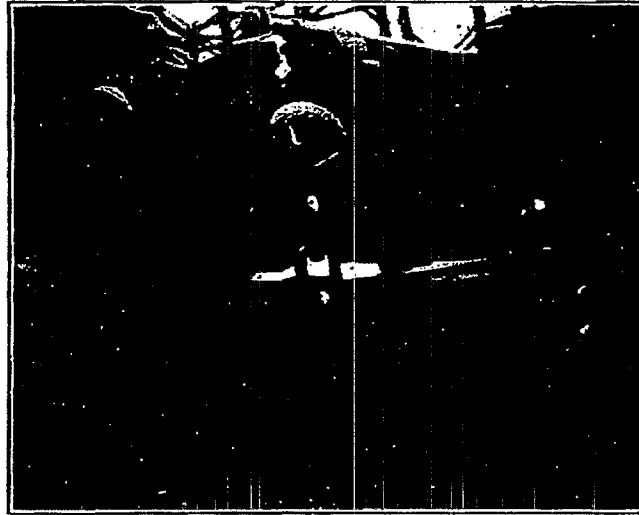


Figure VI. Mine car safety coupling for hoisting on slope.

fastened a padlock. This device is used when doing repair work or connecting blasting wires.

Figure X, which was No. 78 in the Syllabus, shows a "Swinging Chute Lip—Closed Position." The Homestake Mining Company of South Dakota uses a swinging extension chute lip at loading stations which allows the cars to be loaded without danger of spilling. This view shows the extension chute lip in the closed position. The lip as shown can be raised out of the way of motor haulage or of men passing in the drift. Counterweights hold the lip in position.



Figure VII. A safety coupling for man trips.

Figure XI, which was No. 80 in the Syllabus, shows a "Safety Handle for Coupling Cars." The Homestake Mining Company, South Dakota, uses this safety handle on its cars. The photograph shows a simple lever device of flat wrought iron fastened to the end of the ore car and

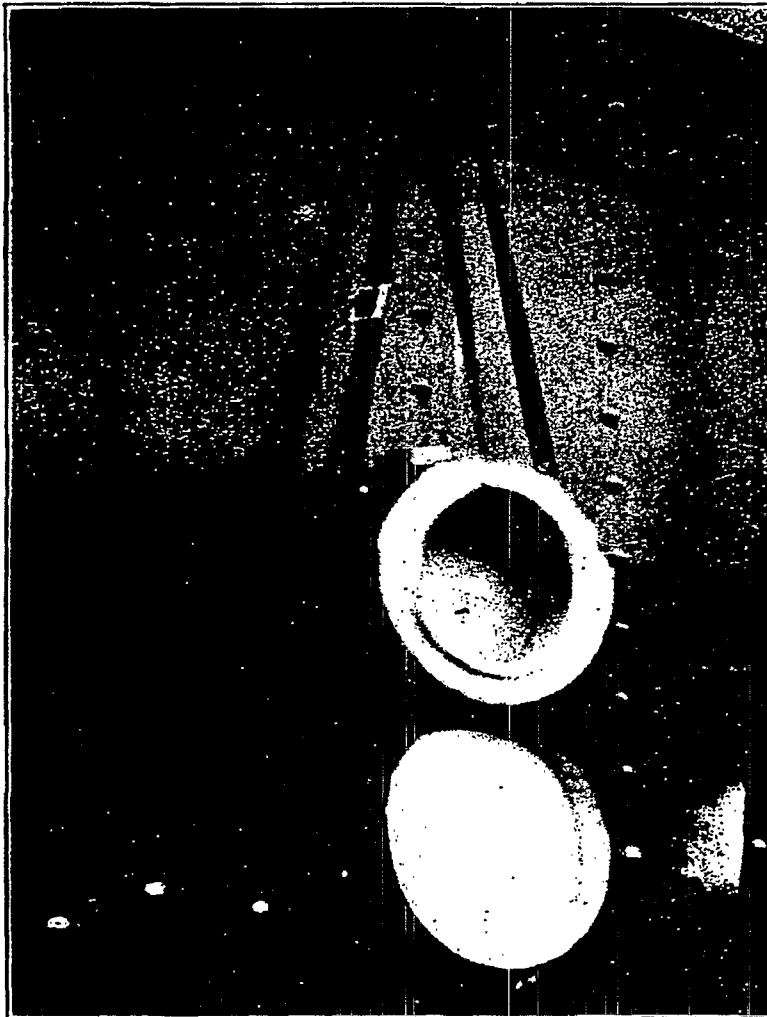


Figure VIII. Carrying case for capped fuses.

operating the pins of the link pin couplers. With this device it is not necessary for the brakeman to get any part of his body between the cars when coupling or uncoupling.

Figure XII, which was No. 91 of the Syllabus, shows "Safety Lugs on Ore Cars." Mines in the Tri-State Zinc and Lead Ore District use such

a safety lug on buckets or cans. The lugs are so constructed that the bail can not fall on the rim of the can, and thus prevents workmen from having fingers and hands injured in this manner.

Figure XIII, which was No. 94 of the Syllabus, shows a "Guard Over Fan Motor for Small Booster Fan in Place." This guard is made of sheet steel and forms an effective position against spreading of fire,



Figure IX. A lock for trolley wire switch.

should the motor burn out. It also protects the motor from dirt dropping from above. Note the all-steel box to which the installation is bolted, making it convenient to move and affording good fire protection. This device is used by Pickands, Mather & Company, Mesabe Range, Minnesota.

Figure XIV, which was No. 99 of the Syllabus, shows "Grizzly for Top of Ore Raises." The Pickands-Mather Company, of Michigan, uses grizzlies to protect tops of open raises. The grizzly is made of 20-pound rail throughout, fastened with one-half inch rivets so constructed that the whole will partially collapse. The framework fastens by spikes or lag screws to the timber bearing pieces of each end of the raises. It has a nine inch drop below the bearers in order to allow more dump room.

MR. FORBES: In connection with these kinks, this is the first attempt we have made in this Section, and I want to thank these members that have sent in material. I think it is a subject that should be continued.

MR. TRESTRAIL: Is it possible to have those in the report of the meeting?

MR. FORBES: The Bureau has the negative in its possession for the kinks. Any member desiring the positive or print of it can have it by writing in to me and I will take care of you. The whole business will cost you about \$8.50. That will have to be done outside the Bureau. I am going to furnish the N. S. C. with the photographs in connection with my paper.

CHAIRMAN YATES: I think we owe Mr. Forbes the thanks of this Section for what he has done in this matter. I know he has had difficulty in getting these subjects. It is a start and in the right direction, and I think as he said, we should continue this next year. I think we should appoint Mr. Forbes right now to receive these.

MR. HALL: I feel very much indebted to Mr. Forbes for getting this material. I suggested the collection of it for about four years and they tried to get me to do it.

MR. FORBES: If the men would send them in, there are outstanding devices at most any mine. I went to Mr. Bannister and he said, "We don't have any." I said, "Let us take a trip underground," and in half

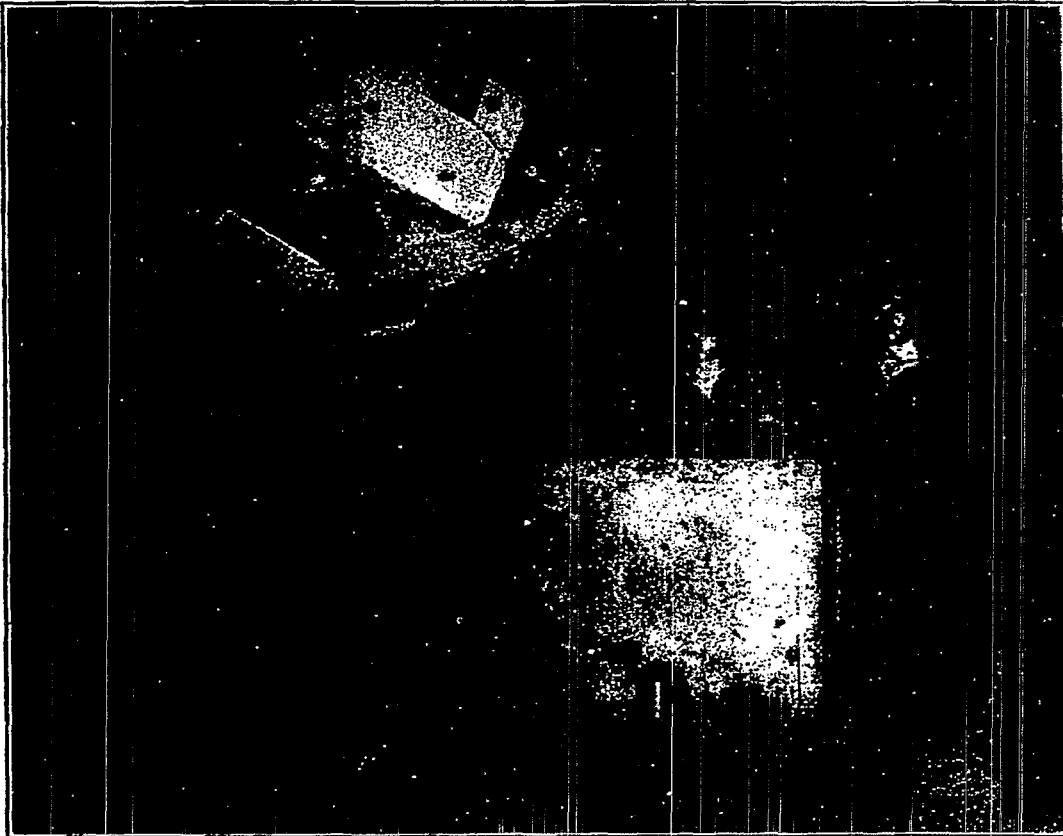


Figure X. Swinging chute lip in the closed position.

an hour we had picked out 10. The stuff is second nature to you fellows, you see it every day, but it would be very valuable to the other men. I think the next fellow that undertakes a paper of this character will be helped considerably.

CHAIRMAN YATES: Now I do not understand the difference between this Mine Safety Devices and the Round Table Discussion of Mine Safety Stunts. I think we have had our stunts. We are now ready to receive the report of the Committee on Resolutions from Mr. Ageton, chairman.



Figure XI. Safety handle for coupling cars.

MR. AGTON: I wrote down the resolutions and passed them to the other members of the committee. The first is:

WHEREAS, The U. S. Bureau of Mines, Department of Commerce, has been very active in furthering matters pertaining to the safety of the men in the mining industry; and

WHEREAS, It is our opinion that this Bureau has not had sufficient funds appropriated them to carry on this work during the past year, proportionate to the growth of the industry throughout the country;

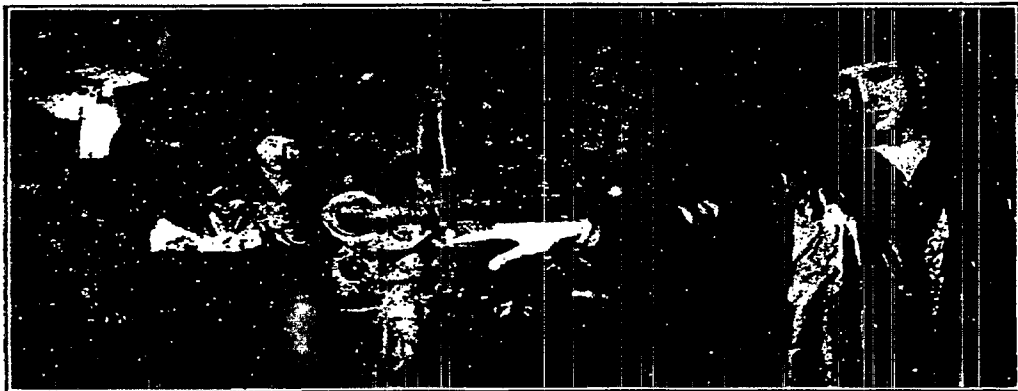


Figure XII. Safety lugs on ore cans.

BE IT HEREBY RESOLVED, That it is the sense of the Mining Section of the National Safety Council that the Congress of the United States should appropriate more money to the use of the Bureau of Mines in order that this very necessary work may be expanded in the various mining industries in the United States;

IT IS FURTHER RESOLVED, That a copy of this resolution be for-

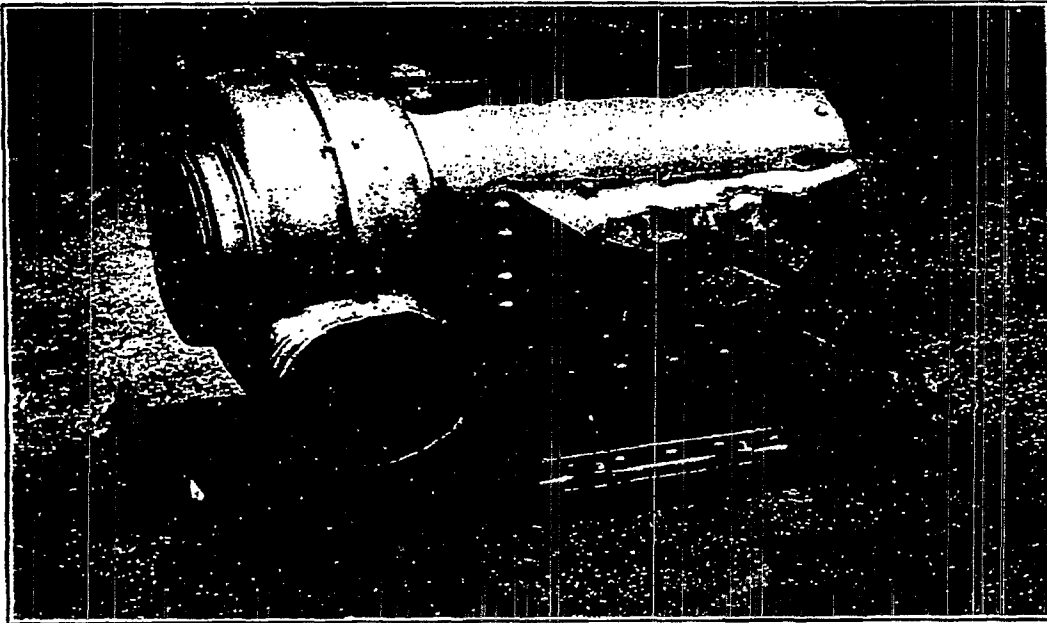


Figure XIII. Guard over fan motor for small booster fan.

warded to the Honorable Herbert Hoover, Secretary of Commerce, by the secretary of the National Safety Council.

I move the adoption of this resolution.

(The motion was seconded and duly carried.)

MR. AGETON: The second resolution reads:

WHEREAS, It has been noted that other Sections of the National Safety Council have very successfully conducted Section luncheons and dinners;

BE IT HEREBY RESOLVED, That the officers of the Mining Section, for the next year, be requested to arrange either a luncheon or a dinner for the Mining Section.

I move the adoption of that resolution.

(The motion was seconded and carried.)

MR. HALL: These luncheons have their disadvantage. They set them for a special time, and we have overrun our time every day. It would spoil our meeting.

CHAIRMAN YATES: We have no time to end these sessions. We start at 9:30.

MR. HALL: I think it would be a very good thing if we could arrange to carry on the papers after our luncheon, provided the luncheon cuts off short in the middle of our discussion.

MR. HODGSON: Make it a dinner. Work night shift.

MR. AGTON: Resolution number three is:



Figure XIV. Grizzly for top of ore raises.

WHEREAS, The success of the present meeting of the Mining Section has been due largely to the effort of our present chairman, Mr. B. C. Yates, and his associates;

BE IT HEREBY RESOLVED, That a standing vote of thanks be extended to Mr. Yates and all of those assisting him in the conduct of these meetings.

I move this be adopted.

CHAIRMAN YATES: Put the motion.

(The motion was carried unanimously by rising vote.)

CHAIRMAN YATES: I wish to thank you for the expression of your appreciation, and I wish to thank all the members of the committees who aided me during the year. It is largely their efforts and your attendance that make this meeting a success, and by your readiness to take part in the discussions.

Has anyone prepared a speech along the lines of Mine Safety Stunts or anything of that kind?

H. F. WEBB (General Safety Director, Allegheny Pittsburgh Coal Company and Windsor Power House Coal Company, Pittsburgh, Pennsylvania): I can not make a speech but one of my inspectors came in from the Pittsburgh coal region last Saturday and brought back a piece of poetry written by a ten-year old boy who was the son of a man who lost his life in a mine explosion along with the lives of 43 of his fellows. I am not going to mention the name of the mine. Without a doubt it is one of the most remarkable pieces of poetry I have ever come across, and I want to take a few minutes to read it to you men because I believe

you will be much interested. All the schools in that section are causing the pupils to commit it to memory.

Daddy, Please Come Back

May he rest in peace,
My Daddy, dear:
His voice again I'll never hear;
His smiles again I'll never see;
In dreams alone his face I'll see.
Oh! Daddy, please come back to me!

Mamma cries and sister, too,
Oh! Daddy, dear, what shall I do?
I'd like to work like other men,
But Mamma says I'm only ten:
And Mamma will not let me go
Into the mines so far below.

But Daddy only smiles to me
Across the wild eternal sea;
With tear-stained cheeks, he's kneeling there.
His pale eyes move with silent prayer.
He's praying to come home, I know.
Oh! dearest Lord, please let him go!

Mamma's sick and times are bad,
Now's the time we need our Dad;
I'll go to church and pray and pray,
So that he will come back some day.
If he returns, what joy it would be!
Oh! Daddy, please come back to me!

Oh! Daddy, Daddy, please come back
To our humble shack;
We'll need you more day after day,
As the long hours roll away,
I'll always pray on bended knee,
Oh! Daddy, please come back to me!

(This remarkable original and pathetic poem was written by the ten year son of a miner who lost his life along with 43 fellow workers in a recent mine explosion.)

CHAIRMAN YATES: Does anyone else have anything to add? I am wondering if you will permit me to read something I had prepared. I can not speak off-hand very well, and I wanted to read it. This touches on several things we have mentioned in this Section. Will you kindly permit me? The general subject is Mine Safety Stunts. I took that from

the last number on the program, and my assertion is that an operating organization with a unified safety mind is the best safety stunt.

AN OPERATING ORGANIZATION WITH A UNIFIED SAFETY MIND

B. C. Yates, Superintendent, Homestake Mining Company, Lead, S. D.

From the viewpoint of the executive, the best "Safety Stunt" is to have a working organization thinking safety as a unit. It matters little how efficient a safety engineer may be, one man in the organization whose mind is not in tune with the accident prevention idea will hinder the work just to the extent of the man's importance in the organization.

W. W. Adams, statistician of the Bureau of Mines, says that the causes of accidents are 20 per cent mechanical and 75 per cent human. If we can control this human element do we not at the same time control the mechanical? In other words, when every person in an industrial organization is working for accident prevention, mechanical safeguarding will follow.

At the Homestake we have our local safety committees, we put on special safety campaigns, and we give our underground shift bosses a monthly and yearly bonus provided their accident records are below a certain average. We reward our mine employees who have worked throughout the year without a lost time accident. We distribute National Safety Council calendars to all employees and furnish the *National Safety News* to all members of our safety committee. What is it we hope to accomplish by this? Nothing more nor less than to get accident prevention firmly fixed in the mind of every person in the organization.

Many writers on the subject contend that accident prevention is a matter of education. It is more than that, it is the application of such education to our daily living so that safe thinking becomes a part of our subconscious thought. Guarding and inspecting machinery, protecting workmen from falling objects and instruction in safe methods of doing work naturally follow such applied education.

It is necessary to educate not only the workmen, but the shift bosses, the foreman, the superintendent, the general manager, the directors and even the stockholders as well. When we have reached this stage in the education of industrial organizations we will have nearly reached the goal for which our National organization is striving, and the money now spent by industry to pay for dead and broken men will be available for a better use.

Before leaving the subject permit me to say that this education must begin with the child in the home and the school. It has been said that Germany trained her soldiers at their mother's knee. If children can be taught to be instruments of destruction they can be taught to be instruments of preservation.

MR. AGETON: Four or five men have asked me to explain some of the flags and things around this meeting room. The flag is the safety emblem

in our district. About two years ago, that is in 1925, we started a contest among the 185 mines of the Tri-State Zinc District, to see if we could not get a few mines to go a few weeks without having time lost accidents. During the month of January three mine foremen (we call them ground bosses) turned in complete records showing no time lost accidents. All three of those foremen were immediately voted as being the biggest liars in the Tri-State District. Everybody could prove that they had had accidents of that nature. Now we figured that they were correct and that we ought to recognize that work, so we developed four flags to fly above the shaft house of the different mines.

The Pete flag is a small flag showing the picture of our guardian angel, "Accident Prevention Pete," and is given for two months or 2,000 man shifts without a time lost accident. At the present time 69 mines out of the 185 fly that flag. The Star flag is given for four months, or for 7,500 man shifts, without a time lost accident, and at the present time 24 mines are flying that flag. The New Broom flag was given for six months or 10,000 men shifts without a time lost accident. We adopted the new broom, following Benjamin Franklin's saying that a new broom sweeps clean. Any ground boss that runs his force for six months or 10,000 shifts without a time loss accident cleans up on accidents. Fourteen mines are now flying that flag.

Mr. McNeil of the Federal Mining Company is just a whole lot of bother down there; he keeps winning prizes and more prizes, so finally we had to adopt the combination flag for 20,000 mine shifts without a time lost accident. That has Pete, the broom and the star. I am up against it again because Mac has a mine now that has gone over 33,000 man shifts without a time lost accident. He is insisting I give him something else.

The point I want to make is this—our stunt is like that used in lots of other places, but traveling around on the street cars in the districts there you will find the "rustlers," as we call them, candidates, are looking for jobs in the mines that are flying these flags. We have only been in there three years now, but I think these figures will be indicative of improvement. In 1924 our severity record was 19.7 man shifts loss due to accidents per 1,000 man shifts working; in 1925 it was 16.9; the first six months of 1926 it was 10.1. All that we can do is hope that we can have the energy to stay in there and keep them going down. But the stunt of awarding the mine as a whole, I think is a good stunt. The Federal Company and the Commerce Company and the Eagle-Picher Company, all whose representatives are here, have the different bonuses for the ground bosses and for their men, and anything that recognizes the good work of the foremen and the men themselves is a good safety stunt.

ADJOURNMENT

Packers and Tanners Section

New Officers of the Section

CHAIRMAN: WILLIAM C. COREY

Delaware Leather Co., Wilmington, Del.

VICE-CHAIRMAN: WILLIAM CAMPBELL

Graton & Knight Co., Worcester, Mass.

SECRETARY: O. C. STERN

Plankinton Packing Co., Milwaukee, Wis.

Committees

MEMBERSHIP: FRED SCHWARZE, Chairman

The Pfister & Vogel Leather Co., Milwaukee, Wis.

PROGRAM: OLIVER F. W. CROMWELL, Chairman

Central Leather Co., Ridgway, Pa.

PUBLICITY: CHARLES BONCHOLT, Chairman

Hammond Standish & Co., Detroit, Mich.

POSTER: W. F. McCLELLAN, Chairman

Armour and Company, Chicago, Ill.

STATISTICAL: DEAN MONEYSMAKER, Chairman

International Shoe Co., St. Louis, Mo.

ENGINEERING REPRESENTATIVE: S. R. JENSEN

Armour and Company, Chicago, Ill.

EXECUTIVE COMMITTEE: (The Officers and)

N. L. BRAINARD

Swift and Company, Chicago, Ill.

J. M. EATON

Libby, McNeill & Libby, Chicago, Ill.

LLOYD F. ALLEN

The Rath Packing Company, Waterloo, Iowa.

October 26, 1926

OLIVER F. W. CROMWELL, Chairman

Safety Engineer, Central Leather Co., Ridgway, Pa.

THE first session of the Packers and Tanners Section, Fifteenth Annual Safety Congress, National Safety Council, was called to order at 9:45 o'clock, in Parlor A, Book-Cadillac Hotel, Detroit, Mich., Chairman Oliver F. W. Cromwell presiding.

CHAIRMAN CROMWELL: The first paper on the program this morning is by Wm. C. Corey, President, Delaware Leather Co., Wilmington, Delaware.

THE PRACTICAL APPLICATION OF SAFETY AMONG LEATHER WORKERS

William C. Corey, President, Delaware Leather Co., Wilmington, Del.

The facts and figures that I shall read to you are mainly from my own experiences as the chief executive of a small plant which employs about 120 hands. I think, however, that those things which are practiced with success in a small plant can be practiced with the same success in a larger plant.

The physical condition of a tannery is liable to cause many injuries which would rarely occur in a plant where the work is carried on under different conditions. I refer particularly to the wet floors and small pieces of fleshings of the banana peel variety, all of which bring about conditions not encountered in plants where the work is done on dry floors. Every individual industry, however, has its own particular hazards. We are all rather prone to think that our industry is more difficult than that of our neighbors; but perhaps if we knew as much about their business as we do about our own, we would see that they also have their difficulties to contend with.

One of the first things necessary for successful safety work in a plant of any kind is the personal cooperation and interest of all official heads; or, in other words, "they must," as the saying is, "be sold on safety." How can an executive expect to interest his employees in any subject unless he is interested in it himself? To obtain any objective we must start with the head of the company and work down through the foreman to the worker himself. You will agree with me that it is quite impossible for a teacher to be successful unless he is interested in the subject he is teaching. Therefore, since our employees are only grown-up children, we employers should be the interested teachers. It has been my experience that if the head of the concern is interested, it is not very difficult to get your workers interested also.

A clean, well-kept plant should be had at all times. If you are clean, your worker will be clean. Machinery must be kept in repair; guards placed where needed. If you are careful, your worker will be careful. Well-kept machinery shows good care. If you visited a plant and saw machinery in poor condition, what would it indicate? I need not answer.

Guarding machinery and belts has always been our practice, more so since the advent of safety. Of course, there are some machines for which no practical guards have yet been devised. I have in mind roller fleshing machines, shaving machines, staking machines, and side glazing machines. We do guard belts and moving parts and engineers in our industry are working on the design of operating guards that will not interfere with production.

One of the principal hazards that have to be guarded against in tanneries, especially those tanneries making leather from imported hides and skins, is that of anthrax. Many foreign skins carry this germ and

precautions against infection have to be taken. The workman is generally infected through an open cut or from picking off a scab or pimple. The symptoms of this disease are in most cases unmistakable and the infected workman should be taken to a physician at once. In most tannery centers there are generally one or more physicians who have studied the treatment of anthrax and know the symptoms. It is to a physician of this training that the patient must be taken. I have heard of cases where a man was infected and failed to report his trouble to the factory dispensary or other responsible authorities at the tannery, but went to his family physician and was treated for swollen glands, and died. Some states have passed certain rules concerning the sanitary measures to be used in those tanneries and a study of these is recommended. In short, the following rules should suffice:

1. Allow no one to work in those departments in which an infection from anthrax may occur who has an open wound or scab exposed. A mere bandage about the wound or scab will not suffice.
2. In case of a cut send the workman to the dispensary at once. (As in all accident cases).

Four General Rules for Safety Conduct

3. In the raw stock department workmen must wear gloves and in handling dusty hides or skins respirators should also be worn. In the raw stock and bean house the men should wash the hands in bi-chloride of mercury solution at the end of working periods.

4. At the first sign of infection, take the man to a physician skilled in the treatment of anthrax. It only takes anthrax from two to five days to prove fatal.

Permanent notices, painted where the worker can see them while he works, are desirable; also bulletin boards placed in conspicuous places on which are displayed weekly posters; these are furnished by liability insurance companies and the National Safety Council. These bulletins, I find, are very useful; but do not put up too many at one time! I find many of my employees looking for the new posters each week.

Mass meetings should be held at least twice a year. These meetings should be opened by the president himself with appropriate remarks. He will introduce the speaker who should give a talk on safety. Most of the liability companies now furnish this service. But, by all means, the head of the concern should open these meetings and there should be present with him his executive staff. I have addressed my workers many times, and the interest that they have shown has given me much pleasure and many a thrill. The speaker furnished by our insurance company, has often told me that it was inspiring to talk to our workers, they were so attentive and interested!

I have heard of a president whose excuse for not being present and speaking at a safety meeting was that he was too busy, and did not have the time. How about that afternoon golf? A stereopticon, or, better, a moving picture illustrating safety and the dangers of careless-

ness are fine adjuncts to these meetings. A lesson can often be taught much better through the eye than through the ear!

A safety organization should be formed consisting of safety committees; in a small plant, say of 100 to 125 hands, one committee of four or five, I consider enough; in larger plants there should be departmental committees, with a central or main committee having at least one executive.

Our practice is to listen to suggestions from employees pertaining to safety; and several times we have carried out these suggestions, when they were not as practical as they might seem to be. We consider it worth while to do this in order to keep our employees' interest and encourage further suggestions which might be practical.

We investigate all accidents, try to determine the cause and see what can be done to prevent them happening again. To illustrate, one of our men slipped on a wet incline and strained his back, and we put up hand rails on both sides of this incline. Another time, a man slipped in a passageway near a drum, and we immediately guarded this place. The reward is that the worker sees our real interest in him and he becomes interested in us.

On several occasions I have worn a long linen duster, a common habit of many of us, and I have been approached two or three different times by my men, suggesting that I do not wear such a garment as it could easily get caught in running machinery and cause me injury.

The Small Company Executive Has an Advantage

I think that the president of a small company has a better opportunity to carry on successful safety work than one employing a large number of hands. To illustrate, I know personally the names, residences, and something about the family of every foreman in my employ; and, furthermore, I know the names of many of the other workers, so that with this personal touch it is much easier for me to interest my 125 workers than it would be if we had five or six times that number.

How close a personal touch has the head of a concern employing 800 or 1000 hands—or perhaps twice that number? You see, we small fellows do have some advantages, after all!

I doubt if any of us today will live to see the real benefits of safety teaching. None of us ever heard of safety when we were school children; but some of our grandchildren who are now being taught safety are going to grow up to be safety workers; although I expect the hazards will be greater then, as they now are compared with those when we were children.

I have heard it said recently that "the safe plant is the efficient plant." I cannot agree with this! I think that it should be "the efficient plant is the safe plant." Efficiency is made up of several elements, and safety is one of them. The progressive executive will have his plant as efficient as he can make it. If he hears of improvement whereby he can improve his product or lower costs, he will install the

device; so the progressive executive installs safety as an element of efficiency.

I would like here to give you a few figures showing our accident records as compared with some of our neighbors. Our record proves, I think, that safety teaching pays. Our lost time accident frequency per 100 employees per year for 1925 was 2.05 per cent; one of our neighbors, 4.56 per cent, more than twice as much. Another, 2.45 per cent or 25 per cent greater. Our loss ratio for four years averaged 6 per cent; our neighbors', 20 per cent and 49 per cent respectively. The longest time that we operated without a lost time accident was one year and four months; this was for the whole plant. Our staking machine department has operated nine years, our beam house five years, and our tan cellar five years, without a lost time accident.

In the last eight years, since the advent of compulsory liability insurance and safety teachings, we have had only ten lost time accidents, none of which has caused permanent injury of any kind nor the loss of any part of the body. Our most serious accident in our 23 years of manufacturing life was the loss of a hand, and that was 18 years ago, before we thought much about safety teaching. So, after all, safety teaching is worth while and pays big dividends, although we will never know how many accidents we prevent.

Let me add that "interested executives make interested employees!"

An Organization with More than Average Intelligence

CHAIRMAN CROMWELL: If anyone has any questions to ask I am sure Mr. Corey will be glad to answer them.

FRED SCHWARZE (Pfister-Vogel Leather Co., Milwaukee, Wis.): I should like to ask Mr. Corey regarding the type of help he has in his plant?

MR. COREY: My foremen are men who have been with me ever since I started in business. I don't think there is one foreman who has been with me less than 12 to 15 years. We have 25 or 30 girls. About half are American and half Polish girls. We have some colored help, about 15 or 20 per cent colored. We do not employ a great deal of foreign help and I do not believe we have an employee who can not understand English. The intelligence of our help today is much higher than it was 15 to 18 years ago, and it is not so difficult to get them interested.

N. L. BRAINARD (Swift & Co., Chicago, Ill.): Do you fumigate all your hides and all of your raw stock?

MR. COREY: We do not fumigate all of them. Some of the skins come from foreign countries where it is necessary that they get a consular certificate of health, in which it says that they are free from hoof and mouth disease. There are others that come to this country where we can not get the certificate of health and we have to fumigate them ourselves.

From my experience, I don't believe that goat skins are quite as liable to have hoof and mouth disease as sheep skins and others, although we have two or three neighbors who have had several cases.

I can not tell anything about goat skins by looking at them as to whether they are all right or not, so I usually have them fumigated. I can not get my men to put on gloves when examining them unless I do so myself.

We have one doctor in my part of the country who is very good on these diseases. He has cured several. Most doctors are prone to commit themselves on these diseases.

I might add while I am on my feet, that when I get back to Wilmington I am going to have a mass meeting and I may read part of this paper to my help. It will help to pep them up a little. Mass meetings should be held at least twice a year. These meetings should be opened by the head of the firm himself. He should have a speaker who will give a talk on safety. I have addressed my workers many times and the interest that they have shown has given me much pleasure. The speaker furnished by our liability insurance company has often told me that it was inspiring to talk to our workers, they were so attentive and interested.

Successful Treatment in Cases of Anthrax

CHAIRMAN CROMWELL: I know of a Dr. Bouhr who has never lost a case of anthrax. He is a specialist along that line, and we have shipped him all kinds of cases and he has never lost one.

The way we do if we have a case of anthrax, or if we even suspect it is a case of anthrax, we put him right in a car and ship him over to Dr. Bouhr and let him take care of the man.

Wm. CAMPBELL (The Graton and Knight Mfg. Co., Worcester, Mass.): We fumigate all hides that come from foreign countries before they come out of the car. I think it is a good way to keep away from anthrax to do it right in the car before they go into soak.

CHAIRMAN CROMWELL: Our company practices the same thing. All foreign hides must be sterilized before they are taken out of the car. We have a special man to do this if the state can not do it.

MR. COREY: We are always watching accidents and when there is one we try to safeguard against a recurrence. One of our girls tripped over a truck handle which was laying on the floor. We immediately had all the truck handles painted white and there has not been an accident of this nature since.

CHAIRMAN CROMWELL: Our truck handles are such that they can be turned around under the body of the truck. This prevents a lot of tripping accidents.

MR. COREY: Our employees are supposed to do that but they don't always do it.

CHAIRMAN CROMWELL: Last year we had quite a few accidents where the employees got their feet pinched under the floor wheel trucks. We have put a shield around the truck wheels. This comes about half an inch from the floor. The shield does not interfere in any way with the movement of the truck.

There is another point I should like to bring up and that is a system

we tried out in our different departments. We gave to the foreman of each department going three months without a doctor bill a gold medal. This medal consisted of a two-dollar-and-a-half gold piece with the foreman's name engraved on it. This made quite a hit with the employees.

DEAN MONEYMAKER (International Shoe Co., St. Louis, Mo.): Do you have any trouble with your sheridan presses in guarding them and keeping people from getting their hands caught in them?

MR. COREY: We do not have any of that kind of presses in our factory.

MR. FRED SCHWARZE: We have a guard for these machines. I won't say that it is 100 per cent safe, but I should be glad to give you specifications.

CHAIRMAN CROMWELL: I might say that our company uses the same guard that Mr. Schwarze does. I am sure you can get any information you want from Mr. Schwarze.

If there are no other questions we will proceed to the next speaker. Mr. Al Kroes, Director of Safety Education, Employers Mutual Liability Insurance Co., Milwaukee, Wis., will talk to us.

HOW TO SELL SAFETY TO THE WORKER

Al Kroes, Director of Safety Education, Employers Mutual Liability Insurance Company, Wausau, Wisconsin.

Whenever I find myself addressing a group of safety workers my first thought is of gratitude for the opportunity and the chance of perhaps planting a bit of seed here and there, which will advance the great cause of safety for which we all are giving our time.

"How to Sell Safety to the Worker" is a task, a real problem, and it would take a lot more time than we can give it here to do justice to it. We shall, therefore, pick out the most important phases, and you will readily agree with me that the best man in all the world to sell safety to the men, is the foreman.

Oh, yes, there may be a safety director in your plant, and all hail to the real outstanding ones, who are a credit to that profession; but even in those plants that have one and in the smallest shops too small to support one, the foreman is the real captain of the ship. On him depends the safe conduct of the men in his charge, the frequency of infrequency of accidents and a lot of other things which contribute to the smooth running of things in his department. All this has a tremendous effect on the production sheet and makes the foreman who knows the intricate combination. But my subject is nothing so far as effect to the foreman.

Salesmanship, the real kind that gets the work done, depends upon that great essential, "enthusiasm," and enthusiasm can not be sold by a foreman or safety man of whatever kind, who has not in him that divine spark of enthusiasm necessary to get over any successful sale.

In the first place, you must have something to sell. Present the real thing. Don't try to pass off to these fellows that safe-work substitute familiarly known as "something just as good," for they can quickly detect

the "near beer quality" of your proposition. The average fellow in the shop is willing to be sold on the genuine article but resents just as quickly the imitation that is handed out in some of the industrial plants.

Safety today is not what it was in 1910 or thereabouts, when almost every foreman thought he had done a hundred per cent job by guarding a few belts, pulleys, shafts and gears. Of course, this had to be done in the same way as building the foundation of a house, but the upperstructure of safety has more and more to do with the guarding of the human machine than ever before. And here we come to the line of demarcation, the question whether you are just a guard-foreman or a safety man who can reach out to the human side of accident prevention and get at the man on the job. When we have gone that far the real selling begins.

And, before we get out our book and start to sell, let us here and now pause for a moment and consider what a splendid thing it is to be instrumental in this wonderful work of eliminating the sorrow which always goes with every accident. What a chance to be a part in this worthwhile proposition to make dad a safe worker so that the boys and girls may have a chance, and the home may be spared from disruption, and happiness may reign instead of grief and despair. That is the heritage of being a leader of men.

Expect a Comeback of Some Kind in Selling Safety

Refreshed by this thought of our responsibility and pepped up by the inspiration of our work, we will now consider how best to reach our fellow worker and sell to him what he surely needs, but which many of them so indifferently or even suspiciously reject. And never forget the fact that the sale is not made until you have gone all the way. Naturally, you can not sell all of these men your proposition direct. You can hardly expect them to sign your bill of sale unconditionally and without some kind of a comeback.

Oh, indeed, a few of them take it willingly. They not only are one hundred per cent sold on it, but actually become your agent and enthusiastically sell it to their pals and shopmates. However, many of the others will have to be sold on the installment plan, and you have a regular time to follow them up for monthly payments and "interest." Some of the crowd are unwilling to seriously consider your best plan. They are sure that you are trying to slip something over, and they start broadcasting over station U.N.R.E.S.T., which is a serious menace to both safety and shop efficiency.

The last two groups of men are your problem. There is the test. You may as well stand up and be counted. You either are a born salesman or you belong to the class commonly known as ordertakers. We all have some different idea of how best to sell the safety idea to the great mass of workers, but we also have come to some definite conclusion.

The National Safety Council's Annual Congresses have long been known as the clearing house for these ideas, and the good they have done in the national field can not be disputed. Carelessness, thoughtlessness and indifference have cursed humanity for ages. The great waste of

human material in the workshops of America has been somewhat cut down since safety came into its own, and it is to the everlasting credit of thousands of superintendents, foremen, safety supervisors, safety committees, and the fellows on the job that much has been accomplished.

Just what has done or will do the most good depends on the size and conditions of each individual shop. But, whatever is done, must have in its inception the willingness of the man in the ranks to do his part and the capability of the foreman to put his men in a frame of mind where safety willingly becomes a part of the daily routine.

To have a man become a safety enthusiast willingly can only be accomplished by great and persistent effort on the part of the foreman or safety director, plus the earnestness and enthusiasm he puts in the work. The contrary-minded and "I-dont-give-a-damn" fellows should be talked to privately. To bawl them out when they violate a strict shop rule and especially at the spot and in the presence of fellow mates is the worst kind of a blunder and leads to nothing but trouble. A heart to heart talk in your private sanctum and an appeal to their good judgment and sense of justice will have amazing results, which will even surprise yourself. It will create good will and harmony, two essentials in the safety campaign. And, put this down, that these heart to heart talks are worth more than a box car full of printed stuff.

Close contact with the men you have called on the carpet not only makes for a better understanding between the party of the first part and the party of the second part, but it makes the party of the second part a missionary for good and your safety work has welded another link in the chain that eventually will become endless.

Successful Foremen Have Faith in Their Men

Such a process is slow and tries your very patience but it also puts you in a position where the leaders are. It's hard but it is not without compensation. To be a part in the great scheme of accident elimination to add your mite to the happiness of the many homes of your workers ought to make you feel proud and give you that peace of mind which nothing else can give.

Think what it means to put over a sale like that. No loud boasts or soap box oratory, but quietly and surely reach into the hearts of your men and find fellowship. And, above all, have faith. The really great foremen, the most successful safety supervisors, are those who have faith in their men. And, then, be human, you're dealing with men. Talk to them in their language—don't be too technical. Don't try to put over the Einstein theory. Don't forget that you are talking to Joe Kalinsky and not to President Coolidge. They're not hard to meet if you meet them on their own ground.

There are many more things that enter into a real campaign of selling safety. Important among these is a live wire safety committee, including an inspector, who not only knows his business but is a mixer. He must have that much-needed asset, personality, and the ability to radiate the safety spirit when he makes his rounds. Only a safety com-

mittee which includes the men on the job is worth while. Very few committees or councils composed only of executives are doing real good work. They are apt to become paper organizations and exist in name only. They certainly can not have the full endorsement of the men for they have not been considered as a part of it. Human nature is much the same in every station of life and when you ignore a man, and then expect his cooperation in the safety game, your efforts will end in failure.

During my 15 years of safety work I can look back with pride upon some safety organization bands of earnest men who have sold safety for many years and are still on the job. All honor to them. They deserve it. It's all work and no pay.

Bulletin boards sell safety just as surely as newspapers sell politics. It's a slow job but all advertising is slow work. The most attractive ads catch your eye first, and with bulletin boards it is no different. Then it is not only the right board and the right material on it, but above all the right location that counts. Good safety bulletins should be augmented by some news material of interest to the average men. Some of you may say that they don't read it. It depends a great deal what you mean by "it." Try it; just put a two-by-three-inch notice on the board that after November 15 all piecework will be raised fifteen cents a hundred and you will have a riot at the old bulletin board by noon. Keep the bulletin board up to the minute. The most enthusiastic newsboy can't sell a yesterday's paper. Today is what interests us. Yesterday is under the roses.

The Individual Plant Safety Campaign

Another stimulant that sells safety to the men is earnestly conducted individual plant safety campaigns. They call for everybody's help. They act like a primer to your old bus. These campaigns brush away the cob webs and put ginger into a lagging safety movement. They call for pep and point and put every man on his toes to get through the month without a mishap. Departments vie with each other with good natured jealousy to come through clean. These campaigns sell our old friend safety in a new garb and it is marvelous to watch the place in spic-span-safe attire after a concentrated effort. The old dark gloomy corners where old man carelessness has lived and grown fat for years will take on new life and the whole shop become a safety worth while place to work in. These campaigns arouse the competitive spirit born in all of us and write the word "efficiency" on every machine even though you can not see it.

Yes, safety can be sold to the worker, but the sale must be a real sale, made by real methods and by a real salesman. It means work, you must keep everlastingly at it, but you'll win out with a little patience.

At no time has accident reduction been more important than it is now. Always putting in the foreground the humanitarian aspect of this great work, it has a salutary effect on the bank book of both the employer and the men. The same fellow at station U. N. R. E. S. T. will tell you or some other close friend that all this safety work means a

lot of money to the boss. Pick 'em out and tell him frankly that he is right. Also tell him that the small sum the boss saves is nothing compared with the benefit to him in saving a hand, a leg, or an eye. Be honest with him and you'll make a sale. The primary assets of safety are a better work place, an ever increasing better atmosphere, a better understanding, and, therefore, better men, all of which means more efficiency, production, health and happiness. They are the four aces in the deck. It's a great game.

When safety supervision in the shop goes on the hummer and things go by default, accidents become epidemic and everybody joins the trouble club. Work for harmony. Put the oil where the squeak is. A noted piano manufacturer in this country is a great sticker for harmony in his plant. He truly said "There can not be real harmony in my pianos unless we have it in the factory."

Accidents Are the Growing Pains of Safety

Gentlemen, your work has many angles. It has all the high ideals of a profession. Yours is the noble missionary zeal of the enthusiast. What a God given opportunity to be a leader of these industrial masses and teach them to walk into the channels of safety. Safety furnishes a common meeting ground on a lot of questions, having a bearing on sound industrial relations. Sell real safety. Do it now—you can't put it over by putting it off. In the safety dictionary there are just two words "HOW" and "NOW."

Accidents and the attending toll of suffering are the growing pains of safety. Thousands upon thousands of fair minded workers are beginning to hate these unnecessary preventable accidents. They are looking for guidance and leadership.

In closing, I would say that on the glorious foundation of kindness to our fellow men the safety movement stands like a rock.

It stands there to the everlasting credit of the thousands of earnest superintendents and foremen who have unselfishly given of their time and efforts to shield their fellow workers from untimely death or serious injury.

It stands there to the glory of the thousands of "Unknown Soldiers" who without much praise but wholeheartedly gave all they could give to the great cause of safety so that their comrades may remain on duty and unhurt.

It stands there because safety is built on service and the brotherhood of men.

Gird on your sword, you men of safety. Your task is not without trouble, but it is a great work.

Make a brand new resolution today. Return to your desk with a new vision, a new slogan:—

"Quell your quarrels and sell your stuff."

CHAIRMAN CROMWELL: I am sure we all appreciated Mr. Kroes' paper. Mr. Kroes is an authority on this thing. Is there anything you want to ask him about putting over safety talks in the plant to your workers?

MR. KROES: Is it ever done in your plants? Do you give any talks of this kind or any other kind?

MR. MONEYMAKER: We do on occasions, getting the foremen together and giving them a talk.

MR. KROES: I mean, talk to the men particularly.

MR. MONEYMAKER: Occasionally we do, probably once every month or six weeks. Of course, that isn't done in all of the plants, just certain of our plants.

MR. COREY: We have mass meetings twice a year for every employee. We have them during the noon hour. We believe in taking our time instead of their time. We shut down for lunch about 11.00 o'clock and give them a chance to eat and then from 12:15 to 12:45 we have our meeting. Everyone in the plant is there. We have no difficulty in getting them there. I have seen some meetings where they were so interested you could hear a pin drop. We get our speakers from the liability insurance companies. Mr. Kroes knows something about that.

I want to have a moving picture made. The only difficulty is to have the room dark enough at noon to make the picture show up.

MR. CAMPBELL: We get all the insurance companies to send men, like yourself, who are posted on this sort of thing to come up and talk to our men. We are going to do that for eight weeks and the men will ask questions. At the end of eight weeks we will award diplomas.

MR. KROES: It is kind of a school.

MR. COREY: Our local safety council still runs some sort of a foremen's school, which is very good.

LOUIS BARR (Armour & Co., Kansas City, Kansas): I should like to ask Mr. Kroes a question. Do you think that the greatest benefits can be derived from employees' safety rallies, or do you think that the greatest benefits can be derived from performance meetings?

Meetings of Employees with Foremen Beneficial

MR. KROES: I should think, from my experience, that meetings where all the employees and all the foremen attend are very beneficial. We have held meetings in plants where we have never been before. We did not know the conditions there. When it was time for the meeting, the timekeeper was told to get the fellows together. The timekeeper is not the man to get the employees together for a meeting of this sort. He is all right to get them together in a certain way. When he got them together they did not know exactly what it was all about, so there was no interest.

We then had meetings for the foremen and they were very much interested. We asked them about having a meeting for all the employees. They thought it would be a fine thing and they went among their men and told them about the fine meetings they had been having and asked them to be there. The meeting was set for 1:00 o'clock as they wanted it to be held on the company's time if possible. The foremen got all their men together and it was a real meeting.

MR. BARR: You have the same idea that I have. I have been carrying on that sort of work for a number of years. We have meetings for the foremen and they take the message and pass it on to the employees.

However, I am a great deal like you, I think the combination meetings are the best, where all the employees attend. They get their inspiration from the meeting, not secondhand, and we do not have to depend upon the foremen to take the message to them.

F. M. SINGER (U. S. Gypsum Co., Gypsum, Ohio): We have had considerable experience in the safety line. We find that you must continually keep after the foremen in order to keep them interested in the subject of safety. Our meetings are in the form of training classes for the foremen. We find that you can discuss topics with the foremen at these meetings that you would not want put out to the men in the shop.

CHAIRMAN CROMWELL: I want to add a word. You can not get along without having the foremen and men meet together. You can talk to the foremen until you are blue in the face and you will not get very far. You must talk to the men themselves in order to get the desired effect.

A Foreman's School Graduated Two Thousand

MR. SCHWARZE: We have a foremen's school under the guidance of our local safety council. Over 2,000 graduated from that safety school last year. In our company we believe that the foreman is the key to the situation. We believe that the foremen can lead the men in safety work by example and courtesy.

We are confronted by this problem. We have a variety of languages prevailing in every single department. We have about 12 different languages. How will you solve this problem? We admit that a great deal can be done by example and leadership. How can we get this message of safety to them when there is such a variety of languages?

MR. COREY: Moving pictures will help some. In other words, put it through the eye. Of course you will have to have a moving picture that is especially adapted to illustrating without any words, but that is something that could be worked out.

MR. KROES: That is the only answer to that question except one more. The Illinois Steel Co., years ago got out a little book showing all the different hazards of the plant, and rules of conduct. All of these things were in this little book in 10 different languages. Every new employee got a book and at the end of four weeks they had an examination. If they could not answer three or four questions out of that book they had to take it home and read it over. Usually the man will be attracted to the book which is printed in his own language. He doesn't see that every day. He might get an old country newspaper, but most of them don't do that, so this little book is very attractive to them in that way.

If these foreign employees could answer three or four questions in this book, as a recognition of that, the firm would give them a little button. That little button was certainly a feature. If some of those new fellows

had a button on, and the other fellow didn't have one, they knew that he surely was a dumb-bell. When they had a button, it raised them up into a better class. If they could pass the examination, it showed conclusively that they had been reading. When a new man was employed they gave him a book and told him to read it and in a few weeks they would ask him some questions, and if he answered them, they would give him a button. These fellows were proud of those buttons and classes were created in that line.

MR. SCHWARZE: Has anyone here had experience in making moving pictures that could be adapted to use in their own plants?

MR. KROES: I happened to be on the Motion Picture Committee of the National Safety Council. There are many very good motion pictures which teach safety in an effective way. Of course, there is no single film which might cover the hazards in all industries, nor is there yet a film picture depicting the hazards of each industry. The production of motion pictures teaching safety is yet to be developed; but many of the pictures that have been produced and shown in industrial plants have been very influential.

The ideal film would, of course, depict scenes and hazards in the individual plant for the individual employee organization. But this would entail prohibitive expense and a great deal of time and difficulty.

MR. CAMPBELL: We had a motion picture company come into the factory where I worked and make a picture. It was a fine picture after it was finished. It showed the various hazards of the plant. I think the moving picture company paid for getting into the plant.

The Safety Committee Pulled a Stunt

MR. BARR: Our Safety Committee pulled a little stunt which I thought was pretty good. We made a moving picture of accidents that had happened. We had a general meeting of all the employees after working hours and it was surprising to see 400 men turn out. We produced a scene in tableau form, showing a man looking over an elevator gate and the elevator coming down from above. Next we showed that man lying out on the operating table, and in the other rooms there were the wife and two small children.

We then showed a scene of a man working at the grinding machine with his goggles hanging around his neck and not over his eyes. The next scene showed him with dark glasses being led around by a little boy.

In another scene we showed a man going down stairs with his hands in his pockets. He stumbles and falls on his head. That gave them a kick. It was surprising how they enjoyed that picture. They went out into the factory and told the fellows who didn't show up about it. When I went out in the plant, many of them had suggestions to make and a lot of them said, "Come over here, I want to show you a bad place."

MR. KROES: I have had something on my mind for some years and I have never mentioned it. I might just as well do it now.

Your scheme is fine. I think it would be a fine thing to have a film of scenes like a man walking down stairs with his hands in his pockets, and

then have your employees write a story in their own languages of what they have seen and give prizes for the best story. That would interest them a great deal. A watch fob makes a good prize. That costs money, but at the same time the fellow will say, "I am going to see what is going on." It will keep them interested.

J. J. JULSEN (Jacob E. Decker & Sons, Mason City, Iowa): I don't know if this is just exactly in order, but the gentleman from Kansas City mentioned the elevator pit accident in the factory. We have had posters that showed the elevator hazard and the man with his head over the elevator pit. My company is putting in two new elevators which can not be raised or lowered until the gates are closed. The contact is in the gate of the elevator. To have this safety device installed, it does not cost so much, and the elevator can not be raised or lowered until the contact is made when the gate is closed. Of course that does away with that one particular hazard.

CHAIRMAN CROMWELL: Don't most states require that elevators be equipped with that safety device?

MR. BARR: I just want to say that in lots of plants you will find that the elevators are built according to conditions and they will have gates about six feet six inches high, which is the standard height. In some factories a gate that size will not clear sufficiently for some loads that have to go on the elevators. In a case like that it is necessary that they have a gate of several sections.

Where this accident happened, there was just the ordinary slotted gate and the man looked over the gate to see where the elevator was.

MR. COREY: We have such a condition as that in the basement of one of our buildings where we have put in two gates, one above the other. They both shove up together. On the bottom of the gate we have small ropes tied to it so that when a man sticks his head too close to the elevator it will tickle his face.

CHAIRMAN CROMWELL: Our time is getting short. The next paper will be by Mr. F. R. Jensen, Chief Engineer, Armour & Co., Chicago, Ill., on the subject of "Safety From the Viewpoint of the Chief Engineer."

Mr. Jensen was unable to get here and Mr. W. F. McClellan of the same company will read his paper.

ACCIDENT PREVENTION FROM THE VIEWPOINT OF A CHIEF ENGINEER

F. R. Jensen, Chief Engineer, Armour & Company, Chicago, Ill.

The student of safety and accident prevention, and in fact all of those who are engaged in the field of conserving industrial life and limb, have reason to be well satisfied with the steady progress that the safety movement has attained during the last few years.

Not so very many years ago, if one advocated safety in an industrial plant, that person was not regarded very seriously. But now, "The Safety Movement" is not a mere slogan nor a meaningless phrase—it is an important and vital part of industry.

The company with which I have the privilege of being associated, realized long ago that it was an absolute necessity to its progress to maintain safe and sanitary working conditions in all of its plants throughout the country, and it insists at all times that the premises and equipment must be in such a condition that every employee may enjoy the greatest measure of safety and protection in his work. As there is no nobler or more worthy aim than the conquest of accidents and the prevention of human suffering, it is the duty of everyone to participate in this conquest and try, at all times, to eliminate accidents and thus make this world a better place to live in.

When accidents happen, the workmen and their families are the ones who suffer most, and the financial burden of the employee is far greater than that of the employer. In no case does the amount of compensation equal that of the income lost, to say nothing of the pain and suffering necessitated by the accident. The word "compensation" is a misnomer when applied in reference to serious accidents, and in reality should be supplanted by the phrase "*partial compensation*." This, for the reason that money, in any amount, is a poor substitute for lost eyesight, lost limbs, etc., for they can not in reality be compensated for; they are lost forever.

As there are no short cuts nor secrets about accident prevention, the problem of prevention comes down to a very simple formula of education.

The chief engineer of an industrial organization, aside from his manifold duties, has today an obligation to fulfill that is as important as the rest of his duties, and that is to be a leader in the safety movement. He must see that the premises and equipment under him are at all times in safe working condition. Mechanical guards and protection devices such as safety goggles, gas masks, shields and knife guards, high voltage danger signs and safety campaigns, have reduced the number of accidents to a remarkable degree.

Man-Failure the Big Cause of Accidents

But when one realizes that more than 75 per cent of all accidents are due to "man failure," and not directly to machinery, it can be seen that a great majority of accidents can be prevented *only* through education, that is, to educate *the workmen themselves* as to the hazards of their occupations and the importance of playing the game safely.

Psychology, the great science of the human mind and its operation, plays a very important role in this safety education. You have all heard the maxim, "As a man thinketh so is he." If you can lead a man to "think" safety, then he will also "act" safely. This man should be *led* to think, and not *driven*.

Someone, in a safety discussion, made the remark that it was not so much the men who should be educated, but rather, the bosses. There is considerable truth in that remark, because if the foremen or "straw-bosses" are not "sold" on the safety idea, then the workmen will not be apt to consider it seriously.

The chief engineer, therefore, must first of all be sure that the supervisory force directly under him are all "sold" on the subject, and by their conduct set an example to their workers. The supervisory force should instruct the men in their duties and point out to them the hazards of the job and give them specific instructions as to working with safety. New men should receive more attention than the older employees. The chief engineer should at all times make use of the safety engineer, and every accident, no matter how small, should be given the greatest publicity, so as to study it with a view of preventing similar accidents in the future. Inspection of the departments by the safety engineer, regularly, and daily watchfulness, should be insisted upon. Every dangerous place and practice should be pointed out and particular attention given to these.

The importance of the safety engineer, in every industrial organization, is being more and more recognized, and the chief engineer should work hand in hand with the safety engineer, in order to devise ways and means of accident prevention. The safety engineer is of great importance in educational campaigns, as he specializes in this work and has more opportunities than the supervisory force to observe accident causes.

A great progress has been made in the industrial plant, but the surface is barely touched; as we are in an age of speed, no one knows what the future has in store for us.

Discussion Following Mr. Jensen's Paper

CHAIRMAN CROMWELL: I would like to thank Mr. McClellan for reading that paper.

Is there any discussion of the paper?

MR. BARR: There is one point I wish to bring out. I find in my plant, and no doubt most of you find it is true in your plants, that when you sell safety to your employees, you are naturally going to sell some of it, but when he goes back into his department and the foreman is not sold and takes that "I don't give a damn" attitude, what kind of an attitude do you expect the man to take? If the foremen are not interested, the men will not report any bad conditions or unsafe practices that exist in the plant.

I think the question is to sell the foremen. A lot of our foremen are overburdened with the production end of the plant, in fact some of them have more than they can handle. The safety engineer can work with the foreman and get him lined up. He can tell him what is causing his accidents. The safety engineer studies the conditions in his department and he can encourage the foreman to encourage the men to keep safety uppermost in their minds, in that way, if we all work with that point in view, we can accomplish more than has been accomplished in the past.

MR. COREY: Of course I wouldn't have the difficulties in a small plant that some of you gentlemen would experience in a large plant where there are several thousand employees.

Safety is a hard problem to teach the employees, but I can recognize the fact that you have to sell your foremen first. If you don't sell your

foremen, it will be impossible to get very many employees interested. The same principle applies to the head of a small company like my own. I am sold on safety and I can get my employees interested. That is the problem that we have to contend with, but it is interesting to see how the employees will take hold of the idea when the man above them is interested in the subject.

MR. BRAINARD: I think that brings us to a phase of the work in connection with accident prevention that has not been touched upon this morning. It is the value of statistics. Our foremen are great men to study figures. They figure the cost of labor and other operating expenses. It is just as essential that they should have figures on what accidents are costing the company. We have to pay for casualty insurance.

The foreman should know that the cost of insurance in his department or the superintendent should know that the cost of his plant is based upon his actual expenses, and I think we should utilize that information by giving it to the foreman and impress upon him the cost in connection with accidents.

It always appeals to the foremen to know what the accidents are costing them, and that means that we should analyze accidents as to causes and for frequency; we should always put before them what these accidents are costing and this should be based upon the actual experiences in each department.

CHAIRMAN CROMWELL: I would like to ask Mr. Brainard, are those statistics gotten out every month?

Monthly Statistics Tell the Accident Story

MR. BRAINARD: I think monthly is the most logical way to get them out. Show him how much his department is costing him, and the foreman, as a business man, is quick to catch the idea. Show him comparative figures from other plants. Show him the cold facts in figures and impress upon him that your plant is not as efficient in safety measures as perhaps some of the other plants.

CHAIRMAN CROMWELL: The trouble we have had in comparing statistics is that almost in every state of the Union the compensation law, and the cost of insurance, are different. We finally agreed last year that the only way we could arrive at a fair comparison would be to figure the number of accidents and figure the time lost.

MR. COREY: You gentlemen who are with companies which have plants in different parts of the country have an excellent opportunity to put your different plants on a competitive basis. Put one plant up against another and figure their lost time accidents, and offer a prize to the plant that has the lowest lost time rating.

CHAIRMAN CROMWELL: About three years ago we started a campaign by giving a first prize in money and a second prize in money to the foremen of the plant which came out ahead with fewer accidents. That materially reduced our accidents. In one plant they dropped over 85 per cent. You can readily see that that means a lot of money to us.

MR. COREY: We have a poster in each department reading like this:

"The last accident in this department was on, a certain day. Who is going to spill the beans next?" Once in a while we have to change that poster when they have an accident, but it is a factor in keeping the subject of safety foremost in their minds.

HUBERT L. CLOVER (International Shoe Co., St. Louis, Mo.): I am a new man on this safety work. This is my first year to attend the Congress and I am here to get the safety kinks from the rest of you. Probably next year we can offer something.

MR. SINGER: I want to say this for the Packers' and Tanners' Section, that this has been a very interesting meeting. I have been coming to these meetings for the last five years and I don't know when I have gotten more inspiration than I have here this morning.

CHAIRMAN CROMWELL: I am glad that you have. I hope you will come back again.

Accidents Last Month in the Sheridan Presses

MR. MONEYMAKER: We have quite a number of problems. During the last six months we have had three people lose fingers or the complete hand in the sheridan presses. It is a pretty big problem that is confronting us, and we haven't been able to work out a guard or a system as yet to overcome it.

We did work out a guard, but about a month after it was installed another party got his hand taken off, so that brought up the question again.

CHAIRMAN CROMWELL: Do you use a stick to straighten out your leather?

MR. MONEYMAKER: We should, but occasionally the employees don't.

MR. CAMPBELL: We have tried several kinds of guards for the sheridan presses. We put a platform on each machine. It is impossible for them to put their hand into the machine with the platform in that position.

MR. MONEYMAKER: This guard that we manufactured was the same proposition as yours, but we had girls operating that machine. We had to do overtime work and the men came in and used the machine. A man's reach was longer than the girl's and he would reach his hand into the machine while the guard was still out and so he got his hand taken off. It was probably the foreman's fault for not readjusting it for the man.

MR. JULSEN: Isn't it compulsory in the other plants that men who carry their cutting knives around with them, carry them in pouches? I find it is an every day occurrence that the men go around with their knives sticking out in front of them and they hurt themselves or hurt others. We have had several accidents of that sort. I wonder how the other packers handle that situation?

MR. MCCLELLAN: It is compulsory so far as our trimming floor is concerned. We furnish them knives and pouches free. On the killing floor we sell these pouches to the men for just what they cost us. When a man is seen running around without a pouch, the superintendent gets after him and tries to make him buy a pouch, and in this way we have elim-

inated quite a lot of running around without pouches. In fact, all our government men have bought pouches.

We can't get the hog killing department to use them. That is the only department where we are bucking into any trouble. The sheep killing department uses the pouches. We do not make it compulsory, but we sell the pouches to them at cost.

MR. COREY: Why do you charge the men for the pouches?

MR. McCLELLAN: They take better care of them when we sell the pouches to them. We tried giving the pouches to them at first, but we found that we could not keep enough of them in stock. I don't know what they were doing with them. The first thing you knew you would not see any of the boys with them on, so finally we started to put a little charge on them. They take better care of them now.

MR. COREY: How about their knives?

MR. McCLELLAN: They buy their own knives. Of course, if a new man comes in we furnish him with a knife. After that he has to furnish his own knife. We find by putting a little charge on it, he takes a great deal better care of it. He doesn't throw it around and let some one steal it.

The Problem of Supplies for the Workers

CHAIRMAN CROMWELL: We had six new pairs of rubber boots disappear one morning from a department.

MR. McCLELLAN: We had that trouble in the cutting department. It got so we could not keep gloves there. We finally had to keep them in the storeroom and in order for a man to get a pair, he would have to leave his check number. If they didn't have them when they left, they were docked for them.

MR. CAMPBELL: We furnish rubber boots at half cost, although we give them aprons free.

MR. COREY: In our company it is customary for the men to furnish their own rubber boots.

MR. SCHWARZE: I would like to ask Mr. McClellan if all the things that the men take out are charged to them, or just the initial cost borne by them?

MR. McCLELLAN: Just the initial cost. When a man comes to work he is given everything that is necessary, and we charge him for them. If anything wears out, he takes it to the foreman and gets another pair free. When he leaves our employ he turns in all of the stuff that has been issued to him, and we refund his deposit.

MR. SCHWARZE: How far should the safety engineer go in regard to retaining foremen who can not be sold on the idea of safety? It is my idea that the man who can not be sold on safety should not be retained by the company. Are there any definite rules for that?

MR. SINGER: A case like that will usually take care of itself. The foreman who can not see the relationship between safety problems and cost of production is a poor manager. His deficiencies are liable to crop out to such an extent that he will be replaced. I have seen that work out three times in the past year.

MR. SCHWARZ: That hasn't proven true in our organization.

MR. MONEYMAKER: The men higher up must be sold on the idea of safety, but if you have a man (I have one particular man in mind) who hasn't been sold definitely on safety, but is one of the best production men in the organization, he is still on the job and is likely to be for some time. Of course, if he falls down in production or on some other phase of the work, he may get the gate, but that problem hasn't been worked out to my satisfaction in our own organization. It is a problem that is confronting me as a safety man and the instructions that we have are to go and sell him. If you sell him, he is a safety booster, but if you force him, he won't be.

MR. SINGER: I am a safety engineer myself. We have discussions with our foremen and we give a reward for good records. I am going to admit a few of my own faults now and point out some of the faults the safety engineer is liable to have. He is likely to pass the buck to the foremen just a little too much, and in judging accidents he is a little too apt to say that it is the foreman's fault. Your sales methods may be just a little bit at fault.

MR. MONEYMAKER: I will admit what the speaker just said, but when you run up against the management which is not absolutely sold, of course you are reflecting back on the safety man and his inability to sell the idea.

MR. SINGER: This may be a radical statement, but if I worked for a company that did not back me up, I would have a new job in four or five months.

MR. MONEYMAKER: I am going to sell the proposition. I am comparatively new in the game. I have never given up the hope of selling them the proposition.

Representatives of the Small Packers Welcomed

MR. McCLELLAN: In looking over the registration cards I see that there are a few men here from some small packers. There are also a few boys here from our leather industries. I am glad to welcome you in behalf of our chairman.

I would like for you, Mr. Chairman, to appoint a committee of three to see if we can not get together with the American Institute of Packers and see if we can not build this Section up. Year after year we have to dig and scrape around to get somebody to fill out our program. Why not make up a program of the small packers so that they can not say that the big five always dominate this meeting? We tried to get them to serve this year but they all declined.

Every year has been a duplicate of the past year. Mr. Campbell, Mr. Brainard and some of the older heads have always met and taken part in the programs. I think we should have some of the boys who are new here today, serve on this program. Some of the boys from the small packers and from the leather industries. If your companies are not members of the National Safety Council, go back and try to get them to join, and attend these meetings regularly.

CHAIRMAN CROMWELL: That is right; it has been an awfully hard job to get people out to these meetings. Mr. McClellan, Mr. Campbell and Mr. Brainard have always been in on the programs and we want new faces. I see a lot of new faces here for the first time.

MR. BRAINARD: Mac referred to me as one of the old ones here, but I want to say to those who are here today for the first time, that I have always gone back to my work with a lot of inspiration and help from these meetings. I always get a lot of benefit out of these round table discussions. The talk that Mr. Kroes gave us was one of the best safety talks I have ever heard, and I think all of us can go back with a lot of new ideas.

I want to say a word to the new men. Come in and take an active part in the work of this Section. Make some contribution so that we may all profit by it. We are coming here every year and we learn every time we come, and we want to profit from the experience that most of you have had. Bring it in the form of a paper so that we may discuss it here, and it will help those who are working along similar lines. I assure you, if you will do that, we can build this Section up and we will all benefit by it.

MR. COREY: I think this meeting today has been very helpful. I am going back with a lot of new ideas and new thoughts, and that is what we have to get in order to keep this safety movement going. We have to get something new all the time from these meetings and take it back to our plants.

MR. CAMPBELL: If this was the Leather Workers' Council instead of the tanners, we would have more of an audience here. The Leather Workers' Council have meetings all over the country in bigger rooms than this.

MR. BRAINARD: There are a great many problems that are of mutual importance to both the packers and tanners, while the leather workers might bring in something which we don't come in touch with in our industries.

Mr. Corey's paper this morning was of interest to us all and it all bears on safety. I think that the two industries are better united, at least for the present.

CHAIRMAN CROMWELL: I would like to make a suggestion that the incoming officers try to hold more meetings this year. I have tried to hold meetings on the outside, and I would suggest that they hold meetings around where we could get to them. I think we should get together more than just once a year at the annual meeting of the Safety Council.

J. A. FONRO (Elliott Service Co., Chicago, Ill.): I am a new member of the organization here, and I enjoyed the meeting very much.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The meeting of the Packers and Tanners Section was called to order at 9:30 o'clock, Chairman Oliver F. W. Cromwell, presiding.

CHAIRMAN CROMWELL: We will have the report of the Nominating Committee.

H. W. SCHILDT (Plankinton Packing Co., Milwaukee, Wis.): The Nominating Committee recommends the selection of the following officers:

Chairman, H. W. Schildt, Plankinton Packing Co., Milwaukee, Wis.

Vice-Chairman, Wm. C. Corey, Delaware Leather Co., Wilmington, Del.

Vice-Chairman, Wm. C. Campbell, The Grafton & Knight Mfg. Co., Worcester, Mass.

Secretary, O. C. Stern, Plankinton Packing Co., Milwaukee, Wis.

Chairman Membership Committee, F. L. Schwarze, Pfister-Vogel Leather Co., Milwaukee, Wis.

Chairman Program Committee, Oliver F. W. Cromwell, Central Leather Co., Ridgway, Pa.

Chairman Bulletin Committee, Dean Moneymaker, International Shoe Co., St. Louis, Mo.

Chairman Publicity Committee, C. Boneholt, Hammond Standish & Co., Detroit, Mich.

Engineering Representative, F. R. Jensen, Armour & Co., Chicago, Ill.

A motion was made, seconded, and regularly carried that the officers as recommended by the Nominating Committee be declared elected for the ensuing year.

CHAIRMAN CROMWELL: Mr. Schildt, I will turn over the meeting to you and wish you all kinds of success for the coming year.

Mr. H. W. Schildt took the chair as the new chairman.

CHAIRMAN SCHILDT: Our next order of business is a paper by Mr. Frank Morris, Assistant Chief Engineer, Liberty Mutual Insurance Co., Boston, Mass.

SAFETY KINKS IN THE LEATHER WORKING INDUSTRY

Frank E. Morris, Assistant Chief Engineer, Liberty Mutual Insurance Co., Boston, Mass.

The question of who tanned the first skin so as to make it at once pliable and imputrescible is as unsolvable as the question "Where did Cain's wife come from?" Fig leaves were sufficient for a covering while in the Garden of Eden but just as soon as they began to travel the first female demanded from her spouse a fur coat.

Because we men of our day know how imperious this demand for a fur coat can be we are all willing to agree that in all probability Adam

was the first tanner. He had some trouble in obtaining the leopard skin in the first place but it was not much of a problem to dry it to prevent putrefaction. Eve complained, however, that the garment was too stiff and poor Adam was in desperate straits. After trying everything he could think of he finally gave up the idea of ever making the coat fit Eve as snugly as it had clung to its first inhabitant and in a forlorn attempt to please his wife he lined it with leaves, because in the garden she had never complained about the fit of the fig leaves.

As we all know, Eve flew into a rage and threw Adam's labor of love into a corner of the hut where it lay during the several ensuing weeks of the argument. Manhood finally asserted itself. Adam determined to make her try the coat on. He tied his recalcitrant wife to a bed post, rushed to the corner where the leopard skin lined with leaves had lain for many days, picked it up and discovered with great glee that it was as soft and as pliable as it was on the day he removed it from its original owner. Thus was revealed the secret of the curative properties of certain leaves, twigs, and bark, and ever since that day men have known how to tan leather by the vegetable process—and women have continued to demand fur coats.

Tanning Is One of the Oldest Domestic Trades

Two weeks ago Dr. George Grant MacCurdy, of Yale University, returned from Europe aboard the steamship "Belgenland" bringing with him specimens of domestic tools used by the Neanderthal man, about 60,000 years ago. Mr. MacCurdy, who is a member of the American School of Prehistoric Research, visited five countries during the four years he was abroad, and made excavations in France and Czechoslovakia. The domestic tools included a combination knife and scraper, of pure rock crystal, used by the Neanderthals to skin, as well as clean the skin of reindeer and other game animals.

How do we know that there were reindeer? Because in the caves that were the homes of these prehistoric people we today find pictures of reindeer carved on the walls. We know quite a bit about these people of 60,000 years or more ago, and we can feel certain that they knew how to tan hides and skins even before they learned the art of softening metal by fire.

Mr. Paul Warburg says, "The remarkable feature of the industry, even now, remains the fact that it rests primarily on an empirical basis, far more so than any other of our primary industries."

In the state of Massachusetts we have 11,000 workers employed in tanning and finishing leather in 125 different plants, or an average of 88 workers to the plant. In all of our safety conferences such as this, we naturally think in terms of the large plant, the plant that has a safety department, nurse, safety committee and so on, and of course most of us here assembled come from plants of that size. One of the big problems of the National Safety Council is to reach the small plant, for we must remember that 92 per cent of the manufacturing industries of the country have less than 100 employees and obviously such a plant can not employ

a full time safety man, and moreover there may be serious doubt about the value of a safety committee in a plant of that size.

A few months ago the Engineering Section of the National Safety Council undertook to stir up interest that would culminate in a regional safety conference in Boston of men from tanneries and leather finishing plants in New England. The reason such a conference was not held has already been given—the average plant in Massachusetts has but 88 employees and I doubt if you could dig up a half a dozen full time safety engineers among the 125 plants.

A study of the accident experience of these plants reveals that they have an accident frequency hazard that is slightly lower than the aver-

TABLE No. I

**Accident Experience of Three Plants, 650 Employees Each,
1920-1924 Inclusive**

	Plant No. 1	Plant No. 2	Plant No. 3	Total
Infections	72	41	35	148 Accidents
	1,572	1,315	875	3,762 Days lost
Strains—lifting	54	51	28	133 Accidents
	1,845	2,400	1,675	5,920 Days lost
Slips—floor	21	27	11	59 Accidents
	840	875	241	1,956 Days lost
Non-mechanical totals.....	222	219	173	614 Accidents
	6,990	7,100	4,440	18,530 Days lost
Mechanical totals	12	35	47	94 Accidents
	471	1,956	2,415	4,842 Days lost
Total lost days.....				23,372
Days losts to infections, strains and slips.....				11,638

age industry in the state but the insurance rate is about 30 per cent higher than the average rate, due in some measure to the occupational disease hazard which is compensable under the Act in Massachusetts and due in part to the higher than average cost of the non-mechanical accidents.

Over a period of five years the non-mechanical accidents in Massachusetts averaged 67 lost days and the same class of accidents reported in tanneries averaged but 64 lost days; but, as I will show, the percentage of the more costly accidents in tanneries is much higher than in the average plant. I refer to "strains," "slips and falls on floor level," and "infections."

Let us view the experience of three plants each having 650 employees over a five-year spread. They had a total of 708 reported accidents, 94 of them being mechanical and 614 non-mechanical. Of these 614, over 50 per cent, or 330, were due to the three above causes. I will analyze mechanical accidents later but for the moment let's talk about these three causes in these three plants. (See table I.)

Plants No. 1 and No. 3 handle hides and Plant No. 2 handles sheep skins. In the sheep skin plant we have 27 slips on the floor level, com-

permits of a finger getting in danger. One plant in our state has such a guard all made up but they will not put it on until they have an accident. They claim that they have yet to have a serious jack accident and they have been in business 47 years. The moving parts on a jack look terrifying to the uninitiated but the hazard here is often over-emphasized.

On buffing drums we had but one partial disability with an exposure of 55,000 men years. The fire hazard under the bench here, however, does demand attention and of course this can be obviated with a sprinkler head at each drum.

TABLE No. II

Summary of Machine Accidents in Tanneries in Massachusetts,
1920-1924, Inclusive; Average Employees, 11,000

	Tabulatable	Permanent Partial Disability	Death
Fleshing, Shaving, Skiving Machines.....	135	12	0
Jacks, Glassing, Rolling, etc.....	99	9	0
Buffing Drums	54	1	0
Splitting	52	8	0
Presses and Baling Machines.....	33	8	0
Hair Washing and Drying.....	14	1	0
Setting Out	11	1	0
Extractors (centrifugal)	8	2	0
Unhairing	8	0	0
Drums (not buffing) and Paddle Vats.....	7	0	1
Miscellaneous	435	46	1
Totals	856	84	2

Splitters are bad actors. One fellow who was very fond of golf, in fact, he was a golf professional on Sundays, got his fingers in a splitter several months ago and he may play golf again some day and he may not, but certainly not for several months. This man agrees that splitters should be guarded. If a bar guard is not practical here why not at least insist on using a small block with a handle for smoothing out the skin?

On presses we have several guards on the market but a wide table and a short armed feeder make that side safe, providing the workman always uses his flat stick when necessary. In one plant the short armed feeder was sick one day and a long armed man was substituted, with a distressing result. On the take-off side a guard that will come up with the ram and push the take away man out of danger is simple and practical.

The rest of the machines on this list do not appear hazardous enough to worry much about. Note that during these five years one man was killed on a tanning drum. If the belt is locked in the "off" position with a spring lock that takes two hands to operate, and so located that to start the drum one would step on a worker who had his head in the drum, I believe this problem is adequately provided for.

Tanning of leather has not changed remarkably in processes during several hundred years and that is one difficulty in accident prevention work in this business. We often hear the story, "We've been in business 47 years and no one was ever hurt in that way or by that machine, so why worry?" The real truth may be that accidents are so infrequent that the employer really believes that he hasn't had a serious accident in 47 years; but the probabilities are that his father and his grandfather never worried about the accidents, so why should he?

Discussion Following Mr. Morris' Paper

CHAIRMAN SCHILDT: Are there any questions that you would like to ask Mr. Morris?

MR. CROMWELL: Mr. Chairman, in speaking of an arrangement for making a drum safe, I would like to draw Mr. Morris' attention to the one which the Eberle Tanning Co. has. It has an electric contact safety device and I believe it is one of the best I have ever seen. You have to throw a series of levers before you can start the drum, and everything must be in position.

MR. COREY: I should like to ask Mr. Morris if he can get me a sketch of the drum used by the Letts Co? We have a device that one of our men built some time ago, but instead of putting the pin back of the lever, he has a lock arrangement with the pin sticking out. That keeps the spring holding the latch so that you can not start it without taking hold and pulling it down.

MR. CROMWELL: Mr. Campbell has one of the best safety devices that I know of for a side loading drum. I am sure Mr. Campbell would be glad to furnish you with a blue print.

MR. COREY: We use a stave loading drum.

MR. McCLELLAN: I would like to ask Mr. Morris if he knows of a good practical guard for a fleshing machine?

MR. MORRIS: No, I can't say that I do.

MR. COREY: I don't see how you could operate it with a guard. We have fleshing machines and I have operated them myself and I don't see how you can put a guard on them that would be practical.

MR. McCLELLAN: I did not ask that question to embarrass you. I thought maybe that in your travels and experiences you might know of one.

MR. MORRIS: It doesn't embarrass me a bit. Up to the present time there hasn't been a guard developed for those machines that is practical.

MR. COREY: Are there so many accidents on those fleshing machines?

MR. McCLELLAN: There are not so many accidents but when you do have one it takes the arm right off. Our company also uses these machines for another purpose. In the hog cutting room they take the fat off the skin with them. The skins are not always the same size and in getting the small skins into place the men sometimes have an accident. When they do it usually means an arm.

MR. CROMWELL: Last year we had an accident in one of our plants.

The man had his arms inside the machine and in some way kicked the starting lever and caught the arms at the wrists. That has been the only bad accident we have had in years. To overcome that I have put a board over the treadle. It is about four inches over the treadle and extends out about two inches beyond the edge of the treadle. This prevents anyone from kicking the treadle by accident.

MR. MORRIS: I would like to say that in studying the experiences in those two plants, the one with the lowest number of accidents was not the best guarded plant. We found why this was true in spite of poor plant conditions. We found that the manager of that plant was right on the job. He believed in accident prevention and kept his people lined up. I have been in Mr. Corey's plant and I have seen how close he is to his people and how he is after that accident proposition all the time.

I am absolutely sold on the fact that accident prevention is a managerial proposition. In our larger plants we have safety experts, but if the boss at the top will pass the word down the line and see that all the men are sold on this same idea that we are not going to have needless accidents in this plant, that plant is going to have a good accident experience.

Executive Influence Important in Teaching Men

Take a tannery that guards all the machines and the employees think that they are the bunk, and then take another tannery that is not so well guarded but the boss and all the employees think safety while they are on the job, that plant will have the best safety record.

That is the conclusion that I am sure of now because of the large percentage of non-mechanical accidents such as infections, strains, slips and falls on floor level, etc. These non-mechanical accidents cause more than three times the number of lost days than mechanical accidents do.

MR. CROMWELL: If you will talk to your foremen about taking care of accidents immediately after they happen, it will eliminate your infection hazards. We have practically eliminated them in our plants. We had one bad case of where a man's arm was infected. He has been to the hospital three times to have his arm cut and drained. He will probably lose the use of it.

MR. SCHWARZE: I am heartily in accord with Mr. Cromwell. I think you should treat a wound, no matter if only a scratch, immediately to guard against infection. We have our employees pretty well educated up to that idea.

Mr. Morris mentioned the possibility of guarding a splitting machine. We have guards which we think are very effective. They are subject, of course, to improvement like all these guards, but these are the result of getting the men who operate these machines to express their ideas. If anybody would be interested in these guards, I would be glad to give them the drawings.

H. B. BENJAMIN (Haynes Stellite Co., Kokomo, Ind.): I may be a little out of place here. But I saw a few topics that I wanted to hear dis-

cussed, and while I don't belong to the Packers and Tanners Section, I came in this morning to take away what I could.

A gentleman was talking about the management being behind the safety movement. The biggest problem in most plants is to get the management to cooperate with the safety man. That does not mean that the management will have to get out in the plant and run around every place. If the management will get behind the safety man, give him a 15 minute talk occasionally, it will give the safety man a chance to go out and put it over with the men. You can not fool those men.

In one plant by agitating among the workers we reduced the accidents 66 per cent in one year. All the manager said was, "Go out there and put it over. If there is anything you want or if there is any way I can help you, let me know." I did not have to call on him much.

The following year, under another superintendent, he told me, "We want safety, put it over. I have heard all about you. Keep it up. It is a wonderful thing." However, certain little things have come up out there that need correcting. I did not have the authority to correct them. I would go over and tell him about it so that it would be stopped, but he didn't appoint anyone to stop it and he didn't give me the authority to stop it. The accidents got so frequent that I quit the job.

I have been offered two or three other jobs, and I am going to one of them, but I am going to know that the management is behind the safety movement before I take the job of promoting safety among the workers.

CHAIRMAN SCHILDT: I want to thank Mr. Morris for his interesting paper.

The next item on the program is by Mr. N. L. Brainard, Industrial Relations Department, Swift and Company, U. S. Yards, Chicago, Ill.

NO-ACCIDENT CAMPAIGNS

**N. L. Brainard, Industrial Relations Department, Swift & Company,
Chicago**

To the end that the whole plant shall work together for safety, organization is necessary. The plant manager, superintendent, foreman, and workman, each have a determinate and distinct responsibility and each is answerable for the effectiveness with which definite phases of the problem are met. They are jointly accountable for the promotion of safety as an enterprise embracing the whole plant, the success of which requires that their forces shall be unified. The effective agency for this co-ordination is the Plant Safety Committee.

The story of our accident prevention campaigns can not be told without a description of this safety committee. Eighteen of our packing houses have a plan of employee representation known as the "Assembly." A general description of the plan contains the following:

"The Assembly discusses and makes recommendations on all questions referred to it or raised by it, relating to the joint interest of the company and its employees, and to working conditions in particular, such as wages, hours, safety, sanitation, and like matters."

A consistent adherence to the purposes of the plan as declared in the foregoing statement, requires that the safety work of the plant shall be linked to the Assembly. For that reason the safety committee is one of the major committees of the Assembly. In making up the safety committee provision is made for including in its membership someone standing for each of the groups we have named as sharing the burden of maintaining safety.

The plant foreman, as an appointed representative, is the delegate of the management in all affairs coming within the scope of the assembly and through him the management has a voice in the activities of the committee. But it is in his own sphere as foreman that his presence on the safety committee is especially needful. The foreman's attitude toward the safety projects instituted in the plant is the most important factor of any. He brings to the committee a fund of valuable knowledge which, in his place as a leader of the men, he alone acquires. His experience in operating and production problems, of which safe working is a recognized item, is needed to fully equip the safety committee.

Elected Representatives Zealous in Safety Matters

The elected representative, standing as he does for the workmen, is zealous in all matters affecting their interests. It may be that when he first becomes a member of the safety committee he does not fully appreciate what a large contribution safe working conditions and safe practices make to the welfare of his constituents. He quickly becomes imbued with the importance of this subject and he not only gets an education in safety work, but his influence is invaluable in educating the men of his division along the lines of thinking and practicing safety.

The plant safety supervisor is also, ex-officio, a member of the safety committee. He devotes a large portion of his time to safety work and gives the committee the benefit of his technical knowledge and his information on safety standards relating to machinery and equipment. He follows up general lines of outstanding safety work and frequently brings to the committee ideas which suggest to them new lines to work on. Discussion of these suggestions adds to the interest of the meetings and prompts the committee to check up and deviate their methods when it is found desirable to do so.

The committee has broad powers and large prerogatives. The management gives it the support necessary to maintain its prestige. Recommendations made by the committee usually need only the formality of an official order to make them plant rules.

The appointments to membership on the committee are confirmed by regular assembly action, and membership, with the exception of chairman, alternates regularly. Records are kept of all meetings. The meetings are held regularly, and reports are made to the meetings of the assembly. At the committee meetings all lines of safety work are reviewed and plans for future activities discussed. Inspections of the plant are made by a sub-committee of which the plant safety supervisor is always a member. Reports of their findings are made to the main

committee. Should anything of special importance, such as an unusual hazard or a notoriously bad practice, be brought to light or any suggestion of value to the plant as a whole develop in the discussions in the committee, it is taken before the entire assembly and made a part of the published minutes. By that means information about what the safety committee is doing is spread wide. I am outlining these methods at length as the accident prevention campaigns and no-accident contests which I shall describe originated in the safety committee and were sponsored by the plant assembly.

In the inter-plant campaign the local committee devised means for sustaining the interest as well as maintaining the enthusiasm by formulating plans for inter-department contests.

A notable project which had its origin in the safety committee of one of the larger assemblies, was that of awarding various divisions of the plant operating one or more months without a lost time accident, a "Certificate of Merit." This certificate is signed by the president or vice-president of the company, or in case of plants at a distance from the general office, by the plant manager, the plant superintendent, the chairman of the plant assembly, the chairman of the safety committee, and the safety supervisor.

Certificates of Merit are Valued

A certificate bearing a seal and a white ribbon is given for one month; a red ribbon certificate for three months, and a blue ribbon certificate for six consecutive months without a lost time accident in the division. After adoption of the plan at the plant where it originated, it was presented to the assemblies of all the other 17 plants and acted upon favorably in every instance. The plan was also presented to the smaller plants and allied concerns without assemblies. The support of the plant manager, superintendent, division superintendents and foremen were enlisted in promoting the plan. It was presented to the workmen, however, through the plant assembly and was featured in the plant publications as well as on the bulletin boards.

When awarded to a division, the certificate is carried in a suitable frame, covered with glass, and displayed in a conspicuous place. This idea appealed to the assembly as a means of recognizing division efforts as well as the individual efforts of division representatives. There was considerable rivalry between different divisions to secure the first blue ribbon certificate. Some unusual records have been reported and the divisions evinced a good degree of pride in obtaining the certificates.

The safety committee at some of the plants asked and were given permission to modify this plan in minor details. One of the larger plants made the goal necessary for the attainment of the certificate of merit a 50 per cent reduction in lost time accidents. At another plant certificates were awarded to departments instead of divisions. At the Chicago plant, where some of the divisions are quite large, it was found that certain departments were penalized by the performance of others in the same division and there was danger of their saying: "What's the use of making a big effort to win a certificate. Other departments of the

division will fall down and our good work will not be noticed." So it was arranged that smaller certificates should be awarded to each department on its record. Any record made during inter-plant or inter-department contests counted also in securing for the division or department the "Certificate of Merit."

In the month of December, 1924, an inter-plant contest was held in the Chicago plant with the idea of creating inter-department rivalry and stimulating interest in reducing accidents. This contest took the form of a "Cross Country Run." The 18 divisions of the plant were represented by cars of distinctive color and the position of each car during the days of the race was shown on a large map of the United States, on which the course of the run was marked. This course took the cars through cities and towns in which the company has packing houses. The division superintendent appeared on the list of entries as driver of the car, and the employee representative as the mechanic. Cars were handicapped on the basis of the previous record of the department, the handicap carrying from 60 miles to 1,395 miles. Each day in which a division had no lost time accidents, that division's entry advanced 450 miles along the route. Every lost time accident caused the division to lose 150 miles.

Names of the entries, drivers, mechanics, and departments represented and officials of the race were posted and in naming the entries there was considerable ingenuity displayed in finding names suggestive of the department—"Premium Frank" for Sausage Department, "Maxine Elliott" for Soap Department, "Stick Tite" for Glue Department, etc. While no notable records were made in the way of no accidents, this campaign stirred up foremen, division and plant superintendents, as well as the men in the gangs with the result that before the cars were far on their way the spirit of competition was having its effect and those who were indifferent at the start, somewhat laggard or perhaps overconfident, realized they were going to be put to shame by the contestants who had worked energetically not only from the start but for some weeks prior thereto. The big thing learned from this race was that it could be done.

A Second Campaign Better Than the First

The fact that nearly every division made a substantial reduction was conclusive that all, with organized effort, should do just as well or better. Before the race was finished, plans were under way for another contest for the next month. Some of the scoffers were waking up, and the next contest saw divisions that had been tail-enders in a complete reversal. Several departments low on the list in the first contest came through in top position. The results of this second campaign were even more convincing of the value of the contest as a method of developing leaders and making converts.

These campaigns inspired the Chicago assembly to seek new worlds to conquer and in their monthly meeting of January, 1925, on the recommendation of the safety committee, they voted to issue a challenge to

all plants for an inter-plant campaign. The challenge with the plan of the campaign was formally presented to the various plants through their assemblies.

The plan submitted was that each plant should contend against all other plants by competing against its own lost time accident record for the fiscal year, 1924. The plant showing the best percentage of reduction in its lost time accidents for March against its 1924 average was to be considered the winner. All of the plants with employees numbering from 400 to 6,000 and a total of 22,000 accepted through their plant assemblies the challenge of the Chicago plant. Several of the plants ran inter-department contests concurrent with the inter-plant race.

The device for posting the standing of the plants each day was a thermometer on which 56°, or temperate, was its 1924 average accident rate per day of 100 employees. Each one per cent cumulative increase, or decrease of one per cent, from the average rate resulted in a decrease or increase of one degree in temperature at that plant. In this way the greater the reduction of accidents the higher the temperature and vice-versa. The 15 plants went into the campaign with a wonderful spirit. The various plant assembly committees were enthusiastic and the interest did not slacken while the campaign was on. Bulletins were wired each day showing the standing, or temperature, at each plant at the close of the preceding day. The interest in the standing from day to day extended throughout the whole body of workmen, foremen, division men, superintendents, as well as to other executives in touch with plant operations. Several of the plants ran very close from the start. Some remarkable records were made and the contest was a wonderful demonstration of what organized spirited effort and determination can do.

True Sportsmanship Prevailed in the Contests

Just prior to the day upon which this contest began, a letter was sent to the manager of each of the plants intimating that each plant would be expected to observe a spirit of true sportsmanship. They were asked to make sure that in the ardor of the contest and as a result of the eagerness to win, there should be no deviation from the usual practice in handling accident cases. They were urged to see that every accident, however slight, should be reported and given medical attention. The attention of the managers was called to the risk there was of harm resulting from the campaign rather than good if minor injuries were not reported. They were asked to check any tendency there might be to getting injured men back on the job too soon and to impress upon the plant doctors their responsibility in giving first thought to the safety of the patient. No injured employee was to resume work of any kind if there was a chance that the work would cause discomfort or hinder recovery. As a result of these precautions the showing of each plant at the close of the contest was considered a fair summary of what had been done in actually preventing accidents rather than the ability of the organization to get injured men back and keep them on a job.

At the conclusion of the four weeks of this campaign Denver and Cleve-

land were tied for first place, having had no lost time accidents during the period and their temperatures were shown as 156°; Omaha, St. Joseph, Kansas City, and St. Paul showed over 90 per cent improvement and the average for all competing plants was 66.8 per cent. Cleveland and Denver plants by agreement continued the campaign for another five weeks. At the end of that time Denver had recorded against it two lost time accidents, an improvement of 49 per cent, while Cleveland, showing an improvement of 77 per cent with four accidents, and temperature 133°, was declared the winner. A silk banner was awarded the Cleveland plant in recognition of their finishing the race in first position.

As a result of this campaign all phases of accident prevention work were greatly stimulated. Inter-department plant contests were held during and after the inter-plant campaign and when comparative figures were made up at the end of the fiscal year they showed a reduction of 12 per cent in lost time accidents for the year on the basis of million hours worked.

The Loser Challenged All Plants to Another Contest

The Denver plant assembly was inclined to question the final decision, as it seemed inconsistent that the plant having fewer accidents should have to take second place. However, they were reminded of the terms of the contest which provided that the determining factor should be the percentage of reduction and accepted their defeat graciously. They were game, however, and at a meeting of their plant assembly in March, 1926, the Denver plant challenged the plants that had taken part in the 1925 contest to a contest in May, 1926. This challenge was accepted by all the plants. The contest was for five weeks and on the same basis as that of the preceding one.

Each plant was to compete against its own record of lost time accidents for the preceding year and the plant showing the greatest reduction was to be declared the winner. This took the form of an archery or arrow shooting contest.

A target was used for showing the position of the various plants. The percentage of improvement was indicated on the target by means of arrows, colored and lettered to represent each of the plants; 100 per cent improvement (or no lost time accidents) placed the arrow in the bull's eye, while each per cent less than 100 placed the arrow toward the outer edge. The last ring from the center represented the 1925 accident rate or zero. An increase in the accident rate placed the arrow outside the target proper.

After the contest had continued five weeks, as originally planned, five plants had come through without a lost time accident, each showing an improvement of 100 per cent and standing equal in the contest. Of the remaining plants, one plant with one accident showed 95 per cent improvement and one with two accidents had a standing of 94 per cent. All plants combined registered 63 per cent improvement over the previous year.

The five plants having a perfect score agreed to continue indefinitely

and the plant which continued longest without a lost time accident was declared the winner. The first of these remaining five plants to drop out of the race continued until June 17; the next, July 1, and third, July 31, leaving two plants neck and neck. Their battle continued until September 17 with a remarkable record of 105 days without a disabling accident. The Omaha Packing Company was the survivor and winner of the campaign with 89,804 man days at that plant without a lost time accident. They were awarded a silk banner suitably worded in recognition of this achievement.

At the Chicago plant an inter-department contest was run concurrent with the 1926 inter-plant race. This contest was in the form of an election for the safety mayor of "Swifttown." The plant was platted into precincts, one for each assembly representative. The employee representative whose precinct gave him the greatest number of votes during the period of the contest was declared elected mayor of "Swifttown." Each day in which the voting division did not have a lost time accident, one vote was recorded for the representative of that division. The representative who received the most votes—i. e., the division continuing the greatest number of days without a lost time accident—was elected and was inaugurated as mayor at the next meeting of the plant assembly, to hold office for the six months to follow.

The Position of Mayor One of Considerable Honor

The candidate elected was the representative of one of the mechanical divisions, usually considered one of the most hazardous, his constituents being carpenters, masons, tractor drivers, and tractor repair men. The successful candidate was a carpenter. His ward had a previous accident rate of six and three-quarters lost time accidents per month. He secured the interest and earnest support of his constituents and avoided lost time accidents entirely.

This position of mayor was not one of empty honor. Since his election he has been an important factor in the safety enterprises of the plant, having taken on a number of special commissions to check up divisions which seemed to be laggard and act as adviser and consultant in difficult divisions.

With the inauguration of Mr. Gustafson as "Safety Mayor of Swifttown," the election of his successor was immediately under way. During the six months following conclusion of the first election each day that a voting division goes without a single lost time accident is to count as one vote for the employee representative from that voting division as next mayor of Swifttown. Reports are posted twice a month and show the standing of each candidate up to the time of posting. Notice is sent daily to the employee representative in whose division an accident has occurred, giving him the details of the accident, so that he can investigate and remove the cause.

The methods used in preparation for these contests and for keeping up the enthusiasm while they lasted, probably do not offer anything new. There were group meetings held with inspirational talks, slogans were posted and the plant publications got out special editions, devoted

wholly to the campaign. We must have special concern to convert what we learn in planning, organizing, and training leaders and workmen, into something permanent. We recognize that the greatest value of special, intensive safety drives for a week or a month is found in demonstrating what can be done by organized effort. We lose the value of the campaign if we relax at its close and fail to conserve what the experience of these weeks of special attention to promoting safety brings to us. Here is a big field of effort for the safety organization. Looking ahead, the safety committee should begin well before the conclusion of the campaign to lay their plans and be getting pointers which will indicate ways best calculated to continue the work.

In preparing for and carrying on such a campaign we enlist every agency in accident prevention and utilize every factor necessary to its success. The safety committee must be brought to full strength in organization and personnel. A definite program of activities must be mapped and the efficiency of those already laid down gone over. Plant inspections, maintaining safeguards, proper use of accident reports, the cooperation of the doctor's office in determining the extent of the injury and getting the injured man back to work, are all important considerations. Securing and maintaining the interest of the management, superintendent, foremen, and workers, providing programs and speakers for mass meetings, material for bulletin boards, instructing the new workmen, preparation of printed matter, distribution of rule books, etc., must all be arranged for.

Campaigns Were Kept Before the Management

We kept our campaigns before the management, not only the plant managers, but the directors, by sending each of them at regular intervals a mimeographed report showing the standing of the plant. At the conclusion of the 1925 campaign Mr. Louis F. Swift, president of our company, wrote a letter to each of the plant managers as follows:

"We are pleased with the spirit shown at your plant in organizing and carrying on the Accident Contest during March. The good work done by your Assembly, Safety Committee, foremen, and employees, resulting in an improvement of 100 per cent and first place for Cleveland, should be a source of satisfaction to you, as it is to us.

"We note that you had no accidents during the month, and that the saving in money is quite an item, and these are important considerations, but not as important as the avoidance of injury. Swift & Company is deeply concerned to avoid all accidents and to preserve the lives and limbs of its employees.

"Very often there is a letting down after a campaign like this. Real progress is made only by continuous and consistent effort, and I hope that we may have an improving record of accident prevention for the benefit of the employees and the company."

This letter was signed by the president personally.

Four months after the close of the campaign a comparative statement

was sent to each manager showing the lost time accident frequency prior to the campaign and for each month subsequent, with the five months average, putting before him how his plant was reacting to the special drive. This report showed improvements over the period of four months prior to the campaign of all the way from one per cent to 60 per cent. The letter as well as the statement were passed on to the superintendents, and by them to the plant assembly and the safety committee.

The report demonstrated the value of statistics. Placing before a plant manager at such a time a statement showing his plant far down on the list could not help but stir him to action. He knew the figures were also going before the officers and directors and that they were showing a special interest in the safety work at every plant as a result of the campaign. The plants with a poor record were spurred to do intensive research into causes and analyze the record by divisions and departments. The poor showing of certain plants, which led to a closer analysis by divisions and causes, usually disclosed that someone—foreman or straw boss—was not thoroughly sold on accident prevention as an economic or humanitarian proposition. Laggard plants and laggard superintendents and foremen have been stirred into consistent safety boosters.

The Plant with the Poorest Showing Spurred Ahead

A result of this closer scrutiny of their methods during and after the intensive campaigns has been that some plants have shown a complete reversal in a period of a year. The plant with the poorest showing in the 1925 campaign was one of the five that came through without a lost time accident during the five weeks of the campaign of 1926. They have found the sore spots in their organization. Every plant, as a result of focusing so much attention upon safety, has given more attention than heretofore to all phases of the problem. They are doing more than ever to study the causes of accidents, to properly report and treat all injuries, and to see that each case is followed so that the injured employee is influenced to get back to work as soon as possible.

The various plants were asked to report on their impressions of the campaign, what benefits had come to them, and what plans for the future had resulted. Here is what one plant wrote, on investigating and following up of cases. This is a striking example of what can be learned by diligent investigation of a case where there is only the injured man's statement.

"We had two lost time accidents which happened off the plant:

"The first was a man in yard cleaning department who on his way home stumbled while getting off of street car, fell to the ground and caused contusion and bursitis of right knee. He first claimed it happened in plant, stating that he stepped in a hole, but on being questioned the second time he admitted that it did not occur in the plant. When questioned why he made a false statement, he stated that he thought he would not draw E. B. A. benefits if the accident had not happened in the plant.

"The second case was a man trucking the same as usual. He worked for several days when he hit his wrist against the wall very lightly and had not the wrist been sore it would not have caused even the slightest injury. He laid off from work three days and upon his return stated that he did it by scraping his hand along the brick wall while trucking a heavy load. After digging into the case a little deeper he admitted that the injury occurred at home and that he merely hit his wrist a light tap breaking the skin which, of course, was very tender. This man is a Mexican and hard to understand. When questioned about the false statement he stated that he didn't think it made any difference where or how it occurred.

"With these two cases in mind we believe we have learned a point which will be a great benefit to us in checking up cases in the future. We feel that this campaign has been a lot of benefit from the fact that the standings on the thermometer from day to day caused great interest among our employees, especially the assembly members, and consequently they became interested in safety first work.

Plant Managers Were Enthusiastic

"The assembly members figured a big part in this campaign as they were all determined not to be the first to go down. The determination together with the cooperation of the division men and workmen's safety committee saw us through the first 13 days before we had our first lost time accident.

"However, during this campaign we had 148 accidents as against 137 for March, 1924. This is accounted for by the doctor's office explaining that the employees are being more educated to the point where they are reporting to the doctor's office in every little case regardless of how small the injury might be. This was probably the reason for more infections and consequently more lost time accidents in 1924.

"As a result of this campaign, a feeling has been created among the employees which we believe will eliminate a great deal of lost time in minor cases. They seemingly realize that lost time accidents are a loss both to the company and the employee.

"With the intensive effort for the past month and the 'Certificate of Merit' campaign being pushed now, we believe we will be able to show a decided decrease in lost time accidents on our monthly report during the present campaign."

Another plant manager wrote as follows:

"We attach statement showing the results of our March campaign by divisions; also comments of our General Safety Committee. We are pleased to inform you that to date, during the month of April, we have had only one lost time accident, which indicates that the spirit of the March campaign is still being maintained, and we feel that the distribution of the Certificates of Merit will help us in still further maintaining this interest."

And still another plant wrote as follows:

"We have decided to continue on a competitive basis at Fort Worth plant by showing the assembly divisions in daily and weekly comparison with one another. We will use different methods as may be decided upon from time to time to keep SAFETY constantly before our employees, and we are confident we will show a good decrease for the year as compared with 1924. We are enclosing a copy of *Safety Hints* put out to all employees April 1st."

And here is letter from the Omaha Packing Company:

"We are rather disappointed in not showing up better in this accident campaign but the reason is due to the small amount of accidents March last year. Also case of employees not reporting to the doctor's office on small scratches and cuts.

"We believe this campaign is working out very good at this plant, and we are arranging to put up a blackboard made up with a thermometer for each division which will show their standing.

"I am attaching hereto analysis of each accident that occurred during this campaign. You will notice that six of the seven accidents which occurred were due to carelessness on the part of the employees."

You will note the explanation and apology for the poor showing. This plant was the winner of the next campaign.

Not the least of the benefits we have derived from these campaigns is the stimulus and vigor imparted to our safety committees. As a result of their prominence in the campaign and bringing them to the front as an important cog in the plant machinery, membership on this committee has a new meaning. Placing this committee and their accomplishments before the entire plant force as an agency with large responsibility and the opportunity revealed of a chance to deal with a big problem, makes it attractive. The man in the parable while digging in his hard, stoney field came upon a rare and hidden treasure. We never know what talent may be lying dormant, what genius for planning new methods of reaching the careless workman.

Men are quick to respond when they are asked to compete. There is an appeal to pride in the division, if it is an inter-department contest, and an equal call to their pride as well as their loyalty in an inter-plant contest. This and the unique devices used to stir up interest frequently provide just the touch needed to supplement the everyday efforts of foreman, representative, and safety supervisor in winning a man for safety.

Better Safety Conditions Mean Better Production

CHAIRMAN SCHILDT: Is the production affected in all of these campaigns?

MR. BRAINARD: The question of production, while we know it is a factor, is rather indeterminate with us. I think as a general proposition that if you have better safety conditions, you will have better production. I don't think there was any slowing up of production in any of our plants. Our men are working under a wage incentive plan in practically all of these plants that were in the contest and you may be sure that when they are working under such a plan, they are not going to allow produc-

tion to slacken; and our experience has been that we have pretty good evidence from superintendents and foremen that when working under the incentive plan, there is no tendency to increase accidents, because when the production of the man or gang is affected by lost time accidents, it is brought home to them in the loss of earnings.

MR. MORRIS: How do you keep your plant managers informed of the money saving?

MR. BRAINARD: Largely by casualty insurance. That will bring it home to them quicker than anything else. They can tell from that in a general way. I think we have statistics at all plants showing just what the average cost is.

MR. BENJAMIN: In looking at it from a business standpoint, that is a thing I have had to do because I have had to be in a small plant. We have found that by taking suggestions from the employees it will help us. Those men bring up things that improve the efficiency of the production, which you could not expect them to bring up, and we let them go ahead and give them credit for those suggestions. Later on, if there is a promotion in sight, we look to see who is turning in those suggestions.

One Department with a Lengthy Safety Record

We have one department which has a safety record of having gone 21 months without a lost time accident. They increased production 22 per cent and reduced the cost 17 per cent. I think every man in that department received a raise in wages during that period. That one department proved that safety is a financial proposition. I know of one suggestion which was just a chance remark. It developed into enough saving of production cost to pay for our safety movement in that department for a year.

MR. SCHWARZE: Does your lost time accident record include any disability as a result of disease hazards?

MR. BRAINARD: If there are any, they are very rare. We have very few occupational diseases in our business. They do not enter into the final figures. Sometimes in our paint shop there are little hazards in the use of sprays and in the use of lead paints.

MR. BARR: I would like to ask Mr. Brainard, who draws up the plans for these contests? Are they submitted from the other plants outside of Chicago or do you have to be devising these plans all of the time?

MR. BRAINARD: No, these plans have originated at the various plants. Not one of our safety supervisors has made suggestions in reference to these plans. Of course we encourage them to do so when we do get a suggestion. We do have some men in executive positions on the plant assemblies who have a place on the Safety Committee and it usually was with some of those men that the plans originated.

MR. BARR: In your assembly, does that include the various divisions in the plant or do you subdivide any assembly in another town?

MR. BRAINARD: We have the main divisions of which there are about thirty in the Chicago plant and as few as eight in some of the other plants, but there is no subdivision of the main divisions.

MR. BARR: How are the men selected?

MR. BRAINARD: They are elected by the Safety Committee, or appointed by the chairman of the assembly.

MR. BARR: They are not selected by employee representatives of the assembly?

MR. BRAINARD: No, sir. The chairman of the assembly is appointed, but they keep a record of the representatives who have had positions on the safety committee and they alternate the appointments so that in the course of the year or 18 months each employee representative has had a place on the Assembly Safety Committee.

MR. BARR: The chairman of the Safety Committee, is he a general manager representative or an employee representative?

MR. BRAINARD: As a general thing he is a manager representative.

MR. BARR: As a general rule, does the safety supervisor sit in at the safety meeting?

MR. BRAINARD: Yes, but at most plants he does not act as chairman.

T. R. BICKFORD (Flint-Kote Co., Rutherford, N. J.): I do not belong to this Section, but I should like to ask Mr. Brainard a question. In your campaigns, do you count minor accidents that may never have been reported, I mean such injuries as slight scratches?

More Accidents Usually Mean Fewer Lost Time Accidents

MR. BRAINARD: Our campaigns had reference to lost time accidents, meaning the time lost beyond the shift in which the injury occurred. We have not taken into consideration accidents which might have made it necessary for the man to lose a little time on the shift where he was working, but would be back on the job again the next day. We do keep for statistical purposes the record of all accidents as well as lost time accidents. Our statistics show that the plants which have the greatest number of accidents reporting to the doctor's office, show the smallest percentage of lost time accidents. It shows conclusively that the better attention given to all injuries, the smaller the rate of lost time accidents will be. If minor injuries are given attention promptly and frequently, it will in a lot of cases prevent a lost time accident, but if not attended to it might run into a lost time accident.

We had a case not so long ago. A man working in the press room hurt his finger about 10 minutes before quitting time. Instead of going directly to the doctor's office he stopped to change his clothes and wash up. By the time he got to the doctor's office there was no one there, and his injury did not receive attention. He reported to the doctor the next morning in pretty bad shape, but it had progressed so far that four days later that man died.

That is what I want to bring out. The plants that had the greatest number of accidents reported to the doctor's office, have the best lost time accident records.

Of course, we all must recognize that in the time of campaigns the employees are going to bend every effort to keep the accident rate down.

If there is any evil connected with campaigns, that is it. You have to give them awfully close supervision.

MR. SCHWARZE: Have you had any unfair competition during your campaigns?

MR. BRAINARD: No, sir.

MR. COREY: I think the fellows have to be good sports like in any other contest of any kind. There is that definite appeal of sportsmanship to the contestant, as the plants are scattered over quite a range of territory.

MR. CAMPBELL: How many employees have you in the plant that won the battle?

MR. BRAINARD: About 124 employees.

MR. CAMPBELL: How long did the contest run?

MR. BRAINARD: About 112 days.

MR. MCCLELLAN: Did you start out by counting the frequency of accidents and totalling them all, and then later on change to counting the lost time accidents?

MR. BRAINARD: We have never counted anything but the lost time accidents. Counting the total number of accidents has never been a factor in our campaigns.

CHAIRMAN SCHILDT: The next item on the program is a paper by Mr. Wm. Campbell, Safety Inspector, The Graton & Knight Mfg. Co., Worcester, Mass.

HOW TO MAKE A PRACTICAL SAFETY INSPECTION

William Campbell, Safety Inspector, Graton & Knight Mfg. Company,
Worcester, Mass.

In carrying on an accident prevention campaign the organization of a local inspection service within the plant is of the greatest value. This is effective not only from the standpoint of eliminating accident hazards, but also from that of educating the personnel of the working forces along accident prevention lines.

Whether a plant be large or small, it is very desirable to have a definite organization with a regular time allotted for making inspections; otherwise, the work is likely to be done in a haphazard, inefficient manner, and the interest of the men will soon lag.

In our plant we have a general safety committee which consists of our general manager, master mechanic, superintendent, and assistant superintendent. They make inspections regularly, but are really "on the job" all the time as they travel about the plant—thus assuring themselves that all are working in harmony, and keeping in mind the welfare and safety of our employees.

The safety inspector is on the job all the time, and he makes a general inspection every Friday, so that he can fill out the superintendent's report for the week ending Saturday. On Monday morning he rings the sprinkler alarms which are on the top floors of all our buildings, the area of our floor space being twelve acres. To fulfill the requirements

of our master mechanic, Mr. Dahlin, the safety inspector must make an inspection once every week or he will soon be told he is slipping. The general manager, Mr. F. H. Willard, is sold on safety, and he holds his organization responsible for the welfare and safety of the employees. Everything possible is done to make the factory a safe place in which to work.

We now employ about 1,200 hands. Our labor turnover is very small, not exceeding two and one-half per cent per month, which indicates that a large number of our employees have been with us for many years. I myself have been with the company over 40 years. The general manager and general superintendent are both old employees, having started in the factory as errand boys.

The personal qualifications of a safety inspector are very important. He should have a good knowledge of machinery, and resourcefulness in solving the safety problems which arise. Above all, he should be able to work with the other employees and secure their cooperation without arousing antagonism; otherwise, safety recommendations are likely to be considered as a form of criticism by those to whom they are made, and it is essential that controversies and disagreements be avoided if this work is to be carried on successfully. It must be considered mutually advantageous by all, and for all, with the entire organization working together toward a common end—namely, safety.

The foreman is the logical safety executive for his department, and should be held accountable for any accidents of whatever nature happening in his department; also for the education of his employees, in the safety work. The safety engineer and safety committees can do little or nothing without the cooperation of the foreman and employees, and must depend upon the foreman for the education of the workmen.

The entire organization must be "sold" on the idea that accidents are an additional cost to production, as well as a cost in the living expenses of the employees. Accidents are just as much an additional cost of production as waste in material, break-down of machinery, or unnecessary waste of time, and much more important in relation to the efficiency of the employees, because a well safeguarded employee will be free from any sense of danger, and will turn out much better work than one working in a plant where safety has not been thoroughly sold to the organization.

The Safety Committee Checks Careless Practices

CHAIRMAN SCHILDT: Is there any discussion on Mr. Campbells' paper? There should be some questions and discussion.

MR. MORRIS: What does the safety committee do to check up on careless practices? The reason I ask this question is that I believe if every safety committee that is functioning today would forget machine guards entirely and go out through the plant and study careless practices and do nothing else for the next few months, we would see a great deal of improvement in the accident rate.

MR. CAMPBELL: We have made an organized effort in that direction. The State Labor Department and the insurance companies are all interested. The people who are making the machines are putting on the guards now and the safety committee can forget the mechanical side and study careless practices.

MR. BRAINARD: I think that is also true of the supervisors. They are on the job all of the time and could do a great deal to correct bad practices. In our organization the safety supervisor brings into the meetings of the safety committee a report of bad practices which he has noted. Sometimes he can correct them while on the job, while at other times he reports them to the safety committee, which meets twice a month. They are made a matter of record and they then are reported to the general meeting of the assembly; and always those matters are brought to the attention of the plant superintendent who is instructed on them. I think we all agree that what you say about careless practices is the most important thing right now.

Most Plants Are Believed to Have Modern Safeguards

MR. COREY: It was not uncommon a number of years ago to see machines unguarded, belts and different moving parts were exposed, and the first thing that was done was to guard those moving parts. Now, in all modern plants the machines are guarded with the latest types of guards, but with our machines all guarded we still have accidents. Most of them are, I believe, of a non-mechanical nature. The idea then would be to investigate why we have these accidents. In other words, we have to get away from the guarding of machines, and we have to think of something else that comes ahead of the guarded machine and that is careless practice, and I think that there is a big field to develop in that line.

MR. JULSEN: Mr. Corey just mentioned that we do not operate a machine without having it properly guarded. I don't know how the other packing plants work, but we have never been able to guard the head splitting machine. We have had one or two serious accidents on that machine and I would like to hear from some of these men as to whether there is a guard for this machine.

MR. COREY: When I spoke of proper guarding, I meant where you can practically guard a machine. We have machines that we have never found a practical way to guard as yet, but where we can guard a machine, we do.

MR. MCCLELLAN: I will try to answer Mr. Julsen's question. I have traveled through almost every packing house in the United States and I can truthfully say that there is no practical guard for the head splitting machine. The only way we will ever be able to guard them will be to change the design of the machine which is a very costly operation. The boys in the packing industries who operate the head splitting machines, split the head open in two halves so you can pick out the brains, but the machine is so constructed that you must get your hands in danger. There is no other way this can be done unless the design of the machine

is changed. Some day we will have to change. We do not have many accidents on that machine. In all my experience I do not recall but one accident in our plant. The head slipped a little in the machine and the man got his thumb taken off. The heads are not all uniform in size.

CHAIRMAN SCHILDT: I have a little note here which I think strikes the sentiment of the Packers and Tanners Section entitled, "Pass it along."

No matter how much accident prevention is discussed in committee meetings, unless the information is passed along to the man on the job, little will be accomplished. The objective, therefore, of the safety committee should be the purpose of disseminating safety and educational data to employees in organizing for the prevention of accidents.

We are apt to forget that the foreman is the one man responsible for the safety of his department and that the safety organization composed of the safety department and all committees simply represents a Service Department to assist the foreman in meeting his greatest obligation, that of the conservation of human life and limb.

Carelessness is a matter of habit and if you are going to get rid of it you must replace it with another habit, carefulness.

MR. McCLELLAN: Just before you adjourn I want to take the privilege of thanking the speakers for their papers. They were splendid and I think we all got some wonderful inspiration from them.

MR. CROMWELL: Before the meeting breaks up I would like to ask every one in behalf of our new chairman to give him all the cooperation during the coming year that you possibly can. It was awfully hard to get members out to this meeting and to other meetings. We want to get some new material into this Section.

Two Final Resolutions by the Section

MR. SCHWARZE: I would like to offer the following resolution:

RESOLVED, That we, as members of the Packers and Tanners Section, appreciate the remarkable services of the retiring officers for the past year. It has been very helpful to us all.

A motion was made, seconded, and regularly carried that the resolution be adopted.

MR. McCLELLAN: Here is a resolution that I want to appear in the minutes of this meeting:

RESOLVED, That we, as members of the Packers and Tanners' Section, request that the National Safety Council bend every effort this coming year to help the Packers and Tanners build up their Section and not to leave it to one or two people to do all the work. We want them to appoint a member to work with us.

(A motion was made, seconded, and regularly carried that the resolution be adopted.)

ADJOURNMENT

Paper and Pulp Section

New Officers of the Section

CHAIRMAN: W. J. PEACOCK

Northern Paper Mills, Green Bay, Wis.

VICE-CHAIRMAN: M. G. HOYMAN

Kimberly-Clark Company, Neenah, Wis.

SECRETARY AND NEWS-LETTER EDITOR: AMEIL UMBERHAM

Fort Howard Paper Co., Green Bay, Wis.

Committees

PROGRAM: M. G. HOYMAN, Chairman

Kimberly-Clark Co., Neenah, Wis.

ENGINEERING REPRESENTATIVE: A. P. COSTIGANE

Ontario Pulp & Paper Makers' Safety Assn., Ont., Canada.

REGIONAL DIRECTORS OF CONFERENCES, CONTESTS, MEMBERSHIP AND POSTERS:

ALVIN RECORD

International Paper Co., Chisholm, Me.

N. F. BARTLETT

Hollingsworth & Vose Co., Boston, Mass.

W. A. GLEASON

Hammermill Paper Co., Erie, Pa.

G. W. PHILLIPS

The Champion Fibre Co., Canton, O.

WALTER L. MEAD

Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.

ERNEST AUGUSTUS

Mead Pulp & Paper Co., Chillicothe, O.

R. S. TURNER

West Virginia Pulp & Paper Co., Mechanicsville, N. Y.

JAMES M. MURRAY

International Paper Co., Gatineau, Quebec, Canada.

October 26, 1926

W. J. PEACOCK, Chairman

Head, Department of Personnel, Northern Paper Mills, Green Bay, Wis.

THE opening session of the Paper and Pulp Section of the National Safety Council convened at 9:30 o'clock at the Book-Cadillac Hotel, Detroit, Michigan, Mr. W. J. Peacock, Head, Department of Personnel, Northern Paper Mills, Green Bay, Wisconsin, presiding.

CHAIRMAN PEACOCK: Gentlemen, I am going to suggest a form of getting acquainted before we go to reports or program. Let us have a general self-introduction. I would suggest first of all that you rise, one gentleman from each mill, tell who you are, then introduce the rest of the representatives from your mills.

(The members then followed this suggestion.)

DELEGATES IN ATTENDANCE AT CONGRESS

Adams Bag Co.—J. F. Grazer, Chagrin Falls, Ohio; Alton Box Board & Paper Co.—C. G. Patterson, H. C. Sackett, Alton, Ill.; American Zinc Co. of Tenn.—P. M. Arthur, Mascot, Tenn.

The Beveridge Paper Co.—O. E. Blanford, Indianapolis, Ind.; Bryant Paper Co.—Mrs. M. Buckingham, Kalamazoo, Mich.

Casualty Engineer—C. J. Strobel, Philadelphia; Champion Coated Paper Co.—Kenneth L. Faist, Hamilton, Ohio; The Champion Fibre Co.—T. L. Jamison, G. W. Phillip, S. W. Plott, Bob Varner, C. N. Wright, Canton, N. C.; Chief Sanitary Inspector—Alex R. White, Toronto, Ont., Can.; Consolidated Water Power and Paper Co.—Leo J. Barrett, C. E. Jackson, Walter L. Mead, J. J. Plzak, Wisconsin Rapids, Wis.

Detroit Sulphite Pulp & Paper Co.—Ernst Gaschwender, Detroit, Mich.; Director Safety Dept. The Celotex Co.—H. T. Bond, Marrero, La.

Esleeck Mfg. Co.—John L. Gibson, Stuart Winch, Turners Falls, Mass. Falls Mfg. Co.—Wm. Benninghaus, Hugo Boldt, H. A. Korth, Oconto Falls, Wis.; Fort Howard Paper Co.—Amell Ueberham, Green Bay, Wis.

Robert Gaylord, Inc.—Ed. Ahrenhoerster, St. Louis, Mo.; Great Western Paper Co.—E. A. Kennedy, Ladysmith, Wis.; Hammermill Paper Co.—W. A. Gleason, Jacob B. Lind, J. J. Little, Walter Packard, Erie, Pa.; Hercules Powder Co.—M. G. Milliken, Parlin, New Jersey; Hollingsworth & Vose Co.—Mat F. Bartlett, Boston.

Indemnity Ins. Co. of North America—S. J. Steinmann, L. G. Wood, Philadelphia; Industrial Laboratories, Ltd.—T. Linsey Crossley, Toronto, Ont., Can.; Interlake Tissue Mills Co.—C. Nelson Gain, Merritton, Ont., Can.; International Paper Co.—Daniel T. Meady, John Lundrigan, New York City.

Kimberly-Clark Co.—Edw. J. Goodman, M. G. Hoyman, A. W. Redlin, Neenah, Wis.; Arthur W. Hoffmann, Niagara, Wis.; F. A. Robinson, Niagara Falls, N. Y.

Lincoln Pulp and Paper Co., Ltd.—J. R. Leslie, Merritton, Ont., Canada. Marinette & Menominee Paper Co.—L. Larson, Marinette, Wis.; Mead Pulp & Paper Co.—L. O. Bonner, J. E. Collins, Chillicothe, O.; Michigan Mutual Liability Co.—Ed. H. Vaniere, Detroit.

National Carbon Co., Inc.—A. J. Herrin, Niagara Falls, N. Y.; Nekoosa-Edwards Paper Co.—F. H. Rosebush, Port Edwards, Wis.; Northern Paper Mills—W. J. Peacock, Green Bay, Wis.

Ontario Pulp & Paper Maker's Safety Assoc.—A. P. Costigane, Toronto, Ont., Canada.

The Paper Industry—A. Scott Dowd, Chicago, Ill.; Peerless Div.-Mead Pulp and Paper Co.—C. W. Twitchell, Dayton, Ohio; Port Huron Sulphite and Paper Co.—James J. Hastings, Port Huron, Mich.; Provincial Paper Mills, Ltd.—F. M. H. Cushing, Thorold, Ont., Canada.

The Richardson Co.—Wm. A. Hellemann, Melrose Park, Ill.

Sec., Safety Committee—Ben Wahl, Detroit, Mich.; Scott Paper Co.—Edward J. Gayner, 3rd, Chester, Pa.; Sorg-Oglesby-Smith Paper Co.—H. H. Faries, D. D. Thirkield, Middletown, Ohio; Standard Accident Ins. Co.—Edward W. Bidigare, C. R. Blackburn, Detroit, Mich.; Herbert A. Raseh, Milwaukee, Wis.; L. C. Long, Watertown, N. Y.; E. S. Shartzler, Utica, N. Y.

Tennessee Copper Co.—H. T. Harper, Copperhill, Tenn.; Travelers Ins. Co.—C. Fred Wolf, Hartford, Conn.

Union Bag & Paper Corp'n.—Stuart H. Brown, New York, N. Y.; United States Casualty Co.—O. J. Smith, New York City, N. Y.

West Virginia Pulp and Paper Co.—Walter D. Bauer, Tyrone, Pa.; R. S. Turner, Mechanicville, N. Y.

REPORT FOR OFFICERS AND COMMITTEES

CHAIRMAN PEACOCK: The first item on the program is the report of officers and committees.

May I speak a word informally for the officers? I do this, less in the nature of a report to the meeting than as a means of getting a record. I find that in the records of the meetings of the Section in past days a great deal has failed of historic note. What I have to say is for the use of future officers.

Following the meeting at Cleveland last year there was an informal gathering, a kind of committee of the whole, at which we canvassed the question of programs, contests, and Sectional activities, and after that there was a meeting of the officers of the Section. Thus the year's activities began before we left Cleveland.

The activities of the year that have occupied the attention of the chairman in the main might be listed under the head of program service with Mr. F. W. Ashe and the other officers. The program was built with Mr. Ashe as chairman.

Another activity occupying attention during the year was a voluminous correspondence.

First of all are the news letters. These news letters have been made as personal as possible and have built up friendships and contacts that have been valuable. A great number of personal letters have been written.

Another activity that has occupied the attention of the chairman has been the executive sessions of the National Safety Council. I have attended eight such meetings in Chicago and other places. Also, there has been a major activity which I would call Regional Conferences. Naturally our opportunity to set these things up has been at home in

the state of Wisconsin. Two such conferences have been held, and we were able to advise in a third conference centered in Erie, Pennsylvania. So we must include in the activities of the year not simply the Congress, but three other conferences that have been engineered from within this Section.

Try to get some idea of how many mills were represented in each conference. At the Green Bay conference, December, 1925, there were about 200 representatives of paper mills, foremen and others. At the Appleton conference held in September of this year there were 300 representatives of paper and pulp mills.

My conception of the chief problem of the Section, as it has been in my mind throughout the year, is the formation of a group spirit, a consciousness in the Section, if you please. We have tried to get you gentlemen to feel throughout the year that you belong to one of the major activities of the National Safety Council.

The news letters sent out by Mr. Umberhan have been very valuable toward this end. And with this problem of the formation of a group spirit in mind we have been majoring through the year on the safety contest. It has developed interest in safety in your mills, but above all things, I hope it has helped to increase this spirit of the group.

Part of the task of the Section is to get every mill present at a regional conference or at the annual meeting. At another time we are going to have presented to us the value of regional conferences in which the spirit, the speakers, exhibits and methods of the National Safety Council are brought to your own safety committees, and to your own foreman.

Will you keep these things in mind throughout the three sessions we are to have, and participate as much as possible in the building of a group feeling inside the Section?

We are to have reports from two committees at this time. A report from our Program Committee. Mr. Ashe isn't present. I am afraid he is confined at home on account of sickness.

We will have the report of the Poster Committee, by Mr. Gleason.

REPORT OF W. A. GLEASON, CHAIRMAN, POSTER COMMITTEE

W. A. GLEASON (Hammermill Paper Co., Erie, Pa.): Your Poster Committee had the power to collect the bulletins. (I say power because power was needed.) We were able to furnish the Section with 15 posters during the past year.

I want to appeal to you gentlemen, especially those of you who are in the contest, to send on your ideas to the Poster Committee so that we may get a number of Sectional posters. You all know the value of having posters particularly adapted to your industry, and I want to tell you, gentlemen, if you can place in your mill a poster which has at the bottom the notation, "Donated by Hammermill Paper Co.," or whatever company you are connected with, it will have much more effect than a poster made by some steel company.

One of the members yesterday cited the case of a man in his mill, a boss machine tender, who had worked in the mill at the trade for 37 years without an accident. That would make a great poster, not only for his own company, but for the rest of our companies. Post that in your machine room and you get a wonderful kick out of it. This year I hope that you will cooperate very greatly with the chairman of the Poster Committee, because we need more posters, at least three a month. We fell down on furnishing half that number this year.

CHAIRMAN PEACOCK: This year has seen the completion of a real contribution on the part of the Paper and Pulp Section to the literature of safety engineering, the Paper and Pulp Safety Code. I think you will want to meet members of the committee that had this matter in charge. Mr. Altman was chairman, he isn't present; Mr. Costigane is present. Let's get a good look at you on your feet, Mr. Costigane.

Personally I feel that these gentlemen have put the Section on the map. Certainly the government has recognized what has been done by them.

I am going to take the liberty of turning the meeting over to the vice-president of the Section, Mr. F. H. Rosebush, who will announce the speakers.

(Vice-Chairman Rosebush took the chair.)

CHAIRMAN ROSEBUSH: It is a matter of principal comment to have so many representatives of paper mills here this morning. It certainly is the earnest and sincere desire of your committee to make this Section so worthwhile that not only will you men return but you will also bring members of other mills to these sessions.

The first speaker of the morning is Mr. G. W. Phillips, of Canton, N. C.

THE A B C OF PAPER MILL SAFETY ORGANIZATION

G. W. Phillips, Champion Fibre Company, Canton, N. C.

When we speak of the A B C of Paper Mill Safety Organization, we mean of course, the fundamentals of organization or the best way to begin. Although I may not be able to tell you the best way, I shall endeavor to give you a few suggestions which seem to me are very important in organizing for accident prevention, and should be given consideration.

You understand, of course that conditions vary somewhat in different plants, therefore no set rule can be laid down or followed.

It is generally conceded, I believe, that the accident problem involves three essential activities: safeguarding, education, and engineering adjustments. To secure the best results, it is necessary, of course, that the highest measure of cooperation exist between the management and the worker.

The management must be thoroughly "sold" on the value of safety work in the plant. In other words, safety must have an equal place along with production, financing, etc. Don't make it a kind of "side issue," a welfare

proposition. Every employee must understand that it is a business proposition; that safety is as much a part of their job as any other duties. If the management is not in earnest, the workers will not be.

In organizing for safety, it is absolutely necessary that one man should direct all of the safety activities. The departmental superintendent and foreman are interested primarily in production. Therefore if the safety of the plant is left entirely to them it is apt to be neglected in the interest of production.

We have long since learned that to accomplish the best results in any enterprise, especially in accident prevention, a certain amount of organization is necessary. Now, I do not mean, of course, that there should be a lot of unnecessary "red tape stuff," but with the right kind of organization I am sure that a better spirit of cooperation can be developed.

There should be at least two committees, an executive and a shop committee. The executive committee should be composed of the manager and superintendents from each department of the plant, together with the safety director. This committee should meet once a week to discuss and act upon all safety problems over which the shop safety committee does not have jurisdiction, and consider safety suggestions and recommendations for the prevention of injuries. In other words, this committee should act as a clearing house for all safety ideas and activities and follow them until disposed of.

This committee should also decide all questions of operating methods which affect the safety of the workers; decide on standards for guarding machinery and equipment, standard operating policies, safety rules, and so on.

The safety engineer should submit to this committee a report of each injury causing lost time, together with a suggestion for the prevention of a recurrence of a similar accident.

Shop Committee

A shop safety committee should be composed of either foremen or workmen from the various departments of the plant. This committee should consist of at least five members and should meet each week. The duties of the shop safety committee should be:

1. To make inspections of the plant for unsafe conditions and practices, and submit a report to the safety engineer.
2. Help create a safety "atmosphere" in the plant.
3. Instruct the workmen in safe methods of doing their work and discourage unsafe practices.
4. To investigate all serious accidents and near accidents and make a report with recommendations.
5. Help to encourage the cooperative spirit between the management and the workers.

The size of this committee will depend upon the size of the plant, but should of course consist of enough members to insure a variety of ideas and opinions; however, not so many that all members will not have a

chance to express themselves in the short space of time allotted for the meeting, which should not be more than one hour each week.

As to the election or selection of this committee there is a wide difference of opinion. Personally, I favor appointment by the superintendents of the various departments. When the committee members are chosen by the elective method, there is danger of the wrong men being chosen. Members who are not enthusiastic for safety, or who do not harmonize in a safety committee, will be a hindrance rather than a help. All members of this committee should be selected with a view of rendering the best service. It is a good idea to change the members at regular intervals.

Experience has shown that the most productive field now open to development is that of education—that is creating and maintaining interest in safety.

A Definite and Concrete Program Essential

To accomplish worthwhile results in safety education, I believe that a definite, concrete program is absolutely essential. I do not mean merely posting bulletins, placing danger signs or formulating a lot of safety rules, all of which are of course more or less necessary; but there should be a program of instruction covering the hazards of each particular job, followed by a convincing argument why employees should make safety their first consideration.

All dangerous places and equipment should be guarded and made reasonably safe, but we should always bear in mind that "a careful employee is the best safeguard."

I am convinced that in the plant where men are taught to play safe, there will be less accidents without mechanical safeguards, than there will be in the plant where all machines and dangerous places are well guarded and the employees disregard safe practices.

Remember, careful workmen are not born, they must be taught to observe the rule of safety. The most effective method perhaps is "precept upon precept, line upon line, here a little there a little," or in other words a constant and everlasting repetition of the message of caution. It may require the patience of Job, the wisdom of Solomon and the persistence of a book agent, but remember that life and time are at stake and we should put forth every effort possible to prevent injuries.

Department superintendents must be convinced that supervision plays an important part in the elimination of accidents, that they are responsible to a large extent for accidents in their departments, just as they are held accountable for production, and that the safety of their men is a real part of their operating problems. The foreman and workman must also be "sold" on safety. All of which can better be accomplished through the medium of an organization.

All safety committees have an educational value, especially for the men who are appointed to membership. Committee service is the best and sometimes the only means of arousing and holding the interest of the men in safety and thus securing from each the necessary cooperation in his own department. Such interest is absolutely essential for maximum

success and can be secured only when each man is completely sold on the safety idea.

In closing, I want to emphasize the fact that you will be disappointed with results if the safety program is not wholeheartedly and enthusiastically supported by the general manager and superintendents. Half-hearted interest will mean failure, therefore remember you can not fool the workers. If the management and members of the safety committees are not in earnest and enthusiastic you can not expect the workmen to be.

The Connection Between Safety and Production

CHAIRMAN ROSEBUSH: Mr. Phillips has given us some fine things to think about and discuss. The first thing for your consideration is Mr. Phillip's point of safety and production. I wonder if there aren't some mill managers here or members of the management of some companies who would talk on safety and production.

The question is this: Do you men really believe that there is a connection between safety and production, and what is that connection?

H. C. SACKETT (Alton Box Board & Paper Co., Alton, Ill.): The part, I take it, that safety plays in production is keeping an organized force on the job all the time. Of course, aside from your general turnover, an organization that can go along with the minimum amount of accidents actually receives a greater production due to the fact that they have the same organization on the job day in and day out.

M. G. HOYMAN (Kimberly-Clark Co., Neenah, Wis.): That question as a rule many times applies to what effect safety campaigns have on production. I remember one time when we had a contest (which we have nearly all the time), taking men out to put on various stunts from the departments; and the question arose as to what effect that had on production, putting so much time on the campaigns. I inquired from some of our production heads and found two different plants, which at the time were putting the most intense effort on safety and taking a great many men off the job to help on safety committees and on the programs, yet they had their greatest production and broke all records during this safety drive at those plants.

H. T. BOND (Celotex Co., New Orleans): We have had our safety campaign on for about two years. The point we have found of greatest value is that the men work with better spirit and are more contented, more eager to make good on the job. That helped out considerably, better morale, better discipline. It was easier to enforce discipline among the men after the safety campaign started. Production has increased some, too, and we lay it to the safety organization.

CHAIRMAN ROSEBUSH: I would like to suggest this question: Do you believe that the teaching of safety brings direct results in production? Do you realize that if you teach men safety you are teaching them those characteristics of carefulness, precision and attention to business that not only make a good safety man but that have a direct result in getting out more tons of paper?

We will pass to the next paper, which will be delivered by Mr. E. A. Kennedy, of the Great Western Paper Company.

APPLYING SAFETY ORGANIZATION TO THE SMALL PLANT

E. A. Kennedy, Great Western Paper Company, Ladysmith, Wis.

So much has been said and written relative to organizing for safety that anything I can tell you will be merely a repetition of what has been said and done. Mr. Phillips in his paper covered thoroughly the reasons for organizing and how to organize.

Another thing we have to offer is a very excellent pamphlet entitled, "An Industrial Safety Program to Fit Your Needs," put out by the National Safety Council, something that covers every foot of ground relative to organization.

The question arises: Can these points of organization be applied to a small plant? Why not? I could pick 11 men in this room and call them a football team but that would be rather flattering; they would not be a football team until they had some sort of organization.

The same thing applies to a small plant as to a large plant. Your large plant, I might say, is Kimberly-Clark with a central organization. They have a number of mills, but, as I understand it, each mill is an organization within itself. Mr. Hoyman this morning said they had one mill with 27 men. Has that mill an organization within itself? There is one example of what an organization can do within a small plant. They look after their own safety.

The dictionary defines "organization" as "a number of individuals systematically united." Organization deals with men rather than with things. In its relation to accident prevention, organization has been symbolized as a three-legged stool in which the management, operating executives and workers represent the three legs, each being dependent on the other two to perform their functions. Any two legs are useless without the cooperation of the third. The safety director is the block that retains the legs in a normal cooperative and working position, and gives the whole stability.

Incidentally I might add that the safety director serves as the block on which everybody sits.

It is not so many years ago that paper mills were dumping practically all their white water into the river. Shrinkage was something we knew about but paid very little attention to. Nowadays the mill which has a large shrinkage is a back number. So with safety work. I can recall just 15 years ago when we used to go to a man when he got hurt, before he left the mill, and find out how he got hurt. We would do that because we had to turn in the report to the Industrial Commission. Now safety organization is not guess work. It has been perfected in any number of plants. Safety organization is necessary and it is just as necessary in a small plant as a large one.

Mr. Phillips brought out the fact that one man should be picked as a safety director. If you leave safety work to anybody and everybody, it is nobody's business. One man should direct the safety work in every plant, regardless of its size. (The larger the industry, the greater is the need for a safety director trained in the personal and technical problems of accident prevention. In a small plant this man may have other duties also.)

Our plant employs in the neighborhood of 250 men. We have a safety organization, based on this pamphlet issued by the National Safety Council. We have no full-time safety director, but he has a great deal of other work to take care of.

Here is a short outline of what our organization consists of:

Details of a Safety Organization

We have the safety director and we have what we call our foremen's club. It is practically the same as what you call a general committee. It includes all the foremen throughout the plant; we have 19 foremen. Every man in that foremen's club considers himself a safety director of his own department. Within this foremen's club we have an executive committee made up of the officers, that is, president, vice-president, secretary and three members of the inspection committee, which makes an executive committee of six. The president of the club appoints this inspection committee from members of the foremen's club.

Within each department a foreman appoints an inspection committee for his department. This inspection committee, the department inspection committee, makes an inspection once a week. They post their report in their department. The inspection is gone over by the foreman; he endeavors to remedy all suggestions made by the inspection committee and crosses them out as they are made. The safety director, when he goes through these departments, looks at these slips and when he finds something has not been taken care of he can take it up with the foreman. The inspection committee makes an inspection once a month, and foremen directors make an inspection once a month. We have monthly meetings of the foremen's club, but at their last meeting they decided that once a month was not enough. They are going to have a meeting every two weeks.

A year ago we organized for safety work. Prior to that we did not know what it was to have a month without a lost time accident, but since organizing we have had four months this year without a lost time accident, and in other months we have cut it down to where we had one minor accident. We have had one fatality this year.

N. F. BARTLETT (Hollingsworth & Vose Co., Boston, Mass.): Do these inspection committees look after their own departments? You wouldn't have a member of the finishing room go into the machine room to make inspection of their reports?

MR. KENNEDY: We have tried sending men from one department to another to make inspection. Now we send men to different portions of

their own department. A machine tender will inspect another machine besides his own.

I will mention an instance along that line. On our number three machine they had a roller cooler. The bottom of that platform had been missing. It was a very dangerous thing, and I waited for the inspection committee to make a report, but the members of this crew never reported that step missing. They had always stepped over to miss that last step. But when the man from number two machine went over it, one of the first things he noticed was that the step was gone and he reported it. A short while later we had it remedied.

EDWARD J. GAYNOR (Scott Paper Co., Chester, Pa.): Is it the tendency, Mr. Kennedy, for your inspection committees, to recommend the guarding of machines and the spending of the company's money, or is it their tendency to push the education idea?

MR. KENNEDY: These inspection ideas, when we started out, were to give the men in the department something to do. I think you have found that if you want to get a man interested in safety work, or any other work, you should give him a job. It was an educational proposition in the first place. But we find they make suggestions for guarding and they talk it up. It has aroused more interest in the department. They suggest guards, but if their suggestions are not feasible, the foreman will explain to them why the suggestions are not feasible. There is no suggestion ignored; we try to explain to him why his proposition is not feasible.

Departmental Inspections One Hour Each Week

KENNETH L. FAIST (Champion Coated Paper Co., Hamilton, Ohio): Do you allow the departmental inspection committee a certain amount of time each week?

MR. KENNEDY: We allow them an hour during the week.

A. W. HOFFMANN (Kimberly-Clark Co., Niagara Falls, N. Y.): I would like to know where you draw the line as to who constitutes a foreman?

MR. KENNEDY: A foreman is any man in charge of the department. That is a ticklish question, I grant you.

MR. HOFFMANN: Do you consider a machine tender a foreman, or a head grinder a foreman, in this club you have at Ladysmith?

MR. KENNEDY: We have three pulp mills; one at Ladysmith, one six miles farther down the river in charge of one man, another 12 miles down the river in charge of another man. There are three men in charge of those three pulp mills. They are members of our foremen's club, but every time we have a meeting the foremen of the two lower mills bring the two machine tenders that are not on tour with them to the meeting. These wet machine tenders are not members of the club, but they are brought to the meeting to instill in them safety organization because they really are foremen in absence of the first foreman. You might say the first foreman is the first sergeant, the other two are under sergeants.

MR. HOFFMANN: I think that is a good idea.

MR. KENNEDY: They have no vote nor power, but they attend the meetings of the foremen's club.

CHAIRMAN ROSEBUSH: Do you have present any members of the management, or is it confined to foremen?

MR. KENNEDY: The safety director represents the management at all meetings and no members of the management attend the foremen's club unless they are invited by the club.

CHAIRMAN ROSEBUSH: Why do you exclude members of the management?

MR. KENNEDY: In the first place, we have found that in the presence of the superintendent and managers, the foreman would hold back, he would not express himself. We have gotten a number of things the men would not have brought out if their own particular boss was on the job at the time.

A. P. COSTIGANE (Ontario Pulp and Paper Makers' Safety Association, Toronto, Ontario): What discussion takes place in that club?

MR. KENNEDY: The discussions become public property. Whatever they say at that meeting, the manager and superintendent gets a copy of; each member of the foremen's club gets a copy.

Committee Members Are Rotated Regularly

MR. STORLE (Philadelphia, Pa.): Do you rotate your safety inspector every three months?

MR. KENNEDY: The general inspection committee serves one year and the committees within each department change every three months. New members are appointed on the general inspection committee by the new officers.

W. A. GLEASON (Hammermill Paper Co., Erie, Pa.): I would like to have you bring out the point that you mentioned to me yesterday, that when you make your inspection the foreman sends three men with you to make repairs, etc.

MR. KENNEDY: In one department we have a superintendent who lost a leg in the mill. He was caught in a pulley and was just thrown around and his leg caught on a concrete pier and was shorn off. We have a fine support for safety in this superintendent. When they make an inspection of the mill, the foreman and superintendent know I am going to make an inspection within that week. I start out to make that inspection and this superintendent has three men of his repair crew to follow me around. It is not my suggestion, however. The minute I make a recommendation regarding anything in the plant, one man drops off and that is fixed. By the time I have dropped the third man, the first man is back on my trail again. I never lose him. I have had the finest sort of cooperation from that superintendent.

JAMES J. HASTINGS (Port Huron Sulphite & Paper Co., Port Huron, Mich.): Are your safety directions carried out on recommendation of the foreman, or the committee men? Does he see that the work is carried on or merely see that it is crossed off the recommendation?

MR. KENNEDY: The inspector himself sees that it is carried out.

MR. HASTINGS: The reason I asked that, I have found that a committee man would recommend a thing, the foreman would cross it off, and say the thing was not necessary.

MR. KENNEDY: We have the safety inspector because we do not want the foreman to slight anything. If a man is dissatisfied with the way he has been treated relative to a suggestion, we want to find it out and set him right, because the dissatisfied man is going to ruin everything for you in a short while.

CHAIRMAN ROSEBUSH: Is your safety director responsible to see that the work is done after it has been recommended?

MR. KENNEDY: Yes, if it is feasible.

CHAIRMAN ROSEBUSH: Is your safety repair man under your safety inspector?

MR. KENNEDY: No, that is done by the millwright's or master mechanic's crew, and carried out.

STUART H. BROWN (Union Bag & Paper Corporation, New York, N. Y.): Mr. Kennedy, I was very much impressed by your reference to the fact that the minutes or recommendations of the safety committee are posted in the department of the foreman to have his attention and be crossed off at the time they are finished. That is rather a new one on me and I think it is a very splendid thing. Does that safety inspector make a report to you of these various items that have been completed?

MR. KENNEDY: No; at first we had them send these written reports in to the safety director, but the safety director in our plant has other work to do. We found he was swamped with these inspection reports, so we finally decided they should be posted in a place where everybody could see them, and the safety director makes it a point to go through the plant to look over all these reports.

Safety Education is Emphasized

MR. BROWN: Another thought occurs to me as to whether or not the matter of safe practices, or the abolishment of bad habits, takes any part in your committee discussions.

Some committees I have seen recommend guards for this and guards for something else, and everything they see must be guarded, and it runs into a lot of what I consider unnecessary expense, and they lose sight more or less of the fact that the modern view of eliminating accidents is largely a matter of safety education, and under that heading I was moved to ask the question if the matter of preventing accidents by safer practices or the elimination of bad habits of doing things, forms any part in your discussion.

MR. KENNEDY: Yes, each accident of the previous month is brought out at these foremen's club meetings and the accident is discussed, and in the course of discussion one or more men make the remark, "We still have accidents. My suggestion is that every man when he punches the clock, put on his own particular guards." That brings out the thought that safety education is something we have to stress.

Our paper machines were a source of accidents. We had any number of

them prior to our organization, but we have not had an accident on any of our paper machines since organizing, that is, in the last nine months.

Now we find that men bring up things during the month. The foreman usually makes a note of it and it is brought out and discussed at the foremen's meeting. In that way we have eliminated a number of unsafe practices which were current before.

EDWARD J. GAYNOR (Scott Paper Co., Chester, Pa.): Is your foremen's club interested in anything else besides safety work?

MR. KENNEDY: We take up matters of safety and fire prevention.

J. R. LESLIE (Lincoln Pulp & Paper Co., Merritton, Ontario): What is the limit of authority vested in your safety director to carry out suggestions made by your safety committee regarding expense?

MR. KENNEDY: The management, from the first meeting of the foremen's club, stated right from the shoulder that it was absolutely behind the foremen's club. Any suggestion they make that can not be approved calls for an explanation as to why, either by the safety director or by the management.

MR. LESLIE: You mean by that you would refer suggestions to the management before they were carried out?

MR. KENNEDY: Yes, sir.

MR. PEACOCK: Referring back to Mr. Gaynor's question, Mr. Hoyman might have something to say regarding other matters being considered by foremen. Your foremen's club takes up matters of waste, economy, etc.?

Safety and Production Discussed in Meetings

M. G. HOYMAN (Kimberly-Clark Co., Neenah, Wis.): Yes, we have enlarged our plan. For two years, every Friday, at 11 o'clock we meet. Our Kimberly mill has about 1,000 people. All the foremen, superintendents and department heads meet on safety. That works very well now, because the men know things that ought to be corrected. The superintendent who has the power to correct it is there, and anything that comes up is supposed to be handled the next week.

But I started to say we have since worked in production and other things. Twenty minutes or half an hour is allotted to safety and then we discuss production or any other pertinent matters in this same meeting.

MR. KENNEDY: That is the spirit I carried back with me at Cleveland last year after talking with Mr. Hoyman and other Kimberly-Clark men at the meeting. We had a case before the Industrial Commission, a case of hernia, a man in our plant claiming to have hernia. We had seven men who reported to the office that they wanted to go on the stand as witnesses to the fact that this man had not been hurt in the plant. That was something unheard of before we started safety work. It just goes to show how far the safety spirit has got down to the rank and file through our safety organization.

MR. WOLFE (Travelers Insurance Co.): There is one thing I don't quite understand, that is about the management injecting their influence

in this organization. As I understand it now, the head man is really the safety director.

MR. KENNEDY: Yes, and then you have the foremen's club to discuss these different problems.

MR. WOLFE: I can see very well that you have your foremen interested and with all that cooperation you are going to have success, but let's assume another case.

I was taken to a plant last week where they have a somewhat similar arrangement. They have a safety director and they have the foremen's committee. As I understand it, most of the foremen in this committee razz each other when they get together. Sometimes when a foreman criticizes or points out that he was sort of responsible for an accident he comes back with a slam. While the safety director has authority to order improvements, he doesn't seem to govern this situation that has arisen between the foremen. What would you do in that case if it arose in your plant?

The Management Not Actively Interested in Safety

MR. KENNEDY: Is the management of that plant in favor of safety?

MR. WOLFE: He is in a way, but he seems to be so busy he leaves it to the safety director and foremen.

MR. KENNEDY: I think there is your answer.

MR. WOLFE: I appreciate that, but I was wondering what you would do?

MR. KENNEDY: I don't think any foreman, if he knew the management was in favor of safety, would deliberately get up in a foremen's meeting and razz, as you say, some other man because the other man made a suggestion he didn't like.

MR. WOLFE: Is this safety director a man of authority?

MR. KENNEDY: I don't know. I happen to be the safety director.

MR. WOLFE: If you found a foreman that wasn't interested, would you discharge him?

MR. KENNEDY: No, sir, I would not; I would take it up with the superintendent. The safety director has no authority to discharge any man.

G. W. PHILLIPS (The Champion Fiber Co., Canton, N. C.): I seem to have had a very similar experience to that the previous gentleman spoke about. I know when we first formed the safety committee we had several foremen on the committee. We found that practically all they did on the committee was to razz each other. After two meetings I formed a new committee with very few foremen and some workers, and then just let these foremen slide for a while, gradually educating them to the safety habit. Recently I put two of these foremen back on the committee and I find they are right with me now.

L. J. BARRETT (Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.): I wonder if the seven men who volunteered to witness in the case of hernia, knew this man had been ruptured.

MR. KENNEDY: Two of them testified that he had been ruptured before he entered the employ. Others testified that the man never worked hard enough to get hurt. At the time he claimed he got hurt these men volun-

tarily offered to testify to the fact that there was nothing there at the time that could have hurt the man.

MR. PEACOCK: What was stimulating their interest in offering to testify this way?

MR. KENNEDY: The safety idea had gotten to these men. A lost time accident would hurt their department, and the men felt that this chap was trying to slip something over on the company.

MR. BARRETT: Would it be a fair question to ask what the decision was by the Industrial Commission?

MR. KENNEDY: It was thrown out.

KENNETH L. FAIST (Champion Coated Paper Co., Hamilton, Ohio): Do you have a physical examination of your employees when they enter the service?

MR. KENNEDY: No, sir, we do not.

MR. FAIST: I wonder if that would not have eliminated that case in the first place.

MR. KENNEDY: It undoubtedly would have, but at the present time we have no physical examination.

CHAIRMAN ROSEBUSH: The last speaker on the program this morning is to talk on "The Value of Medical Examinations." It is quite a problem for the small mills, and you are all interested in it. I know you all feel the need of having medical examinations. Perhaps how that can be handled will be touched upon by Mr. Robinson, Kimberly-Clark, Niagara Falls, N. Y.

THE VALUE OF PHYSICAL EXAMINATIONS IN INDUSTRY

F. A. Robinson, Employment Secretary, Kimberly-Clark Company,
Niagara Falls, N. Y.

The time is at hand when the modern industrial plant must conserve all waste in order to live, and if we let our "human machine" run down are we not overlooking the possibility of a big saving?

The "human machine" costs us more than any mechanical mechanism we have. I have been informed that the wages paid to industrial workers, in the average plant over a period of four years, equals the cost of the plant. Just think of that!—in the short period of four years the average plant pays out to the "human machine" the equivalent in money of the entire building and machinery. We go on painting, repairing and inspecting the building, but our "human machine," which costs us the most, is neglected. After the four years the factory still stands and the machinery keeps on operating for years to come, thus making the cost of the mechanical machine considerably less than the "human machine," but the "human machine" gets the least attention.

I think you will agree with me that the general tendency of industry today is to develop men for tomorrow and that the progressive, alert, keen, ambitious worker of today is the foreman of tomorrow and the executive of the future. But can we develop men to such a degree if

they are not in the best of health? In most cases the answer is "no," and in others, "it is possible but improbable," for a healthy mind lives only in a healthy body.

The only way to know whether this body is in good physical condition is to have a thorough check-up made by a competent physician. If we go into our development program without such health service, we are gambling our money; for we may be spending considerable money and time trying to develop men to the high degree of proficiency at which we have aimed, and suddenly find out that the individual has to leave us for a sanitarium, or for a climate more suitable to his health, a condition which should have been known years ago.

Companies are judged by acts of individuals and individuals by their own acts. Do individuals act normally when the body is not in A-1 physical condition? No, is the answer, and you know it to be true. Then it is to the advantage of both company and employee to have medical service.

Build Leadership in Men With Healthy Bodies

You will grant me, I am sure, that the best promotion policy is to fill all vacancies from within the organization, whenever possible, but if a man is ailing, or slow, or not steady, due to physical trouble, he will not qualify; and here again medical service would have eliminated him in the first place from employment, or helped him to correct his trouble and thus made him a desirable candidate for promotion.

If you desire leadership tomorrow, you must build it today in men of healthy bodies. When a man is ailing in any way his mind is not on his work; it is divided between the two.

It is only fair to industry in these days of liberal compensation laws to know what an employee's physical condition is before he is given work. I have hired men who appeared robust and looked every bit the men for the job, yet the doctor found them to be afflicted with "T. B," "high blood pressure," "heart trouble," and other defects that disqualified them. These are cases where the company and our Mutual Benefit Association were saved the taking of an unjust chance.

I can quote you one case where a man upon entering our employ had defective sight in one eye. He was later injured by receiving a blow on the forehead just over the eye and he later claimed defective eyesight as a result of this blow. His doctor found defective sight and stated that it could have resulted from such a blow, but we were able to prove through the record of his examination at entering our employ that the defective sight was present at that time and the case was dismissed, with a saving to the company of about \$600. I could quote a number of similar cases, as can anyone having to deal with compensation cases where there is physical examination upon entering the employ of the company, where the company has been saved a considerable sum of money.

The employee benefits by such medical service also. Whenever we

make an examination the doctor gives the employee, or prospective employee, a card stating thereon his ailments and advising him to consult his own physician, or a specialist, as the case may be. Many of our employees have used this service to their advantage by having their defects corrected. As you know, good eyesight is a necessity in the paper industry to distinguish the various colors, etc., and a color-blind man, or one with poor eyesight, would soon get the company in bad as well as himself and thus retard his promotion.

Much emphasis has been placed in the past upon safeguarding all hazardous machinery, equipment and conditions. The importance of this factor in accident prevention can not be overestimated. But let us bear in mind that when a plant has been 100 per cent guarded we have only insured against the occurrence of 10 per cent of the preventable accidents. We are not safety boosters when we put men to work with any ailment that might be the means of causing an accident. It is not just to the man or the company, and the only way we are going to find these defects is through physical examinations. I do not say that we should never employ people who are not 100 per cent physically fit; but I do say that if his trouble can be corrected and he is willing to have it corrected, then he should be given a chance.

It might be well, here, to consider some of the objectives of physical examinations, which are:

Six Objectives of Physical Examination

1. To ascertain the exact physical condition of employees at time of hiring.
2. To prevent contagious diseases from getting into the factory and being spread among the present force.
3. To place workers in jobs for which they are physically fitted.
4. To prevent workers in poor physical condition from entering the factory, where they would be a danger to themselves, others, and property.
5. To use the information learned through the examination for future follow-up to better his physical condition and make better material for promotion.
6. To prevent workers being transferred to jobs for which they are not physically fitted.

A close study of these six objectives will convince you that physical examinations at entry and periodical re-examinations are of mutual benefit to employee and employer alike.

At the Niagara Falls factory of the Kimberly-Clark Co., we have such examinations and we do not reject every prospective employee because of some minor ailment. Our medical examiner classes them as follows:

"A"—Those physically fitted for any employment.

"B"—Those fitted for any employment, but who have minor defects.

"C"—Those having more important physical defects which would permit them to work in only certain occupations.

"D"—Those physically unfit for any employment.

To get the best results from such service the employee should have just as much privacy as he would have should he go to the doctor's office. The service department should follow up all employees hired with a view of having their physical defects corrected. In our particular case any employee under 50 years of age may become a member of our Mutual Benefit Association, which costs the employee a very small premium in proportion to the wide scope of the policy; and after a six months membership a number of ailments can be corrected, for the cost of which the association will stand from 50 per cent to 90 per cent. The employees appreciate this and make use of it.

Statistics Gathered from the Physical Examinations

Our examination goes into the applicant's past physical condition relative to the diseases he may have had. This information, we find, is of great help to our nurse in keeping close watch on the employees and preventing any recurrence, if possible, while in our employ.

In 1925 we examined only female help, and out of a total of 288 examinations 16 were rejected, or a total of 5.6 per cent. Exactly half of these rejections were conditional, meaning that any time they had their defects corrected they would be employed. The other half were permanent rejections.

In 1926 we examined both male and female applicants. Of the total we found we had 6.3 per cent rejections. Out of the female applicants we had 4.2 per cent rejections and 7 per cent rejections out of the male applicants. One per cent of the total are temporary rejections, leaving a total of 5.3 per cent permanent rejections. It is interesting to note that we had a smaller percentage of rejections among female applicants than we did the male. Further, we found that the average number of defects per man was 2.4 per cent while for the girls it was 2 per cent, which indicates that the female help is in better physical condition than the male. In this connection I might say that we are more strict in our female examinations than we are in the male because of the product they are working on.

We also find that the new employees accepted are in better health than the old employees. In other words, we are building up our organization on a better physical basis. We also find that the female help is more easily sold on the idea of correcting their physical defects.

In 1925 we examined 273 girls and found 119 in "A" class, this being a larger number than usual; but we account for this because of the fact that we had more applicants to choose from at the time of starting up the factory than we have had since. We found 209 defects out of a total of 273 examinations. Through careful check-up by our nurses we succeeded in getting 133 corrections, or 64 per cent of the total defects corrected, which probably put about 100 others in "A" class.

It is interesting to note that out of the total number of examinations, these were the outstanding defects:

35.7 per cent had nose trouble.
93 per cent had teeth trouble.
16 per cent had throat trouble.
12 per cent had skin trouble.
18 per cent had right eye trouble.
16 per cent had left eye trouble.
14 per cent had trouble with arches.

Out of total applicants accepted in 1926, 27 per cent were in "A" class, 67 per cent in "B" class, and 6 per cent in "C" class.

Re-examinations should be made, but just how often depends on the class of workers and the class of industry, as there are factories that have poorer health conditions than others and, naturally, re-examinations should be made more often.

Of course, as it is with safety, production, or any other program, the success of it depends on the management. If they are thoroughly sold it will go over. If they are not, it will not go over.

Health Service Cost is Very Moderate

Health service, generally called medical service in industrial plants, costs employers \$5.14 per employee a year, according to a National Industrial Conference Board survey of 501 plants employing more than a million workers. The report points out that the significant feature of this figure is that it is greater than the annual expenditure of many individuals for medical care and shows that industrial health service is thorough and efficient and, therefore, profitable to all concerned. Public health service is supported by taxation, and so is paid for by those who live under it. Industrial health service is not a tax on the workers whom it benefits. In theory it is a tax on the consumer of the goods produced; since it is a production cost, but in practice it is not even that. As a matter of fact, it pays for itself. Large as the sum of \$5.14 per individual worker may appear, it is quite apparent that an extremely small increase in average worker efficiency would balance the account.

The average book on employment gives the cost of turnover as from \$50 per person up. If we can save one employee to the company we have off-set the cost of medical attention for approximately 10 employees, or entrance examinations only, of 25 people. (Using the National Industrial Conference Board figures.)

The cost of the examinations generally run from \$1 to \$2, depending upon the completeness of the examination and the time consumed in making it.

One of the bulletins of the United States Public Health Service stated that the plant with medical service had an 18 per cent better attendance record than those plants without it, due to less sickness.

There is one big point to take into consideration in selling this service to the management, and that is this: By looking around us we will find plants that have had medical service in the way of entrance examinations alone, or more completely for a number of years, and others just going into this field of work, and what is happening? Just this, the plant

without such service is getting the physically unfit and suffering from it, either consciously or unconsciously, and is not keeping that costly human machine up to standard; while the plant with the service takes the "cream" and builds up its force to the point where production costs them less. In these days of high competition can we afford to be without such service?

For further study on this subject, I will refer you to:

"Medical Care of Industrial Workers," by "National Industrial Conference Board."

"American Management Association's Bulletin No. 19" on "A Manual of Health Supervision," by Dr. R. S. Quinby, of The Hood Rubber Company.

"Health Service in Industry," by Clark.

I must also say I have been very pleased with the attitude shown by some of the older employees who have come back to work recently after operations, as a result of our follow-up work; and their physical condition is certainly improved.

I might say in closing that if you haven't gotten hold of the Industrial Conference Board's report of survey, and you are interested in this subject, you had better get it, because it is a mighty interesting book. The report is complete. I have a few other references here, one of which is the American Association Bulletin Number 19, by Doctor R. S. Quimby of the Hood Rubber Company.

If there are questions I will try to answer them.

Medical Examination with Old Employees Optional

J. R. LESLIE (Lincoln Pulp & Paper Co., Merritton, Ontario): Mr. Robinson, when you first started the medical examination in your plant, did you make it compulsory that your employees take it?

MR. ROBINSON: No, we made it optional.

MR. LESLIE: What about new employees?

MR. ROBINSON: In that case it is compulsory. We don't want them unless they pass it. We are having less rejections now than we had when we started, because some of the fellows who are coming to work now know we have this examination and if they have defects which will eliminate them they don't come.

MR. LESLIE: What was the general attitude of old employees toward the medical examination?

MR. ROBINSON: It was like anything else you start in your plant, it was about fifty-fifty; fifty for and fifty against. But you have to get out and sell it. It will be easier from now on to get the older employees into it because of the follow-up work we have done. The men who have come back from the hospital are so pleased that they are selling agents.

MR. COSTIGANE: Suppose one of your older employees submits to this examination and something is found wrong with him, what do you do?

MR. ROBINSON: He goes under medical care, but if his weakness can not be corrected the man may enter a long period of disability.

MR. COSTIGANE: Who takes care of him?

MR. ROBINSON: We do. Of course, we are more lenient with our old employees than anyone else, but they have all had that chance of coming into our Mutual Benefit Association, which takes care of them, to a certain extent, even to the operating expenses.

MR. COSTIGANE: If they should go to a doctor or hospital and be operated upon and die, who would be responsible?

MR. ROBINSON: I don't know why we are any more responsible for that death than they would be themselves.

MR. COSTIGANE: In the event of a man dying under an anaesthetic that was practically encouraged by his employer, would the employer be responsible for that death, and would he compensate the wife and family?

MR. ROBINSON: No, I don't think so. Whether they go for that operation depends upon the advice the doctor gives them. What that advice would be depends upon the doctor. Mr. Hoyman, can you answer that better than I can?

Clearing the Employee's Mind of Suspicion

M. G. HOYMAN (Kimberly-Clark Co., Neenah, Wis.): One thing we did before starting the physical examinations was to guarantee that it would not interfere with their jobs or their chances with the company. We simply offer them the opportunity, and whether they take advantage of what they find out, is purely optional with them.

MR. COSTIGANE: In the event of a death under an anaesthetic what is the position of the wife and family?

MR. HOYMAN: I don't see the point. To begin with, a man has some disabling ailment or he wouldn't do this.

MR. COSTIGANE: We are assuming that something has been discovered in the medical examination.

MR. HOYMAN: I can't see where anyone would be responsible but himself. If he decides to take advantage of any knowledge gained that way and it should prove unsatisfactory or fatal (which is a long chance under modern surgery), I can't see why the employer would be responsible.

MR. COSTIGANE: Yes, but if due to some inherent weakness he passes out under an anaesthetic, should the man be wholly penalized and his wife and family have no provision to take care of their needs?

KENNETH L. FAIST (Champion Coated Paper Co., Hamilton, Ohio): When we make a recommendation that a man have an operation performed, we recommend that he go and take that up with his own family physician. Therefore, two physicians make the recommendation and one of them is his own physician.

W. A. GLEASON (Hammermill Paper Co., Erie, Pa.): Our plan is not to suggest any doctor to do the work. They can have any doctor they wish. Sometimes they will ask our medical advisor who would be a good man to do it, and he will name over two or three specialists. We have to be very careful not to commit ourselves or the doctor who is handling it, and he will take care not to commit himself. I think Mr. Costigane's question has been very ably taken care of by the position taken by the insurance companies. Some of the big companies offer a

physical examination with the insurance, and examine every two, three or five years and submit the finding of this examination to you, with advice of an operation or of other means of correction. If you pass out during the operation, they lose.

CHAIRMAN ROSEBUSH: Mr. Robinson has brought up some very fine points in his paper and it is open for further discussion.

D. T. MEANY (International Paper Co., New York, N. Y.): I would like to ask Mr. Robinson a question in regard to the Mutual Benefit Association. When you have a man in service who is over 50 years old and he is eligible for insurance after a certain period of employment, I understand from your paper that you don't take him in your group insurance.

MR. ROBINSON: In the case of men over that age in the employ of the company who have not taken the insurance, that is their hard luck. That amendment to the clause was made later.

D. D. THIRKIELD (The Sorg-Oglesby-Smith Paper Co., Middletown, Ohio): I would like to ask if a plant employing 375 employees would justify the employment of a full-time doctor. Can anybody give me an idea as to that?

The Doctor on Duty Four Hours Each Day

MR. GLEASON: At the start of our medical examination we had a full-time doctor who was an older man, sort of on the downward grade. We changed and are now employing a young doctor, a graduate in 1920, for a period of four hours a day, two in the morning and two in the afternoon, 9 to 11, and 3 to 5. That gives him a chance to maintain his own office. We have 1,250 employees and it works out very well.

MR. THIRKIELD: Do you have a full-time nurse?

MR. GLEASON: Yes.

MR. THIRKIELD: Does the doctor come to your office and spend the four hours?

MR. GLEASON: Yes, unless we send him out to make visits at homes, which is never more than once or twice a week. If a man is injured and is not able to come, of course, we send him out.

MR. THIRKIELD: That is the question, how are we going to handle a medical examination? We have never done anything along that line, but we are planning such an activity.

MR. GLEASON: Our doctor makes all the examinations of new employees; we don't require the old employees to undergo that examination. We have had this examination for a period of four or five years and we find the old employees gradually drift in one at a time with some ailment, and at that time the doctor uses very good judgment as to whether they wish to submit to an examination or not.

MR. THIRKIELD: What do you do in case of an accident if the doctor is not at the mill?

MR. GLEASON: If it can not be taken care of by the nurse we send him to the doctor's office. We practically have control of the doctor except from hours 11 to 12 in the morning. We govern his office hours from

3 to 5 at the plant and in the evening any cases are sent to the office. Those, of course, are paid for at the regular medical rates. He is only subject to duty from 9 to 11 and from 3 to 5. We pay for any office calls or anyone sent to his office outside of those hours.

MR. ROBINSON: My information is that when an employee is injured he is obliged to go to the doctor you specify. He can't have his own doctor.

MR. GLEASON: Under the compensation law in Pennsylvania we regulate the doctor. We have other consulting surgeons; we don't require that he submit to ours if it is a surgical case. We have a surgeon whom we have had for about two years and outside of those two doctors we have sent a man to Cleveland in one case, but you have to use judgment. We don't make it arbitrary. He may go to his own physician, but, of course, in that case he must pay his own bill.

J. E. COLLINS (Mead Pulp & Paper Co., Chillicothe, Ohio): Would it be feasible for mills employing the same number of men to get together and hire a doctor for full time?

Employment of a Doctor Full Time Not Advised

MR. GLEASON: We found it wasn't successful, for when you employ a doctor full time he has no other incentive. He doesn't have any outside practice, and the employees sometimes think they are not getting first class medical attention; whereas, if you get a practicing physician from the town, even if you employ him only part time, it has a much better effect.

H. C. SACKETT (Alton Box Board & Paper Co., Alton, Ill.): Our plant, which employs something over 200 men, and the steel plant across the road from us which employs approximately 700 men, employ the same doctor and he takes care of his outside practice just the same, and in a case of an employee being severely injured we have never had any difficulty in getting the doctor down to the plant. I might add that the leading physicians do not care to concentrate on just a few plants, because they feel that they are losing their identity with the public.

L. J. BARRETT (Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.): Mr. Robinson, what success have you had with your physical examinations, so far as eliminating hernias?

MR. ROBINSON: I should say about three and one-half per cent of rejections are on account of hernia. Those rejections will be less because men who have those ailments don't come to us.

MR. BARRETT: In case of hernia, within a short time some of them get ruptured. What do you do in a case like that?

MR. ROBINSON: We don't take them.

MR. BARRETT: How do you get around it? We don't like to take the responsibility, we want to see our men through. Hernia comes on during a very light task. It is pretty hard to determine who shall take the responsibility of that injury. How can we work that out?

MR. ROBINSON: That is a problem that every one of us has where the compensation laws are as lenient as in New York state. I think it.

requires a very serious thought on the part of the plant that has that question to deal with, to take into consideration the compensation laws. Other plants could answer that question for you better than I can.

MR. BARRETT: It should be interesting to the members from the state of Wisconsin. What are we going to do about it?

MR. SACKETT: I think that the Illinois Compensation Law provides that if hernia comes on a man while he is in the employ of a company, the company must stand behind and pay the medical bill and put the man on his feet, because they claim it is an aggravated condition due to the hazard of his employment.

MR. PEACOCK: The disadvantage under which employers labor in New York was called to the attention of the Section last July by Mr. Samuel Pruyn, of Finch, Pruyn & Co. He stated that all hernias, whether there has been trouble from them before or not, are considered accidents arising out of employment. To a Wisconsin man this is curious from both standpoints, law and medicine. In our state the burden of proof rests on the man.

MR. GLEASON: I would say in Pennsylvania the burden of proof is on the employer, that is the compensation law there. There is nothing we can do. If he develops hernia we have him taken care of. If he doesn't want it, we correct the condition in another manner.

The Question of Hernia in the "Meade Case"

MR. PEACOCK: The situation in Wisconsin is embodied in what is known as the "Meade case," with a decision by the Supreme court of the state. George Meade had appealed from an order of the Industrial Commission dismissing his application for compensation for an injury which he claimed resulted in a hernia. The accident was a fall. Meade took the case to the circuit court, where the Commission was reversed. In the Supreme Court the case was dismissed on grounds that now form the policy of the Commission regarding hernias. The man must show (1) that the hernia was produced by accident; (2) that the accident was such as could produce a hernia; (3) that the hernia appeared immediately after the accident; (4) that it was followed by pain immediately disabling the applicant; and (5) that the applicant gave immediate notice of the injury to his employer.

In our mill I had an excellent man lose out before the Commission, although I took the stand in his behalf fully convinced that he was ruptured on the job. Insurance companies in our state deny responsibility for hernias as a matter of form.

R. S. TURNER (West Virginia Pulp & Paper Co., Mechanicsville, N. Y.): In New York a man can have hernia and if, during the course of his employment, he aggravates the hernia, the employer or the insurance carrier is responsible. I heard a case last Thursday in which the insurance carrier in this particular case was the State Fund, and they argued through the employer that the man had the hernia previous to his taking employment. It was a brick concern and the referee and the insurance carrier both held that the nature of the work the man was doing would not produce or aggravate an existing hernia; and the referee held that a

man might do a job one time and not aggravate or create a hernia, but that he might do it another time and twist himself in a different way or make some movement which would cause the abdominal rings to be more weakened and cause a hernia, and the insurance carrier had to pay.

MR. PEACOCK: This is all very interesting, showing the state of mind in the Commissions in the states. In Wisconsin the Industrial Commission assumes from common knowledge that inguinal hernia is rarely caused by accident, but is generally the result of inherited or acquired weakness. We are given to understand that this is the position now being taken by the medical profession and we are told by our insurance carriers that hernia can not be caused by any sort of accident or strain. We are informed that a man can not make an effort severe enough to produce a hernia.

W. L. MEAD (Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.): In this same connection not long ago I wrote the Industrial Commission asking for any possible information on hernia, and in addition to the case which Mr. Peacock just gave of the instantaneous hernia, they also said that hernia can be an occupational disease. I think it was in 1919 that there was added to our Industrial Commission Accident Laws the industrial disease element, and that if a man was working in such work that would cause hernia even if not caused at the immediate time, and he didn't go through the intense pain which would come from sudden hernia, still it would be considered industrial accident, which wipes off the map the theory that it has to be sudden or caused by a sudden lifting or jolt.

I wish we knew more about this hernia, gentlemen. I think that medical authorities are divided. Some of them say that hernia has to be inherited or a congenital proposition and others say that it is caused by heavy lifting or a heavy jolt of some sort.

I think many on the Commission say the industry shall stand part of the responsibility, and I am not sure how many. I think the industry stands the hospital bill, and the industry does not pay compensation for the days the man is off.

CHAIRMAN ROSEBUSH: I would like to emphasize one point Mr. Robinson made in his paper regarding the Mutual Benefit Association, which is intended to cover a man's accident or sickness while off duty. I think that is a fine thing and a coming thing, and I can't see much excuse on the part of an employee to whom that is offered, for a come-back on the company if he has the opportunity, in addition to receiving the state compensation which protects him, to take protection in a Mutual Benefit Association.

It is about time for us to close and I am sure the committee would welcome suggestions from you members during the remaining session for points on future programs. I will now turn the meeting over to Mr. Peacock.

(Chairman Peacock took the chair.)

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The second session of the Paper and Pulp Section of the National Safety Council convened at 9:30 o'clock at the Book-Cadillac Hotel, Detroit, Michigan, Mr. W. J. Peacock, head, Department of Personnel, Northern Paper Mills, Green Bay, Wisconsin, presiding.

CHAIRMAN PEACOCK: The Round Table discussion was put first on the program this morning. I think we will reserve the topic of frequency and severity until certain gentlemen come in who are peculiarly interested in that subject and who have some interesting information on it; and we will go to the topic, (b) Practice versus Theory in Safety Work.

I gave you yesterday what was in the mind of the program chairman regarding this topic. He is asking the question, "What Is the Goal of Our Safety Work?"

Let me ask this question first: "Is it a practical hope that we may some day achieve a condition of no accidents?"

EDWARD J. GAYNOR (Scott Paper Co., Chester, Pa.): I feel that hope for no accidents would be a fine thing, but some accidents seem unavoidable and it will be years and years before we strike the acme of perfection. We shall always have men who are not acquainted with the job and men who are themselves hazards. I would like to go on record and I feel that it is good to hitch your wagon to a star, but we can't hope to attain a perfect record. The nearest we can come is some percentage of imperfection.

CHAIRMAN PEACOCK: Mr. Larson, what do the Marinette and Menominee Paper Mills think?

L. LARSON (Marinette and Menominee Paper Company, Marinette, Wisconsin). As long as we have human nature to deal with we can expect accidents, although that may not be exactly the right attitude to take. Up in our mill we have been a little fortunate and we are hitting the ball just as hard as we possibly can to reduce the accidents by keeping the men informed. The men in the mill are informed what our experience is from month to month and from year to year. We seem to be getting somewhere; we are aiming to reduce and we know we shouldn't have as many accidents as we are now having.

I. G. WOOD (Indemnity Insurance Company of North America): I might say just a word about the American Railway Association. They have established a goal of 30 per cent reduction in accidents by 1930. They haven't established a goal of "no accidents" because they want to establish a practical and workable goal. They say, "We will get five per cent each year," and that is their goal, and if they do that they will certainly have done well, but to believe they can get no accidents is to establish no goal at all.

H. T. BOND (Celotex Company, Marreno, La.): We are trying for longer and longer periods between accidents. I read in the *National Safety News* and journals of other mills that are setting up "no accident" records for increasing lengths of time, and when we accomplished one month without an accident we thought we were doing something. If we accomplish two months we are doing better. We have accomplished four and one-half months as our best record. I think the goal is longer and longer periods between accidents until we get accidents really very scarce.

CHAIRMAN PEACOCK: What does International think about this topic?

DANIEL T. MEANY (International Paper Company, New York City, N. Y.): I was just thinking that it is much better to develop a careful workman than to win the goal of "no accidents." We have one mill that is our oldest division where we employ about 800 to 900 men, and during the past year, so far, we have only had two or three lost time accidents there. That is due first to the manager's interest in safety, to the foremen and the low labor turnover there.

In some of our other mills our accident experience is not so good, and to some extent it is due to the high labor turnover in those mills. If we can get a man when he comes to work to take an interest, teach him safety from the beginning, get him interested in his work, and show him there is an object in view for him in promotion, then we can develop careful men, and that, in my judgment, is the better goal to look for.

Perfection in Safety Should Be Striven For

NAT T. BARTLETT (Hollingsworth & Vose Company, East Walpole, Mass.): We take our separate departments and compare them month by month with the records for the previous month and year and determine in each department the reduction. When you have a "no accident" campaign, an accident discourages everybody.

CHAIRMAN PEACOCK: Kimberly-Clark, what is your goal?

M. G. HOYMAN (Kimberly-Clark Company, Neenah, Wis.): In any endeavor your goal is perfection. Why shouldn't it be in safety? We can strive for it and unless we endeavor to act in that direction we will never reach perfection. In all the ramifications of safety there are many ways to work toward that end. Various contests have been mentioned. There are some objections to these contests. Objectionable features will in time eliminate themselves, but I think we should strive for perfection.

CHAIRMAN PEACOCK: How are you gentlemen who are presenting goals other than "no accident," going to sloganize the thing? How do you keep up the enthusiasm of your men?

L. O. BONNER (Mead Pulp & Paper Company, Chillicothe, Ohio): Give each department head his record for last year in the form of a chart of the total accidents during the year. Get him to keep under that line this year. If you do that I think it is the crux of the whole thing.

MR. BARTLETT: When I came here last year I was a new fellow at this safety work. I am a traffic manager and this safety question is a side

line. I am going to tell you something that has happened in our mill. Last year I had 71 lost time accidents and 570 cases of first aid. At the East Walpole mill, up until the first day of October, I only had 31 accidents. You may say that is still an awful lot of lost time accidents in 280 days, but we cut last year's record in half. My aim is to bring that down every year until we go along without a lost time accident for a whole year.

MR. BONNER: I would like to ask Mr. Bartlett what he does if he has an accident on the last day of the month?

MR. BARTLETT: I have had two or three months without a lost time accident. When I have a lost time accident I write a letter to my safety committee at the mill and they post it up. I say, "Here we have had an accident; let's go to it a little bit harder, see what caused this accident and prevent the next one." I look at it in this way: if you have \$100 and find that \$10 of that amount is counterfeit, you think a lot more of the \$90 that is left. I cherish those days more that are left without accident.

Each Year Should Cut Down the Accidents

CHAIRMAN PEACOCK: You saw the picture last year of last year's prize winner, Mr. Rosebush. Mr. Rosebush is here. What is your goal, Franz?

MR. ROSEBUSH: I am frank to say that I have a dream of no accidents. In 1924 we had 363 accidents. In 1923 we had a larger accident average. In 1924 it was cut to 44. In 1925 it was 39. This year we have had 19. I am going to be disappointed if next year we don't cut 50 per cent of those accidents.

I remember in December, 1921, we tried to go a week without an accident. We felt pretty proud because we did go the week without an accident and later we tried to go a month without an accident and then we tried to go two months.

At Port Edwards mill last year we went five months without any lost time accidents and I hope the time is coming when an accident in our mills will be regarded as a calamity. I can't see any objection to making your goal zero and having no accidents at all.

CHAIRMAN PEACOCK: I will call upon Mr. Augustus.

ERNEST AUGUSTUS (Mead Pulp & Paper Co., Chillicothe, Ohio): Our goal since we started in on organized safety work two years ago has been no accidents. Each month it has been our ambition to go that month without an accident. As a result during the past 23 months we have had 10 of them without any accidents. We have a large sign out in front of the plant showing the number of days we have gone and the number of accidents. I think 730 days with 20 accidents is our showing at the present time, but our goal is to go without any accidents.

CHAIRMAN PEACOCK: Does not the phrase, "no carelessness" sloganize the thing and doesn't it put into the minds of your men that safety measures are entirely practical? "No Carelessness" eventually means "No Accidents."

Let us now take up "Frequency, or Severity?" I am going to call upon Mr. Costigane, to open the discussion for us.

A. P. COSTIGANE (Ontario Pulp & Paper Maker's Safety Division, Toronto, Ontario, Canada): The question you have put is, frequency, versus Severity. Before saying anything at all on this subject I would like first of all to make the statement that any remarks that I make are applicable only to conditions as we have them in Ontario.

The cost of accidents from our point of view is a very vital one because in our province insurance companies have no standing of any kind. The whole accident prevention movement in Ontario is under a government commission. The government commission at the beginning of the year levied what is called a provisional assessment on all the employers in that group and of the actual industries in Ontario divided up into different groups, some groups embracing quite a number of smaller industries.

The pulp and paper industry, as you gentlemen may know, is now becoming one of the largest in Canada and is expanding daily so that now it is large enough to take up a group by itself.

View the Accident Costs Critically

All accident expenses, all accident costs, both for hospital, disability and for nursing expenses are paid direct by the board, so that you can easily see there is a direct and close connection between a government commission and the industry itself. I think you will also see that when the government is assessing direct, one of the chief aims of industry is to view accident prevention not only from the humanitarian side, but that compensation loss must be brought down. In order to do that and to emphasize the necessity for accident prevention, one must show the cost, and in showing the cost give reasons and methods whereby that cost can be brought down and controlled.

From that point of view, I am convinced that as far as our work is concerned we should concentrate on severity and study frequency. I could say something in favor of frequency but it would be entirely from an academic point of view. From a practical point of view in connection with the work that I am engaged in I am convinced after a long period of experience that severity is the goal we should shoot at.

CHAIRMAN PEACOCK: I thank you, Mr. Costigane. What we mean by frequency is the number of accidents. What we mean by severity is the number of days lost in connection with accidents. The subject is open for discussion.

MR. AUGUSTUS: I don't want to start a long argument, but isn't the thing we are shooting at as safety men primarily the elimination of accidents? A man engaged in safety work has one aim, morning, noon and night, the prevention of accidents. He doesn't say, "Now, boys, if you are going to get hurt, don't get hurt very badly"; he says, "Don't get hurt." Therefore, I can't see why frequency isn't the thing we should look at more than severity. We don't want to forget severity

but if we look after frequency properly and do our jobs in the way we should, severity is going to take care of itself.

Personally, if I were in a contest and my mill had a lot of accidents with only two or three days lost for each one of them, and the other fellow had four or five accidents and two or three men killed, I would think he was a darned sight better safety man than I.

It is a matter of chance whether a man is seriously injured, whether it is only a minor injury or whether he is injured at all. You can think of any number of serious cases that would result from a minor injury. Something may hit a man and kill him, it may mash his toe or it may miss him by two inches.

CHAIRMAN PEACOCK: Mr. Burns is promoting this subject as much as anybody. Frequency or severity, Mr. Burns?

An Element of So-Called Luck in "Severity"

MR. BURNS: When I originally wrote to Mr. Peacock on Frequency versus Severity it wasn't with any thought of starting a discussion. That idea originated in the promulgation of national statistics, particularly in the sectional reports that we get out each year.

Mr. Augustus feels the same way that I do, but there is an element of so-called luck in severity. The breadth of a hand may mark the difference between a fatal accident and a minor accident. Possibly somebody else has brought this out, but many times the question comes up in our office. Somebody says, "Well, after a man is hurt and leaves the plant it is entirely beyond our control. It is up to the doctor then. The safety engineer has no control thereafter. But you are rating my mill on the basis of the length of time the patient is in the doctor's charge. If it is frequency, it is within my control. If it is severity, it is not within my control."

CHAIRMAN PEACOCK: I am going to call on Mr. White. I am sure he also has some very clear ideas on this subject of severity and frequency.

ALEXANDER R. WHITE (Chief Sanitary Inspector, Province of Ontario, Toronto, Canada): Mr. Costigane expressed my ideas exactly in his remarks this morning. You have mills operating in settled territory where you have well ordered arrangements, hospitals, doctors and so forth, and little or no labor turnover. Because of that it is possible for you to deal with this question from the standpoint of frequency. But if these things are not factors, if you have a large labor turnover, if you are living in a piece of territory that is not yet settled, you have no hospital and very few doctors, then to study frequency and frequency alone will mean in a very short time the boss will be out of patience with you and you will be out of a job.

As you men study this thing it is quite all right to study frequency but for us to spend our time on frequency to the exclusion of severity would be a fatal mistake.

Now everybody knows that the number of accidents you have depends on labor turnover, the number of new men you take into your plant.

If you have 200 new men coming in each month then how do you expect to keep your frequency rate down. But you may have all the control in the world over your severity.

The fact that the case has gone over into the hands of a doctor does not mean you have lost connection with it. It means you have to study a little more about what the doctor does. Our aim is that this doctor shall become hitched up with the company in a new way. He is not merely going to be a man who sits down and says, "We have a patient down here." You want to begin before that. We want the doctor and you people to join hands and form a copartnership so that each of you will play your part and make a prevention agent out of the doctor as well as a curative agent.

Now that may not interest you people; if you went to Oregon in one of the outlying places of that state and you decided to build up a mill there, you would have to be interested in that thing. You go into the woods, you start to build up a community and it will be 10 years before you get a settlement. It is not frequency you are suffering from. It is costs. It is quite conceivable to suppose 30 per cent or 40 per cent of the open wounds will be infected. That is severity. Are you going to leave that to the doctor? You can attend to it just as nicely as the doctor can.

The Problem When Many Employees Are Old

MR. LARSON: We have a situation up in our mill of having a lot of employees that are 60, 65, or even older. They have worked for the company for 30 or 40 years and the company has changed hands two or three times during their employment.

I have this particularly in mind. One man got hurt. I am positive in my own mind that he is able to go back to work but he gets his compensation and he belongs to some benefit society that pays him a weekly amount, I don't know how much. But along with those two incomes he has his home paid for, and we can't get that fellow back on the job. We have gone to the doctors and insisted that they send him back to work but the fellow makes his case so strong and so good to the doctor that the doctor is puzzled. We have had a half dozen cases like that.

The reason we are stressing severity is because the men out in the mill know much better than I do whether that fellow is bluffing or not. The nurse is watching that man, I am watching him, and two or three of the millwrights are watching him. We are trying to catch him in an unguarded moment when he forgets himself and proves to the fellows that he is laying down on the job and that there is nothing the matter with him.

The insurance company charges a premium based upon experience. He is running up our lost time accidents and he is making our experience look bad.

CHAIRMAN PEACOCK: We want to continue just a moment with another very interesting matter. If you gentlemen will look at a chart

showing the general geographic arrangement of the pulp and paper mills of the United States, you will observe how they follow an irregular line down from Maine and across to Minnesota and on southwest, with a few mills away out on the western coast.

This will picture the difficulty of getting all our Section members together. Is there anyone here from the mills of Maine today? We have a dozen members in that state. We have several hundred mills in the northeast, that we only touch when we get far east with our conventions. I suppose the records will show we are today favoring the territory in the vicinity of Detroit.

Promote the Regional Conferences

That brings out something I want to accent to you, namely, the advisability of promoting Regional Conferences. Your object is to get the method and the thrill, if you please, of the National Safety Council into your own mill. How are you going to do that? The mills in this vicinity can send their foremen and their safety men to the convention, but only once in a half dozen years do the men in the extreme northeast have an opportunity of attending the National Safety Congress.

How are we going to afford that opportunity every year? The answer is by means of regional conferences. The setting up of a regional conference means calling in Mr. Burns, of the National Safety Council, and getting together the representatives of allied interests, men who are promoting safety in their various plants, spending a half day or a day and a luncheon talking over the sort of speeches you want, the sort of discussions you want to promote, then turning over printed matters and the building of the program to Mr. Burns. You go out to do the promotion end of it, to work up the attendance. The expense of the thing is very easily met.

At our first regional conference in Green Bay a year ago two dollars and fifty cents per man paid all our expenses. We started in with the idea that we might have as many as 150 present, and we went at the thing eagerly. Within six weeks the interest promoted an attendance of 640. This year we had over 800 present. We had more paper and pulp men present both years than at the National Safety Congress; 200 a year ago at Green Bay, 300 this year at Appleton.

Our members need the conference idea in Pennsylvania, in Ohio, in Maine and in Massachusetts to cover our constituency every year, and it is a simple matter of organization.

MR. BURNS: If there is a local council anywhere in the region they will gladly handle it for you and take care of all the details.

CHAIRMAN PEACOCK: Mr. Rosebush, will you please take the chair. (Mr. Peacock retired and Mr. Rosebush took the chair.)

CHAIRMAN ROSEBUSH: Suppose we call for a report of the Nominating Committee at this time and get that out of the way. Mr. Gleason is chairman.

W. A. GLEASON (Hammermill Paper Company, Erie, Pa.): The Nominating Committee appointed by the present chairman consisting of

Messrs. Hoyman, Phillips and Gleason, submit to you the following officers for the ensuing year.

For chairman, W. J. Peacock, Northern Paper Mills, who is the present chairman. For secretary, Amell Ueberham, Fort Howard Paper Company, who is the present secretary.

A suggestion was made by the officers of the National Safety Council and by our present chairman that we nominate as vice-presidents of the Section, men geographically located who would act as chairmen in their section of the country and handle the affairs of the pulp and paper section in general. We have taken that into consideration and submit to you the following men: M. G. Hoyman, Kimberly-Clark Company, Neenah, Wisconsin; R. S. Turner, West Virginia Pulp & Paper Company, Mechanicsville, New York; James M. Murphy, International Paper Company, Gatineau, Quebec; G. W. Phillips, The Champion Fiber Company, Canton, North Carolina; Nat F. Bartlett, Hollingsworth & Vose Company, Boston, Massachusetts; Ernest Augustus, Mead Paper & Pulp Company, Chillicothe, Ohio; Alvin Record, International Paper Company, Chisholm, Maine, and W. L. Mead, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.

CHAIRMAN ROSEBUSH: Gentlemen, you have heard the recommendation of your Nominating Committee. What will you do with these recommendations? A motion to accept the recommendations with the power of election will be in order. (Mr. John Lundrigan so moved, and the motion was seconded by Kenneth L. Faist. The motion carried unanimously.)

CHAIRMAN ROSEBUSH: The next speaker on our program this morning is Walter A. Gleason of the Hammermill Paper Company, Erie, Pennsylvania.

Mr. Gleason is an old timer in safety work and has been connected with this Section for a good many years. He has been a faithful worker and we are glad he is going to talk to us this morning.

SAFETY AND PLANT MIND

W. A. Gleason, Safety Director, Hammermill Paper Company, Erie, Pa.

In this modern age we hesitate to think that the mind of a plant manager or chief executive is so burdened with problems of financing, manufacturing and marketing that he does not take the time to consider the safety and general well-being of the personnel of his organization. Yet this condition must still exist in the minds of some executives, for one of the common subjects at conventions of this kind is "selling safety to the executive." Factory inspectors for state and insurance companies also tell us that the atmosphere with regard to safety in some plants as compared with others is as different as day and night. When recommendations are made to provide safer conditions in some plants they are frowned upon and complied with only after being deferred as long as possible.

New applicants for employment will sometimes look askance at you when you inquire about the safety conditions and practices in the plants they have just left, as if they never heard of such things. It has often been said that the rank and file of any organization radiates the spirit of its leaders.

If this is so, leaders of industry can not delegate the problems of safety to some individual in the plant, and then make it impossible for him to work these problems out by withdrawing their moral and financial support, without this spirit reaching every person in the organization.

Employees making suggestions which are never carried out, foremen and superintendents receiving no encouragement from the management, will soon recognize the insincerity of the officials and cease to interest themselves in furthering safety.

Most Organizations Earnestly Interested in Safety

I believe, however, that there are few organizations today that are insincere in their efforts to prevent accidents. The history of the safety movement and the results attained during the past 20 or more years have proved that the modern executive is turning his thoughts more and more to the improvement of conditions within his plant, which will tend to provide better and safer conditions for the personnel of his organization.

This was not done from selfish or monetary reasons, although it has been proved in your plant and ours, as well as in some of the other large industries, that safety work actually pays in dollars and cents; but rather because the men who are at the head of these various industries have long ago come to recognize that the personnel of any organization is of far greater importance than its mechanical equipment.

Let us assume then, that "Plant Mind," as created by the officials, holds a priceless value on the human life.

Webster defines the "mind" as "power of remembering, retention in memory, consciousness of thought," and in these I see the reason for accidents occurring. If all of us had minds that functioned 100 per cent perfect, there would be very few accidents. Of course, we can not hope for this, and it remains for us to keep awake that consciousness of thought in our own minds, so that we can act as transmitters and pass the thought to others. This is rather difficult sometimes because in every organization there are many types and conditions of mind.

We see this in the fact that some persons are chosen superintendents and foremen, because their minds function quickly and accurately, and they are able to lead, while others are doing work which requires very little thought.

Among the latter class is the fellow who gets hurt several times during the year, because he fails to realize the conditions he encounters on his job. Then there are others of mature years, whose minds have never developed beyond the stage usually attained by a 16-year-old, and we must be ever alert for new methods of reaching these types of minds

and bringing them to realization that the value of human life can not be measured, but is priceless above every other possession.

Defining "mind" as a transitive verb, Webster gives it as meaning "To remember, to call to mind, to put one in mind of." In the work of preventing accidents this refers directly to the person in charge of safety, the foremen and the superintendents. They have been chosen for their places because they have the power to lead and to remind others of the need of caution, and to encourage them to put their best efforts into the making of the product. Sometimes I feel that a great many accidents occur because the foreman in charge of an operation, whose mind is much clearer as to what is the safe way, fails to consider the minds of the persons who receive his instructions; he takes it for granted that they know the safe way, and this sometimes results in an accident.

The Little Girl Illustrates a Mind Type

By way of illustration, and I hope you will pardon the personal reference, my little girl is just eight years old, and in going to and from school she must cross the main highway between Cleveland and Buffalo. We have cautioned her many times regarding the care she must exercise in crossing this highway, and from checks we have made and what we are told she is mindful of the instructions we have given her. Just recently I noticed her leaving our home (which is just one block away from the highway) and running directly across the street without looking in either direction for traffic. When I called her and asked why she had crossed the street without looking, she replied that I had not cautioned her about this street, but had only told her about the Buffalo road. This illustrates that it is not only necessary for us to call to mind safety practices, but we must be sure that we convey to persons whose minds do not function exactly as ours, the thoughts that we are trying to get across to them.

Repetition, too, is a method we must adopt to impress the mind. A leading advertising agency representative recently told me that one of the best methods of advertising is to repeat constantly the good qualities of a product. The lesson of one safety bulletin may not reach every person, but if various types are posted, each one will make its separate appeal, and will drive its lesson home.

Another type of mind is the one that feels that safety is meant for the other fellow, but it is of no value to him. You see him in the fellow who walks from the other end of the mill to locate you, and tell you there is an unsafe condition which he might have corrected with very little difficulty, or who will tell you that the other fellow is doing something carelessly, and the very next day he does something equally as hazardous.

Another example is the new man whose mind has not had time to grasp all the details and conditions of his work, and is injured before his mind has become accustomed to the existing hazards. Still another type is the man whose mind has never been trained in the simple rudiments of safety, who was in industry before its teachings were taken

up in the schools. The teaching of the fundamental principles of safety in the schools will, I believe, insure us a class of workers in future years who will be less liable to be injured in the first few months in industry. Every safety man whenever possible should devote some of his time to the furthering of this educational work. Again there is the man with a troubled mind who has always been a careful workman, and free from accidents on the job, but through sickness of himself or family, finances or other cause, brings his cares to work with him, and in this state of mind contributes to accident causes.

These and many other types of minds lend themselves to the creation of plant hazards, and it becomes necessary for us to devise ways of eliminating them so far as is humanly possible.

What, then is the best means of bringing to the attention of employees these conditions which are to be guarded against, and get them to realize that their most important duty is the consideration and protection of human life? I believe it is by **DEVELOPING PLANT MIND**.

This is being accomplished by different companies in various ways. The manner in which it is carried on is inconsequential, providing the results are obtained.

I believe safety guards are the first and most important step in developing plant mind, as they are a silent testimonial to the value placed on human life by the officials. When guards are being considered, we have many times strengthened good will among our employees, and at the same time insured the use of the guards, by getting their ideas and suggestions for construction and placement. They are just like you and me—they like to be consulted about the things which are so closely connected with their daily life.

Workmen's Safety Committees Furnish Ideas

Workmen's safety committees, when they function properly, provide many new safety ideas, and represent the point of view of the employees on conditions and safe practices. These committees are very often the cure for carelessness among employees and tend to increase their good will.

Bulletin boards, motion pictures and foreman's safety school lectures afford educational facilities for correcting unsafe conditions and practices and help to acquire right thinking or training of the mind, so necessary in the prevention of accidents.

I very recently learned of one industry that has established a bulletin board reading service where one page of a book is published every day. Continuing this idea with the publishing of the life history of Gene Tunney, Roger Hornsby and other recent heroes of the sport world might be the means of attracting persons to the bulletin boards who now take no interest in them.

Safety contests and first aid meets among departments and different mills provide the means to stimulate keen rivalry, so necessary in setting up long "no accident" records.

Athletic contests between mills or among departments will create

team interest which permeates the whole organization and keeps your plant mind in a very happy state.

Picnics and community safety rallies, wherein the affairs of the town or district are discussed, provide excellent means of entertainment and keen interest in striving for certain goals.

Furnishing employees with safety calendars and educational pay envelope material opens the way to have this taken into their homes where it brings its message to the members of their families.

Employees magazines or house organs, giving information on departmental accidents, progress of safety contests among paper mills, safety services furnished by the National Safety Council, pictures of employees establishing long safety records, general news items pertaining to employees, etc., tend to keep the safety message alive in the mind.

Provide a Suggestion System for the Employee

Suggestion systems so that employees may express their ideas regarding improvements in manufacturing processes and be awarded in proportion to the savings effected by them, is a good way to develop plant mind and keep employees thinking. Very often a suggestion for the improvement in manufacture will correct a condition which has been a troublesome subject to you and contributed to your causes of accidents.

Paid vacations for workers, in order that they may spend some time in recreation with their families without sacrificing wages which they may not be able to afford, encourages them to travel and see other parts of the country and how their fellowmen are living. It will give them a bigger and broader view of life and they will return to work in a happier and more contented frame of mind.

Provide group insurance to relieve the mind of the worries incident to sickness or accident, bringing with it loss of wages and discontented and worried minds.

Establish pension plans to relieve the worries of approaching old age for employees who have been unable to set aside sufficient funds to insure a contented existence.

Arrange for transfers to different departments of employees who through day or night work are prevented from extending their education or maintaining happy minds under the present working hours or home conditions.

Arrange consultations in the first aid or medical department for employees threatened with ill health. In some cases it may be possible to relieve financial difficulties arising from unexpected operations, dentist bills, etc., by establishing credit service which will allow payments to extend over a period of time.

Malingering among employees is reduced to a minimum and "no accident" records established by the discussion of conditions which are causing a troubled mind. In many cases what seems like mountains to the individual may prove to be mole hills when he discusses them with others.

Join with them in the discussion of their hobbies. You can get a better mental picture of them and their problems in doing so.

Finally, have employees share in the management of all of the activities in which they participate. Sometimes I feel that we make things too easy for them, and what is not worth trying for is not worth having. This, then, is the keynote, I believe, in building up plant mind.

It is to establish individual thinking as well as organized plant thinking (team work, if you please), so that employees will do their work in such a cheerful and happy manner that they will forget the cares of home and worries of the job. Plants having reputations of this kind bring favorable comment and attract the right type of employees.

If we, as plant safety leaders, are able to maintain employees' interest, instill in them the need of their cooperation, and bring to them and their families the higher ideals of life, we will make this world a better and safer place to live. Then will we truly have established a plant mind bringing contentment and safety.

Safety has been described as just plain, every day, honest to goodness common sense, and if we are able to couple plant contentment with this we never will have to fear that our employees will believe in any of the existing "isms" or any others that may hereafter arise.

A Management That is Thoroughly Sold on Safety

CHAIRMAN ROSEBUSH: That was a splendid paper. Mr. Gleason has put before you a number of points worthy of discussion and the opportunity is now open for you to discuss the subject if you care to do so.

I would like to introduce to you Mr. Walter Mead. I know the Consolidated mills have been doing extensive work along practical safety lines for a number of years and Mr. Mead is the head of the Department of Personnel in that company.

WALTER L. MEAD (Consolidated Water Power & Paper Company, Wisconsin Rapids, Wisconsin): I have heard a great deal about selling safety to the management and I have wondered what that meant. It seems to me that this idea of safety is sold; I mean by this, that management is already sold.

When the safety movement was first introduced in our plant, the management said, "Do whatever you want to. You can spend what funds you need to spend, you may have all the committees you need and we will do whatever you suggest to prevent accidents in the plant."

At that time we established a safety committee among the men and it worked very well from the start. There were many things that were rather foolish to do and yet we didn't object to them and they went on through. Later on we took safety on as a practical production matter and it was no longer what you might call the convention or party affair.

Every foreman is a member of the safety committee. Every man in the plant is a member of the safety committee. We don't have committees in regard to production. We have a centralized system in regard to production. Therefore, we centralize the safety idea and have it go in the same manner that production does. We have the safety

manager and the plant foreman and every man in the plant working toward the reduction of accidents. I think that is the crux of the whole situation, at least of our situation at Wisconsin Rapids.

We no longer have a large safety organization any more than we have a production organization and we run it along with production. Safety is sold to the management in the same way production was sold. Production was the manager's first thought in the beginning and now safety is on the same plane as production.

An Investigation of the Old Employee Problem

CHAIRMAN ROSEBUSH: Mr. Mead has told a new way in which the safety work has been handled in the Consolidated Mills. I hadn't supposed there was a mill in the United States where the management wasn't sold on safety. Some of you men that have problems of that nature may want to talk about them. Mr. Gleason raised the question of the old man, getting him to take safety steps, and then there comes up the question of how much authority the safety man should have. What should he do when he finds unsafe practices going on? Should he step in at once and stop this or work through the foreman?

MR. BURNS: It might be interesting to know that one of the largest corporations in the country made a study of the old employee versus the new employee, a matter of personal injury, and discovered that over a period of years, 33 per cent of the employees that were hurt had been employed 10 years or more by the company. That was the highest percentage of personal injuries in the entire organization.

I. G. WOOD: I know something of this work. It has been found that when a motorman first goes on the job he has car collisions, and in about six months he gets more experienced and becomes careful; but they do have a great deal of trouble with car collisions among their oldest and most experienced men. They get to a point where they think they know more than they actually do about how to do things.

I want to ask you a question. Mr. Gleason suggested the using of safety material in pay envelopes. There is some little feeling in our company against that. It has a very unfavorable reaction from the point of view of wage payment or anything of that kind.

MR. COSTIGANE: We did something along that line but it was in a limited way because most of the mills in Canada pay by check. We took the safety calendar. We made a group of 12 pledges and put them on the pay envelopes with an illustration, using one each month until all were used. When a man got his pay with that illustration he took it home and the chances are he handed it to the children and they studied the illustration. We did a little along that line in getting safety into the home.

MR. PHILLIPS: We tried this plan for a while. At first it seemed to work fine but after a few months we found that the men, when they learned to expect it each month, just took it out and threw it away. When men are looking for their pay they are more interested in that than any other one thing.

MR. AUGUSTUS: We don't have pay envelopes but we used to give out a little card each pay day, attached to the check. He can't help but read it; he can't throw it away.

MR. BOND: We put a safety news sticker on weekly pay checks for about two years, and at first there was a great deal of interest shown in it, but this died down. We then made it interesting by having an artist make posters, and now we are having a great deal of success. If you can give them something to interest them they will read it and appreciate it, whether it is on the check or in a plant publication.

S. J. STEINMANN (Indemnity Insurance Company of North America, Philadelphia, Pa.): It is the consensus of opinion in the insurance companies that payroll inserts, if properly used, will bring results. You simply have to run around and use the advertising principle. If you put an insert into payroll envelopes every week or every month you are doing the wrong thing. You want to stagger it, as it were, just the same as putting up posters, and then you will get results.

CHAIRMAN ROSEBUSH: If there is no further discussion I would like to call on Mr. Crossley. Mr. Crossley has been connected with the publication of the volumes put out by the Pulp and Paper Technical Association. A number of paper mills are using those books for putting on efficiency school work.

Text Books for Efficiency School Work

T. LINSEY CROSSLEY (Industrial Laboratories, Toronto, Ontario): Mention has been made of the fact that a series of text books was gotten out by the pulp and paper industry and I would like to give you a little idea of the origin of those text books.

We worked for a number of years, sporadically in different mills in the United States and Canada, where we had two committees working to carry on night classes and schools in the mills. We found we had no teachers, no text books and we had different shifts. We had only a very small number of men interested.

Eventually we formed a joint committee for the United States and Canada, which went to the industry and said: "Our greatest need is for text books that shall give authoritative, useful information both for classroom and lecture instruction and for conference work, so that if there is a man or two in the mill who wants a course of study in paper technology or elementary education we can give it to him from the point of view of the paper industry." Eventually the paper industry of the two countries jointly will provide us with \$50,000 to get out this valuable set of text books.

This money comes just about equally from the two countries. We had a little advantage in Canada because our organization made it possible to go into the industry directly and assess them. The Technical Association of Canada is a part of the association; when we brought the matter up they decided to assess the mills on the tonnage basis. Members of the committee in the United States found it a good deal more difficult because the Technical Association of the United States, while

affiliated with the association, is not a member, and therefore they had to get their money by personal solicitation.

However, we got the money and then we had about 100 men working four or five years on these text books. Eventually the text books were published, and two conference schools were organized to carry on this work; one of them in the University of Wisconsin and one at Gardenville, Quebec. The one at Wisconsin was under state direction in the state university, the other one was carried on by a committee representing the various organizations of the industry in the two countries. The Gardenville school to which I now refer, is the one I have possibly put more time in than any other; and partly because of their independence of existence, they were able to place funds at my disposal for getting around the country. The other, being a state organization, hadn't the funds available for that kind of a campaign.

I don't want to go too far into that, but I would like to say that we have somewhere in the neighborhood of 140,000 men in the two countries in the paper industry at the present time, and as far as we can find out, there are probably about 2,000 out of the 140,000 who are in these schools, the University of Maine, the Pulp and Paper schools at the Province of Quebec and the University at Syracuse.

Education Makes the Employee Safer

Suppose we take the men who are working in the universities as being employed, that is, the men who are studying and majoring in pulp and paper. There are about 2,000 men out of the 140,000 who are studying to prepare themselves for life work in the paper industry. As the connection between this work and your work, the slogan was adopted: "An educated man is a safer man." He is a safer man.

There are two developments in the industry today that I thought ought to be brought to your notice. One is that the mechanical equipment of the mills has outstripped the mental development of the men. That is a subject for discussion but it is a moot question. The brightest engineering minds of the country have developed the machinery of the mills and some of the lowest in intelligence are operating that machinery. We can't expect to get 100 per cent production from machinery that is delicate in its adjustments and large in its productive capacity, without seeing that the men who operate those machines have an intelligent conception of the elementary principles on which those machines are operated. That not only applies in production but it applies in the safety factor.

A man should have adequate knowledge of the mechanical equipment that he is working with and that knowledge should not only be how to operate that particular thing, but should be also some idea of its constructive principles.

The second general thought I want to bring before you is that the industry is getting away somewhat from the paternal point of view and is getting into a fraternal organization, so that things that were impossible from a psychological standpoint when the mills were paternal, can be put over when the mills are fraternal.

I think those two points should be considered very carefully by all men who have to handle the safety or educational work in the mills.

Another thing is that cooperation is essential to production and to your own department of the mill operation, which is a matter of production as well, because, of course, an unsafe mill is not an ideally producing mill.

I will tell a little story that illustrates the point: There was a coasting steamer on which the engineer and the captain always had a great squabble as to which had the more important job. Eventually the captain said he would go down in the engine room and show the engineer, and the engineer said he would go to the bridge. The captain went down below, and after a while, wiping the sweat, said, "I can't make the darn thing go."

;"Of course not," said the engineer. "She is aground."

You don't want to teach a man the other man's job, but you do want to teach him enough respect for the other man's job so that each can cooperate with the other, and I believe in our work we can do that. Now, I would like to say right here that the Joint Committee on Vocational Education of the Paper Industry of the United States and Canada (which is its full title), has placed at my disposal a fund so that I can get about more freely among the mills. The school at Gardenville has been taking the burden of this in the last few years, but the committee decided that it would help to broaden my work if some more funds were available, so they have placed at my disposal a fund for travel; and if you gentlemen are interested in the matter of vocational educational work in your mills, I should be very glad to meet you and discuss the matter with your directors.

Safety Should Be Made a Part of Company Policy

I might say that it has been my experience that until you get the directors sold it is very difficult to inaugurate movements in the mills. That was the case, I think, with the safety movement. Twenty-five years ago men who had the vision in safety were working to bring this matter about, but until the directors made it a part of the company policy it was difficult to get the thing organized on a proper basis and the same is true of education, and, of course, education and safety are the two hand-maidens of industry that tend to increase production and the lowering of wages.

We have had so many discussions about various aspects of these questions that we are likely to get the point of the old story of Dean Swift's "Gulliver's Travels." You remember Gulliver reached a place at which there was a big war going on, and the cause of the war was that one army was supporting the big end of the egg as being the most important and the other army was supporting the small end of the egg as being the most important; and they forgot altogether that the most important thing was the egg. It didn't matter particularly which end of the egg was concerned but it was the egg itself.

In industry we have to consider, as Mr. Gleason brought up, that the personnel of the industry is more important than the mechanical equipment. We have a long way to go before we reach that point.

CHAIRMAN ROSEBUSH: I am sure we express thanks to Mr. Crossley for this fine talk and for the point he made about stressing men more than machinery.

The next paper on our program is "The Old and the New in Paper Mill Safety." Mr. Kindleberger was to have given that but it was impossible for him to be here and at the last moment another speaker was secured.

Mr. Jackson of the Consolidated Mills at Wisconsin Rapids, as late as last Friday, consented to appear on the program. Mr. Jackson is not new to this section of the Pulp and Paper Industry because for a number of years he was safety director in charge of the safety work at the Consolidated Mills and graduated from that job to become mill manager.

THE OLD AND THE NEW IN PAPER MILL SAFETY

C. E. Jackson, Mill Manager, Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis.

I have no other mission than to discuss the things which you already know. Alexander Pope once said, "What is so tedious as a twice told tale?" It is my hope, therefore, to inject at least one or two new thoughts into this conference, if I can do so without appearing to depart from principles and ideals which have proven worthy and which have been generally accepted. We are surely in accord with the great movement to prevent unnecessary suffering and death, yet there may be certain minor details of application which cause people to differ in their opinions: but as Ralph Waldo Emerson said, "Whoso would be a man must be a non-conformist."

I would like to have you feel that I am here to expound certain theories and philosophies which are practiced in the mills of Consolidated Water Power & Paper Company. The thoughts and methods of other people and other groups may be somewhat at variance in minor details but I am sure that it is our desire to gather together and absorb the experiences of all, thus enabling us to weigh the merits of things broadly and pass judicious judgment.

My subject implies a radical comparison between old and new safety methods in the paper industry. Perhaps we are apt to look back at the old era and call it a benighted age. Personally, I am inclined to be an optimist, as far as the past is concerned, and I actually believe that the old time methods were not as reprehensible as they are pictured. I do not like pessimists anyway, and I am reminded of a definition I recently heard. "A pessimist is one who, when given his choice between two evils, chooses both of them." Let us therefore cheer ourselves with the thought that our fathers in the paper game were in many respects very knowing and reasonably progressive. There is a tree in California still bearing leaves which has stood since the year 2,000 B. C. A living thing

of that age must certainly laugh in contemptuous amusement when it hears men referring to 20 years ago as the "dark past."

We modern people in a spirit of ego complex are prone to regard ourselves as leaders in new and better things and we like to indulge in the thought that in this great safety movement, we are guiding the industry out of stagnation and ignorance. To dispel such a thought we could look back in history and smile at the self-confidence exhibited by men who thought they were doing something new, but were merely copying and duplicating. Christopher Columbus is spoken of by many as the first man who ever ventured the thought that the earth is round. Surely he must have known that 350 years before Christ the library and museum at Alexandria contained 700,000 volumes and was full of studies in astronomy and mathematics. Eratosthenes produced manifold writings on specific gravities, the rotundity of the earth, the polar circles and the distribution of climates. The Alexandrian Museum contained more globes than can now be found in the average state university.

We are apt to regard the steam engine as a comparatively modern item of equipment but Hero, the Greek mechanic, constructed a two-cylinder steam engine long before the days of Julius Caesar. We think we know something about architecture, yet we wonder how the Egyptians built the Pyramids.

Tracing the Development of Safety Ideas

In the realm of safety we must not deceive ourselves with the false assurance that we, in the last decade, are the only people who have revered bodily perfection. A thousand years before Christ a band of conquerors descended upon southern Greece and established three kingdoms, one of which was Sparta. Read the history of the Spartans and their ideals of physical supremacy. You will be interested in the fact that sickness, injury, imbecility, old age and other infirmities were punishable by death. In the Holy Bible, Christ many times spoke of the human body as God's holy temple, not to be defiled or destroyed. Twenty years ago, in the paper industry, was really only yesterday. It is true they had no compensation laws to serve as an impetus for intensive, scientific accident prevention, but in the interests of self-preservation they possessed many of the fundamental things. Safety valves on boilers, spiked feet on ladders, gear guards, trip valves, and stair railings were not at all uncommon.

To get an intelligent and authentic viewpoint, I took pains to interview a member of our organization who is regarded as an expert mechanic and a wise counsellor in the field of machinery. I should also add that he is an enthusiastic supporter of everything which has to do with the prevention of injuries in our mills. His experience in paper making goes back 40 years or more. In the course of the conversation he made what seemed to me a very wise reflection as follows: "One of the principal reasons why paper mills are safer today than they were years ago is because the improvement and perfection of machinery from the standpoint of higher production and efficiency carries with it a safer condition for operators."

I was greatly impressed by the truth of this statement for it is surely

an obvious truth that mechanical efficiency carries safety with it. The modern, up-to-date type of paper mill equipment, even though higher speed is a feature, contains protection for workmen which machinery of former days did not have. I am referring now to improvements which were *not* planned specifically in the interests of accident prevention. The locomotive crane has done away with hand unloading and has incidentally eliminated many of the accidents which were formerly a common occurrence in log yards. I might also mention at random the oil switches on power house switch boards, circuit breakers, concrete flooring, automatic stokers and the well known drum barker which supplants the old knife barker which took such extensive toll.

On paper machines, the operator shoots the paper from the wire to the reel by air and in the present age we see very few calender fingers. The drum reel is rapidly driving out the old stack reels which caused injury and death to paper makers. Twenty years ago paper mill machinery was driven by line shafting, belts and pulleys, and we can recall many tragedies. Today the up-to-date mill machinery is driven direct from motors. There is no shafting and there are no pulleys to threaten human lives. High speed paper machines today have separate individual motors on each press, on each section of dryers and on the calender stack. These motors are synchronized, giving uniform speed. The modern paper machine is a picture of convenience and safety. We have no right to say that the elimination of line shafting was prompted solely by a desire to prevent accidents, but the result is obvious and we are happy to recognize it.

Accident Prevention Is an Institution

Beyond these there are countless things which offer further contrast between the old days and the new—things which are the result of deliberate premeditated safety action. They constitute impregnable proof that accident prevention is an institution, a tangible science and the product of trained minds—pulmotors, goggles, square D switches, rubber gloves, double hand control, illumination, standards, gear guards, belt guards, saw guards, elevator gates, railings, runways, toe boards, distant control of blow-off valves, winder guards, cleanliness, sanitation, and finally safety habit and safety discipline.

When we speak of the psychological aspect of safety we are brought to a major point which warrants our most thoughtful analysis. If there is a correct way to handle the human element, what is it? I would like to quote a familiar adage: "Business is business," and apply it to industrial relations.

Modern business has reached an appalling state of complexity. We look back 150 years and find the one-man factory. One man made a pair of shoes, and now hundreds are involved in the process. Perhaps a single apprentice was in the shop, but he worked six years at no stipend to learn the trade.

Along came the industrial revolution at about the same time, and

equally important with our American Revolution. Hand work was ruthlessly thrown to discard, and machinery, the curse of civilization, took its place. Individuality was placed on the scaffold. The creative instinct was ready to be suppressed.

The trouble started in England and the weavers got the first jolt. Agriculture was next invaded. Oliver Goldsmith said, "Ill fares the land to hastening ills a prey, where wealth accumulates, and men decay." The epidemic spread to the United States. In 1815 there were 200 patents recorded. In 1860 there were 5,000. Children were sold to factories by the parish clergy and made to work from dawn until dark. Gloomy, poorly ventilated factories, harsh employers, rickety tenements, pale anemic faces—these were the marks of American industry.

Today there are ten million wage earners in this country. One-fifth of this number are working in groups of 1,000 or more.

The Golden Rule Is a Workable Principle

A certain gospel has come to the front. The Golden Rule has become a workable principle. I have a Rotary code of ethics hanging on my wall which sets up a high standard of conduct for business. Contracts must be held sacred, employers must be fair, competition must be honest, and business as a whole must be straight and upright. I would like to attribute this great transformation to a higher moral stamina, but I am anxious to go farther than that and say that business actually is doomed to fail unless it is honest. In our present day, material success is impossible unless founded upon a high sense of morality.

The relationship between employer and employee is a business relationship. Paternalism is passe. The worker sells his services; the employer buys them; and each should give value received.

The safety movement should be treated as an immensely practical matter. There has been too much college spirit. In a great many cases safety has been made a travesty rather than a factor in production. It should be treated in a hard boiled, business-like manner, on the same basis as boiler evaporation, stock hydration and Mullen test. It is no wonder that the safety man has been looked at suspiciously by the old timers, and hailed with jeers as a busybody, a reformer and a tenderfoot. Men do not want to be children. They do not want community singing in the interests of safety anymore than in the interests of boiler house efficiency.

I do not believe in selling the "Safety Gospel" to a foreman any more than I believe in selling him the idea of paper quality. If he has not learned that the prevention of mutual losses through injury are just as much a part of his job as to keep machinery from going to pieces, he never should have been made a foreman. A good foreman is not a man who gets low production, low quality, or kills off his men. Business is business.

How about contests? Perhaps the proof of the pudding is in the eating, and the results might be evidence of a correctness of theory. Very likely a safety contest is a good stimulant for the employer; on the other hand,

in some cases it might serve as a temptation to keep unfit men at work. Undoubtedly if a man breaks his neck during a safety contest, the stigma attached to it is greater than if he had postponed the incident until after the race was over. Personally I feel that a contest brings safety into an unreal, intangible realm.

Safety is an essential factor in operation and production. Effective management with its force of discipline, and its business transactions with employees will demand safety as a feature of good service. Accidents are inexcusable economic losses. A concern which kills and maims its men can not survive with a competitor who avoids it.

I am not attempting to exclude the humanitarian aspect of this question. That side of the situation needs no discussion. I am merely pointing out the fact that the employer loses profits every time an injury occurs, regardless of his own negligence. Therefore, he rightfully demands that each man in the plant be awake to his individual responsibility.

In our mills, we negotiate wage contracts and working conditions with representatives of the employees. Our dealings with organized labor have never prevented the introduction of progressive labor policies. We have never been deterred from eliminating incompetent help. Our mill rules are adopted mutually, discipline is enforced by common consent and I want to say that infraction of safety rules is a serious offense in the eyes of management and men.

Routine in the Event of an Accident

For your interest I will state that our routine method of accident prevention is somewhat the same as that which you hear about in other mills. We have regular periodic inspections by competent men. Reports are turned in and the work followed up. In the event of an accident, rigid inquiry is made as to the cause. A conference is held attended by the personnel manager, mill manager, employment manager, foreman, and if possible by the injured man himself. Those who witnessed the accident are brought in. This tends to prevent a recurrence of that particular type of injury.

It is apparent that industry has taken the lead in the preservation of life and health. It is in the industrial world, whether the motive be sordid or humane, that safety has taken on its scientific color and produced the most potent results. Let me cite some figures to prove this.

Automobile deaths in the United States amounted to 14.9 per 100,000 population in 1923. In 1924 this figure increased to 15.7 and in 1925 to 17.2. In July, 1925, there were 58 fatalities per day, and in July, 1926, there were 59. In the year 1913 there were 3,822 people killed in the United States by automobiles. In 1924 there were 17,566. The city of Pittsburgh last year and this year conducted investigations to determine the number of automobiles having defective brakes. Last year's test showed 68.9 per cent, and this year, 69.5 per cent. We are forced to look upon automobile death records with considerable pessimism.

The number of people killed in home accidents does not increase mate-

rially from year to year. In 30 cities, totaling 12,000,000 population, there were 120 home fatalities in July, 1926. This, of course, included falling out of windows, falling down stairs, suffocation, asphyxiation, burns, etc. An examination of statistics does not show a material decrease in accidental deaths at home.

In spite of the increase in the number of automobile deaths, the actual number of all kinds of accidental deaths in the United States has shown an improved condition from year to year. In 1913, 82,500 people were killed. In 1924, there were 85,549. This means in round numbers that 100,000 lives have been saved during that period.

The dynamic effort put forth in the industries of the United States is at the bottom of all this. Every branch of manufacture has shown radical improvement from year to year. The paper industry ranks high among them all. I have talked recently with paper mill representatives and they all tell the same story. The Nekoosa Edwards Paper Company, our neighboring mills, have shown radical improvement. The mills of Consolidated have experienced a reduced number of accidents and a reduced number of days lost every year for the past six years. In 1925, we decreased the number of lost time injuries by 30 per cent and the number of days lost by 40 per cent. So far this year, the number of days lost is about 50 per cent of last year's total.

Prohibition has furthered industrial safety. I do not know much about the politics of prohibition. It is possible that the jails are more crowded. Perhaps young people are drinking more than before. On the other hand, we must not take anti-prohibition propaganda too seriously. One thing is indisputable—industry is better off; workmen are more prosperous; their hands are steadier and their heads clearer. I know that there is less drinking among paper makers and the result is a higher and more intelligent type of man. In the old days, whiskey and accidents walked hand in hand.

The paper industry with its logging operations, its high pressure boiler houses, high voltage power lines and fast running machines, should be proud of its success in this great and laudable activity. I hope that we may continue to go forward, remembering that the inevitable results are greater efficiency, higher quality and the unqualified respect of those hundreds of men whose skill and toil are indispensable and who have a right to demand good management.

CHAIRMAN ROSEBUSH: I am sure you gentlemen have heard Mr. Jackson with a good deal of interest. He has presented these safety ideas, which may be different from some of yours, in a very clear and consistent manner. I am sure he deserves the thanks of this Section for undertaking to take part in this program on such short notice.

You have heard the suggestion made by Mr. Peacock that Mr. Gleason also be included as a regional vice chairman. Will someone second that motion?

(Mr. Augustus seconded the motion. The motion was then carried unanimously.)

ADJOURNMENT

LUNCHEON SESSION.

Wednesday, October 27, 1926

The Luncheon Session of the Paper and Pulp Section of the National Safety Council was held at the Oriental Cafe, Detroit, Michigan, at 12:30 o'clock, W. J. Peacock, presiding.

CHAIRMAN PEACOCK: Let us have some music while we are waiting to be served. Mr. Al Kroes, president of the On Wisconsin Association, is our song leader. Mr. Fred Braun is at the piano. Both of the gentlemen are well known to you.

(Singing, led by Mr. Kroes, was then followed by roll call of mills, by Secretary Ameil Ueberham.)

CHAIRMAN PEACOCK: I want to introduce Mr. Scott Dowd, Editor, The Paper Industry, Chicago, Illinois.

MR. DOWD: Mr. Chairman and gentlemen of the Paper and Pulp Section. The zero hour has arrived and I know you feel just as glad as I do that we are going to get rid of this job. I also know that a good many of you know who is the winner of the cup; nevertheless it has been pretty hard to keep. At the regional conference at Appleton it was hard to stem the tide and not make the announcement there, but I feel an association of this kind should have the real enthusiasm of its members aroused and the winning of this cup has surely kept enthusiasm at high tide.

Edward B. Fritz, who is the donor of awards on our paper, regrets his inability to be here and to make this presentation. He has asked me to extend his congratulations to the officers of the Paper and Pulp Section and to the mills which entered into this contest for their interest and remarkable accomplishments.

In 1925 a suggestion came from one of our field men that a contest be put on because it would be an excellent medium for encouraging more activity in safety work in the industry and would be a means of enabling the Paper and Pulp Section to make a name for itself in National Safety Congress activities.

I wish at this time to express appreciation and give a great deal of credit, as we see it from the viewpoint of publishers, to the officers of the Section. I want to express our appreciation to your chairman, W. J. Peacock, and to your secretary, A. M. Ueberham, for those inspiring news letters gotten out every month which we are sure was the means of keeping up the interest in the contest.

Though we are at distant points of the country, nevertheless the personal expressions in those letters keep us going, keep us together and keep us working towards the same end. They have certainly done remarkable good in preserving and keeping up this contest.

Great credit is also due to George Burns for his untiring efforts in

looking after the details of this contest, and I wish to thank him personally for his great help and assistance in this work.

The mill that has won this beautiful cup has gone for more than one whole year without an accident.

I now have the pleasure of asking Edward J. Goodman, Millwright of the Neenah, Wisconsin, mill of Kimberly-Clark Company, to approach the front. (*Applause.*)

Mr. Goodman, on behalf of the paper industry we extend our congratulations for the winning of this cup and the fact that your mill has performed such a remarkable record and by that performance is the rightful winner of this cup.

We want to say before we give you an opportunity to say a word in response that, while we are largely an outsider and observer in the contest, it seems to us great credit is due the teacher represented by the directors, the man who stages these things, who educates his crew to do the job, who directs the whole job, yet the performance of which is in the hands of the crew, and to them is due the overwhelming credit for their great performance, and that crew, Mr. Goodman, is represented in you and for that reason we are very proud to present this cup to you. (*Applause.*)

MR. GOODMAN: Gentlemen, I am no orator, but I want to thank you in behalf of the employees who sent me down here to receive this cup. I thank you.

Presentation of Certificates of Merit

MR. DOWD: I now have the pleasure of presenting these certificates to the various mills which have won them, and in doing so I will call the name of the mill and their ranking number, starting with number two.

We will give the first certificate to the first mill, which happens to be Spruce Falls, Limited, a subsidiary of Kimberly-Clark, Ontario, Canada.

There is no representative of the Spruce Falls, Limited, here in this meeting today and on consultation with Mr. Hoyman we thought it would be very proper to ask our good friend, Mr. Costigane, Safety Engineer of the Ontario Pulp & Paper Makers' organization, Toronto, Canada, to take the certificate of merit to the Spruce Falls mill when he is in that territory and present it to them with our congratulations.

A. P. Costigane: Perhaps some of you gentlemen know that in Ontario we work in the group system, and the Spruce Falls mill is one of the mills that had entered the contest, but I did not myself know how they stood in the contest. I have learned that fact today and it gives me great pleasure indeed to know that one of the Canadian mills has risen to second place in this list and I am hopeful that the result of the contest next year will be that a Canadian mill will head the list, and from that point of view I am going to make a great deal of use of this certificate that has been handed me today on behalf of the Spruce Falls Company. I am going to take this certificate to every mill within the jurisdiction of our organization and I am going to show it to them and tell them that they, as well as the Spruce Falls mill, can occupy a high

position in any contest that takes place national or internationally. (*Applause.*)

MR. DOWD: Gentlemen, if I might be permitted to make this suggestion, I think it would be a great thing to insert the inscription on this cup right into the record and if you will permit I will read it at this time. The inscription on the cup reads as follows:

"Awarded to the Neenah, Wisconsin mill, Kimberly-Clark Company, winner accident prevention contest among seventy-two paper and pulp mills, members National Safety Council, for perfect No-Accident record January 1 to August 31, 1926, by The Paper Industry, Chicago, Illinois."

The Certificate Inscription in Full

MR. DOWD: And this is the certificate wording:

"The Paper Industry of Chicago in conjunction with the National Safety Council, Certificate of Merit, awarded to Spruce Falls, Limited, Ontario, Canada, subsidiary of the Kimberly-Clark Company. This certificate is awarded as a deserved expression of appreciation of this mill's accident record for the period of eight months, January 1 to August 31, 1926, during which period but ten days were lost out of 535,369 man-hours worked for an average severity rate of .01.

"In witness whereof, the Publisher of The Paper Industry and the Managing Director of the National Safety Council have hereunto affixed their signatures this 27th day of October, 1926. Signed Edward B. Fritz, Editor, *The Paper Industry*, Chicago; Countersigned, W. H. Cameron, Managing Director, National Safety Council."

MR. DOWD: Seventy-two mills were engaged in this contest, the Spruce Falls, Limited, holding the final rank of second.

The next mill, the mill to rank third and which receives the next certificate, is the Badger-Globe mill of Kimberly-Clark, Neenah, Wisconsin. I will ask Mr. A. W. Redlin, Superintendent of the Neenah mills, to approach the front and receive the certificate.

MR. REDLIN: Gentlemen of the convention, and Editor of *The Paper Industry*. I have not the honor of working at this particular mill, but I take great pleasure in being the bearer of this certificate to that mill. I think it is quite an honor to take it back with me. (*Applause.*)

MR. DOWD: Number Four certificate is awarded to the combined mills of Nekoosa-Edwards Paper Company, represented here by Mr. Rosebush, of Port Edwards, Wisconsin.

Mr. Rosebush, as we all know, won the cup trophy for the 1925 contest and it certainly gives me great pleasure to be able to present him a certificate for the second contest to take back to his mill to show they are still in the running. (*Applause.*)

MR. ROSEBUSH: Mr. Chairman and gentlemen, I certainly shall be proud to take this home. I think the Neenah mill is to be congratu-

lated and I want to extend our congratulations to them for the splendid showing they have made and this is going to be an added incentive to our men at home, to the management, to all of us to keep on with this safety work.

Mr. Down: Number Five certificate goes to the Phillipsdale mill, R. I. Bird & Son, Incorporated, Phillipsdale, R. I. This mill lost 32 days out of 299,007 man-hours worked. Severity rate, .107. We are sorry that company has no representative here to accept this certificate from us, but we will see that they receive a letter congratulating them on the part of the Section as well as *The Paper Industry*.

Number Six goes to Kimberly-Clark again. This goes to the Niagara Falls mill. This mill lost 134 days out of 93,473 man-hours for an average severity, .134, and F. A. Robinson is present and represents that mill.

F. A. ROBINSON: Mr. Chairman and gentlemen, the speaker just said it wasn't quite so good to have so many of these prizes coming to the Kimberly-Clark Company. Well, I think it is and I am going to have some photostatic copies made of this certificate and the original is going to stay in the manager's office and every time he holds a meeting in there and I happen to be present his attention is going to be called to that certificate. (*Applause.*)

Two Rooms in the Mill Had a Perfect Score

Mr. Down: The next award goes to the Upson Company, Lockport, New York, and in this connection it is interesting to know the Upson Company was among the leaders until the last month when they dropped, but they are still remaining in the first class. As they do not have a representative it is regretted that we are not able to congratulate them for staying in the contest, but we will see that they get a letter telling them how proud we are that they stayed with the job.

Mr. Burns: We sent telegrams to a few companies, representatives from which we thought might not be present because of distance. Among them was the Upson Company. On October 20th we received a letter from them which reads:

"We certainly appreciate your telegram of October 14th, advising us that you will award us a certificate of merit for our efforts in the recent safety contest. However, we are very sorry we can not have a representative present at the Detroit Congress. There is no one in the place at present we can send and we will surely miss a lot of useful ideas along the safety work line which are sure to be presented at the Detroit Congress. Our heater room and machine room carried a perfect score in this contest. We trust this year's Safety Congress will be the 'biggest ever.'"

Mr. Down: That is the kind of spirit that promotes this contest. The next certificate is awarded to the Paraffin Paper Company, of California, and they haven't a representative present. They lost 41 days out of 260,552 man-hours worked for an average severity .156.

The next certificate goes to the Marinette and Menominee Paper

Company, Marinette, Wisconsin, and since Mr. Larson is present I will ask him to come forward.

L. LARSON: Mr. Chairman and gentlemen, I wish to thank you on behalf of the Safety Committee and the employees of the Marinette-Menominee Paper Company, for this certificate. We are going to try to be at the top for next year. (*Applause.*)

CHAIRMAN PEACOCK: Mr. Larson, may I ask you to read the record on your certificate?

MR. LARSON: Number of days lost, 86, out of 529,028 man-hours worked; average severity, .163. This is certificate Number Nine.

MR. DOWD: The Laurentide Company, Limited, Gardner, Quebec, Canada, gets the last certificate, Number Ten. They had at least 1,000 employees and refuted the idea there was no chance for the big mill. They made a splendid effort to get the prize in this contest. They lost only 323 days out of 3,864,815 man-hours worked, averaging .173 severity.

I am going to ask Mr. Costigane to carry this certificate to that mill, as it is about 30 miles from his place.

I now want to call on M. G. Hoyman, whose official title is Superintendent of Service of Kimberly-Clark, and ask him to give us a few words.

Fine Cooperation Was Enjoyed in the Contest

MR. HOYMAN: It will be just a few words. One thing I take delight in mentioning, however, is the unqualified and whole-hearted cooperation and backing of our management, without which, of course, no safety movement would be successful. To that feature we can lay a great deal of whatever small success has attended our efforts, and then we go right down the line and point to the greatest cooperation from our personnel, and I want to say I am proud of our men.

I am proud of the managers and I am very, very proud indeed of our company.

MR. DOWD: Thank you for those inspiring remarks, Mr. Hoyman.

We had a conference on this matter of contest and I will outline it to some extent. While it is a fact that the severity rate, or the number of days lost per thousand hours worked, is a fair rating, because no matter whether it is 100 people working or 1,000 people working, it is the number of days lost per thousand hours worked, there is in the minds of many a feeling that there is an inequality between the mills in a contest. Both those with a small number of employees and those with a great number feel that they have an unequal opportunity to win this cup, and as it is the desire of the Section to get as many people interested in this contest as possible, these ideas must be brought out, we must have this contest satisfactory to all of the members of the Section.

For that reason it was decided to divide the membership into three groups: the (a) group consisting of 501 employees and up; the (b) group to consist of 201 to 500 employees; and the (c) group to have 200 and less. For each of these groups a trophy will be awarded so that each group

will have something to strive for and at the finish they can say that they made the best record in their particular class.

No one likes to leave an uncertainty in the atmosphere. Everyone likes to see a champion. There is a great human appreciation of one who is called a winner and a champion, and how to determine such a champion has been a problem for the Section officers to decide.

There is no mathematical factor on which to make such a decision. Some claim that severity rates should be taken as a governing factor. Another thinks frequency should govern. So we have finally come to the decision that it becomes a matter of judgment and that a board of judges will have to be appointed, and they should be disinterested judges to decide who among the three winners of the three different groups is entitled to the greatest credit for performance made, and the one the board may select will be named the champion and receive the championship trophy.

Details of the 1927 Contest Plan

For fear you don't understand, a trophy will be awarded to the winner of each group and then from these three winners this board of judges, which will be chosen as a disinterested group, will decide who among those three is entitled to the championship cup.

That will be four trophies to be awarded in the next contest. This contest will be sponsored, as usual, by *The Paper Industry*, to begin January 1, 1927, for a period of six months (as it was this year), with the elimination factor which provides that in the event there is a tie at the end of six months the contest will continue until one mill remains in each group.

Another thing that will be done which was not done in this contest is the publication, in *The Paper Industry* on a certain page of the previous month's record of the mills. That was kept out of the magazine during the last contest because it was thought it would tend to discourage many mills if they saw they didn't have much chance to win the cup. But we have decided to try it this coming year.

I want to read a striking poem to you that seems just to fit the spirit of this meeting. I will give you the author and you may read it for yourselves when you go home. The poem is written by Arthur Wellington and is entitled, "Lift Your Aim."

(Mr. Dowd read the poem.)

CHAIRMAN PEACOCK: I hope Mr. Dowd will see that the poem is published in *The Paper Industry* where we can read it and keep it as an appreciation of the thing we are trying to do in the contest.

My own mill is down the line and yet we are ahead of anything we ever did before and my feeling is that the contest spirit, getting close to the men has done us a world of good and we are going to be very glad to enter this contest.

I notice some very significant things in the final ranking. For instance, the Hammermill Paper Company, 1,282 men, 2,438,119 working hours, and a loss of 6,475 man-hours worked. What represents the real standing of the mill is the 475 lost hours, not the 6,000.

I notice another very significant thing. The Strathmore Paper Company, Mill Number Two, has a loss of 6,012 days. That represents a death and possibly one minor accident of 12 days. Those boys deserve an immense amount of credit for staying in the contest and achieving what they did after they had had the misfortune of a casualty. There are other significant things that should be brought out. Mr. Burns can give you some very interesting figures.

Mr. Burns: We have a score sheet, made up month by month for your information, covering the 72 mills reporting, and this sheet is on file in the library of the National Safety Council, and available for your reference.

I think we have one thing to learn, that is, what constitutes man-hours. Many of us report hours that the mill works rather than man-hours. Some of them seem to think it is a very complicated thing to figure the number of man-hours involved.

To anybody who has asked the question, I usually say, "Take the average number of employees in your plant for the week; if it is 100 and if your plant operates 50 hours a week, multiply it by the 100 and there are your man-hours." That is the easiest way to get at it. To take it off the pay roll is the accurate way to get at it. Many plants depend altogether on the pay roll record.

Prompt Reports Are Requested to Headquarters

One point I want to stress in the coming contest for all mills, and that is the necessity of getting the monthly report into headquarters so that we can publish it. We specify ten days in the usual way, that is, we did in the last contest. If they were 30 days in arrears they were automatically withdrawn from the contest.

I realize that sometimes you have an outstanding case and you don't know how long that particular man will be out. In any event, use the doctor's estimate and then on the following month, if necessary, send in a correction. We will be only too glad to correct one month, two months, or three months back.

I wish to express my appreciation and the appreciation of the staff for such excellent cooperation as we have received from all the mills entered in the contest.

CHAIRMAN PEACOCK: There is one thing for us all to do. We can all express our approval of what has been said today by Mr. Dowd, and I think in our expression we can include our determination to get into the contest and back it up sincerely. Are you all in favor of another contest on the terms that have been outlined, and are you all eager to get in?

Mr. LUNDRIGAN (International Paper Co., New York): Before that is put as a motion I want to say a word which I think I should say in the interest of the manufacturer.

Thereupon, followed by close attention, for nearly two hours Mr. Lundrigan led a discussion regarding the "mythical" scale of time loss which rates death cases at 6,000 days. He explained the refusal of The International Paper Company to participate in Section safety

contests on the ground that they can not agree to have their accurately kept records of losses translated into arbitrary generalities. The 6,000 day penalty, he declared, originated before accurate statistics were available and was adopted by a committee "not one of whom had any particular stake in industry." He urged upon the Section that such widespread publicity as this scale receives in a safety contest of national extent amounts to a suggestion which can be translated into costs and ill-advised legislation. His inquiry among insurance actuaries revealed a general death compensation of \$4,500, which represents 1,000 to 1,200 days. The use of a 6,000 day penalty means that the Section is committing itself to a practice which unwittingly suggests 20 years and \$20,000 in money as the moral and legal obligation industry should assume. This violates all actuarial experience and raises the question whether safety men are capable of representing the interests of the manufacturer in terms of scientific cost accounting. He showed the handicaps incurred by two mills during the 1926 contest. Both have efficient safety organizations and apart from a death penalty achieved records over an eight-months' period far superior to the average, low enough in fact otherwise to have entitled both to honorable mention.

Until, Mr. Lundrigan insisted, The National Conference Board and other agencies committed to service founded upon statistics, can offer to Industry trustworthy guidance in these matters it becomes a serious matter to publish any rating standard. Meanwhile the business-like procedure, fair to employees and manufacturers alike, is to use as a measure in contests the figures that govern actual compensation payment in terms of compensation.

CHAIRMAN PEACOCK: This is an eminently practical matter Mr. Lundrigan has opened up for us. I wish we had a year of time and the freedom of the floor in the Executive Committee in the National Safety Council. However, we have spent practically half of the time of the Section in Detroit, with two protracted periods of the officers' time, in an attempt to discover a satisfactory solution of these matters. If you see fit, I see no reason why the Paper and Pulp Section should not adopt a standard of its own in its own contest. If there is a motion, let's hear it, and we will have further discussion.

Several trial motions were made and discarded. Finally a motion was made in the following form which secured a unanimous vote: Moved:

That the Paper and Pulp Section, in the contest of 1927, adopt a standard penalty of 1,000 days for fatal accidents in place of the present 6,000 days, and that penalties for permanent disabilities be computed on 1,000 days as 100 per cent instead of 6,000 as it now is.

Mr. Burns, of The National Safety Council staff, was asked to prepare and submit the new schedule at the earliest possible date. In addition the chairman was asked to present and explain the stand of the Section to the Executive Committee of the National Safety Council. This he agreed to do, stating that the verbatim report of Mr. Lundrigan's address would be incorporated as "Exhibit A."

ADJOURNMENT

Petroleum Section

New Officers of the Section

CHAIRMAN: V. R. CURRIE
The Texas Company, Houston, Texas.
GENERAL VICE-CHAIRMAN: DR. R. P. ANDERSON
American Petroleum Institute, New York City.
CHAIRMAN, PACIFIC DIVISION: CHARLES M. BUTLER
General Petroleum Corporation, Los Angeles, Calif.
CHAIRMAN, MID-CONTINENT: RAY E. MILLER
Marland Refining Co., Ponca City, Okla.
CHAIRMAN, ATLANTIC DIVISION: THOS. W. WADDINGTON
Standard Oil Company (N. J.), Elizabeth, N. J.
SECRETARY: A. A. NICHOSON
The Texas Company, New York City.

Committees

PROGRAM: F. C. SINGLETON, Chairman
Standard Oil Co. (Ind.), Chicago, Ill.
NEWS-LETTER: A. A. NICHOSON, Chairman
The Texas Co., New York City.
BY-LAWS: DR. R. P. ANDERSON, Chairman
American Petroleum Institute, New York City.
POSTER: D. J. WALLACE, Chairman
Humble Oil & Refining Co., Houston, Texas.
MEMBERSHIP: GEO. F. PRUSSING, Chairman
Union Oil Co., Los Angeles, Calif.
STATISTICAL: J. W. MYERS
Standard Oil Company (N. J.), New York City.
ENGINEERING REPRESENTATIVE: E. J. SENNE
Vacuum Oil Co., New York City.
EXECUTIVE COMMITTEE (The Officers and)
ROY S. BONSIB
Standard Oil Co. (N. J.), New York City.
F. A. SCOFIELD
Associated Oil Co., San Francisco, Calif.
J. D. BRIGHT
Texhoma Oil & Refining Co., Wichita Falls, Texas.
W. F. BURT
Standard Oil Co. (N. Y.), New York City.

J. S. GIBSON

The Prairie Pipe Line Co., Independence, Kan.

R. J. LAUDER

Roxana Petroleum Corp., St. Louis, Mo.

S. H. McKENTY

The Atlantic Refining Co., Philadelphia, Pa.

E. D. MURPHEY

Mid-Continent Petroleum Corp., Tulsa, Okla.

T. N. SHAW

The Mid-West Refining Co., Casper, Wyo.

J. M. STEFFEN

Standard Oil Co. (Kansas), Neodesha, Kan.

S. W. CANDEE

Tide Water Oil Co., New York City

C. W. SMITH

Standard Oil Co. (Indiana), Chicago, Ill.

October 26, 1926.

E. J. SENNE, Chairman

Safety Supervisor, Vacuum Oil Company, New York City

THE Tuesday Morning Session, October 26th, 1926, of the Petroleum Section convened at 9:45 o'clock at the Tuller Hotel, Detroit, Michigan, Chairman E. J. Senne, Safety Supervisor, Vacuum Oil Company, New York City, presiding.

OPENING ADDRESS

By Chairman E. J. Senne

Friends and fellow-members of the Petroleum Section! It is with much pleasure that I am again privileged to greet you at this, the Fifteenth Safety Congress. A hearty and sincere welcome is extended to all, and I trust that our sessions may be characteristic of the nature and quality of effort that has always been the standard of our industry. To the new members of our Section, for whom this may be an initial visit, we extend a special greeting and invite you to participate fully in our work and deliberations.

Ours is a work of service, not circumscribed by any set rules of procedure, but rather a duty of careful thought towards evolving the best ways and means to protect life and limb, to conserve the manpower of our industry, to avert accidents, to avoid disaster, and, in general, to provide for the safety and security of industrial workers and assist in maintaining orderly progress and to eliminate waste in its various forms.

Injured workmen need not be a by-product of industry. There is no

question that by most of you the word "Safety" has been considered from angles a thousand-fold in the comparatively short time during which the scope of our work has been concentrated. I feel that, although our progress has been somewhat slow, the greatest and most appreciative reward which has come to us is that recognition which is accorded us by the rank and file in our profession and also by the supervising forces connected with the great industry which is represented here today. This, in fact, is a reward worthy of a continued and more intensive effort.

As you all know, the field of our endeavor is among the working people, and whatever success we may achieve is only possible through their cooperation and by their acceptance of the principles which we teach and try to have them practice. Safety fundamentals are the same the world over; but it is through a higher quality of service, combined with a personality which reflects a sincere interest, real friendliness, and a personal regard—all of which are necessary in the make-up of the real, progressive safety man—that efficiency and favorable results are obtained. Any other way may seem to be effective, but will continue only to a moderate degree and for a limited time.

Education the Prime Factor in a Safety Program

Education is the prime factor in successful accomplishment of any safety program. We must follow this education along school lines, from a primary grade upwards to the point where a workman is schooled to the idea of thinking safety and working with that regard so necessary for his own good and for the best interests of his employer. Not until we are satisfied that all workers are careful men will our duties be completed.

Then again, such progress in education will vary considerably. We will find various degrees of intelligence among the workers. Some will readily learn every lesson taught; others must be led through the ABC class of safety; some will always remain in the ABC class; and, strange to say, others may even teach us. Discouragements and a seeming failure of our best efforts will come sometimes and it is in these instances where determination and courage will be needed to overcome the obstacle. Patience, diligence and earnest toil are the requisites of success in your work.

As the spirit of industrial safety work is lofty and ideal, the underlying principle being based on humanitarian impulses, there can be no more convincing evidence of the real worth of the cause to which you have devoted yourselves. The procedure, therefore, as I see it, is not one of a highly technical nature, neither the broadcasting of a maze of theoretical processes, nor the enforcement of some untried or unproven plans; it is rather a modest approach to the subject with a purpose of leadership in a movement of safety and accident prevention, which previously you have analyzed and studied, and for which you can prescribe fair and reasonable remedies, bearing in mind that the support of the employees must be obtained and maintained through

practical and common-sense methods. They will not lean to scientific or speculative practices offered to them in a complex manner; good ordinary judgment and simple advice will reach and stay with them.

Safety work unquestionably is a real part of any plant's existence, and the need was never greater for service and for sincere and competent leaders in this field. The opportunity is here and the duty to grasp it is ours. If we are to carry on this work and keep going forward—and the minute we stand still we commence to go backwards—we must begin today to make a survey of our work, and the forward march will be on.

In conclusion, I wish to acknowledge gratefully the many exceptional courtesies which have been shown to me by all of the officers of the National Safety Council and by all of our own member friends, and for the encouragement and inspiration of my associates which have signalized their support during my two terms as your general chairman. It has been a pleasure and I have considered it a duty to carry on in behalf of this great work, and if my efforts have been instrumental in helping others, or, better still, if I have been able to lessen accidents and injuries among the great army of workers, I consider that I have been amply repaid and that the greatest reward is due to our Petroleum Section for the ideals which it always wants to uphold.

Reports and Standing Committees

We will now proceed with the regular order of the program, the first being a report of officers and committees. If there are any officers or committees here to report, I will be glad to hear from them at this time. Perhaps the chairman of the various divisions are here. Is the chairman of the Atlantic Division present? Is the chairman of the Midcontinent Division present? Mr. Miller, have you any formal report to make?

RAY E. MILLER (Petroleum Safety Council, Tulsa, Oklahoma): No formal report today.

THE CHAIRMAN: I regret to announce the absence of the chairman of the Pacific Division, Mr. Kelly. During the past year Mr. Kelly has found it necessary to sever his relations with the industry, for which we are all indeed very sorry. We have lost a man whom we held in very high esteem and a competent man in every way. He has done a great deal for the Petroleum Section.

I will read the names of the standing committees as they are today:

The Program Committee: C. C. Seals, chairman, Vacuum Oil Co. Mr. S. H. McKenty, of the Atlantic Refining Company. Mr. F. L. Newcomb, of the Standard Oil Co., New Jersey.

Committee on By-Laws: Dr. R. P. Anderson, of the American Petroleum Institute; Mr. W. F. Burt, of the Standard Oil Co. of New York; Mr. Wm. V. Winslow, of the Texas Company.

Committee on News Letter: C. W. Smith, chairman, of the Standard Oil Co. of Indiana; Mr. Roy Bonsib, of the Standard Oil Co., New Jersey; Mr. H. W. Boggess, of the Sinclair Companies; Mr. R. E. Donovan, of the Standard Oil of California.

Poster Committee: Mr. F. A. Epps, of the Tidewater Oil Co.

Safety Codes Committee: Mr. Kelly, Associated Oil; Mr. Prussing, Union Oil; Mr. Timm, Standard Oil Co. of New Jersey; Mr. Roth, Vacuum Oil; Mr. Boggess, Sinclair Oil; and Mr. Miller, Midcontinent Oil and Gas Association.

The next order on the program is the appointment of a Nominating Committee. The Nominating Committee which we have selected through cooperation with the Regional Chairmen is announced as follows:

Chairman of the Nominating Committee: Mr. D. J. Wallace, of the Humble Oil & Refining Co.; Mr. E. A. Timm, of the Standard Oil, New Jersey; Mr. W. F. Burt, Standard Oil of New York; Mr. J. S. Gibson, Prairie Pipe Line Co.; Mr. M. A. Tracy, Louisiana Oil Refining; G. F. Prussing, Union Oil, and Mr. C. M. Butler, General Petroleum Corporation.

Before announcing the name of the first speaker, I just want to outline briefly my ideas of the man.

The gentleman who will first address you is really one of the founders of the Petroleum Section. He has done considerable pioneer work, and that pioneer work has been supplemented by actual physical work, practical planning and continued effort for the best interests of the Section and for the oil industry. He is known by all of the members as a capable and efficient man, a friend of everybody, and a man whom we all enjoy having as company. I am very pleased to present to you Mr. D. J. Wallace, of the Humble Oil & Refining Company.

A Lantern in the Middle of the Road

D. J. WALLACE (Humble Oil & Refining Co., Houston, Texas): That makes it awfully difficult for me, and inasmuch as my voice is weak this morning, I am going to ask everybody to come up here and sit in the front seats. We are not going to work you very hard, but we surely would like to have you in these front seats.

I am sure that everybody thought there was hyperbole in the chairman's remarks. The only reason they put me on the program was to open things up and get going, and we have in the organization an infinitely better can-opener than I am, and I am going to ask Mr. Currie to say a few words to start the thing off and then it will make it easier for me.

V. R. CURRIE (The Texas Co., Houston, Texas): Considering the fact that most of us are more or less strangers in Detroit and that many pitfalls and temptations are likely to cross our way during the next few days, especially due to our proximity to the Canadian border, I thought that perhaps it might be well to call the attention of the members of the Section at the outset of this meeting to a clipping which I cut a few days ago from one of our newspapers. This is dated in San Antonio, Texas, the state that Don Wallace comes from.

"September 18th. A drunken man now sleeping it off in the Barr County jail has proved beyond any reasonable doubt that self-preservation is the first law of nature. Midnight Friday found this self-same

man too much the worse for drink. He knew it and like a whole lot of drunken men he needed sleep badly. The middle of South Almo Street looked fairly safe for sleeping at that time of the night, but before retiring he placed a red lantern at his feet. 'Why the lantern?' a motorcycle officer asked the gentleman after awakening him. 'Well, some of these drunken fellows will run over a fellow if he ain't careful,' was the reply."

Mr. Chairman, I would like to suggest that a committee be appointed to purchase a half a carload of red lanterns to distribute among the employees for their protection during the coming week.

THE CHAIRMAN: The chairman will take note of your recommendation.

EXPERIENCE AND PROSPECT OF SAFETY IN PRODUCING TERRITORY

A Round Table Discussion, Led by D. J. Wallace, Humble Oil and Refining Co., Houston, Texas

I am going to surprise you a little bit.

If I remember rightly, my talk this morning was to be on the "Experience and Prospect of Safety in Producing Territory," and inasmuch as I have not been connected with the producing end of the game for the last couple of years, it left me at a loss to know how to tackle the thing. So I wrote to a friend of mine with the Texas Employers' Insurance Association, and asked him to give me a typical group of accidents which had occurred at any time in the Midcontinental territory, and I have here a group of reports of fatal accidents that he sent to me covering only the state of Texas for a period of about 18 months.

These are the original accident reports in most instances. Sometimes they are copies, but they are all verbatim copies.

What I am going to do—and I certainly hope you will bear with me and cooperate with me in this—I am going to pass these reports out and ask each man who gets one, as it comes his turn, to rise and read "Section D" of this accident report form—what it says about the injury, and then say whatever he will, just give us his own thoughts as to how the accident could have been prevented; and let's have just a very short discussion on each one of these accidents.

That, it seems to me, ought to make it interesting for this meeting. This is a whole bunch of fatal accidents, and they are from the files of only one insurance company out of about seven. So you can see that it really is serious.

Mr. Shaw, will you start the thing off?

MR. SHAW: This accident under "Section D" describes fully how the accident occurred. "Injured party and helper had finished loading six inch bars of round steel onto a wagon and had started to drive away from box car. In making turn, bars of steel which were protruding, fell down, throwing party under left tongue mule, which was thrown down by tongue and whiffletree. As wagon turned over party fell under hindquarters of this mule, receiving crushed skull, dying instantly."

That tells how it happened. The logical follow-up questions, to my

ming, would be: Was the accident avoidable and if so, how could it have been prevented?

In my opinion this accident would have been avoidable because this load evidently was not properly placed on the wagon, and with the protruding bar apparently tripped this mule or cramped the wagon around. That would be carelessness in loading. These fellows evidently weren't watching their job in the loading. That is the primary cause of the injury. What subsequently happened is to be expected with improper loading, and the whole thing, to my mind, shows carelessness on the part of loading. Greater care would have prevented the accident.

MR. WALLACE: Thank you, Mr. Shaw; that is fine.

Mr. Shaw's difficulty in reading the report is the difficulty that we all have in the reports that come in from the field—not carefully made out. They don't show graphically how the accident occurred. Nevertheless, his analysis is very good. Let's confine ourselves to sixty seconds.

T. W. WADDINGTON (Standard Oil Co. of N. J.): This report is of a man who was injured evidently working on a tank on the Humble Pipe Line Company.

"While working on a tank scaffold, standing on bench supported by scaffold, and piling up iron at about 22 feet above ground, the injured man lost his balance, fell backward, dropped to the bottom of the tank."

I do not think you need any comment from me as to what might have prevented this accident. If that man was working on an honest-to-goodness tank erection job and was in a fitting-up cage he could not have fallen backward, because the back of the cage would have prevented this. I do not know what the circumstances were, but if he was standing on a box or an improvised scaffold, that was all wrong. A fitting-up cage would have prevented the accident. Evidently he was fitting up iron.

A Foreman Who Exposed Himself Unnecessarily

F. L. NEWCOMB (Standard Oil of New Jersey): This is a case of a foreman who while overseeing men loading a car was hit by a piece of steel. The foreman should have stayed out of the way; and another thing, I don't think he was supervising the job properly.

MR. WALLACE: There is so much of this that it is going to take us a long while to go over it, and the thought I was trying to get across by asking you to read these was to give you a graphic picture of the production end in the past three or four years. We don't want to take any longer than is absolutely necessary to do. If you don't think the report is fit, it is perfectly all right to say so, but we would like to get the high lights on all of them.

MEMBER: This report says four men tried to lift a barrel and a man got hurt in the side and died afterwards. It shows they should have used a skid.

MR. WALLACE: That we classify as poor judgment. A man is so liable to lift a little bit more than he should. You have got to watch your men when they are enthused.

W. E. MCGRAW (H. H. Robertson Co., Pittsburgh, Pa.): This is a head and shoulder accident resulting in death.

"On a car in which piling was being extended, and was preparing to roll another pile from the car. Men in the car called out, but he failed to get out of the way and the pile struck him and he was immediately rushed to the hospital."

I think there is only one answer to that and that is carelessness.

MEMBER: This seems to be an alleged injury. "Walked out of the way of a locomotive, jumped and fell." Evidently, any stumbling and falling accident is just about the same.

CHAIRMAN SENNE: The report that I have represents one of the most commonplace accidents that we hear of. A man was killed through a fractured skull. His automobile collided with a street car.

The element of control there is in favor of the street car. A street car has only one mode of progress, it runs on a track; it only has one way to go. It is usually under control. It is usually under a speed of less than 10 miles. The automobile average speed is probably 20 to 40 miles. It appears here that this man was entirely at fault because he should have had his car under proper control and avoided a collision with the street car. It is all up to the driver of the car. I should say, the human element of neglect.

Cases of Carelessness and Oversight

MEMBER: This man was caught on a tubing line and caught in the block. It was not a fatal accident but he lost four fingers of his right hand. I think that was a case of carelessness.

MEMBER: "Deceased left bull rope lying idle on the shaft. Deceased attempted to remove bull rope away from the wheel and rope came in contact with the wheel, where either post or rope must break. So post broke, which struck deceased and knocked him in the hole." That was a drilling operation.

Undoubtedly a case of oversight or carelessness on the part of the man in not seeing that his ropes were clear of this revolving wheel before starting the tools down into the hole.

MEMBER: This man left home at midnight to go on duty at the powerhouse and the superintendent found him at the clutch dead at 4:30 in the morning in a badly mangled condition, evidently caught in the clutch.

A man leaving for work at that time of morning might have been a little bit sleepy in operating his clutch, or he should have shut down the gas engine before he went to the clutch.

MEMBER: This man was standing astride of the drilling line. The clamps gave way and injured him. In my opinion, he should not have been standing astride of the drilling line, but to one side and it would not have happened.

MEMBER: A fireman 50 years of age was firing a boiler. "Employee allowed water in the boiler to run low without taking notice of this fact, and turned on the injector, causing terrific steam pressure and causing the man's death."

Very evidently the man was careless in not watching the water gauge, otherwise he would certainly have known how low the water was in his boiler; although the water was in the boiler, the boiler had a blowout which could have been opened and the explosion avoided.

MR. WALLACE: You will find some boiler blowouts in this, and you will notice on almost every one of them that a safeguard is provided to prevent this, and those safety appliances consist of a valve which you can't open with a crow-bar and possibly a water gauge. That is quite typical of the Midcontinent territory, and I presume in most of the other fields. They are runned for safety and they think everything that they can get and they set it up in a boiler and set it up. I have found lots of them.

Let's have about three or four more and the rest of you read them to yourselves.

MEMBER: May I ask if any of the companies have done anything at all in using a water alarm for boilers?

MR. WALLACE: The Fiske Company and we ourselves have tried it out but it has been our experience that they depend too much on the low water alarm rather than on any automatic device. However, that is nothing against the low water alarm.

MEMBER: Company car operated by employee was struck by railroad train causing death. That is obviously carelessness.

Money Lost in Accidents Outside the Plant

MR. WALLACE: How many companies are really losing more money by accidents outside of the plant than they are in the plant? All of them. We are going to find some day that the ramifications of this particular Section go into almost all other Sections, and particularly into the Section on Public Safety. That is our particular problem, to keep the boys from getting killed going and coming from their work.

MEMBER: I have another automobile accident that I don't think I will discuss. In this particular case there isn't anything in this report which will tell you what happened. We have gotten up an auxiliary form that we are sending out with every accident in which, if it isn't a fatal accident, the individual who is injured goes over that report and we have a list of causes—carelessness, wrong methods, poor tools—and ask the injured man to check what he considers caused that accident, sign his name to it and send it in. We find that helps a lot to get down to details. If a report comes in that isn't in sufficient detail to tell what happened, we are returning it, and we tell them it must be in sufficient detail so that the man who reads it knows as much about it as the man who was on the job.

MR. WALLACE: That should be done.

I wonder now if you don't have a reasonably good picture of what the experience has been throughout our part of the country, and I presume it is the same with all of you. The experiences are regrettable, of course, but if we learn by them as we should and profit by them, then there will be at least that much to help us.

As far as prospects are concerned for safety, I feel that if we try to dwell too much on that we will simply be counting our chickens before they are hatched. We all hope for a better record in the future than we have had in the past, and the few years that we have been working together I think have shown a very real development in safety. I know that it has in the Midcontinent territory through our local association there. We have been showing pictures, etc., as you all know, holding foremen's meetings and doing all that we can to get the work down to the man in the field. And that is the problem in the production work because the men in the outlying places are hard to reach and can't be reached very readily by any one company doing it alone with their own men.

However, I believe I am right when I say that there isn't a company in the Midcontinent territory now that isn't really interested in safety work. They are not all bearing their part of the burden; they are all taking a real interest in the work, and that speaks very well for prospects in the future.

I would like to consider this Section here as the real incubator for the ideas that are going to be hatched eventually and the chickens that we can count. I don't want to make any attempt to count them at this time, but I do have a very firm belief that the eggs that are laid here, if we will take them home and incubate them carefully, will hatch into chickens that will really be helpful to us in our work. I only wish that I had the real eggs to leave with you.

The Mental Attitude Necessary in Safety Thought

My experience has convinced me more and more that what we have to do back home, back in our own fields, is simply a shoulder-to-shoulder work with the fellows who are exposed to the hazards, getting as close to them as we can, and developing if possible that mental attitude on their part which in the last analysis is the only thing that is going to protect them. If we can develop the mental attitude that the employees should have, then the ambulances won't have to run near as much and their protection will be just as much with them on their way to work and on their way from work as it is on the job. And that I believe is the best egg that anybody ought to try to incubate and incubate very carefully—that mental attitude on the part of our employees towards their own welfare and towards the welfare of those associated with them.

Just how to do that I don't know, but I have wondered lots of times if it wouldn't be possible in some way to develop some real traditions in the oil fields, some real traditions in our own companies, that would be helpful in developing that mental attitude. You fellows all remember the traditions of the school that you used to fight for so hard before you had to go out to work. If we could develop traditions—not only along the lines of safety, but along all lines of loyalty and real regard for the companies we are working for (which ought not to be hard with any man that is working for a legitimate oil company, because it is the highest

type of industry that we have in the country), if we could develop those traditions and that mental attitude on the part of the men that would make them fight to uphold those traditions as we used to fight to uphold the traditions of our school, then certainly we would have little trouble in our accident work.

THE CHAIRMAN: The next speaker, I am sure, has a subject of more than ordinary interest for us, a subject that I don't recall has ever been discussed or considered in any of our previous sessions, and I know from the nature and experience of our speaker that we will receive information, advice and suggestions of more than ordinary value. He is a man of experience in the oil industry, but I believe his work is also much of an experimental nature and of the nature of research. I know that we shall listen with much interest to the paper by Mr. Newcomb, on "Safety in Connection With Oil Refinery Processes."

SAFETY IN CONNECTION WITH OIL REFINERY PROCESSES

Franklin L. Newcomb, Chief Safety Inspector, General Engineering Department, Standard Oil Company (N. J.), Elizabeth, N. J.

For the past three years I have attended these meetings and heard many papers and discussions on the work being handled by the safety men of the petroleum industry and on ways and means of controlling accidents. And yet, in all this time I do not recall hearing any discussion relative to the accident hazards incident to the handling and processing of the oil itself with the exception of discussions on static electricity. Therefore I feel that at this time it will not be amiss to point out a large phase of safety work connected with the principal processes of the petroleum industry which seems to be getting a lesser amount of attention by this body than other safety work connected with work only incidental to the industry.

Crude oil and the large majority of finished products made from it are highly volatile and all are flammable. Therefore, by their very nature they contain an inherent hazard and all processes where they are involved must necessarily be of a hazardous nature. It would appear, then, that a careful analysis of the apparatus used in these processes and of the methods employed in the use of such apparatus should command considerable attention from the safety departments if these departments are to render the fullest possible safety service to the petroleum industry.

A modern and complete oil refinery covers a wide range of activity with many and varied processes, a large number of them requiring the heating of the oils to temperatures well above their flash and ignition points. Even the simplest skimming or topping plants cover a number of varied processes with their attendant hazards.

Let me briefly outline some of the major operations in an oil refinery. There is the storage of oil in bulk, usually in steel tanks, some with

no roofs, some with wooden roofs, some with steel roofs, some vapor-tight and others not, some with heating coils and most of them containing products which give off flammable vapors and gases. These tanks must be gauged at intervals to determine the amount of oil they contain. They must be painted on the outside to preserve them; must be repaired at intervals and must at times be emptied and cleaned, necessitating sending men into them.

The oil must be transferred from point to point in the plant necessitating the use of pipe lines and pumps.

In dividing the oil into its constituent parts and finishing them to marketable specifications, fractional distillation must be employed. This is carried on in stills operating only at very low pressure or, in some cases, even under a vacuum. Such stills consist of a fire box, a receptacle for holding the oil while the heat is being applied, which may be either a pipe coil or a large vessel usually cylindrical in shape, various types of fractionating equipment to condense certain of the heavier fractions and cause close separation of the vapors, a condensing and cooling equipment to condense the vapors and cool the products, and a receiving or tail house where the condensed and cooled products pass through for inspection and sampling, and are diverted to the proper tanks.

Intricate Details of the Various Processes

This process necessitates maintaining fires in the fire boxes to vaporize the oil; the operation of many valves to control the separation in the fractionating equipment and to divert the condensed products to the desired point; the taking of samples of condensed products for inspection and test; the charging of the apparatus with oil when starting up; the emptying of the apparatus at the completion of the run; the displacement of all vapors and gases before opening; the cooling of the equipment; cleaning the interior before recharging; inspection to see that the apparatus is in fit condition to operate; the complete, vapor-tight closure of the apparatus; and the displacement of all air before recharging.

The increased demand for gasoline due to the advent of the automobile resulted in the design of various types of cracking apparatus for breaking down heavy hydro-carbons into lighter hydro-carbons suitable for use in gasoline engines. Such cracking apparatus operates under high pressures ranging from 60 pounds upward to many hundred pounds per square inch, and with temperatures up in the neighborhood of 1,000 degrees F. This apparatus consists of a fire box, a receptacle for holding the oil while the heat is being applied, various types of drums for holding the oil under temperature and pressure over a period of time, fractionating equipment under various pressures, condensing and cooling equipment, heat exchangers, receiving equipment for the various products and usually high pressure pumps, in many cases handling hot oils up to 600 degrees F., as well as low pressure hot tar pumps. These processes involve all of the operations outlined under

fractional distillation, and in addition, the operation of high pressure and hot oil pumps and the control of pressures in the various parts of the equipment.

Before certain of the products are marketable they must be treated to remove impurities and to improve their color. This is done usually by one of two methods. Either a batch of oil is placed in an agitator, which is simply a tank with cone bottom, and the treating chemicals are introduced and the batch agitated by circulating with a pump or blowing with air; or the oil is pumped continuously through a series of drums where the chemicals are sprayed in and settled out. The chemicals mainly used are strong sulphuric acid litharge and bicarbonate of soda. The batch agitator method involves the pumping of the oil into and out of the apparatus; introduction of each of the chemicals in turn; agitation after the introduction of each chemical; settling after each agitation; drawing off of the settled out chemicals from the bottom; washing operations between the introduction of each chemical; and a settling and drawing off of the water. The operation of a continuous treating plant consists mainly of continuous pumping of the oil, chemical solutions and wash water and drawing off of the chemicals and wash water from the settling drums. Both methods involve the handling of acids and strong alkali solutions, and transfer of these materials is done either by use of special pumps or by blowing with compressed air from drums commonly called acid or alkali eggs or blow-cases.

Handling the Gas Formed in Refining Petroleum

In the refining of petroleum and its products quantities of gas are formed which must be handled. It is collected from low pressure stills and equipment by pipe lines connected to exhausters which create a constant suction on the line. From high pressure equipment it may be taken away through pipe lines under its own pressure. When used for certain purposes it must be purified and is often passed through scrubbers and other purifying apparatus. Much of it contains light products which can be reduced to a liquid state by absorption in heavier oils or by compression. The surplus gas which can not be utilized at the time of formation must be stored or wasted, and in many cases large gas holders, similar to those to be seen in most cities, are employed.

To send the oil to market it is shipped in various ways. When sent out by tank car it must be loaded into the car from a pipe through an open hatch and the agitation resulting causes vaporization and the release of highly flammable gases. When shipped in barrels, they must be filled through a small opening, by hose or nozzle, and gas is given off and there is liable to be dripping and spilling of the oil. When shipped in cans, the filling is usually done by machines but often the cans are closed by small caps soldered in place.

There are many other processes which it would take too long to describe, even briefly, but the above will serve to demonstrate the varied operations attendant upon the actual process of oil refining. In addition,

steam boilers, electrical power houses, transmission of electricity, by wire, air compressors and air receivers with their attendant operations and hazards enter into the operation of practically every refinery.

It is apparent that practically every operation mentioned has the potentialities of being a hazard. There are three main factors which enter into the safety of these processes.

First, the equipment must be suitable for the job, that is, it must be made of the right material, properly put together and of ample strength. This is a problem of design and an engineering function.

Second, the proper methods must be used in handling the equipment and performing the various operations. This is a problem of operation.

Third, the equipment must be kept in good condition at all times. This is a problem of inspection and maintenance.

What Is Being Done in Design

Let us consider the first fact, namely, that of design, and see what is being done. Only a comparatively few years ago, most of the design was by rule of thumb. The operating man said what he wanted and the foremen of the various trades did the rest. The boilermaker built a still, making it as thick as he thought necessary and riveting it together as his experience dictated. Even at that, we got a pretty good job because we usually had a pretty good boilermaker foreman. It was the same with the pipe-fitting, masonry, and so on. But they did not always get the material best suited for the conditions, nor did they always make proper provision for all of the strains. Today our large companies all have well organized engineering departments and equipment is being designed scientifically. Investigations are being made into the most suitable materials to be used in different locations and under various conditions. Cracking and other pressure equipment particularly is receiving intensive study.

Taking the second fact, that of employing proper methods in the handling of the equipment and performing the various operations, our operating people are giving it considerable attention today. Processes are being studied and analyzed by our executives. In some companies well organized departments are making careful research to find the best method of operation, not only to get the maximum yields of the most valuable products, but also to avoid accidents and fires which may result in long shut-downs for repairs.

Our third fact, that of keeping the equipment in good condition, is being handled in two ways. Maintenance forces composed of mechanics make periodic visual inspection of the equipment, usually during each cleaning period and make such repairs as appear necessary. This is of course, an absolute necessity to keep the equipment operating.

Some of our companies have also an engineering inspection force to make more exhaustive inspections of equipment than can be done during the cleaning period by the maintenance forces. These engineering inspection forces were an outgrowth of the advent of cracking. After cracking

equipment has been in operation for a number of years, serious failures started to occur and the industry began to make an investigation. It was found that cracking equipment deteriorated quite rapidly, especially in some particular places. As it operated under considerable pressure, it could not be permitted to go until leaks occurred or a sharp blow from a hammer would indicate a weak spot.

So gradually these engineering inspection forces were built up to make periodic, systematic inspection of the equipment. The deterioration in cracking equipment is difficult to determine, as it is not visible to the eye, there usually being no marked pitted or corroded areas. Generally the metal has the same smooth appearance as when new. However, the deterioration is not uniform, but often occurs in long waves which can not be seen and for this reason it is difficult to locate the thinnest spots. Parts thinner than others can often be found by sounding with a light hammer, but it takes an experienced and trained man to know the sound. Due to the nature of the deterioration, it has become quite generally the custom to drill holes in various parts of the equipment to determine its actual thickness. These inspection forces also check over all parts of the equipment including pipe, valves, gauges, safety valves, etc., and check up to see that the refinery's maintenance forces are keeping everything in a safe condition.

The Inspection Field Being Widened

The field covered by these engineering inspection forces is being gradually widened and inspections have been made of storage tanks, gas absorbers, gas holders, air receivers, acid and alkali eggs and such things. Men trained to inspect cracking equipment are admirably fitted to inspect any pressure equipment.

Although all the above is being done for safe operation of the actual refining equipment, I believe your accident records will show lost time accidents due to failure of various parts of the equipment or to some operation of the equipment, and I further believe that if you will look into the matter you will find that generally such accidents are of a most serious nature. They may not make up a very large percentage of your frequency rate but I think you will find that if they could be eliminated your severity rate would show a very marked reduction, and, after all, aren't we just as anxious to reduce the severity rate as we are the frequency rate, or more so?

Now that we have considered the various functions of oil refining and the work being done to make it safe, let us consider what the safety department can do to further this work. It may appear that the engineering departments, process operators and maintenance forces are covering the situation, but you can assist materially in advancing this work.

Take the engineering and design. You safety men spend a good part of your time out in the plant. You make inspections and you talk to and get acquainted with the men. They talk freely to you. A member of the engineering department does not hear the men's troubles. You can help by reporting what appears to be trouble with some particular

kind of apparatus or some particular material, and give the engineering department an opportunity to investigate. Are you trying to get and report this information?

Almost the same thing applies to the processing operations. Do the men ever tell of troubles with the methods employed? If they do, do you know enough about the operation to investigate and see if there is any foundation for the complaint? Then is it taken up and followed until a safe method is substituted?

On the maintenance and inspection you can help very greatly. Find the apparatus about the plant which is in need of inspection and then get it inspected. Just at present there is one of our plant safety men who has made a list of every pressure vessel in his plant which is not now being inspected, and he is trying to get his superiors to ask for periodic engineering inspection of this equipment. I understand there are 110 pressure vessels on this list. This is what I mean by helping the inspection force.

Then as you get or can make the opportunity, study every operation and piece of equipment and look for unsafe practices and equipment.

Only a few months ago a vice-president of a prominent oil company asked me if I knew of a safety man who could come into one of his refineries and make an inspection of his refining equipment and processes, point out any part of any equipment which might be dangerous and suggest means of making it safe, point out all parts of the process methods which might be unsafe and make suggestions for making them safe, and point out all points of hazard in the process which could not be eliminated, and tell him how to reduce the hazard to a minimum by laying down the precautions to be taken. Is there any one here who feels qualified to take on that job?

It would appear that there is still a very large field of safety work in the petroleum industry which requires a large amount of study.

Discussion Following Mr. Newcomb's Paper

T. W. WADDINGTON (Standard Oil Co. (N. J.), Elizabeth, N. J.): Supplementing what Mr. Newcomb said, where he spoke of a plant that had a list of 110 pressure vessels and setting the machinery in motion in the matter of systematic tests and inspections, I would like to say he refers to the Bayway Refinery and that this has already taken place. It is unquestionably a step in the right direction. People say: "Oh, yes, we inspect our pressure drums." Sure you do. "When did you inspect this drum last?" "Let's see." They scratch their head and there may be a mark there indicating somebody looked at it perhaps over 18 months ago. But is the inspection periodic and do they know? The vessel may be right at the edge of failure with no safety factor and ready to let go. A water test won't tell you. It may be you will have to drill a hole in the metal to determine the thickness and sound it. This should be done by somebody with experience. Find out actually whether your pressure vessels are ready to let go or not. You would be surprised to

know how many would be thrown into discard when you got through.

THE CHAIRMAN: I would like to ask Mr. Newcomb whether there is such a plan of periodic inspection of pressure vessels. In other words, do you shut down every type of pressure vessel every so often for the object of inspection, the same as we do on boilers? You know, we have boiler washings and regular periodic boiler inspection.

MR. NEWCOMB: Up to date it has not applied to all pressure vessels. It has applied to some of them. All of our high pressure cracking equipment is shut down three time a year for inspection, and we make a thorough inspection of everything. We drill holes wherever we think it is necessary and we don't stint to use the drill. We stick it through any place where we think it is thin and just on a hunch sometimes. We are beginning to do it on other pressure vessels.

Startling Discoveries Sometimes Are Made

Some time ago a man in charge of Bayway's gas plant read an article about a gas holder where the roof had failed due to the fact the rivet heads were all eaten off on the inside and it opened up and the gas escaped and traveled half a mile, hit an open flame, flashed, and carried everything clear back to the holder. So he asked us to inspect his gas holders. We went in there and while we were waiting for a scaffold on the inside the inspector walked up on the roof. He thought he would sound the roof; he gave it a good solid crack with a hammer and the rivets popped out. The man had a good hunch.

We are inspecting gas absorber towers regularly, and we will now inspect all of these 110 pressure vessels in Bayway Refinery periodically. Our periods will vary, depending on the corrosion we find. Hereafter when we make the first inspection on this equipment we will suggest the periods which we think are necessary. They will be at least once a year and on some equipment that appears to be deteriorating rapidly, probably more often.

MR. BURKHARDT: Do you use totally enclosed electric motors?

MR. NEWCOMB: Our motors are usually put in a separate room and our shaft is driven through a stuffing box in the wall. I believe that the company has installed one or two in some outlying stations, but what results they have had from them I do not know.

MR. RISNER: What is the best gas to use to remove the air when you charge your stills?

MR. NEWCOMB: We usually use steam. Anything that hasn't got any oxygen in it will, I imagine, do the trick.

MR. WALLACE: Mr. Chairman, I haven't any question to ask at all. But I plead guilty to not being able to answer the questions that the executive wanted answered. And knowing this, I don't believe there is another man here who would be able to go into a refinery and pick out the theoretical hazards that he has outlined, and tell us whether the equipment was safe and where the hazards are and whether they could be eliminated.

If that is true, why isn't it worth while to develop on Mr. Newcomb's

paper, through committee work next year, something to secure the information that we ought to have? Lots of it is in his paper, but we need more. Certainly the Section could do nothing that would be more helpful in the refinery end of our work than to give us a real insight into the theoretical hazards. I mean those hazards that are not apparent, those hazards which when they do culminate in an accident produce a real catastrophe. Those are the things we want to eliminate if we possibly can, and I wish that from this paper which Mr. Newcomb has given us, which is one of the best papers I have ever heard here, we could develop something that would give us that information. I believe we could do it through committees if the committees would just act.

MR. NEWCOMB: Might I say that I am also one of those who have to plead guilty to not being able to answer the questions that were asked? I told the executive that I didn't know of any man that could do what he wanted done.

Reluctance to Shut Down Stills for Necessary Repairs

MR. TRIBNER: I think there are some of us here connected with smaller plants, and I would like to suggest an annex to that paper which would suggest cooperation between an executive and an inspector. That is my chief trouble, to get the executives to permit shutting down the stills and make repairs which we report are necessary. The production comes along and we have to get it out, get out the material, and they will not put in enough extra equipment to take care of peak loads; and I think there are quite a few of us in the same situation. I think that would be a point worth bringing up.

I know the three accidents I have had in 12 years were all reported and requests made in writing and by telegraph or telephone in most cases; still nothing was done and the first thing the accident occurred.

THE CHAIRMAN: I should say, indeed, that is a very serious situation when an inspector reports such lack of consideration of suggestions on the part of an executive; especially when he backs up that statement by reporting that telegrams and different ways of communication were resorted to, and still no action was received, until an accident happened. That is a serious situation.

ROY S. BOXSM (Standard Oil Co. (N. J.)): I want to back up Mr. Wallace's remarks about the need for definite, systematic codes. I am also guilty of not being able to answer any of the questions; and if the Petroleum Section is to gain the place that it should occupy in the petroleum world, it is going to have to do it through offering something to the petroleum industry that it needs very vitally; to give them something definite, not about or nearly so, but something definite that the different plants, especially the smaller plants, can use.

Of course, the larger plants need it and in most of the large plants there is work of standardization under way now, but if this Petroleum Section could get up something concrete, definite, exact, then we have got a basis of forming and establishing a very definite place in the

petroleum industry, a place that we can occupy and a place we should occupy.

S. W. CANDEE (Tidewater Oil Co., N. Y.): I would like to ask Mr. Newcomb on the reports that are made by the Engineering Department; lots of times that information should be gotten across to the men—not only to the supervisory corps, but to the men. How do you accomplish that?

MR. NEWCOMB: We do a great deal of educational work through our individual inspectors. We make it a point to listen to everything that anybody has to say. We talk to the firemen and we talk to everybody right up the line, and we try to get their confidence and we do get it, and these men talk to us and they come to us when we go into a plant to inspect and we encourage them to bring to us anything of which they are in doubt. It doesn't make any difference how foolish their question is, we treat it just as seriously as though it was something valuable. Probably nine out of every 10 things we get from the men are not worth anything, but we take the time to sit down with that man and show him why it is not and encourage him to come again. We don't make him feel foolish over it, and the tenth one is something which we have found valuable, which we would not otherwise have gotten, and it is worth all the time we have worked on the proposition.

Cooperation with the Mechanical Maintenance People

We work with the mechanical maintenance people and show them what they ought to know about the thing. It has been stated to me that when my men come into the plant, the people operating right down on the stills, the foremen and the still men, all feel that my men come in there as a part of their organization and they just fit right into it. And that is the hardest part of my job—to get these young inspectors to get that idea across and keep it across. They are very likely to get cocky and want to show off their authority, and I have to sit on them all the time to keep them from doing it.

But we have, as far as the cracking equipment is concerned, absolute authority. If one of my men says the repairs have got to be made, the refinery always makes that repair before that still goes into operation, or he has got to shut the still down; and the only people who can over-rule it is the Board of Directors. It has only come up twice and so far we have never been over-ruled.

MR. CANDEE: How would that work if you haven't got a large inspection department?

MR. NEWCOMB: At one time I went around personally and inspected this equipment. You have pretty nearly got to have it under your jurisdiction separate from the refinery. You can't have it under the refinery's authority. It has got to be someone who has got authority and comes under some jurisdiction other than the refinery itself with authority to say that this must be done.

When you have got that authority you have got to be careful how

you handle it. Where you possibly can you had better advise, but sometimes you have got to use your authority. But we never insist if we can get it done any other way, and when we say that a thing has got to be repaired, we try not to tell them how to repair it, but let them suggest it themselves, and unless we can see something wrong with their way of doing it, we let them do it that way. But we always have a way of doing a thing in our own minds before we say anything has got to be done. But we let the other fellow do it his own way if possible. We find it makes a lot better feeling.

JOHN S. SHAW (Hercules Powder Co., Wilmington, Del.): I think Mr. Newcomb touched the key to the secret of real success in safety work when he spoke of listening to every workman, encouraging suggestions. But I want to ask him what he does if after an investigation he finds the suggestion is no good. Does he return to that workman and follow up in an educational way, discuss it with him and tell him why he is wrong and encourage him to keep on suggesting?

Getting the Cooperation of the Employee

MR. NEWCOMB: We do. We sit down with a man and talk to him. Usually the suggestions are verbal. They come to the inspector as he is out on the job and his face is dirty like any still cleaner's. He sits down and he is just one of the men. We carefully explain to him just why we think it is safe, and why he was wrong in the first place, and we encourage him to come again. As I say, we try not to make him feel foolish in any way, shape or manner.

MR. SHAW: I think that is the most important part of safety work.

J. M. STEFFEN (Standard Oil Co., Kansas): I am also strong in the belief that rubbing shoulders with the man actually on the job is the key to the real situation. I have had the experience many times where a man would tell me: "Well, I suggested this to the superintendent or to the foreman long ago but nothing was ever done about it, and I feel almost like never making any other suggestion." That comes from the men themselves, and it is the problem of the safety man to take up that particular suggestion and act as a go-between those in authority and those who make proper suggestions.

Now, I spend a lot of time right with the men, just as has been suggested here. Three-fourths of my time is out in the yard among the various processes. In many cases I have to acknowledge that a certain thing that doesn't look just right to me may be all right, because I am really ignorant of the situation myself and I get a lot of valuable information by just talking with the man on the job; and oftentimes he educates me to things that are valuable to me and at the same time I gain his confidence because he feels free to talk to me.

Then another thing: whenever I make a recommendation to the superintendent (in my particular case I am to make my reports to the superintendent), I make them in writing and keep a copy. He knows that. This suggestion is brought up before the board of directors to be acted upon, especially if it is something that involves the expenditure of con-

siderable money or means the outlay of material and time. We have had a number of instances where my recommendations have been side-tracked or neglected, either through oversight or a refusal to spend the proper time or money, that a little later developed into some kind of an accident; and I had the supreme satisfaction of pulling out my recommendation covering that particular phase and saying "I told you so."

F. A. SCOFIELD (Associated Oil Co., San Francisco, Cal.): There are two studies being made next year in California on refining processes. Mr. Miller, of the Bureau of Mines, will probably check me up on that.

I think that a Bureau of Mines man is going to make a survey and report on safety appliances and processes in the refineries, and then the State Industrial Accident Commissioner is going to do the same and issue orders for California. It occurs to me that in connection with Mr. Wallace's suggestion regarding further study, you might want to keep that in mind. I am not quite certain on it but I am pretty sure that that is going to be carried out. Mr. Prussing, of the Union Oil, can probably tell more about it.

MR. LAU (Standard Oil Co. of Indiana): Am I led to believe that the safety department assumes all the responsibility for all the accidents that occur in the New Jersey plant in regard to process work?

MR. NEWCOMB: In so far as cracking equipment is concerned, we are responsible for any accidents which occur to the equipment—that is, the safety inspection division of the general Engineering Department. It was put up to me personally when I took this job that I was responsible for the equipment, and if any accidents occurred I was to be held for them.

The Safety Department May Take Too Much Responsibility

MR. LAU: I believe that is assuming a lot of responsibility in taking the process away from the real process men. The condition of the equipment lies mainly with the process men. It is their job and they know the work. We come out as inspectors and we probably don't know anything about this equipment, whereas the old timer's know these different processes. I believe the safety department is taking too much responsibility.

MR. NEWCOMB: You will find they don't know very much about the strength of cracking equipment when they operate around 300 or 400 or 500 pounds, and they will tell you it is perfectly safe. You start to figure it and see whether it is or not.

MR. WADDINGTON: I don't know as I have much to add to this discussion, except this—that there is a distinct difference between the responsibility for the physical strength of equipment and responsibility for operation, entirely distinct. Physical condition, from an engineering standpoint as to probable or actual strength, can not be determined by a process man. A process man is responsible for the operation and maintenance of his equipment perhaps, and his obligation is or should be limited there.

I would like to note while on this subject how close you can go to the

safety factor of a drum or tank without something happening. In one of our refineries (and I am not going to mention the particular refinery because something did happen afterwards), back as far as 1913, I was identified with the General Safety Committee just then formed in the Standard Oil of New Jersey. We were visiting one of the plants and had occasion to examine a tank some 60 feet in diameter, 20 or 30 feet high, and there was very visual evidence of deterioration of the material, although they had been very liberal with the paint. An examination and computation of what was left of the metal indicated that there was no safety factor at all. I reported the facts, but in those days safety was not taken as seriously as now, and while we had recognition to go around and make these inspections, our inspection didn't have the weight it has today. The tank held on for four years longer and then let go and deluged the locality, and I think there were one or two injuries as a result.

Had the present recognized inspection been in vogue in those days and if they had been backed up as they are today, that particular accident wouldn't have happened. That is rather an extreme case and we don't pretend to go around and sound all the containers and tanks of that character, but we certainly do undertake to, and actually do, test all pressure vessels and other containers and place the responsibility with one man, keeping it away from the operating force. Many a time an operating man will say: "Oh, well, we will run it once more. We can't shut the still down." That doesn't go. That "once more" might be the fatal time.

This Accident Might Have Been Avoided

MR. NEWCOMB: I know of a case, not in my own company, where there was an inspection force in operation similar to ours, but where the inspector did not have the authority, and he reported to the manager of the plant in which he was inspecting the conditions which he found. He found a still which was in bad condition but he had no authority to close it down. Had the conditions been such in our equipment it would never have made another run. They had no still available to put in its place, but they could have one in two weeks. It ran for exactly one week to a day when it blew the head out of the still and killed eight men.

T. N. SHAW (The Midwest Refining Co., Midwest, Wy.): I believe the duty of safety work can be lined up broadly under one head and that is executive. The fact brought out quite forcefully this morning is one that I have always realized in safety work, and that is that no safety man can be expected to know all branches of the work, and I believe he should really be an executive; that his duty is to initiate inspection. If he happens to be capable of inspecting some particular branch of the work, well and good. If not, get hold of them then in that particular department who are capable of inspecting and follow it up. When an accident occurs, communicate with the department heads, men who are directly in charge of that work. Invariably they know more about it

than you do. If it is a question of strength of materials and things of that sort, pull in your Engineering Department, or whatever department is necessary to cover that particular thing.

The safety man should be a bureau of investigation rather than information. He is the one who should go out seeking the information from the various ones. You get cooperation much better that way. It might be the man on the job that you want to talk to and find out what he did and recommends, or it might be the department head behind the mahogany desk with the glass top. But whatever it is, the safety man is the go-between. He can't be expected to know it all, and if he follows that all along the line from the worker to the executive in the office, he is going to get better results and better cooperation than he does if he goes out and tries to tell somebody else what to do.

Men Have a Particular Pride in Their Own Ideas

If you have an idea of your own you will work your head off to put it over. It doesn't make any difference whether it is the man who has the muck stick cleaning out the still or digging a ditch, if he has got an idea that he thinks can help things, help him put it over. And with the fellow half way up, and with the executive, it is the same way. If you can go into an executive's office and say: "Mr. Jones, I was glad to see today the proposition you spoke about last week works out so satisfactorily," it makes him feel good. Or if you can get anybody else along the line, the same way. Get them all together working for the one aim. And even if you have got an idea yourself to put over, let somebody else think it is his idea and he will put it over for you.

THE CHAIRMAN: On that subject of tie-in between the department head whose department is being inspected, I believe it is generally understood and has been arranged through the industry that on inspection trips the Inspection Committee generally stops in the department and picks up the foreman or man in charge of that department of the company. That seems to me to be a very fair, reasonable and necessary plan.

MR. SHAW (Hercules Powder Co.): And then there is another tie, and that is a standards committee. A standards committee is composed of safety men and engineers, and that committee absolutely ties in the engineering with safety and operations; and no method can be changed, no piece of apparatus can be changed, no new design accepted until that standards committee has acted and passed on this change.

In our company we have such a standards committee working now and we have wiped out a lot of misunderstandings and a lot of work for our safety inspectors, because when a safety inspector is in on the game with the engineer, and the engineer with the operating man, too, then all must be satisfied before the change goes into effect.

J. A. LEAVEN (Standard Accident Insurance Co., Detroit, Mich.): There has been a lot of discussion of inspection certificates. I am interested in accident tabulation and their elimination. I would like to ask if there has been any tabulation of accidents kept and anything of what has

been done toward elimination of a repetition of those same accidents?

THE CHAIRMAN: I think that we may have to defer that for another session. That is a little bit off our regular program. If you will come to a later meeting when we discuss accident tabulation, we will be able to refer to that.

MR. LEAVEN: I thought this might be brought up under the discussion of accidents. I thought Mr. Newcomb might have something in mind along that line.

MR. NEWCOMB: We have nothing in mind along that line, excepting I know when accidents occur they are always of a serious nature. When a still let's go you usually kill a man or two. And on this other equipment you get fatal accidents. A fatal accident doesn't show any higher on your frequency rate, but it shows up on your severity.

I am in a different position than the majority of the men present here in that I simply have charge of the physical inspection of equipment, and I think, too, Mr. Chairman, that some of them are getting the idea around here that I was suggesting that the safety men should do the very work that I am doing. That wasn't my idea at all. My idea was if you people could influence your own companies who haven't such an engineering inspection force as we have, to organize such a force and then you could bring to that engineering force the things which you felt needed inspection and give them the opportunity to do the work which we are doing in our company, that you could eliminate a lot of the stuff and you would know it was safe and you wouldn't have to worry about it. That was what I was trying to get across.

The Plant Safety Men Request Inspections

I think some people got the idea that I was suggesting that the safety men ought to make these inspections which I am making. I don't feel so at all. Mr. Bonsib is the chief safety inspector of the Standard Oil Company and he wouldn't expect, nor would I expect, that he should do these things or have the detailed knowledge. It is a special field which belongs to the engineering department or some equally representative department of the company. But he does bring things to me; our plant safety men bring things to me and call them to the attention of their immediate superiors and they request these inspections.

I might say that those 110 pressure vessels are being inspected today. I have men doing it right now.

L. D. PALMER (Standard Oil Co., of Indiana): I was thinking about Mr. Wallace's suggestion on the thoughts given by our speaker. If I might suggest, Mr. Chairman, if we care to go further with this—I don't know how these matters are handled—but that the chairman appoint a committee to work out the ideas that have been expressed here and bring them back to one of our other meetings, so that we can discuss this matter. I think it is vital. We may all agree on the method that should be used for the inspections according to the desire of the different managements. This one in particular is a very extensive inspection. We could work along that line, if the chairman would care to ask some men

to give us something more definite on that so that we could act on it and arrange for some work during the year on this same subject.

THE CHAIRMAN: This is as regards the development of a safety code in connection with this subject?

MR. PALMER: I would like to refer to the speaker on that. Was that your idea?

MR. WALLACE: It is hard for me to tell what the idea was because it is rather hazy in my own mind. I believe, however, that the code would be a logical method of approach. It would give us a start. What I want to know is things of this kind—when they want to pull off a still, and we want to know what the reasonable temperature is to open that still up, and things of that kind. When you go to the process men you find that they have opened a still and may have a little trouble, they will always tell you that the temperature of the still was down possibly below where it really was. There is going to be an alibi there somewhere. On the other hand, a technical man would know immediately that it was up above a certain temperature, and things of that kind could be put readily in a code. But I don't believe that a code ought to cover all that we ought to get.

I would suggest that we lay the whole subject on the table until one of the other meetings; when the proposition is coming up we could ask for help from some of the other organizations. That will be discussed I am sure at a later meeting. If it is permissible, let's just quit it now.

A Skeleton Code is the Thing Needed

MR. BONSB (Standard Oil Co. of N. J.): What is needed there is a sort of a skeleton code. It is going to be impossible to make a detailed code that would cover all operations because no two refineries operate the same; and if some skeleton form could be drawn up with a few fundamental facts so that each of the different works could have a foundation upon which to build their individual codes, I think that is what is needed the most.

THE CHAIRMAN: We will take that under consideration to be brought up later.

We were to hear this morning from some of our friends in Oklahoma. We had planned for an address on "Training and Supervision of Employees and Foremanship," a paper by Mr. Zimmerman, of the Marland Oil Company, of Ponca City, Oklahoma. Unfortunately, at the last moment it was found necessary to send in a cancellation due to circumstances beyond Mr. Zimmerman's control. We regret exceedingly his absence here.

But, in the meantime, we have approximately the time that was allotted to him, for other subjects, and it occurred to me that this time could be put to very profitable use by opening up the meeting under a general round table discussion, during which time we will try and answer and consider any miscellaneous questions that some of our friends may have in mind. We have about 45 minutes to do that in. I take it that

all of you gentlemen would be favorable towards that, unless you prefer to make a motion to discuss some specific subject. If so, I am ready for that motion for a specific subject for discussion.

MR. PRUSSING (Union Oil Co. of California): There is a question which I should like very much to hear discussed, and that is the form of safety organization which has been found most practicable in the drilling and producing fields. I would like particularly if there is anyone here from the producing fields of the Midcontinent who could tell us something along that line.

On the Pacific Coast our safety work has progressed from year to year but still the drilling and producing fields give us our greatest concern, with only the exception of casual engineering construction. The drilling fields still produce the greatest number of accidents, they still produce the greatest severity rate, and the experience of other parts of the country would be of extreme interest at least to me and perhaps to a number of other men here present.

THE CHAIRMAN: In answer to Mr. Prussing, I think we are very fortunate this morning in having with us a man whom I consider an authority on that particular question, a man who has had a wide experience along those lines. He is here and I would like to present him at least for a few words to the meeting. Perhaps he can make an approach to the subject, at least, and bring out other discussion. I would like to introduce Mr. Ray Miller, who is the safety director of the Midcontinent Oil & Gas Association.

Safety Planning When the Employees are Scattered

RAY E. MILLER (Petroleum Safety Council, Tulsa, Oklahoma): It seems to me that we have developed a number of things this morning that need a lot of thought.

In the first place, most of the discussion this morning has been of interest to large companies. Most of the things said can't be applied to the smaller companies. That is particularly true of large inspection forces or large safety departments. I have been in contact with several hundred companies in the Midcontinent and most of those companies can't afford to do very much organized safety work. They must depend on selling the safety idea through the organization and have the organization carry it on.

Mr. Prussing brought up the question of what could be done in producing fields where the employees are so scattered. I don't know what can be done. We are trying a lot of things in the Midcontinent and I don't know how successful they are. Sometimes I get very discouraged about it. I say this frankly, that darn few men out in the fields take very much stock in safety. That is, despite the efforts that you men are carrying on and the efforts that I am carrying on, very few of them are interested in the proposition. I am thoroughly discouraged about it because I think that view is growing. I believe in the last year or two I have seen a change on the part of

the men in the field. But those men in the field want to know whether or not the executives of their companies expect them to take an interest.

Safety in the oil business—and I am speaking particularly of the Midcontinent; I don't know the other territories so well—safety has not gone across very far yet. It hasn't been received like it must be received. Very few companies in the Midcontinent are carrying on a program that embraces all the men in the fields. Some companies hold a series of meetings through the fields which interest a few of the scattered employees, but those meetings as a rule aren't kept up, the interest isn't maintained, and the results are only moderate.

It seems to me that we must do more work and that work should start with the president of your company, if you please. I often think that if the president of every oil company would spend 30 minutes a month for safety he would do more good than a lot of us are doing in spending our full time at it. If he would have a definite time each month—say, spend 30 minutes each month—or the safety department or the insurance department would report to him the accidents, by causes, by classifications, which have occurred during the past month, he might glance through them and then get the rest of the executives and the department heads together and put it up to them just as strongly as he knows how that accidents must be reduced. Let those department heads call in the supervisory forces under them in their own departmental meetings and put the same problem across to them. Let the foremen take the word back to the job that our company is strictly sold on the idea of safety and accident prevention work and take it to them and force them, if you please, to make safety a part of their everyday work.

Men in the Field Doubt Sincerity of Safety Effort

I don't know whether we are putting the idea across or not, but I simply want to tell you that in my contact with the men in the field they don't believe that the companies are backing the safety program. They just figure that it is somebody's job, and they don't take it to heart to an extent where it gets across.

I would rather hear some discussion on the problem. I would like to hear some general round-table discussion, and you will bear in mind in your discussion that we must suggest things that are possible of achievement, both in the small company as well as the large company. Let's get some ideas together. In place of Mr. Zimmerman's paper we might just as well have discussion on that subject because his subject is one that is very much to the point in accident prevention work.

T. N. SHAW (The Midwest Refining Co.): On the spur of the moment I have appointed myself as a sort of a critic.

Now, you say that the hard thing is for the small company to afford a safety organization. I am speaking now from the producing end of oil. My department covers producing, gas plants, pipe line, electrical department, etc., all in the field. Now, the biggest problem of every producing company is to keep the lifting cost down. Production is going down and

lifting cost going up and the smaller the operating company, as a ~~usual~~ thing, the higher the percentage of overhead, because the executives' salaries aren't spread out over as great a territory; and there are ~~many~~ things that every company has to have in the way of executive organization—can't get away from—and the same organization sometimes will function for a company several times its size.

Now, I made some figures not long ago on what an accident on rod and tubing work cost. I took a period of three months' time. In our producing department more than half of our accidents are on rod and tubing work, and I found in that three months' period that the average cost per accident was \$135. That includes your state compensation, which most of you have, or its equivalent, and cost of repair, hospital bill, etc. Now, if a safety organization could save a couple of accidents a month it would go a long way toward paying for this. If it couldn't save that much you had better get rid of it and get another.

The Safety Department is a Good Investment

But it is a misnomer that a safety department is an expense. It is not. It is an investment. It is sometimes hard to prove that to the management; and it is fine to talk about the humanitarian viewpoint and the saving of life and limb and all that and it sounds pretty, but the thing you want to tell the management is dollars and cents, because after all is said and done at the end of the year, if you are in the red, you sometimes have a hard time paying salaries. And that is the basis for the small outfit to work on. Show your management that you can reduce the accidents enough to pay for the operation of your department (a one-man outfit may be all that is necessary), and he can more than make his salary by keeping down accidents.

If your company has any record at all of what they have cost in the past, if you have an accounting department, you ought to be able to find that out—and we have all got accounting departments and legal departments. I don't believe there is an oil company in existence that hasn't. And they are part of your overhead, and part of their job is telling what these things cost. I doubt if there is a company in existence but what can show that the cost of accidents would pay the salaries of several men. And if one man can take the job as safety inspector or director or investigator, whatever you want to call him, he ought to be able to reduce the accidents enough to more than pay his salary. I believe that the small outfit needs it just as much in proportion as the big one.

MR. MILLER: I think the companies in the Midcontinent are coming more and more to carry on a rather definite campaign in the way of selecting employees first and then their training and supervision afterward. Most of the companies in the Midcontinent now are giving some kind of a medical examination to new employees before hiring them. That isn't working out in the field because the places of employment are so scattered that they can't have one doctor or one group of doctors making examinations. The result is they do it on the contract basis,

have doctors scattered all through the territory and pay them so much a head for passing men to employment. The result is that a lot of examinations are worthless because the doctor is only interested in getting that two or three or five dollar fee:

I was talking on this point at a meeting in one of the large fields in Oklahoma a short time ago. I was urging the foremen when they had a medical examination to look a man over pretty carefully before they accept him through a doctor, and a foreman of a large company got up and said: "I have sent 400 men to our doctor for examination and he has turned one down. I think I have done pretty good." I said I thought he needed a new doctor.

Mr. Gray, of the Peoples Gas Company, has some figures here and I think we would like to hear from him on this very question.

MR. GRAY (The Peoples Natural Gas Co., Pittsburgh, Pa.): We have had a rather interesting experience in accident prevention. The Peoples Gas Company operates about 3,000 miles of pipe line, high pressure trunk line, field and well line and city plant distributing systems. We supply over 100,000 consumers and about 89 cities and towns. We operate 25 compressing stations, with a total horsepower of about 32,000. We have a total of 1,229 producing gas wells. We also otherwise operate five gasoline producing companies. During the period from January 1, 1922, to September 30, 1926, we built six new compressing stations, rebuilt one, improved and enlarged 20, drilled 234 new wells, plugged and abandoned 185 old wells, cleaned out 206 wells, drilled 177 wells deeper, and baled about 350. Also, during that time we built at least five new low pressure plants, laid considerable pipe line, large sized pipe. During the five years we had a total exposure of 14,295,000 hours. We operate a fleet of about 200 automobiles of all kinds.

We started our campaign for safety January 1, 1925. Here are our frequency rates for five years: 1922, 1923, 1924 and nine months of this year. In 1922 our frequency rate was 25.5. In 1923 it was 40.2. In 1924 it was 47.3. In 1925, the first year we started any real safety work, it was 10.1. In 1926, the first nine months, it is 7.1.

Detailed Figures on the Cost of Accidents

On our severity rate, here is another peculiar thing. In 1922 our compensation cost us about \$6,000. In 1923 it was \$13,000. In 1924 it was something over \$26,000, but in 1924 we had one very serious accident, a gasoline explosion in which there were seven fatalities. In spite of the fact that that rate had been increasing double practically each year, the management of the company rather felt that the terrible rate in 1924 was the result of this one bad accident, which was a natural hazard of the business, something you couldn't count at all. In 1925 our total compensation was \$4,900, and for the first nine months of 1926, it is \$2,278.

In our particular case we don't have an organized safety department, as such. We don't have a safety director. We don't have a safety inspector. I have been with the company for something over 20 years, and I have been handling safety work, not as a safety director, but simply as

another one of the general superintendent's jobs. I usually get the jobs that nobody else wants, and I think that that probably is one of the reasons we have been able to do what we have done.

In watching the thing work, it strikes me that so often the company decides they want to do some safety work. They organize the safety department. They go outside the organization and bring in a safety director, safety engineer, who no doubt knows a whole lot more about safety than any man in the organization, but he doesn't in a great many cases know anything about the peculiar problems of that industry. His whole interest, of course, is to make a showing for his department, and in his suggestions for safety he is only concerned with that one phase. He is not concerned with production. He isn't concerned about anything except keeping down the accident rate.

We have local safety committees. In fact, now every regular man in our organization has served a three months' time as an active member of a safety committee in this locality. We started in and appointed three men on a safety committee in each district. We have three principal departments. We have our field department, which has charge of general field work, we have our drilling department, and we have our compression stations. In all cases our committees were made up of three men, one from each of those departments. In other words, if they went out to report on the conditions of drilling a well it wasn't an engineer from the station department or it wasn't a driller, but it was a driller and an engineer and possibly field roustabout.

The Safety Committee's Recommendations Reasonable

The result of that is when you get your recommendations in from your safety committee you have got a fairly reasonable recommendation. In other words, if the station engineer who has entirely different ideas about safety, who is out drilling and makes a suggestion which is absolutely practical from the drilling standpoint, there is a driller on that committee who can say: "That is all right confined to a compressing station, but it isn't worth anything on a well." As a result of that we have been able to do a lot of work the past year in getting real worthwhile suggestions from the men on the job.

Mr. Wallace spoke this morning particularly about the fact of taking the safety work down to the individual. We have an average of between 1,200 and 1,300 men. A lot of those are regular men and a number are casual employees. But we have been able by that method to get what I think I can honestly say is 100 per cent cooperation from every individual.

MR. SHAW: I would like to ask Mr. Gray how many employees they have?

MR. GRAY: On an average about 1,300. We have had as high as 1,575 at times, and there are months when we have been as low as 1,050 or possibly 1,100.

MR. MILLER: There is one company represented here that has been doing quite a bit in the way of field safety meetings of employees. Be-

fore I introduce them, I want to say that I have been collecting actual records from the Midcontinent and trying to analyze them, and I will make a few statements about that.

We have talked here this morning about engineering supervision, maintenance, inspection, etc. We have scarcely touched on the big problem of safety work, educating the employee to work safely. There is our opportunity, I think, to prevent most of our accidents. In these figures I have collected, an analysis seems to show that less than 10 per cent of the accidents in the Midcontinent involved any kind of machinery. Only about one or two per cent are caused by unguarded machinery or failure of equipment. So it seems to me that our big opportunity is educating the boys to do the job in the safest manner.

The Marland Oil Refining Company has been carrying on a system of safety meetings of all employees for a good many years and Mr. Morgan is here, and I think it would be interesting if he would tell us just how they conduct those meetings.

An Organized Safety Meeting Every Month

HAROLD D. MORGAN (Marland Oil Co., Ponca City, Oklahoma): We have an organized safety meeting in every field that meets regularly every month. We have a safety committee of three men. This committee is selected from the workmen in the field. They inspect the field every month and as Mr. Gray said, a man from a lease inspects another lease and a man from a pump station is sent to another pump station. The recommendations they make are valuable because they are practical men. We inspect the field monthly and at this meeting we don't present our recommendations until the committees have presented theirs, and if they bring up the subject we never mention it, but give them credit for recommending it, and make them feel it is their recommendation and back them up in it.

We have had many very valuable recommendations in that way and have reduced our accidents a great deal and cut down our accident frequency.

MR. MILLER: Attendance is compulsory, isn't it?

MR. MORGAN: Yes, we have that as a rule.

MR. MILLER: Everyone who is not on duty must attend or have a good excuse for not attending, and they seem to be getting the program over to the employees in pretty good shape. It is a hard proposition to hold those meetings often enough and in enough places so that you can reach all employees in the producing end, but it seems to be working out very nicely.

Does that help you out any, Mr. Prussing?

MR. PRUSSING: It does, because our own account of accident analysis shows that 10 per cent or less has anything to do with machinery and our first effort when safety work was actively undertaken was directed toward the guarding of mechanical hazards, because while only 10 per cent of the accidents may be due to machinery, still an unguarded ma-

chine is the cause of very serious accidents that produce the large severity rates. Having guarded as well as may be those mechanical hazards, then the problem of educating the man and keeping him up to a standard of safe operation became an extra problem, and to me it is the one problem which you never finish; and the technique and method of constantly keeping that before the men is the thing that most of us have still to learn.

We have tried in one particular field where our operations are scattered, where we have 200 men operating over a very large territory, we have tried to make the safety work, instead of the concern of a safety department, directly the concern of the superintendent. We did that with his full cooperation. He came to us and wanted to know what he could do to reduce the cost of his accidents, because in our form of accounting at my own instigation the cost of accidents is presented to the operating men in such a way that it hits them in the face every month. They have to take it in as part of their operating cost.

We don't assess them the actual cost of accidents month by month for various reasons. One being that a serious accident, a fatality, for instance, will so completely upset their records if it occurs within any one month as to make the statistics of little value. We therefore take the year's accidents, figure out the cost of those accidents on a pay roll basis, just as an insurance company figures rates, and then use that rate on the current pay roll.

The Superintendent Was Hit Forcibly

So if a man has a pay roll for \$100,000 during a month and his rate is \$2.20, he is charged up \$22 for accidents during that month, and he has to take that cost into his accounts; and when he shows the cost of lifting oil, or whatever his operation is, he has to show the cost of accidents per barrel of oil lifted.

That hit this particular superintendent rather forcibly and he asked us what form of organization we would suggest for introducing the safety methods into his particular department. My suggestion was that inasmuch as he had shown that interest himself that he assume the responsibility himself. He has done that and has put one of his own foremen, an operating man, directly on safety work. That particular man has to see all the accident reports. He is, as a matter of fact, being educated as a safety man, although he is an operating man.

I think that is going to work out in that particular field, and in some other fields it may not work out at all. But there it has already worked out to this extent—that when they have meetings, the superintendent harps on the safety subject almost more than he does on any other, because of his own personal interest in it.

MR. MILLER: In the Midcontinent we are trying to assist the various companies in maintaining safety work by safety motion pictures. Possibly some of you don't know what we are doing in this regard.

We make and show two motion pictures a year throughout the Midcontinent field and are reaching about one hundred thousand employees with

them. These shows are made up of three or four or five reels of safety and two or three reels of educational stuff along petroleum lines; and usually a short comedy goes with it to finish the show off. In that way we have about an hour and a half to two hours of entertainment for the employees and their families. It is free to them, and local committees in each case, composed of workmen and foremen on the job, make the arrangements for the show and do the advertising for it, get the crowds out. I think those pictures are going over in pretty good shape.

In addition to that, we have been holding foremen's safety meetings throughout the Midcontinent field, and the attendance and interest seem to be good. We are also putting out posters and carrying on other forms of safety work there. But the interesting part of it is that during the past few months I have been writing out to a lot of foremen in the fields and plants asking them first what they thought of safety in general, what they thought it was doing or could do; asking them, further, what recommendations they had to give on enlarging the program, any suggestions or criticisms they might have to change the program to more nearly meet the demand, and a few other questions along that line. The answers that I have received have been a source of great joy to me because I am getting some of the finest safety letters I ever saw.

When the Field Man Writes a Letter About Safety

You take a field man who is used to hard work, if you can get him to sit down and pick out on the typewriter three or four pages of single spaced information, you know he has done something; and I will say I have gotten some of the finest safety letters I ever read from those men. In the first place, it means those boys think a lot about safety before they could write such a letter, and the fact that they do think is going to help them in their work and help them put safety across to the boys working under them.

I think the program is growing in the producing field and I think the boys are getting ready to receive safety. I believe the time is ripe for a lot more intensive campaigns on the part of the companies. We are just scratching the surface now, and I believe that the time is ready to get down and do some digging.

MR. GRAY: Mr. Miller's statement that they had safety meetings at which attendance was compulsory—our experience has been that the compulsory part of that program defeats its purpose. We have a semi-annual meeting of all the employees twice a year. When I say "all the employees," that means that every compressing station that possibly can be shut down is shut down, every drilling well that is in such shape that it is not a physical impossibility to shut it down is shut down, and practically every man in the district gets in for an afternoon meeting, with dinner in the evening in the early summer.

In that way the men are paid for their time in the afternoon, and the company furnishes the dinner. In the fall we have an evening meeting to which the men come in after working hours. They pay for their own dinner, being in on their own time; and the surprising thing about it is

that men come 25 or 30 miles through mud, they will come in at that evening meeting when they are not getting anything for it and are tickled to death to come. In addition, we have an annual meeting in Pittsburgh, in February of each year, at which we have all of our district engineers, our field foremen, our city plant foremen, and heads of the various departments.

Another interesting thing I want to mention to you. We have had in five years 353 accidents with a total compensation of over \$80,000. Of those 353 accidents there is just one single accident that can be charged up against the natural hazard of the business. The other 352 were perfectly preventable, and should have been prevented, could have been prevented if some individual had just thought about what he was doing when he was doing it.

Back in 1924 Accidents Were Expected in the Business

When we got 140 accidents in 1924, it was said: "That is a lot of accidents, but the natural gas business is a very hazardous business. That goes with it. We always have had them." I think I see a tendency on the part of most of the companies which are doing safety work today to be too well satisfied that a certain percentage of their accidents are natural hazards and there is no use trying to prevent them. Our experience has led me to believe that instead of from 60 to 75 per cent of accidents being preventable, that should be raised. I think in our own case less than one-half of one per cent of our accidents are in any way excusable.

J. M. STEFFEN (The Standard Oil Co. of Kansas): It seems to me that one of the big problems in safety is compulsory attendance at safety meetings; it is a pretty hard proposition if you expect attendance on the man's own time or the time that is his for regular recreation. The whole tendency of the plant or the concern is to pay men for the time they put in for what they are doing. A man works eight hours or more, as the case may be, and the rest is his own time. I am a safety man, and the management is supposed to promote safety; we are getting a stated salary and we ask these men to come out on their own time. You can't very well make it compulsory if you are asking it on their own time. It seems to me that you will have to get the management itself to so present this proposition, that it is so important a part of the operation of the entire plant, that it shouldn't be considered a free proposition.

When you have general meetings outside of working hours in the evening, is your management present at those meetings? Do they really show an active interest? Is your president, vice-president or general manager on the job or are they off somewhere to a party or picture show; are they expecting you to carry on that safety work? As long as you have that kind of a condition existing, you are going to have an uphill proposition, and it seems to me your education has got to start from the top just as well as from the bottom. The management must realize that if their safety work is worth while, that they

must spend some money for it, and they can't expect the average worker to work for safety on his own time gratis.

Now, wherever possible, that monthly meeting of any kind should be held on company time. When you do that, then you can come to the man and say: "Here, from two to four this afternoon we are going to have a safety meeting and we want you there." He is not losing any time. He is getting paid his regular salary for that meeting. You have got a chance to compel him to come to that meeting.

Then, also, the management itself should feel interested enough that at least a goodly representation of them are present at this meeting. Those are some of the things that I have had to contend with. Men say: "I am in the Midcontinent field and I have been to some of these motion pictures that Mr. Miller has shown in our town. We had a very good attendance. It was free and it was well advertised and a good place provided but the general feeling is—well, they are expecting us to attend this for the good of the plant. Yet they are putting it at a time when we must take our time, that regularly we use for recreation, to attend to the business of the company." And they go to this picture show and don't find the management present.

MR. GRAY: I think the first job is to sell your management. And even at meetings we have in the afternoon, we don't say: "Here, fellows, we are going to have a meeting. We want you there." We say: "We are calling a conference in a district at a certain time and dinner afterwards and would like to have every man in this district at that meeting." We get practically all of them. If somebody doesn't come we don't say: "You are getting paid for it, why don't you come?" After all is said and done, there is only one way we are going to get this safety work across at all, and that is by cooperation from top to bottom by each individual. We have these three meetings a year. That doesn't mean that that is our educational campaign. Our fellows are getting safety education three times a year. It isn't being crammed down their throats.

In that connection, I have a man here who is chief engineer of a pump station, and I would like to have him say just a word about safety education at the plant.

MR. GRASSMAN: We practice safety at our plant and when we put anybody out on the job we tell them to work with safety.

MR. MILLER: Gentlemen, I think it is time to stop the general discussion. I will turn the meeting back to the chairman.

THE CHAIRMAN: I was very much taken up with the remarks of Mr. Steffen, on the question of the attitude of the management toward the safety program, and I want to say that I will take occasion to consider the matter and make a response to his remarks at some other meeting, because I have a little to say in defense of the management on that question I don't want to let get by.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The Wednesday Morning Session, October 27th, 1926, of the Petroleum Section convened at 9:45 o'clock at the Tuller Hotel, Detroit, Michigan, Chairman E. J. Senne, Vacuum Oil Company, New York City, presiding.

THE CHAIRMAN: Gentlemen, this is the second day of the sessions of the Petroleum Section, and before going to our regular program, it occurred to me yesterday that we were not quite alive to the proper relationship in this room, notwithstanding the wonderful setting provided here for us. In other words, we were like a lot of Indians in a tent, or we might compare ourselves to Omar Khayyam, the "Tent Maker," in this beautiful setting. Rather than endure that distant relationship, I would have you feel like first cousins. Won't everyone of you shake hands with the man next to you, make acquaintance, swap stories and at the same time get some good information? Get acquainted, boys. You will find it will be to mutual interest and we will get along much better. So I will just call a recess for handshaking and general approval of each other.

(The session recessed for a few minutes in order to enable the members present to get better acquainted.)

THE CHAIRMAN: Gentlemen, we will now proceed with our regular program, and the first speaker this morning is a gentleman whom we have not had the pleasure of meeting at any of our previous congresses, as I recollect, but a man whom we have heard about because his fame has preceded him. We have read much about his activities and heard of the wonderful work he was doing on the Pacific Coast; so I am sure that he has a story this morning that will be of special interest to all of us. Mr. F. A. Schofield, manager, Industrial Relations, Associated Oil Company, San Francisco, Cal.

SAFETY INSTRUCTION AS A PART OF THE SALES PERSONNEL PROGRAM

**F. A. Schofield, Manager, Industrial Relations, Associated Oil Co.,
San Francisco.**

When the personnel department has charge of safety work as well as employment and training, it is possible to provide instruction regarding accidents as a part of the regular educational program. The advantage of such coordination lies chiefly in the possibility of combining accident prevention with educational meetings and in presenting labor turnover and accident statistics as a unit. It is important to let the operating head see that low labor turnover and low accident rates generally go together.

Before undertaking a program of this kind it is necessary to investigate accidents reported and determine the most serious causes and means of prevention. From an analysis of accidents of the sales department of this company the following classification was obtained:

A. Injuries resulting from the use of the automobile:

1. Sprains and bruises.
2. Cranking automobile.
3. Inflating tires.
4. Auto collisions.
5. Burns from radiators.
6. Particles in eye.
7. Auto doors.
8. Miscellaneous.

B. Injuries from other causes:

1. Handling barrels and drums.
2. Falling against objects.
3. Slipping and falling.
4. Infection.
5. Miscellaneous.

It was easily determined that sprains and bruises, cranking automobiles, and handling barrels and drums accounted for about 40 per cent of all the lost time accidents reported.

Cranking Automobiles

Cranking automobiles was the cause of seven accidents with a loss of 48 days. Both the sales and personnel departments were convinced that instruction in the proper method of cranking was required. Accordingly the training bulletins for service station men carried pictures and instructions on this subject. Truck drivers were given personal instruction by mechanics. In addition a special poster was prepared showing a member of the automotive department in the act of cranking a truck as it should be done, and a talk on this subject was given by the same member at the regular educational meetings throughout the entire sales district.

During all of 1925 only two accidents were reported from this cause, neither of which resulted in lost time. It was considered, therefore, that this problem was practically solved and efforts turned to other types.

But in 1926 six accidents of this nature have already been reported, four of which have resulted in a total of 141 lost days. The average working force has increased almost 50 per cent in the last two years, and more accidents may naturally be expected, but it seems evident that lack of continuous instruction on this subject for new men has been partly at fault.

Bruises and strains, except in the case of automobile collisions, are nearly always the result of carelessness, and individual instruction, together with the usual safety posters and letters, will help to reduce them. In the case of strains resulting from handling barrels and drums.

the problem is largely a case of improper methods of holding or lifting, and nothing can take the place of instruction for the new man.

Our refinery has long since recognized this and has developed a training system through pictures that has proven very effective. The correct and incorrect methods of performing every operation in handling drums in the barrel house, while loading cars and moving from one part of the building to the other, have been photographed and pictures placed on a special bulletin board. Not only has this plan reduced the accidents to a minimum, but it has greatly increased the efficiency of the worker and lessened the time taken for a new man to become acquainted with the best methods of doing his work.

Similar instructions were incorporated into posters for plant men in the sales department, and while the results obtained were satisfactory, plans are now under way for more complete instructions in accordance with the refinery practice referred to.

Organized for Safety Work

While the accident record in the sales department compares favorably with that of the other large marketing companies in California, we are not yet satisfied. Increased numbers of sales plants means that proper supervision is becoming more and more difficult. A safety engineer has therefore been appointed in the personnel department, whose work combines first aid instruction with general safety work. For example, he is training two men in each of 77 plants in the care and use of the first aid kits.

Two special first aid kits have been prepared for our use. One is small (known as an "Oil Kit"), intended for use at service stations and rotary lifts. The other is a larger one intended for bulk plants and shops.

Over 100 bulletin boards have been placed throughout the sales district, and National Safety Council posters, together with special notices and letters, are being regularly distributed. In addition, safety meetings are held in all districts in connection with other educational activities. Motion pictures, lantern slides, charts and demonstrations are used to put over the idea of accident prevention, while banners and other emblems are freely used as incentives.

One district operating in a mountainous territory, although having a small force, has set up a record of no lost time accidents from October, 1923, to September, 1926, and in recognition of this the company presented it with a silver loving cup. This has created much favorable comment in the community and has served to stimulate continued care in accident prevention.

The necessity for sales instruction is so well established in most companies that little difficulty is experienced in obtaining cooperation for training plans. But the subject of accident prevention has been ordinarily considered an engineering matter and somewhat outside the regular training program. Our contention is that the two can be coordi-

nated very effectively and, once established, the safety man becomes a valuable part of the general training program.

THE CHAIRMAN: I am sure we are deeply grateful to Mr. Scofield for his very interesting address. If there are any questions you care to ask Mr. Scofield, I am sure he will be glad to respond intelligently.

MR. BONSB: (Standard Oil Co. of N. J.): In the statistics Mr. Scofield gave he had sprains and bruises. Aren't sprains and bruises a result and not a cause?

MR. SCOFIELD: Sprains and bruises, in our accident report, are frequently due to a certain thing, such as lifting a barrel. It might be lifting a board. We classify that in the sprains and bruises. We found that most of these sprains and bruises were due to handling drums and barrels. I tried to bring that out. From our standpoint I don't see how we could classify all down the line. They are all sprains and bruises. Then we tackle all the things that went with it. The Union Oil has done a great deal in eliminating sprains and bruises due to improper lifting and handling of barrels, and we have tried to do the same thing.

THE CHAIRMAN: In answer to Mr. Bonsib's question and also elaborating on Mr. Scofield's answer, I might say that in our company we have the same problem. We have numerous sprains and bruises. They are caused by such a multiplicity of causes and conditions that we found it necessary, instead of itemizing 15 or 20 causes, to classify them under "incidental to occupation."

MR. BONSB: We classify those as lifting, pulling, pushing or reaching. I think that is the direct cause. It is more illuminating. It is much clearer.

In the Standard Oil Company of New Jersey our biggest problem is in the sales department, and I envy you for the results in your sales department. Personally, the Standard Oil Company has not been as successful in the sales department as it has in other departments. However, we hope to steal some of Singleton's thunder and try to do as well as he has.

THE CHAIRMAN: The next paper will be delivered by a gentleman who needs no introduction before this Congress, a man who has had charge of the activities of the Petroleum Section of the Atlantic Division for the past year, a man with wide experience, representing one of our largest industries.

I take great pleasure in introducing Mr. Waddington of the Standard Oil Co. of New Jersey.

SAFETY METHODS AND ACCOMPLISHMENTS IN SOME ATLANTIC SEABOARD REFINERIES

Thos. W. Waddington, Standard Oil Company (N. J.), Elizabeth, N. J.,
Bayway Refinery

In the preparation of this paper the purpose kept in mind was to present briefly, yet as completely as available data would permit, a review of the safety organization, procedure, featured activities and

specific safety results existing and obtained at a number of our Atlantic Seaboard Refineries.

In reviewing the replies received to letters soliciting information from some of the companies, one is impressed with the fact that safety has grown to be an underlying and fundamental consideration in practically every branch and functional operation of the oil industry. It is true that some of the companies are further advanced along certain lines of safety development than others, but from these reports, individually and collectively, we have the most convincing evidence of the general and sustained interest of men and management in thinking, organizing and designing for, and acting safety.

Atlantic Refining Company

Starting with the Atlantic Refining Company, we find that their safety department comes directly under the Industrial Relations Division and is headed by a safety engineer with eight safety inspectors under his direction. The safety work includes general or specific inspection with consequent recommendation for improved safety conditions, guards, appliances, etc. There is a general safety committee comprised of representatives from five divisions of the plant, namely, operating, mechanical, packing, sales and miscellaneous. Each of these divisions has safety committees composed of foremen in their particular departments. These divisional or departmental committees are assigned to inspection work by the safety engineer, and their findings and recommendations are reported to and acted upon at weekly meetings of the general safety committee, the safety engineer presiding.

An inspection system has been established whereby all tanks, sewers and conduits must be inspected and passed as "gas free" by the safety department before workmen are allowed to enter. Previous to this time several fatal accidents occurred due to asphyxiation. Since its installation no fatalities have occurred from this cause. A foremen's class in first aid to the injured has been established.

Bulletin boards, with frequent change of subject matter, are utilized for the information and education of the workmen.

A dispensary is maintained for examination or first aid treatment of injuries. Included in the personnel are two full-time doctors and a nurse.

No comparative figures were obtainable indicating specific reductions in "lost time accidents," but we are assured that the safety idea has taken hold and that accidents are on the decrease.

Tide Water Oil Company

The Tide Water Oil Company to date has featured safety work more particularly along the lines of fire prevention. Regular periodic field and plant inspections are conducted by the local plant management to eliminate unsafe conditions where found.

Safety educational work is carried out through plant publications, posters, safety talks, etc. This is being supplemented with the recent

institution of foremen training and safety work at their Bayonne plant. A more detailed and coordinated safety program is now in contemplation and will probably be put into effect during the coming year. This will include, among other features, the reporting of accident statistics to one central statistical bureau. Tide Water is particularly proud, however, of its record in the field of fire prevention, which, since the institution of its fire prevention program four years ago, shows that their average annual fire losses have been reduced close to 70 per cent.

The Texas Company

It is unfortunate that we are unable to give an outline of the Texas Company's safety organization. However, the Texas Company's activities in the field of safety are so well known to the Petroleum Section in particular and safety circles in general, there is little new information that this paper might contribute. Every safety man in the oil industry looks forward to the receipt of his copy of their publication, the *Look Box*, and turns with interest and anticipation to behold and read the latest adventures of that now famous safety exponent "Gassy Gus."

As to the safety accomplishments of this company, we have but to note the published figures of their accident reductions in the August *Look Box* to appreciate the magnificent work being done by this organization. These figures show that at the northern and southern terminals of this company in 1919 there were 228 lost time accidents, equaling 14 accidents per 100 employees. This has been cut down through the succeeding years until the first half of 1926 shows but seven lost time accidents, or one and one-half per 100.

Vacuum Oil Company

Each of the several plants of the Vacuum Oil Company has its safety engineer, who is responsible to, and under the direct supervision of, the company's safety supervisor. Quarterly meetings are held at the different plants under the chairmanship of the safety supervisor, at which every safety phase or feature, problem and suggestion are compared and discussed.

As the new employee is generally recognized as a potential accident hazard, the Vacuum's safety organization concentrates on his education by safety talks and group meetings. The work is further carried out by properly distributed bulletin displays, distribution of National Safety Council calendars, and novel features in the line of accident score boards, such as "Safety Ball Games," "Safety Channel Swims," etc. In this latter respect Vacuum differs from some of the other companies in the fact that the records of their several plants are shown and entered into competition for the lowest accident score, thus creating a friendly inter-plant rivalry to see which may make the best showing for a current month. They also set aside certain months of the year for intensive safety drives.

All of the above features, together with an intimate contact between

the safety workers and the men, together with articles and illustrations appearing regularly in the *Vacuum Oil News*, have produced the most enviable results in the line of accident reduction. The records show that the Vacuum Oil Company had 70 per cent less lost time accidents in 1925 than in 1920. Their experience being 213 in 1920 against a total of 63 in 1925. Their frequency rate for 1920 was .57. This has been reduced yearly until in 1925 it was but .15, a most gratifying example of what properly executed safety work can do.

Standard Oil Company of New York

As to the Standard Oil Company of New York, we will not attempt to discuss their organization or its accomplishments, as Mr. F. W. Burt, safety supervisor of that company, will later present a paper that will do much greater justice to the safety work of that company than the limitations of this review will permit.

Standard Oil Company (N. J.)

The safety organization of this company consists of the following: There is a chief safety inspector, or engineer, with headquarters at the company's general offices, who spends his entire time in visiting and inspecting all refineries and company plants of whatever character. There is also a general safety committee composed of a safety engineer, or director, from each of the several refineries; the chief safety inspector being also a member of this committee, the chairman of which is selected and appointed by the company's manager.

Most of the refineries have their own safety committees appointed by their local management, the personnel varying at the different plants. Some of the smaller plants include all foremen as active members, while at the larger plants, where the number of foremen involved would render this impracticable, the active members are frequently appointed so as to have an equal representation of the trades or other occupations with the supervisory force.

Most of the plants are divided into zones, and systematic monthly inspections are made by members of the committee as directed by the plant safety engineer and in the general instructions printed and furnished for their guidance. The results of these inspections are reported at the monthly meetings of the local safety committee, the safety engineer presiding. Action is taken by the committee on reports submitted and specific recommendation for the elimination of hazards, erection of guards, the removal of obstructions, installation of additional fire fighting equipment, or safety recommendations of whatever nature are set forth in full in the minutes, mimeographed copies of which are submitted not only to the general superintendent of the plant, but to all committee members, foremen and the heads of departments interested. The recommendations are numbered and followed up for prompt execution.

The company has also established a safety inspection division of the general engineering department, whose particular duties are to inspect

and pass upon the serviceability of all refinery equipment designed for operating under high pressure and temperature conditions.

The general safety committee meets quarterly at one of the company plants. At these meetings, which usually take from two to three days, all major safety problems are discussed, safe procedures formulated and standard codes and specifications worked out either in detail or outlined for further elaboration by the safety inspection division. The conclusions or recommendations of the general committee are written up in detailed minutes and turned over to the general engineering department for review and comment, then in turn submitted to the company's managers, who pass upon and specifically approve or disapprove recommendations rendered. Upon approval of any recommendation, code or standard, all plants interested are notified by the central management with instructions to carry out or observe each particular recommendation, safety code or procedure approved.

Discussion Has Covered Hundreds of Safety Subjects

The general safety committee, from the time of its reorganization, six years ago, to date, has discussed some 900 safety subjects, resulting in 360 specific recommendations, 80 per cent of which have been approved and put into effect, among some of the more important of which are:

- Use of safety belts.
- Storage battery isolation and ventilation when charging.
- Checking blue prints for safety.
- Adjustable platform for tank car filling racks.
- Containers for fresh air hose and mask.
- Filtering and changing of oil transformers.
- Gas engine testing.
- Fuse boxes, cautions to be taken on old and new installations.

Numerous inspection forms and specifications have also been prepared, approved and put into effect covering: inspection of tools, gas masks, tank before cleaning, etc.; also standardized specifications for welding gloves, hammer handles, and clothing suitable for different occasions, including high laced shoes, "hard toe" safety shoes, gaiters, quick detachable leggins, etc.

Major Safety Codes have been approved, as follows: Part I—Guards for transmission machinery and mechanical driven equipment; Part II—Scaffolds and working platforms; Part III—Safe handling of sheet steel; Part IV—Regulations for welding, burning and hot work in refineries.

Major Codes are being compiled and approval is pending, as follows: Part V—Regulations for operating fuel oil and gas burners; Part VI—Safe operation of refinery field machinery; Part VII—Use of proper goggles for various trades and operations about refineries.

The safety education of a new employee in the New Jersey company starts at the employment office. Using the practice at the Bayway Refinery as an example of the general procedure, the applicant is first interviewed by the assistant employment manager, who gives him a

thorough examination as to personal as well as vocational qualifications. These are noted down, and if satisfactory he is sent to the medical department where he undergoes a thorough physical examination. If he passes this test, he then goes to the record room where facts pertaining to his personal and domestic life and previous employments are recorded. He then returns to the assistant employment manager's office and, after a general talk on working safely, his attention is called to pivoted blackboards, on the first of which appears in large type two cardinal safety rules, which he is instructed to memorize, which read as follows:

Various Exhibits on the Safety Blackboards

1. "Here is your first A B C—Always be Careful."
2. "Notice to Men Seeking Employment—Unless you are willing to be careful, to avoid injury to yourself and fellow workmen, don't ask for employment. We do not want careless men in our employ."

Signed by the Plant Superintendent.

Then on succeeding leaves of the blackboard appear illustrations and exhibits of:

1. Proper and improper clothing and shoes—Noting that shabby, loose, torn, carelessly mended trousers, jumpers and sweaters are strictly prohibited, and that thin soles, soft tip, rubber soled and rubber heeled shoes are strictly prohibited.
2. Illustrations showing the contrast between proper and improper clothing—including unsafe footwear. Samples of overalls, jumpers and safety shoes that can be purchased at the local storehouse, are also shown.
3. Rule against smoking and carrying sulphur matches—Illustration showing damage caused by smoking. Exhibits showing the difference between sulphur and safety matches.
4. Injuries—Splinters and injuries of any kind must be reported first to foreman, after which employees must report immediately to medical department. (An employee is given first aid in the event of accidents and is properly advised as to consultation of personal doctor in the event of sickness.)

Photographs then follow showing cases of blood poisoning as the results of carelessness, the employees having failed to report promptly to the medical department for treatment. Photographs showing results of neglected burns.

5. Goggles—Goggles must be worn when assigned to any work which may cause injury to the eye.

Photographs showing severe burn through neglect to wear goggles. Sample of goggle supplied employee.

Exhibit of goggle broken when worn, but saving man's eye.

6. Tools and Material—Caution in handling. Exhibit showing pictures of broken fingers, toes, arms and legs.

7. Unsafe Tools—Exhibit of mushroomed chisels, hammers, drills.

machinists' hammer taped and mended together, home-made open-end wrench and monkey with sprung jaw.

8. Illustration showing up-turned nails in broken board and picture of resultant accident.

9. National Safety Council poster illustrating right and wrong way of lighting fuel oil burners.

At the conclusion of these instructions, the employee is handed a first aid card for safety committeemen. One side of this card is addressed to the particular foreman as a safety committeeman, then follows the name of the employee, date of employment and request to instruct him in the safe practices of the department, and have him sign the card, then return to the safety department. Immediately below is an acknowledgment of having received the safety instructions from the foreman, a blank space for the signature and check number of the new employee, and date. On the reverse side of the card is an appeal to the foreman as a safety committeeman with "Plant Slogan" and Universal Safety seal, also printed notation at the bottom addressed to the chairman of the committee, reading, "I am returning this card properly signed for your information and record," with space for date and name of foreman. The foreman, when satisfied the man understands the safety instructions given to him, has him sign his name, or in the case of the illiterate, make his mark on the card, the card is countersigned by the foreman and returned to the employment office for record.

When the use of this card was first considered, much skepticism was expressed as to its practicability. The satisfactory experience of over six months use, however, has eliminated all objections and has led the company to consider its adoption at the other plants.

Some of the Safety Procedures that are Featured

Some of the Safety procedures featured at all of Standard Oil Company (N. J.) plants are:

Continuous safety education of the employee by personal contact on the job.

Supervisory responsibility.

Group meetings of foremen.

Medical attendance and ambulance service.

Monthly safety letters and comments on safety records to department heads.

Accident score board, varying features.

National Safety poster display throughout plant.

Distribution of National Safety Council calendar.

Plant papers featuring safety articles, illustrations and cartoons.

Safety badges worn by Safety Committeemen, and, at some plants, by all foremen as Honorary Committeemen.

Continuous campaign to sell safety shoes.

Periodic safety drives.

Fire drills.

Safety inspection of tools, riggers equipment, pressure vessels other than boilers, gas masks, scaffolds and ladders, fire fighting equipment, also conspicuous display of posters and other safety kinks of plant interest. As an example, at the entrance to Bayway plant, attention is attracted to a brightly painted life size outline of a traffic policeman, with one hand upraised and the other pointing to an empty barrel on which is painted "STOP! Before going into works drop your careless habits and parlor matches, etc., here."

At the Bayonne and Bayway Refineries monthly reports are compiled and mimeographed copies issued to all departments showing lost time accidents in each of the several departments and subdepartments, particularly noting by green stamp those departments 100 per cent safe. The Bayonne reports show causes, i. e., machinery or equipment, human element and supervision. Bayway adds the records of each foreman, also a departmental summary of lost time accidents for each month of the preceeding year, each accident being denoted by a black cross. A similar record is shown on the same sheet for the corresponding months of the current year, in red. Monthly minor accident totals for major departments are also indicated. These reports not only stimulate departmental rivalry, but give at a glance departmental and plant comparisons and are a constant safety reminder to the entire supervisory force.

Making Effective Use of Safety Flags

Bayway also, imitating the example of Mr. T. N. Shaw of the Midwest Refining Company, Casper, Wyoming, adopted the use of safety flags on November 1, 1925, with most satisfactory results. A 5x8 flag was designed with the "Universal Safety" seal in white on a green field. Six flags were assigned, one each to the four major mechanical departments and two to the process department. The flags are raised over their respective departments the first of each month, at which time a seventh, or plant flag is raised from the staff at the main office building. The first accident occurring in any department pulls down the plant flag, as well as the department flag, for the balance of that month.

By the use of safety flags, departmental pride is appealed to, resulting in keen rivalry to keep the flags waving.

Safety flags were later adopted and are now used at the Charleston refinery.

In preparing and submitting reports of lost time accidents at the different Standard Oil Company (N. J.) refineries, in addition to setting down the usual statement of facts, all circumstances connected therewith are carefully analyzed by the local safety organization or committees, as to cause and responsibility, and a specific statement made as to what can or should be done to prevent a recurrence of a similar accident.

The lost time accident record of the manufacturing department, Standard Oil Company (N. J.), for the calendar years 1921-1925 shows the following:

Year	Number of Cases	Frequency Rate per 100 Active Employees Per Month	Frequency Rate per 1,000,000 Hours of Exposure
1921	768	.57	28.38
1925	410	.27	13.16
9 mos. of 1926	230	.21	9.86

It will be noted that the reduction amounts to 63 per cent when the frequency rate is computed on the basis of 100 active employees per month and to 65 per cent when computed under the National Safety Council system.

The two refineries that show notable decrease in accident frequency for the nine months of 1926 are the Eagle works, with a frequency rate per 100 employees per month of .09 and Bayway refinery with .16.

Throughout all of the safety activities recited, most of the safety engineers and inspectors of the different companies, or their individual plants, are aided by and kept in touch with the National Safety Council through the Regional and Petroleum Section officers or committees; by correspondence, meetings, bulletin service and safety calendars; as well as by our ably edited monthly news letter, a new and most important feature that we feel has come to stay.

Limited time and data prevents reviewing the work of other companies in the Atlantic group and represented in the Petroleum Section, which are also making substantial progress in the cause of safety.

I would like to say, gentlemen, I have a limited number of those forms, cards and procedure at Bayway and Bayonne in the matter of reporting accidents, and I will be glad to give these to any who desire them.

THE CHAIRMAN: I will say that this valuable contribution by the Standard Oil Co. of New Jersey will certainly bear closer scrutiny, and I want to thank Mr. Waddington for bringing with him further copies so that we can make a study of their procedure.

Is there any further discussion on Mr. Waddington's paper?

FRED W. LAU (Standard Oil Co. of Indiana): May I ask what form of discipline the Standard Oil of New Jersey uses in case of accidents, violation of safety rules, etc.?

MR. WADDINGTON: There is some very distinct punishment handed out for direct violation of safety. If it is done wilfully and you can prove that it is done wilfully, a man gets the gate. However, he can be disciplined and has been disciplined for slips in observances by time off. The local safety committee, which is composed of what we call company representatives and employee representatives on the Industrial Relations plan, passes on the cases as to cause. Maybe I didn't make that clear in the paper. In New Jersey we have a state compensation law; but in addition to the state compensation law, if the man is at fault,

then the company's benefits will be withheld. They are withheld very often. I will ask Mr. Humphrey if that isn't true.

MR. HUMPHREY: (Standard Oil Co. of N. J.): In the case of a man violating the safety rule, the company benefits—which are full-time payment of wages—are limited only to the state compensation, which is about one-half.

MR. LAU: I may state in that connection that with the Standard Oil Company of Indiana we have between 4,500 and 5,000 men. We have our foremen as safety inspectors. Our managers say we don't need any more men. We have 250 foremen and they are safety men. An unsafe foreman has no place in this refinery. Then he means business, and in the last year we have practiced discipline and we found out that discipline has solved that problem to almost nil. If the foreman slips, he slips also the other way. He is either demoted or discharged. If the men violate safety rules they are discharged.

The Severity Rate Is Much Lower This Year

I might say our accident records—I will not blow my own horn or anything of that sort for our company—but on our accident rate so far this year we had 57 lost time accidents among 4,000 men. Although we are a little higher than last year, our severity rate is 90 per cent lower this year, due to the fact that our manager has told the boys that he will not stand for anything at all. They know it, from the department heads down to the lowest man. Discipline is the main factor in putting it across. We have tried the other ways and it doesn't go across so well. We have gotten it down to a point where I am looking for more information to get it down lower. I don't know how we are going to do it.

THE CHAIRMAN: Will you tell us the different degrees of discipline that you have, the nature of that discipline?

MR. LAU: In what particular line?

THE CHAIRMAN: As a whole. For instance, you have a man there who has disregarded a law or a rule and he is up for sentence.

MR. LAU: He is either demoted or discharged. In the first offense we demote him, and that means a reduction in pay. That is the biggest advertisement you can have. If there are 20 men in the gang and a man is demoted, the rest of the men know it and it hurts his pocketbook.

THE CHAIRMAN: Is that same man able to regain his former standing?

MR. LAU: At the discretion of the foreman. If the foreman sees fit to put that man back in his old job he decides to do it.

THE CHAIRMAN: The foreman is the sole judge?

MR. LAU: Yes.

MR. HUMPHREY: I would like to ask the gentleman how serious an accident has to be in order to discipline the foreman?

MR. LAU: That depends entirely on the manager. He decides the discipline for the foreman, whether it is a discharge or a demotion. In most cases it is a demotion. He is set back in the gang. If he is a regular foreman he is set back to a riveter or caulker.

MR. WADDINGTON: Do I understand that the foreman is disciplined if he has an accident, regardless of cause? If the cause is due entirely to a man's carelessness and the man deliberately does it, as most of them do, is that foreman disciplined?

MR. LAU: It all depends on the causes.

MR. WADDINGTON: I am led to believe from your remarks that the foreman is disciplined rather than the men for not observing the lessons that have been taught them, that the foreman is disciplined rather than the man, unless in your actual examination of the facts somebody judges that he is not at fault. I don't know how you are going to succeed along those lines.

THE CHAIRMAN: I believe what the gentleman from Indiana intended to say is that the foreman is subject to discipline along the same lines as the worker is. He didn't mean to say if a workman makes a mistake that the foreman is disciplined. Am I correct?

MR. WADDINGTON: His methods differ in no way whatsoever from the Bayside or Bayonne. If a foreman is at fault he gets the discipline the same as the man. The safety committee determines whether it is the man's fault or the supervisor's fault, and the action is taken as a result of their findings.

A Comparison of Foremen's Safety Efficiency

L. D. PALMER (Standard Oil Co. of Indiana): To supplement Mr. Lau's account of this, he told me a story of a manager reviewing the accidents of the year and he found in one department a number of foremen had six lost time injuries doing the same kind of work that other foremen in that plant were doing, and I think two of these foremen were demoted because they showed a very poor accident score. They were doing the same kind of work. So this is comparable with the other foremen. Possibly it was on account of careless employees. We feel that the foreman is the key in this situation and that he is responsible for this education of men just the same as the rest of us.

We have several thousand men, and we figure that we must use the foreman in this work and that he is responsible for careless men just the same as he is for insufficient work in other lines. So these two foremen, I believe, were demoted and other men put in their place, and these men are making fine records. These men know that if they show a poor score at the end of the year it means something to them, and that explains the point asked by Mr. Waddington. You don't pick out a case where an employee pulls a bad stunt and hang it onto the foreman. That sort of discipline, I believe, is producing very fine results.

MR. SHAW: I would like to ask a question in regard to the pressure you bring on your foremen with regard to safety. Is reward for safety work either to foremen or to gangs or individuals advisable or is it not? Will it get results or will it not? I mean reward in the way of an extra day's pay a month, or a day off with pay, or at the end of the year two weeks of vacation with a day to it for month, because he has gone through a year without an accident; or some other form of re-

ward? I would like to know if anyone has any experience or knows anything about that?

THE CHAIRMAN: Mr. Shaw, if you will allow, we will rather delay this for a round table discussion a little later. We are a little pressed for time today.

I was very much pleased and gratified in looking over our announcements of the visitors we had yesterday that we had the honor of having with us a deputy commissioner from the Department of Labor from the state of New Jersey. If that gentleman has honored us again today I would like to have him present himself.

Cordial Cooperation Enjoyed from the Oil Men

JOHN ROACH (Deputy Commissioner of Labor in Charge of Health Sanitation, Hygiene and Safety, New Jersey): I have been suffering from a bad case of sinus and if anybody here has ever suffered from sinus trouble, you can understand what kind of a night I had last night with it.

I am very much pleased to be at this meeting. It seems to me that our good friend from New Jersey has evidently started something in the discussion line with a paper on Standard Oil practices on safety matters that he read this morning. I know that we receive very cordial and most substantial cooperation and support from the oil group in New Jersey in enforcing the mandatory provisions of New Jersey's labor laws. If we received the same support, coupled with the same intelligent engineering application of safety principles in all other lines of endeavor throughout our state, I feel safe in saying that we might easily reduce the size of the enforcement bureau in our state and save the taxpayers \$200,000 or \$300,000.

I am enough of a democrat and a believer in democracy in the broad gauged way—I am not speaking about the kind that we find in some of our municipalities—but I am enough of a democrat and a believer in representative self-government to hope that the time is not far distant in our country when industry as a whole will grapple with this problem of accident prevention so as to make unnecessary the appropriation of funds by state governments to enforce laws based on the police power of the state.

We have had enough experience in mandatory enforcement of labor legislation in our state to know that the most effective safety measures are not those that are enforced by shaking the policeman's club at the plant manager. I know, however, that we have not yet arrived at that splendid state of self-administration of government when we can expect all people in all lines of endeavor to operate their plants with the greatest measure of safety unless their activities are in a measure supervised by state effort.

You know in our state we have mandatory, definite engineering rules of procedure for almost every processing method that is carried. For instance, our boilers must be constructed according to definite standards—not propounded by the state legislature which probably even in its

wisdom would not know much about boiler construction. But boiler construction rules are framed by the A. S. M. E. and we adopt the code. If we ask the industries to erect a guard about a piece of operating equipment, the method of construction is outlined in a book of rules and the rules have been prepared by sound engineering organized effort and represent the best thought in that line. So that these definite things that the state asks industry to do are based on good sound operating practice.

Now, briefly, in our state if you want to know how carefully the oil industry is run as compared with other industries—while we haven't severity and frequency rates in all lines of effort as complete as you have in the petroleum industry, still we know that in our state roughly we have probably 450,000 manual workers who come under the provisions of the Workmen's Compensation Law. We know that last year we had about 50,000 individual reportable accidents tabulated by the Statistical Bureau, or one for every nine people, roughly. These 23,000 people milled through the Compensation Division and received compensation benefits that for administrative purposes, such as overhead and the wage payments themselves, totalled about \$9,000,000—quite a heavy burden on the state.

But I wouldn't lift my voice to lighten the burden were it not that in addition to the financial burden we have the terrific loss of life and limb to consider. There were 350 lives lost and 23,000 broken men and women that milled through the bureaus asking for compensation who are, in my judgment, immeasurably more important than the mere expenditure of dollars and cents.

The Scrap Heap Gets Few Men In New Jersey

So that I do say very feelingly that we have received wonderful, systematic, intelligent and generous cooperation from the oil group. You know the reason that I stand before you and make this announcement is because it means that the scrap heap in our state is not receiving any appreciable addition from the petroleum industry. I shouldn't wonder but what the same condition prevails in other states. I know when we send down to Bayonne and say we are going to have a meeting at our industrial museum, that is all that is necessary. We will find a fleet of heavy buses starting away from various plants and our industrial museum on that occasion will be filled to overflowing.

It is an inspiration and indeed a great pleasure to me and other men engaged in this life saving work to know that at least one branch of New Jersey's industry can be properly placed in the safety column, and for that reason I like to make this announcement. I only regret that it is not possible to go through all the basic industries of our state and say that management men in the state have cooperated in such a way as to bring them up to the splendid point of conservation achievement noted in the oil industry.

I thank you gentlemen for giving me this opportunity of just getting up here before you and forgetting the sinus for a few minutes and saying these few words.

THE CHAIRMAN: Mr. Roach, on behalf of the Petroleum Section, I wish to acknowledge the very fine spirit in which you approached us to-day. We are very happy indeed to have you with us and we accept your advice and commendation with a great deal of pleasure. May I ask you on your return to Trenton to convey to Dr. McBride, Commissioner of Labor, our best wishes and greetings from this Congress; also the assurance that we appreciate his and your kind interest? We are ready at all times to cooperate with state officials and other government agencies on matters pertaining to safety, and I trust that you will take back with you a feeling that your visit has not been in vain. Certainly we want you to feel that we were delighted to have you with us.

The next subject on the program is one which I am sure will be of considerable interest. It was prepared after extensive work, after considerable research, by the United States Department of Commerce, Bureau of Mines, Experimental Station of Pittsburgh. The paper was prepared by Messrs. Yant and Fowler, and I am very sorry to announce that due to conditions not within his control, Mr. Yant will not be able to present the paper in person, but we surely have a man here who is competent and able to do that for him, and I take great pleasure at this time in presenting Mr. Forbes, Supervising Engineer of the Bureau of Mines at Pittsburgh.

HYDROGEN SULPHIDE POISONING IN THE TEXAS, BIG LAKE, TEXAS, AND McCAMEY, TEXAS, OIL FIELDS

**J. J. Forbes, U. S. Department of Commerce, Bureau of Mines, Pittsburgh
Experiment Station**

In a previous investigation of the toxic gases given off in the transportation and refining of Mexican and high sulphur crude oil it was concluded that hydrogen sulphide was the most toxic gas encountered. A report of this study has been published as Bureau of Mines Bulletin No. 231, which describes the occurrence of hydrogen sulphide, symptoms and effects from poisoning, methods of treatment, and protective equipment. This study was devoted almost entirely to the handling and refining of the crude oil after leaving the wells, no attention being given to the production. However, in the course of that investigation it was alleged that a certain amount of trouble had been experienced around wells in Mexico.

Rather recently, during the development of oil fields in Texas, a "poison gas" was encountered that constituted a decided health and safety hazard. The magnitude of the trouble deemed it to be of sufficient importance for the Bureau of Mines to accede to the request of the operators for an investigation. Reports of Investigations, Serial No. 2776, describes this investigation and is intended to supplement the information given in Bulletin No. 231. Due to the length of this report only excerpts and briefs can be given here. Copies may be obtained by writing to the information Service, Bureau of Mines, Washington, D. C.

This investigation as given in the title was conducted in the Pan-

handle, Big Lake and McCamey oil fields, all these being situated in Texas. The work undertaken in each field included:

1. Examination of the gas coming from representative wells at various locations in the field; also analyses of the gas-air mixtures to which the workmen were or might be exposed.
2. Observations of symptoms of poisoning and severity of these symptoms.
3. Observation of the conditions of exposure that produced the symptoms.
4. Study of ways and means of protection and prevention.

The whole survey was made in order to determine general conditions relative to the hydrogen sulphide hazard in the three fields, rather than a detailed study of individual properties. However, representative data were gathered and from these findings, recommendations have been made that should help reduce the hazard in these and similar fields.

The prevailing conditions in the Panhandle, Big Lake, and McCamey fields were similar to those reported in Bulletin No. 231. The characteristic odor of hydrogen sulphide could be detected almost anywhere in the field; also there was pronounced darkening of white lead paint on houses, of brass valves and fittings, and of silver money. The symptoms caused by this gas—both acute (as unconsciousness and subacute as eye and respiratory tract irritation)—were identical with those produced by hydrogen sulphide. With the exception of slight gasoline-vapor intoxication and the possible existence of gas-air atmospheres containing an insufficient amount of oxygen to support life, no indications of other toxic gases were noted. The examinations of the gases and gas-air mixtures were therefore confined to analyses for hydrogen sulphide content. A brief of the conditions found follows:

The Panhandle Field

The Panhandle field (stated by some authorities to be 20 miles wide and 100 miles long) was too large to be covered completely during the period of this investigation. The study was confined to an area approximately 20 miles in diameter, located about 50 miles northeast of Amarillo, Texas, with the town of Borger as its central point.

There are two distinct types of wells in the Panhandle field, one known as the "granite wash" and the other as the "lime." Both produce gas in large quantities but there is a distinct difference in the gas composition.

The average results of analysis of hydrogen sulphide in samples collected from 20 different wells within a radius of 10 miles from Borger, Texas, show that:

1. In the "granite wash" wells neither the gas coming from the "big gas" stratum above the oil nor the gas coming from the oil contains more than 0.01 per cent hydrogen sulphide. (Also no distinct odor of hydrogen sulphide was detected.) This amount appears to be negligible from the safety standpoint.
2. In the "lime" wells both the gas coming from the "big gas" producing stratum above the oil and the gas coming with the oil has a

hydrogen sulphide content between 0.20 to 0.60 per cent by volume. There appears to be a regular variation between different parts of the field. The gas from a well approximately 10 miles southeast of Borger, on what probably is the edge of the "lime," contained 0.20 per cent hydrogen sulphide; this well was not making oil and is beyond the present radius of active drilling in the field. Wells within an estimated radius of three to seven miles southwest, west, northwest, north and northeast of Borger contained 0.45 to 0.55 per cent; and wells east of Borger in the Dixon Creek region contained 0.55 to 0.65 per cent. Two samples from wells north of the Canadian River, the one approximately five miles and the other approximately 10 miles northwest of Borger showed 0.46 and 0.26 per cent respectively. Both of these wells were in the "lime."

From these data it appears that hydrogen sulphide occurs in the gas from all lime wells within the area examined.

Observations made regarding symptoms of poisoning showed that no symptoms of hydrogen sulphide poisoning occurred among the men working around the gas coming from "granite wash" wells though they were exposed to gas-air mixtures under gas concentrations and working conditions similar to those of the lime wells. It will be remembered that the gas from these wells contained less than 0.01 per cent hydrogen sulphide.

Injurious Effects of Hydrocarbon Gases

However, exceedingly high concentrations of this gas will dilute the air below the point that will sustain life. The addition of 25 to 30 per cent of gas to ordinary air will reduce the oxygen content to 15 or 16 per cent. The low limit of a safe atmosphere for the average man is 15 to 16 per cent of oxygen. The physiological action of atmospheres markedly deficient in oxygen is very rapid. There are no significant warning symptoms before unconsciousness occurs.

The injurious effects of hydrocarbon gases are well known. The symptoms of dizziness, numbness in the legs, drowsiness, or possible exhilaration, preceding unconsciousness are usually recognized.

Accidents due to atmospheres low in oxygen and high in hydrocarbon vapors are liable to occur in the derrick cellars or other confined spaces at "granite wash" wells unless the men take proper precautions. Recovery is usually rapid if the victim is immediately rescued and taken to fresh air. Artificial respiration should be given if breathing has stopped or become impaired.

Although no hydrogen sulphide poisoning was found to occur with the granite wash wells in the field, two distinct types of symptoms occur in the men working around the "lime" wells. One of these is irritation of the eyes and respiratory tract following a relatively long exposure; the other is unconsciousness attending a very short exposure. Eye and respiratory tract irritation is very prevalent among the men working in the gas from "lime" wells. It mainly occurs among drillers, tool dressers and men making bradenhead connections. These men are

exposed in varying degrees from the time of drilling into the gas until the last casing is set and the bradenhead connection made, and even after that there may be sufficient gas leaking around the bottom of the casing or coming with the oil to constitute an exposure.

The eye irritations range in severity from mild conjunctivitis to swelling and bulging of the conjunctiva, photophobia, and temporary blindness. In many cases they are extremely painful and occasion a large amount of lost time. Often drilling is suspended due to the entire drilling crew being affected and unable to work. The same condition prevails among the bradenhead crews, the closing in of wells having frequently been delayed several days.

It is a rather common occurrence to find men around the wells with their hats drawn down over their eyes or wearing dark glasses to protect them from strong light, and many appear daily at the emergency hospitals for treatment. One prominent doctor in the field told the writers that he estimated that he had treated more than 1,000 cases of conjunctivitis during the first six months of 1926. However, the effects are temporary and readily yield to treatment.

A large number of cases of respiratory irritation also occur, although not as frequently as the conjunctivitis. The respiratory irritations of the nose, throat, and lungs often lead to rhinitis, laryngitis, and bronchitis. In some cases there is coughing and a feeling of fullness in the chest.

The recorded cases of unconsciousness have occurred to men making the bradenhead connections in the cellar, or doing similar work when the gas is escaping in that place. The time of exposure preceding unconsciousness is very short, often but a fraction of a minute, and there is no significant warning symptom. The victim is often aware that he is in strong gas and has a sudden choking sensation but usually becomes unconscious before he can get away.

Although there have been many of these cases, no fatalities have occurred. This is due to quick action on the part of fellow employees who have rescued the victims and removed them to open air. Recovery in air is rapid, and the men usually suffer no marked ill effects, being able to go back to work if necessary. In a few cases there is nausea and headache, and in others body injury has occurred due to falling on pipe clamps or fittings.

The Big Lake Field

The Big Lake oil field is situated approximately 350 miles south of the Panhandle field in Reagan County, Texas. It is much smaller in area than the Panhandle field, is older, and in a more settled state of development.

Two types of gas are also found in the Big Lake field but these are in different strata of the same location rather than in different locations in the field, as in the case of the Panhandle. The upper gas is sweet and occurs in large quantities, some wells have flowed as much as 87 million cubic feet per day. This gas is only produced for fuel, the lower

gas being too poisonous and corrosive for use around men and in engines, boilers and heating appliances.

The "poison gas" is present with the oil but fortunately not in large quantities. If the same volume were present as in upper gas or in the Panhandle field, the effect would be disastrous. Analyses of eight samples of the poison gas collected from eight different wells, oil separators, or flow tanks into which the wells were producing, show amounts of hydrogen sulphide ranging from 8.1 to 10.5 per cent. The concentration appears to vary with the location of the wells. Those wells in the extreme east part of the field produce the larger amount, and those in the southwest the lesser.

The sweet gas contains less than 0.01 per cent hydrogen sulphide and no health hazards exist other than those from hydrocarbons as described under the "granite wash" gas of the Panhandle field.

Symptoms of the types described in detail in discussing the Panhandle field also occurred in the Big Lake field. However, the field is older, the men have had more experience with the gas, and the drilling campaign is much less extensive. Also the volume of sour gas is relatively small, so that few symptoms were observed at the time of making this investigation. Many rumors, which were confirmed by conversation with the physicians, indicated that in the earlier days of the field the conditions were similar to those now prevailing in the Panhandle. The men are now cognizant of the dangers and have learned to avoid the gas.

Four deaths are alleged to have occurred in the past from acute poisoning. Before the dangers of the gas were well known and before the depth of the poison gas zone was accurately determined, a well was unexpectedly "drilled in" one night, and the gas killed both the driller and tool dresser—the only men present at the time. They were found dead on the derrick floor by a foreman, but because of the large accumulation of irrespirable gas he could not recover the bodies at that time. Accordingly, he started for help and had proceeded but a short distance when the gas became ignited and set the well and derrick on fire.

In two other cases men died from exposure to hydrogen sulphide gas while gauging flow tanks.

In conversation with gaugers and switchers it was learned that many rabbits and birds are found dead around the wells and tanks. The men stated that these dead animals are usually found after a calm, oppressive night when the barometer is low and there is little or no air movement. One man stated that he had collected a pile of more than 100 dead animals. The writers wished to observe these, but due to a heavy rain which flooded that portion of the field on the preceding day, they could not be found.

The McCamey Oil Field

The McCamey oil field is situated about 25 miles west of the Big Lake field in Upton County, Texas. It is a new field and appears to be in about the same stage of development as the Texas Panhandle, although a great deal smaller in area.

Although some gas producing strata are encountered above the oil the poison gas in this field occurs with the oil in a lime formation. The gas is present in relatively small quantities but the concentrations of hydrogen sulphide are high, averaging about five per cent.

Several men reported that they had become nauseated while working on top of flow tanks and one gang of men connecting up a field tank were affected by the gas. No eye symptoms were noted at the time of the investigation, but a doctor in the field gave information that all of the usual types of symptoms of hydrogen sulphide poisoning had occurred.

Recently a gauger died from exposure to the gas on top of a flow tank. A well "came in" at about 7 o'clock in the morning. There was no control head on the eight and one-quarter inch casing, and the well flowed "wild" for about eight hours. The initial production was estimated to be at the rate of 10,000 barrels per day. It is reported that because water was coming with the oil the well was flowed into open storage for some time after it was brought under control.

The gauger lived in a tent approximately 100 yards from the well. About 3 o'clock in the morning of the second day he went on top of a flow tank to gauge its contents while another man opened the gate valve. As soon as he opened the gauge hole cover, a puff of gas escaped from the opening and he fell on the roof of the tank.

The other man heard the noise of the fall, and the unconscious gauger was immediately taken off the tank, but there is some question as to whether or not he was taken entirely out of the gas area. Effort was made to revive him and a doctor was summoned, but the man died after being unconscious for about one hour and a half.

General Discussion

As has been stated, the concentration of hydrogen sulphide in the "sour" gas in the Texas Panhandle field ranges from approximately 0.20 to 0.60 per cent by volume. A table in Bureau of Mines Bulletin No. 231, shows that an exceedingly toxic atmosphere can occur in a mixture of this gas with air. If the gas contained only 0.20 per cent hydrogen sulphide, it would require a mixture of equal parts of gas and air to give a concentration of 0.1 per cent hydrogen sulphide. In this case unconsciousness would result about as quickly from lack of oxygen as from the hydrogen sulphide present. On the other hand, with the higher concentrations found in the Texas Panhandle (0.60 per cent) a toxic atmosphere could be created containing 17 to 18 per cent oxygen, a respirable amount.

A mixture of one part of the Big Lake gas (which contains about 10 per cent of hydrogen sulphide) in 100 parts of air would be highly toxic. The McCamey gas is also exceedingly toxic, the minimum mixture with air causing immediate unconsciousness being in the ratio of one part gas to about 50 parts air.

Analyses of a large number of samples of gas-air mixtures collected

on the derrick floor, under the floor, in the cellar, and in various other places show that the workmen are often exposed for long periods to concentrations of 0.01 and 0.02 per cent hydrogen sulphide in air, sometimes for short periods to 0.03 and 0.05 per cent, and occasionally for very short periods to 0.10 per cent, or higher. In several of the working places where samples of the gas were taken, cases of eye irritation were observed and in one instance irritation of the respiratory tract resulting in a fullness in the lungs and coughing.

Analysis of gas collected from a cellar where two men had become unconscious a few hours before showed 0.10 per cent hydrogen sulphide.

The concentrations and symptoms found in these oil fields parallel those found in previous work, and the detailed descriptions of symptoms in this report are almost identical with those found to occur in the handling and refining of Mexican and high sulphur crude oil.

Treatment

Conjunctivitis.—Consultation with physicians in these oil fields who have been treating these cases advise that the following treatment for conjunctivitis has given excellent results—not a single case failing to respond to treatment, where the patient has done his part by following instructions.

1. Relieve pain by drops of butyn, or butyn and epinephryn, or in severe cases halocain.
2. Follow with campho borate. One doctor varies this practice by using boric acid ointment.
3. Drops of colloidal silver iodide (neo-silvol), or argyrol (5 to 10 per cent).
4. Throughout the treatment use hot compresses alternating with a cold compress if pain is too great.

Rhinitis, Laryngitis, and Bronchitis.—Irritations of the nose, throat and lungs are treated symptomatically. One doctor has had good success in the use of "anespray" for the throat.

All of these treatments should be under the supervision of a competent physician, and although the symptoms may appear trifling, they should receive medical attention at once due to the complications which often arise. Although the application of hot and cold compresses in themselves will relieve pain in cases of conjunctivitis, and irrigation with boric acid will be helpful in slight attacks, the difficulty of obtaining sterile compresses and eye cups together with the difficulty of self-diagnosis as to the severity of the attack, makes "home remedies" and "home treatment" inadvisable. If a man had a natural tendency toward eye or respiratory weakness, his exposure to hydrogen sulphide gas might result in a complicated condition that would prolong the recovery period. This makes it especially imperative that all cases should be treated by a competent physician.

It is reported that in the Panhandle district some practitioners of little experience are dispensing solutions containing cocaine to be used as an eye wash in cases of gas conjunctivitis. This is a very dangerous treat-

ment because the pain is relieved temporarily, and men will go into the hydrogen sulphide gas repeatedly when they should be receiving proper care. The continued application of such eye washes would undoubtedly result in corneal ulcers and in the permanent injury to the patient's eyes.

In many cases of acute hydrogen sulphide poisoning there is an immediate cessation of respiration. Thus any treatment to be effective must be given immediately and so simple that it can be given by fellow workmen. There is no time for summoning aid before beginning to resuscitate the victim. In view of this the following treatment is outlined.

1. Get the patient into fresh air.
2. Give artificial respiration, if breathing has ceased, become markedly labored, or impaired.
3. Summon a doctor.
4. Give inhalations of oxygen, if available, through an inhaling apparatus similar to that described in Bureau of Mines Bulletin No. 231.

If breathing has ceased or ceases during treatment, artificial respiration should be continued until breathing resumes, or at least for a period of three hours.

Protective Equipment

Employers should furnish the following protective equipment and insist that men working in atmospheres containing hydrogen sulphide gas wear this equipment. The men should be instructed in the proper use of each type.

- (1) For work in cellars, inside of tanks or other confined spaces, where high concentrations of hydrogen sulphide gas may occur, men should wear a hose mask equipped with a blower. Workmen should not enter these places without a safety belt and life line.
- (2) For work on the derrick floor where concentrations of hydrogen sulphide are likely to occur, that will irritate the eyes, men should wear a gas-tight type of goggle. Goggles with water dams to overcome fogging of the lenses, and non-shattering glass are recommended.
- (3) For gauging tanks and for other outside exposure including the derrick floor, where low concentrations of hydrogen sulphide gas exist that would irritate the respiratory tract, suitable canister type masks should be worn.

Education in the limitations of the canister mask is essential. A canister mask is a filter, not a generator of oxygen, and is intended only for low concentrations of hydrogen sulphide. They should never be worn in cellars and other confined places where concentrations of hydrogen sulphide are as high as in these fields. The writers talked with one man in the Panhandle field who had been overcome by the gas in a cellar while wearing a canister mask. According to this man's statement, he had been in the cellar only a short time when the vapors broke through the

filter. He was aware of this by the "taste" (odor), but before he could reach fresh air he fell unconscious (and injured his back in falling).

Canisters should be used in accordance with the instructions of the manufacturers as they are in a position to know the contents of the container and the safe working time that is permissible before discarding it. The life of a canister is relatively short.

One company is meeting these difficulties and maintaining proper supervision of its breathing equipment by having a first-aid man in the field whose duty it is to take care of all breathing equipment and to be present at wells when the bradenhead is put on.

Objections to wearing hose masks on the ground that they can not be used in the cellar when putting on the bradenhead are either due to lack of proper information or to biased opinion, as the writers observed this equipment in use at a number of wells. Men who have worn hose masks claim that their movements are not greatly hindered by the hose and they appreciate the protection given by this breathing equipment.

Methods of Protecting the Men from Gas

Care should be taken that the blowers are sufficiently far enough away from gas so that the men will be sure to have an uncontaminated supply of air. As a matter of extra precaution, a man should be designated to watch each hose and safety line and to keep them from becoming tangled.

While apparatus for protecting men from hydrogen sulphide are essential for certain specific duties, it appeared that the majority of the cases of poisoning could be averted by using mechanical devices to keep the gas away from the places frequented by men and by devising methods of procedure which would not expose men during certain operations. A number of these are suggested in the copy of the report which has been given you. No doubt many more would be suggested to the alert safety engineer who has more time to study the conditions and developments.

Precaution is another item of extreme importance in all safety work.

Many of the cases of irritation were the result of carelessness, negligence, or lack of knowledge of the danger on the part of either the employee or the employer. Men would often heedlessly stand on the leeward side of the hole or in the stream line flow of the gas. Workmen should be instructed to avoid the gas whenever possible by working on the windward side of the outlet from which the gas is escaping. Under no condition should a man stand directly over a thief or gauge hole on a tank. Three out of five reported deaths due to hydrogen sulphide gas in these fields, have occurred to gagers on top of tanks.

I have endeavored in this brief of Mr. Yant's and Mr. Fowler's original report to give you the outstanding features attending the occurrence of hydrogen sulphide poisoning in these three fields. Also I have made reference to means of protection and prevention which are not only applicable to this field but to analogous problems in the petroleum industry. In all new safety problems it always requires a certain time to gain a comprehensive view of the situation and to work out ways and means

of coping with it. However, we can often gain time and profit from a background of what were analogous problems.

In regard to the discussion of this paper we are very fortunate in having with us Mr. Ray Miller, chairman, Mid-Continent Division, National Safety Council, and safety director of the Petroleum Safety Council of the Mid-Continent Oil & Gas Association, who has been with Mr. Fowler in the Texas Panhandle and is in a position to discuss the subject from first hand information.

THE CHAIRMAN: Mr. Forbes, before we call for a discussion of this paper I want to express the thanks of this Section. I consider this paper one of the outstanding features and one of the best contributions to this Section. The whole paper breathes naught but the idea of conserving human life and preventing misery and death, and it behooves all of us here, especially those interested in the producing territory, to arrange for the widest distribution of that paper. I am sure it will be received with much interest by everybody concerned, and I recommend it for consideration and all should be sure and get sufficient copies to see that they are widely distributed.

Policy of the Bureau of Mines is Criticised

MR. WALLACE: Mr. Chairman, it is useless to say anything more regarding the paper that Mr. Forbes has presented to us. We always try to have a paper in any of our divisional meetings from some of the Bureau of Mines group; we always know that they are going to be worth while.

The ridiculous part of it to me is that the stingy policy on the part of the Bureau of Mines has made it impossible for men like Fowler and Miller and the other boys that we all know, to attend these Congresses. It seems to me like putting your light under a bushel. The light is there all right, but they are covering it by a stingy scheme; and I would like to make the motion, Mr. Chairman, that a committee on resolutions be appointed, the purpose of this committee being to draw up resolutions expressing the sentiment which I have in mind, and that a copy of these resolutions be given to every member of the Petroleum Section with the request that they be forwarded to their Congressmen. I expect to take it up with Dan Garrett as soon as I get back to Houston just as enthusiastically as I can. Let's see if we can't help this Bureau, which is one of the few departments—I am a patriot, too, gentlemen—but it is one of the few departments in our Government that make me proud that I am an American.

I have all the confidence in the world in the Bureau of Mines. There is not a particle of commercialism in it. Nothing in the world but a real, honest desire to help in every instance where they can; and we have just started the contact in the last two years between the Bureau of Mines and the petroleum industry, and it is very regrettable if they spoil it at this time by a stingy policy.

(Mr. Wallace's motion was duly seconded.)

THE CHAIRMAN: It has been regularly moved and seconded that this Petroleum Section, by a committee to be appointed, draw up resolutions for presentation to the various Congressmen expressing the regret of our Section over their meagre policy, hoping for a little wider distribution of funds for convention travel. We would particularly stress the necessity of additional funds for convention travel.

All in favor of that please say "aye."

(The motion was carried unanimously.)

MR. SHAW: I would like to ask Mr. Forbes if hydrogen sulphide gas is heavier than air.

MR. FORBES: Slightly heavier, yes. Carbonmonoxide is 0.97; CO₂ is about 1.5. Hydrogen sulphide is slightly heavier than air.

MR. MILLER: I would like to add to Mr. Forbes' paper that that condition is terrible down there. There are several hundred companies operating there in various sizes and degrees and practically none of them are taking care of the situation in any comprehensive way. Most of the larger companies that are operating there have dumped in a lot of safety equipment, but as far as I could find, few of the men on the job knew how to use it. I find gas masks that are still locked up in their trunks and have never been used; we found the inhalaters had never been hooked up, the oxygen tanks were still wrapped up, and we found a few that had been partially hooked up and the valves were leaking so they could not have been used, and the condition is bad.

The General Field Conditions Are Very Bad

The general field conditions are about the worst I ever saw in any field. The cellar runways are invariably broken down, filled up with trash, the bracing and shoring is caved in, there is no room for a man to get out and conditions are rotten. I think those of you who are interested down in that field ought to take some steps to take care of those things.

We held a series of meetings down there, just finished up last week, getting the foremen together, to try and impress on them the dangers not only from the hydrogen sulphide, but the gas and fire dangers, and tried to show them ways of cutting down the necessary time of exposure to that gas, and also show them ways of protecting themselves during the necessary exposure. I think our meetings were good, but we only reached a very small number of people, simply because most of the companies operating there failed to accept our invitation to take part in the meetings. Those who did, I think, found the meetings worth while. Mr. Fowler and I took care of the meetings and I think we did some good among a few foremen. It is a serious question.

MR. CHAIRMAN: If there are no further questions, I might close this subject by stating that there has been a definite, concrete, plain warning sounded here this morning in the paper that has just been delivered. The warning has come in a technical way and from a practical standpoint. There is no doubt that the conditions exist. There certainly is no ques-

tion but what the facts are as stated, and it behooves us all to concentrate on that particular phase of safety in our industry and do some real work on the line of prevention of accidents in the producing fields. I hope you will all consider that thoroughly and make it a strong point to put that over and leave less important things go by the board.

Before closing the meeting I wish to make an apology to our Nominating Committee who were first on the program and unfortunately are now last. But I think they will realize the conditions under which we were working this morning and be satisfied to have their recommendations presented at this time.

The Nominating Committee sends this letter to me addressed to the Council:

REPORT OF THE NOMINATING COMMITTEE

Your Nominating Committee respectfully submit the following names for Sectional officers during the coming year:

For General Chairman the committee recommends the name of Mr. V. R. Currie, of the Texas Company, Houston, Texas.

For General Vice-Chairman for the coming year, Dr. R. P. Anderson, of the American Petroleum Institute, New York City.

For Chairman of the Pacific Coast Division, Mr. Charles M. Butler, General Petroleum Company of Los Angeles, Calif.

As Chairman of the Midcontinent Division, Mr. Ray E. Miller, of the Midcontinent Oil and Gas Association, Tulsa, Oklahoma.

As Chairman of the Atlantic Division, Mr. Thomas W. Waddington, Standard Oil of New Jersey, Elizabeth, N. J.

The committee further suggests that the selection of a Sectional Secretary be left to the option of the Sectional chairman.

Gentlemen, you have heard the nominations. What is your pleasure?

MR. SHAW: I move that nominations be closed.

(The motion was duly seconded and carried.)

THE CHAIRMAN: Consequently, the secretary will cast the ballot for the unanimous election of the gentlemen named. May I at this time request Mr. Currie to present himself as our new chairman?

(At this point Mr. V. R. Currie, the newly elected Sectional Chairman, assumed the chair.)

MR. WALLACE: Might I say that Mr. Currie threatened to kill me if he was even suggested as chairman of the Section for the coming year? So you can all attend my funeral at 4 o'clock this afternoon.

THE CHAIRMAN: Mr. Chairman and Members of the Petroleum Section: I am not going to take up a lot of time or even endeavor to give you a talk at this time.

I don't think that there is a member of this Section but who would feel very keenly the honor of being elected as Chairman of the Petroleum Section. I grant you that I am accepting this chairmanship over my own personal protest. At the same time, I want to say that I accept it and

I am going to put my shoulder to the wheel and endeavor to try to make a success of the job for the next 12 months. I can not but realize that we have made wonderful strides in the past few years in this Section, and I foresee for the future the greatest possibilities in the work of the Section.

I am accepting this chairmanship not in any way as a recognition for any individual work, but I am doing so as, if you please, a compliment to the hundreds of our boys in the ranks who have in the past 12 years served on our safety committees; to the foremen in our plants, who are awakening to the responsibility in connection with safety which rests upon their shoulders; to the assistant superintendents of our plants, who as a rule are the chairmen of our plant committees and on whose shoulders we are placing the responsibility for the accident prevention work in their respective plants; to the superintendents and general superintendents of those plants who I believe in most cases are thoroughly sold on the necessity of accident prevention work; to the assistant managers and managers of the departments who are ready and willing at all times to put their stamp of approval on practically every sane safety suggestion that is presented to them, either by the chairman of the central committee of safety or by the plant superintendent; and last but not least, to the president of our company, who as manager of the manufacturing department 12 years ago this week made the first announcement and made the appointment of our first safety committee. I do not think it is necessary to state here that he is thoroughly sold on the necessity for safety work and is not only giving us every bit of encouragement possible, but is really insisting on more effort being expended along that line.

I want to thank you for this great honor which you have bestowed upon me and I am going to accept this election with one provision, and I believe that that one provision or condition can be readily met—and that is that I have the full cooperation of every one of the officers of this Section and of the entire membership. I believe that I can count upon that.

MR. SENNE: I believe I voice the sentiment of our Section in answering your last suggestion. First I wish to congratulate you personally on your election. I believe the Section has done wisely in the selection. I want to promise you my fullest support during the year and with that support I am sure will go the hearty cooperation of each and every member of our Section. I wish you success and good luck, Mr. Currie. (*Applause.*)

ADJOURNMENT

THURSDAY MORNING SESSION

October 28, 1926

V. R. CURRIE, Chairman

Supervisor, Employment and Service, The Texas Co., Houston, Texas

The Thursday Morning Session of the Petroleum Section, October 28th, 1926, convened at 9:50 o'clock at the Tuller Hotel, Detroit, Michigan, the newly elected Chairman, Mr. V. R. Currie, of The Texas Co., Houston, Texas, presiding.

THE CHAIRMAN: Gentlemen, I am going to suggest that following the papers that are read this morning we confine as near as possible the discussion to the subject matter of the papers, inasmuch as there may be a few matters that the members would want to bring up before we adjourn. I think that there is some unfinished business, and if we can get through in time it will give us a little time for the discussion of miscellaneous matters.

The first speaker on the program is a young man who is comparatively new in safety work. He has only been associated with it, as I understand, the last 12 or 18 months—Mr. R. H. Farrell, now safety director of the Marketing Division of the Buffalo District of the Standard Oil Company, and he is working directly under the supervision of Mr. Burt at headquarters.

I take pleasure in presenting to you Mr. R. H. Farrell.

**LOWERING THE ACCIDENT CURVE AND MAINTAINING
INTEREST IN SAFETY WORK**

**R. H. Farrell, Safety Director, Marketing Division, Buffalo District,
Standard Oil Company of New York, Buffalo, N. Y.**

The widely extended scope of the petroleum marketer's business activities and the demands for service made upon him today cause him to take a special interest in lowering the accident curve and maintaining interest in safety. A marketer's safety problem is not solely one of operating motor equipment on traffic congested highways. It includes literally dozens of unrelated problems, among which the hazards connected with gauging tanks, slippery ladders and loading platforms, handling underground tanks and curb pumps, loading and placing of heavy barrels and drums of oil and the numerous details connected with tank and pump installation and repair work, the digging of holes, chipping concrete, and the supervision of men at many different stations stand out prominently.

Years ago before the advent of the motor tank wagon and motor truck, deliveries were made by horse-drawn equipment, which was a slow way of delivering. Almost our greatest hazard was the runaway horse or runaway team but today an entirely different traffic situation confronts the marketer and he has to solve it as best he may.

Horse-drawn equipment has been replaced with up-to-date, fast-moving equipment fully two to five times larger than the old equipment. With this change we had the problem of converting the old tank wagon driver into a chauffeur for motor equipment. This man was one who had been used to a team controlled by the whip and reins. He was a man who, when placed on this new equipment, jumped from a walk to a run and was placed on the streets and highways with fast passenger cars and trucks. Of course, accidents began to happen and with these accidents the thought of preventing them came to mind.

Our company always endeavored to procure careful drivers and to train them to exercise the highest degree of care in operating, with a fair degree of success.

However, early in 1925, we decided to institute an intensive campaign for the better education of drivers and helpers in safety work, and to see what results, if any, would be shown in cutting down the number of accidents and what reaction would come from the men. In one department a plan of holding meetings was started. At the first meeting the man in charge of handling the accident work gave a talk on courtesy on the highway, rules and regulations pertaining to motor vehicles and in general a talk on accident prevention. We continued these meetings, holding them once a month on the same day, if possible. At first there was little reaction. The explanation seemed to be that we had to contend with the type of man who felt that accidents were a part of the day's work. It was soon apparent that it would be necessary to go into the matter of education with hammer and tongs in order to prevent these accidents, so we kept pounding away with our educational activities. These meetings were continued and we arranged to have outside speakers talk to our men.

Getting the Active Help of Prominent Men

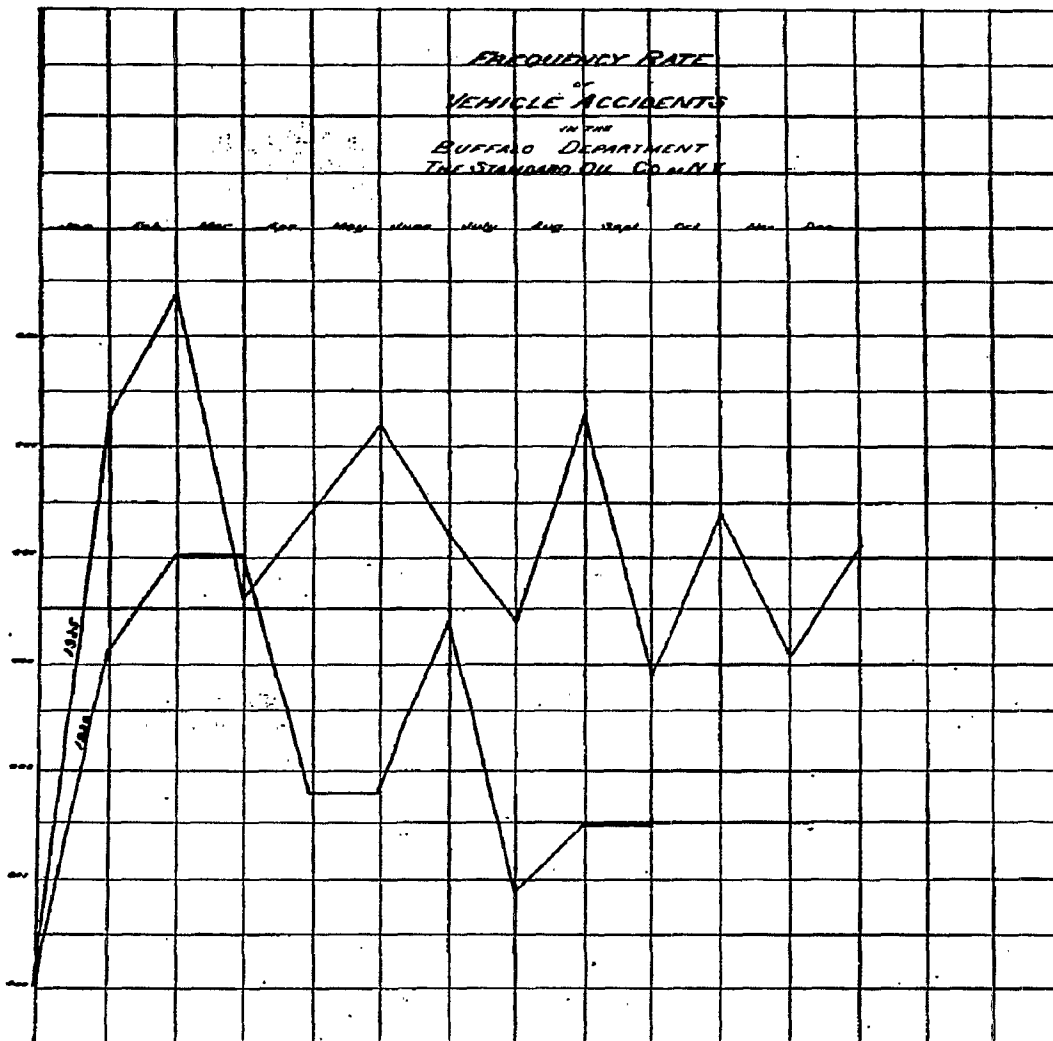
In the Buffalo district we invited the district deputy of the New York State Motor Vehicle Bureau to talk to our men. He gave a very good and profitable talk, explaining new laws and regulations, particularly explaining the ruling of New York state, wherein a driver could lose his license for careless driving and if the license were revoked, the driver would not be permitted to drive for a period of one year. This one point caused our men to pay strict attention, and we noticed that they took more interest after this meeting.

In our Rochester territory we secured the services of the city chief of traffic, who talked on violations.

In another we had the services of the director of safety from the Chamber of Commerce, etc.

The men began to take an interest in these special talks, for they soon realized that these meetings were going to be of assistance to them in the day's work and a benefit to the company. The feature which seemed to have most effect on them was the reading of the reports of accidents which had happened since the last meeting and the explaining of ways and means on how these accidents might possibly have been minimized.

We next started the plan of posting a chart in a conspicuous place to show the record of accidents happening on the road for a six-months' period. This chart carried the names of all drivers in the vertical col-



An intensive campaign lowered the accident curve.

umn. In the horizontal column after each driver's name, we blocked off each week with the date through a six-months' period. In the horizontal column after the driver's name, we entered a zero for a slight accident and an X for a serious accident. This aroused great interest and seemed

to have the effect of cutting down the number of accidents. Drivers, being human, did not care to see a mark after their names. Quite a bit of talk went on among the men who had no accidents and this talk had a good influence upon the man who was inclined to be careless.

During the latter part of the year 1925, we realized that in order to reduce accidents materially and to lower our curve, it was necessary to introduce the spirit of competition. Several plans were advanced, such as medals for drivers not having accidents, cash bonuses, etc. However, we finally adopted the plan of dividing our drivers and helpers into teams. We had 104 men at our largest delivery station and we divided them into two teams, going over the list of names carefully so as to balance up as nearly as possible the drivers who apparently seldom had accidents with those who were less fortunate. We then held a meeting and informed the men of our plan. After we had selected the teams, it was decided that a record should be kept of every accident and the team having an accident should be charged with one point.

The Men Were Kept Informed of the Contest Leaders

The contest extended over a period of eight months and at each monthly meeting we told the men which team was leading. We did not tell them the number of accidents which separated them. The contest included slippery winter driving and summer driving. Much enthusiasm was shown at these meetings, some men going so far as to call down a driver who had an accident and who caused a mark to go against their team. I recall one day overhearing a certain driver telling another that he was "tickled pink" because John Jones was not on his team. It seems that John Jones was unfortunate enough to have had two accidents in one month and he came in for a great deal of razzing.

During the contest a close check was kept with the warehouse superintendent so as to remove the names of men who had resigned and to add the names of new men employed. This kept our teams well balanced. At the end of eight months we held a meeting at which the men were told that the contest was over and that at the next regular meeting we would announce the winning team and that it was decided the winning team would receive as a reward an evening out to take in a show and a supper afterwards which would be held at the expense of the company. There was a great deal of speculation during the ninth month as to which team would be the winner.

Our announcement of the winning team was met with great applause. We found that team No. 2 had won the contest, with a record of 28 accidents charged against it for the eight-months' period. Team No. 1 had 40 accidents. The expense of this party was approximately two dollars per man and we feel that we have been repaid many times. The party was attended by the winning team, the superintendent of the warehouse, his assistant, the assistant manager of our company, the special agent of the division and the safety men. There was no business talk that evening except that the winning team was complimented on its achievement and urged to do even better in the months to come. Our record for the

period of this contest compared to the eight months for the same period of the year previous is as follows:

January 1, 1924, to September 1, 1924, out of our Buffalo district we had a total of 93 accidents. In the same period for 1925 during the contest we totaled 68 accidents. Incidentally, for the eight months of the year 1926 we have a total of 37 accidents. The interest aroused by this contest continued and we kept on holding our regular meetings.

Last spring we received an invitation from the Buffalo Chamber of Commerce for our drivers to attend a safety course for truck and taxicab drivers to be held once every week on Thursday evening at 8:00 p. m. The invitation was posted on our bulletin board and the response of our men was so great that approximately 70 per cent of the drivers at our Buffalo station signed up and attended these meetings. At one of these the speaker of the evening was Joseph Godfrey, Traffic Chief of the Buffalo Police Department. During his talk on the subject of cooperation with the police, Chief Godfrey made the statement: "In all my experience as a police officer, neither I nor any of my men has had to warn or stop a Socony driver for violating the traffic laws." He added that this statement was substantiated by his men.

Similar series of meetings were held under the auspices of the Rochester Chamber of Commerce, and while these meetings were being held a notice was run in the Rochester paper that the Standard Oil Company of New York had the honor of having the greatest number of men attending this lecture course.

Evidence that the Men Had the Safety Spirit

All this simply shows that our men must have caught the safety spirit and that every day in every way the men are doing their utmost to avoid accidents and thus lower our curve.

The latter part of 1925 we also started a bulletin system, as we felt that the general industrial literature on safety did not apply to our business. We decided to send a bulletin to each tank wagon station in our field once every week which was to carry a short paragraph pertaining to safety. Pointers given to our drivers were such as carefulness in driving, attention to driving, duty of the men to the company and obedience to traffic laws, etc. These bulletins are sent out every Saturday morning from our safety department so that they reach the stations on Monday morning. Each station posts the bulletin on the bulletin board where every man will see it. The system has reached a point now where the stations look forward to the bulletin coming in on Monday mornings, and we believe this little piece of work helps us considerable in keeping down the number of accidents. At some of our stations when these bulletins are received, the man in charge of the station gets his men together and they discuss the thought presented. A special bulletin was prepared and sent out to all stations calling attention to the particular hazards of winter driving and urging that winter accidents be minimized as far as possible. The reaction to this bulletin was

very far reaching, not only in our own organization, but even finding expression in the editorial column of the Olean Evening Times.

Our experience in safety work leads us to the firm conclusion that the secret of arousing and sustaining interest in safety work is to keep the safety idea everlastingly before the man in one form or another and often by combination methods to give the men a definite safety goal to shoot at. The particular brand of safety we endeavor to sell our men is the common sense variety and not the visionary.

The first of January, 1926, we called our men together to announce to the drivers, helpers, warehousemen and repairmen that the big idea for 1926 would be safety. We have been fortunate in selling this idea and our men are carrying it out in first-rate style. Consequently at the beginning of 1926 we adopted the slogan, "Let's Make Socony Spell Safety."

We have been greatly helped in our efforts to reduce accidents by the whole-hearted cooperation of our manager, special agents, superintendents and the educational literature and comparative statistics sent to us by our New York City executive safety department.

Wanted to Organize the Safety Work Completely

These are only a few illustrations of the methods we have been using and which we find have been helping us in keeping interest in safety.

All of the foregoing is one phase of safety work which confronts the marketer. Along with this the marketing department has the feature of the handling of the men in the warehouse, at the tank wagon filling station, on the trucks in the repair shop areas and at service stations.

We realized the importance of safety work and its extent and we wanted to organize it completely. Accordingly on April 1, 1925, we formed in our Buffalo territory what we term our "General Safety Committee" to handle matters pertaining to safety in our warehouse and repair shop. This committee was appointed by the management. The committee in turn selected a subcommittee to function with it. Immediately a meeting was held. The safety man, general committee and subcommittee attended. The duties and functions of the committee were explained by the safety man. It was decided then to hold another meeting after this one, one week forward, and to talk on the items picked up by the safety subcommittee and to hold an inspection of our general plant to get an idea of conditions throughout the entire plant. These meetings and visits were held once every two weeks after this.

Reported suggestions were promptly looked into by the general committee and if found to be as reported, the chairman of the general committee notified the management, who immediately made changes recommended. Several reported unsafe practices were investigated and when found unsatisfactory were immediately rectified, which action gave the men the satisfaction that cases brought to the general committee's attention were not forgotten, but were given consideration and rectified if warranted.

We held a general meeting with all our men and told them of our interest in their safety. We told them of the accidents which had hap-

pened and how they might have been prevented in many instances. First-aid kits were placed at many points throughout the shops and warehouses, and we generally kept the idea of safety before our men in all possible ways. We also procured first-aid booklets and distributed them throughout our territory. We held meetings with our foremen and put the responsibility clearly up to them. After a foreman was made to feel that we held him personally responsible for an accident, a noticeable decrease in lost time accidents was noted. Our safety department secured posters from the National Safety Council, which we are continually using. Two of the more recent ones which have caused considerable comment are "Sixty Years And Still Going Strong" and "A Good Safety Record Means Happiness For All."

These service posters were placed on large bulletin boards near the principal entrance to our station in clear view of employees. It is surprising to note the interest and the study the men make of these posters.

Men Wanted to Keep Their Banner Flying

About the time we adopted the 1926 slogan, "Let's Make Socony Spell Safety," a banner was placed in one repair shop with the words "Boosting Safety, 1926." This banner cost 38 cents and we used four because there are four floors at this repair shop. The idea we gave the men was that this banner was to hang suspended from the ceiling of their floor so long as there was no lost time accident, and that should an accident occur the banner would be taken down and kept down for 30 days. This banner was placed on each floor, not with the idea of having competition among the men, however, as this could not be done because the work on each floor is entirely different, but to keep the thought of safety ever before them. The men got the idea so well and became so enthused over keeping their banner flying that a competition soon arose anyway, as the men on one floor determined to keep the banner flying longer than the one on the next floor, etc. So, with no effort on our part, a keen rivalry was started, and we are proud to say that we had no lost time accidents up to September 1, 1926.

Proceeding from the warehouse and repair shop to the service stations, owned and operated by the marketer, let us consider for a brief moment the marketer's newest safety problem. We find that we have to contend with a comparatively younger group of employees who have not had the training of years in discipline, who generally come to us with the "take a chance" spirit. The danger of being burned or scalded when filling radiators of customers' cars, the inflation of old or worn tires and smoking around a station present the chief hazards. Horseplay in one form or another seems to be easy for the men to indulge in during moments while temporarily disengaged. When a new man is employed as a service station salesman he is told of these special hazards and cautioned to use the utmost care to avoid accidents. We also hold our man in charge personally responsible for the behavior of men at our stations. We make use of our bulletin system by sending special ones to service stations which are pertinent to some particular phase of service station safety.

Summing up, we feel that our efforts in educating our men in safety have been worth while and highly beneficial both in the results shown in lowering our accident curve and in inculcating the safety spirit in our employees. The outstanding accomplishments in our efforts to reduce compensation accidents have been that we have not had a single lost time accident in our Buffalo auto repair shop for nine months. Many potential lost time accidents have been averted by the desire of the men to avoid spoiling their particular department's record and also by the constant supervision of the superintendent and foreman.

Our compensation figures show that we have reduced our lost time hours fully 25 per cent in 1926 in our Buffalo field over 1925. The success of our efforts to reduce vehicle accidents is best portrayed by the accompanying graph. We are proud to point out that our frequency rate is consistently lower in 1926 and that we have both "literally" and figuratively made Socony spell safety.

Systematic Inspection of Physical Equipment

THE CHAIRMAN: We are indeed indebted to Mr. Farrell for his very comprehensive and very interesting paper. If there are any questions or any discussion you wish to have with reference to that paper, the floor is now open to you.

MR. SENNE (Vacuum Oil Co., New York): I would like to ask Mr. Farrell whether they have any systematic plan of inspection of the automobiles and how often that inspection of the physical equipment occurs?

MR. FARRELL: We have our motor vehicle inspector out of our Buffalo auto repair shop, and he has 328 vehicles under him. He is on the road continually and we follow up by keeping a record of our stations, our tank wagon stations, out of our Buffalo, Rochester, Jamestown and Olean stations. We keep our records so that he is continually making the rounds, and he checks the equipment for brakes, steering columns, and, of course, defects in operation.

At our Buffalo station we have our home repair shop. That is where all of our overhauling repair work and painting is done. In Rochester we have two men who inspect the equipment at that station. In Olean we have two men and in Jamestown we have two. Our territory takes in the western end of New York state; for example, from the Canadian border to the Pennsylvania line, and east about 50 miles east of Rochester, or coming up to the Syracuse boundary.

MR. SHAW (Hercules Powder Co., Wilmington, Del.): I would like to ask Mr. Farrell if between inspections the trucker has trouble, will he tie up the truck? Has he instructions to phone into the nearest station? That is, if his truck should go bad between inspections, will he tie up his truck?

MR. FARRELL: The driver knows that he is to get in touch with the man in charge of the station. He is to tie up until he can get a mechanic. Understand, we have four B. and M. groups, which, as I said, are Buffalo, Rochester, Jamestown and Olean, and at each of these we have a car connected with our repair shops. If a man is 20 miles out of Buffalo and

should have trouble and he thinks his steering column is wobbling or his brakes won't hold, he knows he is not allowed to run that truck. He calls that station, and our repairman goes out in his Ford jitney and he fixes the truck up or it is towed in.

MR. SHAW: In your contest, after the four months did you find any lagging of spirit, any reaction? What incentive did you give them after the contest was over?

MR. FARRELL: From September 1st to the first of the year, we had no contest of any sort. We took the month of September to keep them guessing as to which team was the winning team. In October we came along and had our party. The fellows who didn't attend the party figured they missed a good time, because everybody there did have a good time, and the talk around the plant was quite general on this party.

Then we came along with the chart, and that is arousing interest. We had it for the six months, and then we started in again the first of July for the second half and the men don't know. We have put the idea into them so well that they don't know when we are going to run another contest. We are leading them to believe now that we are going to run a contest without telling them. We can afford to give another party. We can take 50 men out at \$2 a man.

Physical Defects of Men Influence Accidents

MR. SCOFIELD (Associated Oil Co. of California): In our experience there must be a very close cooperation between the medical department and the driving department. Else we find a very serious source of accident. A very excellent driver may have an accident reported for which he may not be to blame, and on careful examination we find it is his eyesight and not his own carelessness. I am going to believe that we ought to have not only a beginning examination of eyes, but a periodic examination of eyesight of all drivers. I am sure that it is a problem we should give more attention to. Have you done that?

MR. FARRELL: We have not done that in so far as having any systematic check-up, but if an accident comes in and it looks as though the driver misjudged distance (we will say) we immediately talk to that driver and ask him what happened. "Well, it looked to me as though I could get through there," or "It looked to me as though I had time enough to stop." We immediately send that fellow over to our repair shop and a mechanic driver is put on to him and he is given another test similar to the one we give our new drivers. If that man thinks that fellow's vision is off a little bit, he tells the supervisor, and we then have that as a check-up.

MR. WALLACE: That recalls an article that I read in one of our Texas papers, making the statement that there was about an average of one man in seven that lacked the perspective in his vision that was necessary to judge the distance between two cars, one going his way ahead of him and one coming farther away towards him. And we all have that experience often in judging a car ahead of us. Another fellow will duck around and put us back on our own side of the road. The chances are

he is not a road hog, but simply one of those fellows that haven't that ability to judge perspective. I think that is one of the most vital things we can do with our truck drivers—to give them very clear perception, not only on their ability to judge distance, but their ability to have perspective.

RAY MILLER: There is one hazard around service stations that I don't think has been mentioned here, and that is open drain pits. I have run across quite a few accidents of that kind; kids running around the stations at night will fall into those places and are sometimes seriously hurt. I know of a few companies that have a practice of building a rail guard around them with a gate to allow access for a car, where others have a sliding door cover on little rollers or something of that kind, which they can slide on the way.

I wonder if that isn't something that ought to be taken care of?

THE CHAIRMAN: Can someone answer that question?

MEMBER: May I say that in New Jersey it is against the law to use a drain pit, on account of the danger from fumes and the fire danger from the pits, and we are using elevated ramps that they run up on and we now have a regular piston affair and shoot them up there on hydraulic machines. You will find no pits in Jersey.

I think it is better to get rid of the pits, not only from danger to the kids but other people.

MR. MILLER: I think most stations are equipping themselves with an elevated platform, but so many of the older stations do have lots of the old type underground drain pits.

THE CHAIRMAN: The next speaker I have known more or less intimately for approximately 40 years. There is a great deal that I could say about him, but very little that would show up well on paper. Mr. Wallace yesterday morning in his more or less rough and ready illustrations—so common to Texans—stated that he hoped to lay a safety egg during this convention that might incubate into a great many little safety chickens that would be of benefit to all of us. I trust that if any of you took his remarks to heart and since that time have been attempting to follow out his suggestion and have made failures of your attempt, that you will kindly lay the failures on the outside.

TRAINING THE FOREMAN IN SAFETY

V. R. Currie, Supervisor, Employment and Service, The Texas Company, Houston, Texas

Twenty or 30 years ago in industry, the best foremen were numbered among those who were able to chew huge quantities of tobacco, use profanity with emphatic intonation, and whip any man in their gang. Those were the days of brute strength and awkwardness—the foreman furnished the striking example of brute strength, and the workers admirably filled the bill of pure awkwardness. But, in looking back over the industrial road during that brief span of years, what a change has been

wrought; how differently we are obliged to attack the problems of production today which, in the final analysis and in spite of all our intricate mechanical devices, are more and more dependent upon the human factor?

We have come more and more to realize the acute economic value of the workman and to appreciate the fact that there is a vast difference between just a man on the job and a worker on the job. The former represents the class of some 30 years ago; rough, untrained, more or less willing perhaps, but possessing no definite objective, spurred on with no particular incentive; and only able to produce through the peculiar trend of the era rather than through any efficiency of individual effort. The latter are those we find today in the harness of production, in those concerns which keep growing and going in spite of the keenest possible competition; who are possessed with the objective of human happiness; who are carried forward through ambition aroused by the proportionate measure of wages and production; and who have been trained and taught in the most efficient manner of doing their tasks. There has truly been a tremendous change in the handling of our affairs and in the manner of producing those things upon which rests what we choose to call prosperity.

No Change in the Human Factor Since Ancient Times

But, in spite of all the changes which have taken place, there has been little or no change in the human factor. This today stands practically as it stood in the days when the pyramids were under construction; man still has two eyes, two arms, ten fingers, and ten toes; his fingers still create the desires of the mind; he is still susceptible to the same temptations and pitfalls, enthuses over the same factors, sulks over the same dislikes, and as a matter of fact, he is still evolving under the handful of universal laws which govern both his health and his happiness. It is quite likely, since we have come to appreciate the economic value of the worker, that we have overlooked the fact that he has changed but very little, if at all.

Conceding the fact that the good old Golden Rule has always been one of the universal laws of safety, and having recognized the economic value of the worker, we have found ourselves confronted with the tremendous problem as to how all this human wastage could be stopped. And, even then, it seems, we did not totally awake to the fact that there had been practically no change in the human factor. Under the same old universal laws, the worker found himself floundering about in the sea of changed conditions without having been taught practical and effective methods of adjusting himself to meet them.

I contend that the first few pages in the history of organized industrial safety are as plain as the nose on your face, that in almost every effort we have put the cart ahead of the horse. We started out by telling the worker he had to be safe. Then we asked him to be safe. Later, we told him what might happen to him if he wasn't safe; and just now we are beginning to get down to brass tacks and have begun to show him how and help him to be safe.

Now we are just beginning to get out of our swaddling clothes of accident prevention work and are getting up on our feet and taking a few forward steps. A few years hence, when the foggy industrial atmosphere of cripples and fatalities begins to clear, we are probably going to say that such is the harvest from the early seeding. Some of it may be, but then the biggest part of that improvement is going to be because we have at last gotten on the right track after planting the right seed.

For the last 15 years in industry, we have been doing a great deal of talking about safety; but the truth of the matter is, that's about all it has amounted to—just talking. If all the energy that has been expended in talking safety could be commercially harnessed, we could sell Niagara Falls to the Fiji Islands and still have a surplus of power after generating electricity for the United States during the next 100 years. Mind you, I'm not against talking. That's fine and necessary, but before we do very much of it we should have something definite to talk about and firmly and clearly fixed in the minds of those to whom we are talking. Glancing back over the last 10 years of industrial safety, I'm of the opinion that we might just as well have been talking to these millions of workers in the language of the Hottentots. True, we have drawn them a few pictures and posted 'em on the wall, we have made them some promises and a lot of threats about safety, but we've failed to cut the long hair and remove the false whiskers and really and truly introduce the rank and file of our industrial plants to genuine safety in a practical way.

Industrial Safety Effort Needs Continuous Enthusiasm

One big trouble with industrial safety, as a whole, is the fact that there is not sufficient consistent enthusiasm behind it. You start from Maine and go on through to California and you'll probably find the so-called safety program being carried on in every plant. But it's of a passive nature, it lacks the pep and ginger to really get it across and keep it across. Never in my life have I seen anything win out that didn't have enthusiasm behind it, and that holds good for everything from a football game to filling orders for locomotives on time. Maybe, in the matter of industrial safety we've been waiting and expecting that the lone worker would stand there on the job all by himself and all of a sudden get enthusiastic about safety, just as a holy roller might get the power, or a poet his inspiration. If we've been thinking that, then we've been kidding ourselves for a long time, and now the industry which fails to respond to the industrial gong of reason and begins to get its workers as enthusiastic over safety as they are over pay day is going to be permanently forced out of the race for better business.

I don't know who does get the workers enthusiastic over pay day. Maybe they do that all by themselves. But in plants where the production is reasonably high and the quality a bit higher, I know that trick is done by the foreman. And when it comes to the item of safety enthusiasm, he is the only one who can put it across to the boys in his gang.

For a number of years I have given the matter close and careful study and it is my honest opinion that in industrial America there is no better fitted and equipped organization to furnish the propelling power of enthusiasm, clear the underbrush of misunderstanding, and open up the field of intelligence and reason to our millions of workers than the foreman.

When all is said and done, isn't it his job to care for his men? Of course, if you began to analyze the job of any foreman you would run into any number of complexities, but inasmuch as the basis of every effort must begin with the individual, the fact is obvious that production results, or any other kind of results, are only gotten through proper and constantly improved guidance and supervision. And, don't lose sight of the fact that cripples are poor producers, or that results from any portion of the work force confined to the hospital have no commercial value.

Explaining the Plans to the Rank and File

We made a careful analysis of the matter and came to the conclusion that we had best explain thoroughly to the rank and file that about which we had been talking so loud for so many years, and we further came to the conclusion that if safety was to go over the top and stay over, it would have to be accelerated with a lot more enthusiasm than had been shown in the past. To the question as to how we could carry this out, there was but one answer—the Foreman.

And so, with the whole-hearted and enthusiastic endorsement of the management we launched at our Port Arthur Works in April of this year a safety training course for foremen which was absolutely fitted to our particular line of work and our particular type of workers. In this course we have not been under the delusion that it was a panacea for all of our accident evils, but we have rather regarded it from a practical angle and simply endeavored to transmit to the rank and file, through the foreman, an intelligent and enthusiastic picture of the thing that we had been talking about for so long a time.

a success. Of course, a great deal depends upon your interpretation of the word "success", but like any other course of educational training the answer lies in the future acts and attitudes of those affected. A child might be placed in school and continue there until it had attained a college degree. One might ask if its education turned out to be a success. And the answer would be in the future application to which the individual would put those things learned through an educational medium.

We know that we have aroused enthusiasm, at least on the part of the foremen, and my observations of life have taught me that enthusiasm is as contagious as the measles. Then, too, people who shy at it often contract it. The course was purely optional. At its inauguration, invitations were sent out to 150 foremen. On the same day they were sent out, 148 acceptances were received. If that's not enthusiasm, then I

have failed in my interpretation of the word. And it is borne out by the fact that at each meeting throughout the entire course, those 148 men were present, except in some few instances where it was almost a total impossibility for them to be there. On the original invitation each foreman invited to attend was asked to indicate his reason for acceptance. Almost without exception the reply was in order that they could learn more about safety to pass on to their men who really needed it. There certainly is no question about their needing it and we have every reason in the world to believe that it is being passed on, and that it will continue to be passed on.

Every foreman who attended the course has the proper entry made in his personal efficiency folder. We are going to follow the thing up so far as he is concerned, and we expect that he is going to keep hot on the trail of safety so far as his men are concerned. At future times when foremen may be proposed for promotion or increase in wages, we are going to check back on the accidents in their departments and find out whether or not there has been an improvement. If there has been, then there must be two factors which are right; the course must have been right and the foreman himself must be right. That combination applied to any job can do but one thing, and that is to build men who are right.

A Foreman's Course Contained in Lectures

On account of the brevity of time and the magnitude of the object, this foremen's course was put over by the lecture method rather than through any kind of open forum. The men who delivered the lectures were carefully selected and each one was not only vitally interested in the subject of safety but was specifically qualified to handle the particular subject to which he was assigned. The subjects covered in the course were:

The Foreman as a Safety Committeeman.

Accident Reports and the Value of Accuracy.

Compensation versus Carefulness.

Accident Causes and their Removal.

What is the Safety Program and Who is Responsible for it?

The Reflection of a Safe Plant.

These lectures were bound in book form and distributed to each foreman attending the course.

It can not be expected that the reaction to any particular subject will be felt the day following the lecture. But it can be expected that there will be a normal improvement in the accident situation through the fact that we have taken a long step forward in the matter of properly educating our workers through the logical channel, which is the foreman; that the foremen will intelligently understand the managerial point of view as regards the safety movement and the reasons therefor, both the human and the economic angles; and that we may find greater contentment in our forces through the fact that there will be more men

doing the right thing in the right way and doing it day after day without break.

In our industrial organizations, there are still a lot of important problems which confront us, and there are a number of these serious and complex problems which, in the final analysis, will have to be solved by the workers themselves. In the interest of healthy production, there is nothing finer than the friendly intermingling of capital and labor, but they can never mix well in an unsafe plant. I am firmly convinced that if every iota of trouble between capital and labor was settled satisfactorily right now that it would all go wrong and break out anew in the morning unless the issue of safety received the same careful consideration that might be given to production. I don't believe that the horrors of ignorant carelessness ever have been fully portrayed. I don't believe that there is a pencil black enough to draw a picture which will do it complete justice. I don't believe that there is a tongue eloquent enough to tell the sad details of its horrible story. Of all the ravages which we find in industry, the misery, the loss and failure which are brought about through careless practices are by far the widest and the deepest.

Our analysis of the situation pointed to the fact that this condition existed largely because the man on the job didn't exactly know what it was we had been talking about all these years, nor was he properly enthused in putting over what he did know. So we launched the foreman's safety training course in order to give him a fair chance as an individual, which in time will be bound to make the company just a bit better. Mighty oceans are made up from drops of water and great industrial organizations are made up of individual workers. There are none so humble that they do not merit careful consideration, and we believe that their appreciation of consideration through our foreman's safety training course will be reflected in a permanent lowering of our accident record and a better understanding from the general superintendent on down to the worker who watches an isolated gate.

If you should ask me if we feel that it paid, I should answer you by asking if you feel it has paid you to attend this Congress.

Lecturers Were Chosen From Outside Plants

THE CHAIRMAN: I might add to the paper that we have also had installed another regular foremanship course—that is, the training of foremen, which comprises 12 lectures, one of which deals with the subject of safety. So that both in the safety training course and in the regular foremanship course we are reaching the foremen on the subject.

If there are any questions that the members would like to ask, I will be glad to answer them.

MR. SHAW (Hercules Powder Co.): Do you buy a fixed and selected course, or do you go out and pick your speakers in your own neighborhood?

THE CHAIRMAN: We wrote the course and picked out our own speakers.

The speakers in the Safety Training Course were company men located at other plants, but men who knew the subject and knew what they were talking about. Those lectures in turn were typewritten and later delivered to the men.

T. N. SHAW (The Midwest Refining Co., Midwest, Del.): Mr. Currie, you say you picked men from other plants. Should we infer from that that you think it ill advised to have men located in plant A (we will say) talk to the men in plant A? Is it better for them to talk to men in plant B, and the official from plant B talk with men in plant A? Do you think the absentee representative can put something over better with the men than a local man? Is that the reason for it?

THE CHAIRMAN: Not altogether. At the same time, I think on a course dealing with the subject of safety, it gives the local plant a better opportunity of really advertising among their foremen the next speaker and the subject than it would if they announced that one of their own men was going to talk. That is just a little interest that is created there through that method.

I might say that in the regular foremanship course, however, the various lectures were delivered by the local men, the men at that very same plant, the first of which was delivered by the general superintendent himself and the next, the following lectures, by what we might call the experts in that plant dealing with subjects that they knew something about. A general storekeeper might come in and give the foremen something about storehouse records and the proper method of handling stocks, and the chief clerk might be brought in on the lecture pertaining to filling out of reports correctly, etc.

Details of the Two Safety Training Courses

MR. SENNE: About what is the average length of time that you allow for delivering a single lecture, and do you allow or do you have a discussion by the men on the floor regarding that lecture after it is given?

THE CHAIRMAN: I am going to speak of both of these courses, both the safety training course and the foremanship course, because I feel they dovetail into each other.

The Safety Training Course extended over a period of six months. In other words, one lecture was delivered on the last Thursday of each month. The time selected was shortly after the whistle blew in the afternoon, and the men assembled in the cafeteria; as a general rule the lecture lasted from 30 to 40 minutes and an opportunity was given for the discussion of the subject should any of the men wish to do so. Following the lecture and the discussion in the Safety Training Course we gave the foremen their evening meal. In other words, it was not a banquet but just cafeteria style, and they had their meal on those evenings out at the plant.

The Foremanship Course, however, was compulsory. That also was on the men's time held every Thursday evening for a period of 12 weeks. That has not been completed in its entirety as yet, and our present plan at the conclusion of that course is to give a banquet to all of the foremen

and at that time present to them certificates for those that passed the necessary grades.

On the Foremanship Course following each lecture, each foreman is handed a questionnaire pertaining to that lecture which he has two weeks in which to fill out, and return to the office. Those answers are graded and those passing the satisfactory grades are awarded certificates or diplomas, as we might call them, which will be presented at this banquet.

MEMBER: I have found the Foremanship lectures the best thing that has come to our aid in the last few years. But I discovered something that might be of interest. I was absent one time and I asked one of the foremen to conduct a meeting, get an outside speaker and get his men together, and it was wonderful the effect that had on the man. We had to start at the top and you got the thing down to the foreman, and it is up to the foremen to get it to the men. In the larger industries you can extend that to have different foremen have meetings at different times and they certainly are putting it over.

Various Foremen Are Selected to Deliver Talks

THE CHAIRMAN: We find that assigning to the foremen occasional tasks of that kind creates a great deal of interest. We do that to a large extent in connection with our safety rallies, which are held periodically over the year. During those rallies, which usually last a week, we select various foremen throughout the plant to deliver talks to groups every day, and the reaction from those talks has been very, very good.

I recall that one of our engineers during one of these safety campaigns was giving a talk on fire equipment. In other words, at the main gate at noontime, in talking to possibly 1,000 men, he had samples of the various pieces of our fire-fighting equipment, such as the 40 gallon foamite engines and the other extinguishers. He taught them through his talk how to use those extinguishers, if the opportunity should arise, and it was only a few weeks after that a fire broke out in our carpenter shop and one of the workers who had heard that lecture promptly looked for a fire extinguisher and knew how to use it, and put that fire out without it causing any damage. Later on he stated that had it not been for hearing the engineer talking upon the use of fire extinguishers he would not have known what to do, and the chances are that we might have lost the building.

MR. LAU (Standard Oil Co. of Indiana): At the conclusion of this six months' course, you start a new school each year, or does it end there; or do you wait until you get new foremen into it?

THE CHAIRMAN: It is hard to say. We have just completed the course and the chances are that in about six months we may do something of the same kind, but probably along different lines. We will keep after them. We may change our program somewhat, but we have started out to educate the foreman on safety and we are going to keep it up.

The next subject on the program is also from a member who needs no

introduction to you gentlemen. He comes from a rather long distance, and, has, I am quite sure, a great deal of information that we can carry back with us. I take pleasure in introducing Mr. George F. Prussing, secretary of the Safety Board of the Union Oil Company, of Los Angeles, California.

EXPERIENCE IN SOME RECENT OIL FIRES

George F. Prussing, Secretary, Safety Board, Union Oil Company of California, Los Angeles, Cal.

I brought with me from Los Angeles two reels of motion picture films that were taken last spring at the two great fires about which you all read in the daily press. Before showing those pictures, and those are really the meat of the argument as far as my part in the program is concerned—it might be well to give you a little narrative account of what took place at that time. Even though you read in the press of those fires last April, the peculiar coincidence of two tremendous fires 250 miles apart, almost at the same instant, needs some explanation, as do perhaps the reasons behind the fact that in two places there were stored such quantities of highly flammable oils.

The California fields have been notorious in the fact that their production has come in surges. Back in 1910 the Union Oil Company, for instance, took over a well that had been abandoned by a former drilling concern when they had a fishing job, and after sidetracking what was in the well, suddenly brought in the greatest well that California has ever known, the Lakeview gusher, which ran uncontrolled for months, forming tremendous lakes of oil as fast as it was humanly possible to dam up the reservoirs and little valleys around the well site.

That is in measure typical of what has happened ever since, except that not all of them have come in uncontrolled. But there have been in the past 10 or 15 years many fields brought in in which the production has far exceeded the capacity of the market to absorb it, and in some instances has taxed the facilities of the oil companies to produce and erect tankage in sufficient volume to take up the production in excess of consumption.

That was particularly true in 1921, 1922 and 1923, when Signal Hill, Santa Fe Springs and Huntington Beach were at the height of their production. It has been common in California, especially in those fields producing the lower grades of oil, to store that excess production in what we term ground storage, reservoirs, sometimes lined and sometimes unlined, but in almost every case great earthen saucers dug into the ground and covered with timber roofs, which in turn were made waterproof with ordinary composite roofing. I suppose in the last 25 years there have been 50 or 70 such reservoirs built, ranging in size from 100,000 barrels capacity to 4,000,000 barrels capacity, and in area up to six or seven acres.

It has been necessary to build those reservoirs because of the volume

and rate of production, and the greatest number of them were built about 1922 and 1923. The Union Oil Company had built a number of them, and at the San Luis Obispo reservoirs, just back of the Pacific Coast, there were in April of this year six such reservoirs. They ranged in size from 750,000 barrels capacity to 1,300,000 barrels, and in dimension from circular saucers 500 feet in diameter to reservoirs more or less race track in shape, 400 feet across and 1,000 feet long. At that time four of these six reservoirs still contained some of the highly volatile refining crudes produced during the flush production of 1923. About two of them contained asphaltic crudes of low gravity with very little gas.

Refining crude reservoirs had been made as entirely gas tight as wooden roof structure may be made, and these were connected with a gas absorption or gas recovery plant operated in connection with the tank farm machinery. In addition to the earthen or underground storage, there was located at this tank farm a group of nineteen, 55,000 barrel steel tanks of old construction, still equipped with their wooden roofs, not yet replaced with steel, but these roofs in turn had been made gas tight and were connected with the vapor recovering plant. The steel storage was also equipped with a modern foam-extinguishing system operated by gas engine drive. The entire facilities were located on a farm of some 400 or 500 acres several miles from the nearest town and situated on a fairly level valley floor, surrounded by low-lying hills. It was about seven or eight miles along the connecting water ports from the Pacific Ocean.

California Has a Relatively Low Lightning Rate

California has a relatively low lightning rate. I have looked up the Government records for the past 50 years and I notice that the southern part of California has a lightning frequency rate of approximately one and one-fourth lightning storms per year. The west coast of Florida at its southern extremity has a lightening frequency rate of about 300 lightning storms per year.

These reservoirs have been built, many of them, for 20 or 25 years, and the experience of the companies of California has been that they had been thus far immune to either direct hit or inductive ignition in lightning storms. That freedom from lightning hazard had become traditional. Nobody worried about lightning so far as underground storage went, until July, 1925, when a reservoir near Bakersfield, California, was struck by lightning and burned out.

Immediately the oil companies discovered that their supposedly safe reservoirs were not immune from lightning. They got into touch with those agencies that had done so much toward making transmission lines safe from lightning—the General Electric Company, and others of the large electrical laboratories—and began working out the technique of lightning protection. Dr. Peak, of the General Electric Company's plant at Pittsfield, Mass., is probably the leading exponent of lightning protection for large structures, and his services were immediately called

on; as were the services of Professor Schaffer, now with the Johns Manville Company.

A good deal of experimental work was done by these men. Dr. Peak recently had printed in the A. P. I. proceedings of the Los Angeles meeting last year an article which is perhaps the last word on lightning protection. And as early as the spring of 1926 one of the California companies had already contracted for that form of protection which Professor Schaffer and Dr. Peak had recommended.

Among the companies dealing with the electric companies for this form of protection was the Union Oil Company, and at the time that those fires occurred on the Pacific Coast, in April, Dr. Schaffer was already getting under way to visit the Pacific Coast and make specific recommendations covering our hazards. So that the companies weren't exactly asleep on the job, although they had not yet actually protected any of these structures.

The California storms are of peculiar form. They take shape way out on the Pacific Ocean in great cyclonic storms 500 or 600 miles across, which sweep in toward the Pacific Coast and south and southeastward. They start with a wind in one direction and then during the course of a day the wind almost boxes the compass and toward the end of the first day of wind, rain falls. That is almost typical of the California storms.

One of the Great Pacific Storms Swept In

✓ About April 5th ~~such~~ a storm began out on the Pacific Ocean and the weather reports show that it moved in its regular course toward the coast, and on the morning of April 7th the first rain squall hit the coast at the port of San Luis Obispo. About 7:30 that morning, the men working at the tank farm checked in at the time clock and stood there under the eaves of the building waiting for the downpour, which had just begun, to cease. It was in the nature of a small cloudburst, raining at the rate of about three inches per hour over a period of several minutes. With it there was some distant lightning, and as they stood there waiting for the rain to cease, there was suddenly a tremendous flash of lightning with a simultaneous clap of thunder, and followed immediately by a concussion and uproar that knocked the men almost from their feet. It was immediately apparent to these men who were looking out across the tank farm that three of the six large reservoirs had ignited and that the roofs had been blown completely off.

The concussion of that simultaneous explosion of those three reservoirs was so great that it knocked out the plate glass windows of the stores in San Luis Obispo, nearly four miles away. We have a very definite time record of its occurrence from the weather station at San Luis Obispo because the seismograph needle was knocked completely off the sheet and made a definite smear at about 7:35 in the morning. Just at that instant, also, a recording thermometer in the same town showed an immediate drop of 12 degrees, probably as the result of that rain squall.

Hell broke loose just about that time and the men, a dozen or so of them, each a member of the local tank farm fire department, immediately went to their station. Foam was put on to the 19 steel storage tanks as a matter of precaution against chance ignition should another lightning bolt strike the farm. The two families living in the tank farm, families of watchmen and foremen, respectively, were gotten out; notice was sent to the Los Angeles office and to the local railroad, the Southern Pacific; and a call was put in for men to build emergency fire walls where they would do the most good.

There had never been any thought in the layout of that plant that more than one reservoir might ever be on fire at the same time, and it was immediately apparent that if the boil-over from those three reservoirs was to be stopped from sweeping the entire area, an immediate emergency dike must be constructed.

Within a relatively few minutes there were several hundred men on the job working in a terrific downpour of rain and in a gale that increased from 20 miles an hour to 50 miles an hour during the succeeding 12 hours.

Graphic Description of the Firing of the Reservoirs

Less than 15 minutes after the first bolt of lightning struck and those three reservoirs went up, another tremendous flash occurred and a fourth reservoir ignited. There is no question in our minds from the evidence which we have obtained from many eye witnesses that not one of the four reservoirs was directly struck by lightning. It seems that lightning struck somewhere in the area of the reservoirs, perhaps very close to them, perhaps on some metal object. There were a great many pipe lines all over the ground, small boiler plants and electric pumping stations scattered throughout the area. But there is no evidence whatsoever to indicate that any one of the four reservoirs was directly struck. And that seems to be borne out by the fact of their simultaneous ignition, that the cause, whatever it was, release of an inductive charge on the roofs, was incurred at the time of this lightning flash but was not actually the flash itself.

The reservoirs burned relatively quiet for the succeeding several hours. About 14 hours after ignition the first slop-over occurred. It was noticed, however, during the later hours of the afternoon and evening that each heavy gust of rain caused an effect on the surface of the reservoirs. They frothed up, gas clouds appeared, the column of smoke which originated directly from the burning surface and extended perhaps a mile into the air, was suddenly turned into a torch and the oil level in the reservoirs seethed up toward their banks.

A little after 9:00 o'clock, however, the start of the typical boil-overs was noticed, and oil from one of the several reservoirs ran down its bank, crossed its fire wall and got into the creek below. These creeks are, of course, nothing but run-off ravines, dry most of the year, but at this particular moment because of the tremendous rate of rainfall, they

were full to their banks, and this burning oil was very quickly carried down through the canyon toward the Pacific Ocean.

The frequency and violence of these slop-overs increased during the succeeding three hours. Observers and workers were feverishly building dikes between the reservoir area and the pump house, at which site was located also the foam pump house and the tanks. But at 12:00 o'clock the violence of the gas clouds seemed to presage a boil-over of maximum intensity and every man was called out of the area. The last man had scarcely left the reservation when all four of those reservoirs seemed to boil over simultaneously and with tremendous violence.

It was estimated that the height of oil wave coming over the banks of the reservoir was at least seven feet, and that the velocity of that wave traveling across the flat ground was in the neighborhood of 40 miles per hour. Those waves spread in every direction and to a distance of close to a mile on the down-hill side. They swept over the permanent and temporary or emergency fire walls; they crossed the barriers of sheet steel that had been erected around the pump and boiler house, swept through the foam pumphouse and put it out of business; put all the facilities of the pumping plant out of business; burned the warehouses to the ground in almost an instant, and swept through the first row of steel tanks. Five of these ignited within a few minutes and with rather violent explosions.

The Outstanding Event of the Conflagration

At the same time, over toward the other side of the farm the oil swept into the fire wall around the nearest of the two reservoirs containing asphaltic crude, and within a moment the fifth reservoir was added to the fire.

And then occurred what is probably the outstanding event of that entire conflagration, for with the tremendous heat from the several hundred acres of burning ground now covered with this mass of oil, tornadoes, of such violence as to be directly comparable to the ordinary tornadoes of the middlewest, swept from the burning area and out toward the eastward or leeward side of the tank farm.

The first of these to be noticed swept across the roof of the sixth reservoir and tore tremendous patches of roofing material out of it and some of that roofing material was a week or so later brought in by ranchers 40 miles away and identified as part of that roof. Oil from the reservoirs, still burning, was picked up by these tornadoes and carried into the sixth reservoir, and that in turn was added to the fire. More tornadoes formed.

In all, the weather observer counted between 300 and 400 of them. Some of them picked up houses lying toward the east of the reservoir area, others took trees, fences, garages and other standing structures. One house was picked up just after a young woman and her sweetheart had left the door, picked up behind them, carried over their heads and dropped several hundred feet away, killing at the time two men—her father and grandfather, who had refused to leave the house.

Other homes were unroofed and in general the effect was typical of tornado conditions.

That continued for a period of three hours, during which the fire burned with such violence that the reverberation of it was felt miles away and caused plaster to be shaken from the roofs of dwellings, caused plate glass and other windows to be vibrated as far away as the port of San Luis, and in general made the night hideous for everybody within miles. Gas clouds coming from the fire burned to a height of nearly a mile and were visible for a distance of 100 miles around.

From that point on the fire died down slowly, added to only by the remainder of the steel tankage as boil-overs from one tank swept into the basins around its neighbors and set those tanks on fire. Finally, about five tanks remained, these being on a slightly higher elevation and isolated by emergency fire walls. These five tanks came through the disaster with some of the asphalt dripping from their roofs where they were exposed to the heat, but unburned and undamaged.

The Same Storm Swept Down the Coast to Another Farm

Such a fire would go down in history as probably the greatest tank farm fire ever known in the United States; but on the second morning, on the morning of April 8th, this same storm going in its leisurely course down the Pacific Coast, reached the district south and east of Los Angeles, Orange County, one of the large producing sections of California; and there in turn set fire in almost identical fashion to the Stewart Tank Farm of our company.

This tank farm, except as to size and amount of oil stored, was nearly identical with that at San Luis Obispo. The reservoirs were newer but in general the conditions were the same, except that there was a small more-or-less obsolete topping plant connected with the storage which had been used for topping the refining crudes carried in the earthen reservoirs, so that the lighter fractions might be put in the steel storage and the heavier residuum run back to underground storage.

There, too, two reservoirs were set on fire simultaneously, and in their initial boil-over engulfed a third reservoir. The other three at that point were at a considerable distance and were saved by the difference in topography or elevation, that really took them out of the exposure bank.

The steel tankage at the Stewart Tank Farm was exposed although not as seriously as was that at San Luis Obispo. In one instance oil from the boil-over came within 80 feet of one of the steel tanks and caused such gassing in the tank that the relief valves were unable to take care of it and the roof bulged slightly and the sides along the top angle were drawn in. But the tank did not flash. It had been covered with a heavy blanket of foam and that may or may not have been the reason for saving it.

However, the small refinery was completely destroyed except for the steel tankage which was modern, and these several tanks came through

the fire entirely divested of paint, blackened and bulged, but not ignited. They burned at their vents at various times as various waves of oil passed them, but these vent fires were extinguished after the ground fires had died down, by the usual stunt of throwing a wet blanket over them. A good example of what steel storage can be exposed to without failure.

Such, then, is the narrative account of the two fires in California. About 3,000,000 barrels of various grades of oil were consumed, with a total loss of perhaps \$15,000,000, part of which has been spread around the country through some 66 insurance companies that carried part of the risk. The structures themselves, of course, were uninsured, as was the damage to the surrounding country, which the Union Oil Company, though perhaps not legally liable, has assumed dollar for dollar.

California Oil Properties Now Have Modern Protection

The work of protecting underground storage and other wooden roof oil containers naturally received a tremendous impetus through these fires, and it is common now in going about California to see the reservoirs not only of the Union Oil Company, but of other concerns, completely shrouded with the Faraday cage, the net-work of telephone wires running back and forth over the surface and grounded to prevent the accumulation of static or induced charges on their wooden surfaces; and in between the reservoirs on the reservoir farms you will see the typical radio towers extending 100 to 200 feet into the air at such points as to completely cover by their blanket of protection the reservoirs in their neighborhood. Those towers, if you will read Professor Peak's paper, you will see are assumed to have a protective influence over a circle equivalent to four times their height, and they are so situated to overlap and cover the reservoir areas.

What their protection ratio is, no one knows. The laboratory experiments apparently indicate a usefulness of about 90 per cent. But that is so much in excess of what has been done before and the relative cost of that protection is so low that they are being utilized almost uniformly throughout the Pacific Coast.

By way of explanation of how our moving pictures were made—within 12 hours after the fires had started, the magnitude was so obvious that the news reel companies—Pathe and others—sent photographers to the two sites and took these pictures. I afterwards bought up for the company the negatives and had prints made which were titled for use in teaching our own men something of the magnitude of oil fires in an attempt to inculcate some ideas of carefulness on the part of the men working around the reservoir site.

THE CHAIRMAN: Yesterday morning a Resolutions Committee was appointed to draft some resolutions in connection with the attitude of Congress in so far as provisions for expenses for conventions are concerned in connection with the representatives of the Bureau of Mines.

I am going to ask Mr. Senne, who is the chairman of that committee, to give us a word as to what has been done.

MR. SENNE: The matter is really still quite uncertain as to the mode of approach, but it was the consensus of opinion of the committee that perhaps we had better draw up a form of resolution to be submitted first to the membership and then have the membership submit a copy of these resolutions to their Congressmen in the various districts. The idea is that it is apparent that sufficient funds are not available to the representatives of the Bureau of Mines to enable them to disseminate the information, the valuable information, that they have in hand; and the idea was for us to try and create some influence which would lead Congress perhaps to increase the appropriations to allow more funds to be available so that the Bureau of Mines at certain times would be able to send their representatives to the various congresses and conventions which appear during the year throughout the country.

The nature of the information that is sent out by the Bureau of Mines is of such great importance and has been considered of such great value that we feel that it isn't broadcast enough, and in order to obtain the greatest publicity, best results would be had by having representatives direct from the Bureau of Mines present the papers in question. That is the idea and purpose, and as our chairman has told you, the committee will endeavor to draw up satisfactory resolutions which will be sent to each member so that if they see fit they may pass it along to the proper Congressmen or Government officials within their territory. And you will receive a copy of those resolutions in due time.

Two Fatalities from the Great Conflagration

MR. WALLACE: Mr. Chairman, I move that the committee be given the unanimous consent of this Section to spread that resolution on the minutes of our Section as unanimously passed by this body.

The motion was seconded and carried unanimously.

THE CHAIRMAN: The Petroleum Section owes Mr. Prussing a vote of thanks for the splendid address and for the pictures which he has shown to us this morning, and on behalf of the members I want to express our sincere appreciation to Mr. Prussing for your address.

The matter is now open for discussion in case there are any questions which you want to ask Mr. Prussing.

MR. RUSH (Texas Company): As I recall the narrative Mr. Prussing gave us, he mentioned the loss of two lives. I would like to ask if there was any further loss of life?

MR. PRUSSING: Those two fatalities were the only fatalities which were chargeable to those two fires. There were no lost time accidents or serious injuries of any sort among our own men. These two men were the only ones who happened to be in any of the houses that were destroyed. We attempted to get them out, but they were on their own property and didn't want to leave. However, one of our men was laid up for a number of weeks afterward because of a stroke of apoplexy.

which he suffered while watching the fire. We charged that against the fire because we carried it as a compensable case.

So you can say the fire had practically no casualties so far as the oil workers were concerned.

THE CHAIRMAN: During the previous two days' sessions several questions have come up which the chairman advised the members they would be given an opportunity to discuss at a later time. I want to say just a word before that as to the appointment of committees.

It is the duty of the new chairman to appoint the various committees and that will be done as near in the future as possible. I am going to ask that the regional chairmen appoint their own committees as soon as possible and advise me the results. The same holds true of the Executive Committee, which will be appointed by the chairman as soon as possible.

Appointment of Section Secretary Is Made

The Nominating Committee in their wisdom left the selection of a secretary to the new chairman. That is a rather embarrassing proposition, but at the same time, it was felt that one should be selected that would work closely with the chairman and, if necessary, relieve him of some of the duties. It is more or less expected that a secretary would be appointed in the locality where the chairman is. However, I am going to change that a bit. I am going to appoint a secretary in the northeast, with whom I will have very close contact and contact by wire, who has a very keen interest in this Section, and who, I feel, will keep in close touch with the members in the northeast; and I will endeavor to do so in the southwest and on the Pacific Coast.

I am going to appoint A. A. Nickerson, Manager Employment and Service, New York, as your secretary for the next year. Mr. Nickerson is also with the Texas Company.

Mr. Senne mentioned the fact that the transactions of the Petroleum Section would be printed separately and as soon as possible from the transactions of the National Safety Council; of course, included later in the National Safety Council transactions. But in order that we may have copies as soon as possible and from which many of you will want to make your reports to the management, we have made arrangements for the printing of our transactions in a separate pamphlet. It will be necessary, however, for you to let us know if possible now just how many copies you will need. We have thought that, perhaps, it would be an excellent plan to get enough copies to distribute to foremen and others whom we might believe interested. So if possible I would be glad to have you notify me before leaving just how many copies you will need.

There is another matter. Following the close of the meeting this morning I should like to have you assemble on the Bagley Street side of the Tuller Hotel in order that I can get just a few feet of moving picture films of this Section. I have my camera with me and I believe that

would be of interest at some later time when some of you also may wish to exhibit such a reel.

Mr. Senne promised Mr. Shaw and others that a few moments would be given over to the discussion of prizes and bonuses for accident prevention work. I am going now to lay the subject open for discussion.

MR. WALLACE: I hope I am not out of order, but before Mr. Shaw takes up that discussion, the question I am quite sure to come up at this meeting was some form of affiliation or cooperation between our Section and the American Petroleum Institute, and the thought that I had in mind the other day was that the paper presented the first day of our meeting by Mr. Newcomb offered a really wonderful foundation for the start of that cooperation. Mr. Newcomb analyzed the various departments and suggested the hazards that might occur in each of those departments, the hazards, possibly, that might cause the real catastrophes that we all hope to avert. And I would like to make a motion at this time, Mr. Currie, that a committee consisting of our past chairman as chairman of the committee, continue to work for affiliation between this Section and the American Petroleum Institute, so that they can have something definite to present to the Institute at their meeting in Tulsa, Oklahoma, on the 8th of December.

(The motion was seconded and carried unanimously.)

Discussion of Suggested Changes in Congress Sessions

THE CHAIRMAN: Mr. Shaw wants to bring up his question now and we will be glad to hear from him.

If there are any suggestions which the members wish to present at this time in connection with the next Congress, that is, as to the program or method of holding the meetings, etc., we shall be very glad indeed to hear from them.

I think for the past two or three years we have divided our meetings into three morning sessions. If that is felt satisfactory, we will be glad to arrange for that next year.

MR. MURPHY: I would like to suggest in line with a subject that was brought up the other day in connection with the refinery process hazards that we might have more technical papers in the future on technical hazards. Our process men, of course, understand the dangers in connection with processing work and they look after those pretty well. I think a safety man, however, is not right on his job unless he understands all those thoroughly, and such papers presented here might be of benefit not only to the newer safety men in the industry, but to some of us who have been at several Congresses.

THE CHAIRMAN: Thank you very much, Mr. Murphy. That is a good suggestion and will be taken care of.

MR. CANDEE: It has been said that "fools rush in where angels fear to tread," and I am afraid I am in that boat now; I am in no position to make a suggestion. But I am in charge of the Personnel Relations of the Tidewater Oil Company, and safety will come under our department. That is why I am so interested in these meetings. It just struck

me during the sessions we have been attending, would it be possible to conduct our meetings in both morning and afternoon sessions? Have two days or three days. Many men come on for the whole week. If we had them straight sessions, a great many men that I have discussed it with are more interested in the Petroleum Section meetings than they would be in the general sessions.

Don't take that too seriously because this is my first year in attendance.

MR. SENNE: In answer to Mr. Candee, I would say that that matter has been considered for a number of years past, and it is the feeling among the men that if we brought them together and kept them in our meeting room for two sessions a day the thing would perhaps drag on too much. While we realize that we have sufficient problems to discuss, I don't think that we should give these problems to our men in overdoses. Furthermore, we belong to the National Safety Council and if you will glance through the general program you will find that at other sessions interesting programs are given, quite as important as our own. For instance, the program on medical matters.

Delegates Benefit by Attending Other Section Sessions

There are a good many of the plant physicians who attend here, while our sessions very seldom offer anything in regard to development of matters along that line. They can go to the other meetings and mingle with other plant doctors there, and there are innumerable chances for the men to broaden out by attending other meetings. Not alone that, but it would give them a chance to compare the enthusiasm and the nature of the work that other Sections are doing with their own. It has a broadening effect on the men to let them mingle with others outside of their own industry.

That was the thought. But if the idea prevails that we can further our own interests by keeping together, I have no objection; perhaps that can be very well regulated. But, personally, I believe that we should allow a certain time to visit other Sections and that would be my recommendation.

MR. SCHOFIELD: Mr. Chairman, I would like to get the group that I am interested in together and I wonder if the rest of them wouldn't feel the same. I see that some of us are from the refineries and some from the producing fields and some from the sales, while most of us are from the whole general field: and if you are going to get a technical paper, too technical for the entire group, it isn't going to fit the needs of all of us. If it is going to be a technical paper, I think it should be a round table for the refinery men or the sales group where they can get down to as many details as they want. I am not altogether in favor of too many technical papers at a general session.

THE CHAIRMAN: If there are no further matters, the Chair will recognize at this time Mr. D. J. Wallace, past chairman.

MR. WALLACE: I should like very much to give the floor to Dr. Anderson of the American Petroleum Institute.

R. P. ANDERSON (American Petroleum Institute, New York): Mr. Chairman, I am in the same situation as the man from New Jersey the other day who had sinus trouble. On the contrary, I can't make a speech the way he can; so, consequently, I feel I haven't much to say to this group session.

I wasn't able to get here on Tuesday. I was able to be here a short time on Wednesday and today. I have enjoyed the sessions very much. I don't know whether Mr. Wallace had in mind any particular topic to talk on. If he has, I should be only too glad to attempt to do it.

MR. WALLACE: Dr. Anderson, the thing that I am vitally interested in, and I am sure that we all are, is some contact that we can have with your organization that will be wonderfully helpful to both of us. I know there are none of the larger companies and very few of the smaller companies that are not vitally interested in safety. And it is so much easier to get the heads of our companies together at an A. P. I. meeting than it is at the Petroleum Section, or any of our local sections. So that if we could get some form of contact with them we could get ideas across to the presidents of the various companies that we can't get across at these Sections by personal contact. And my hope was that the American Petroleum Institute will lend us their facilities in developing food for safe practices for process work, standards for equipment—not too definite; neither should the process work be too definite. But general principles that might possibly sometime avert disasters. The thing is so intangible in my mind that it is very hard to express. But if you could draw on your imagination just enough to get my thought, then you could develop it so that it would be intelligible for all of us.

Hazards That the Safety Engineer May Not Perceive

But you know around the refineries and fields and around the pipe lines, also, there are hazards that no safety man has been able to find, hazards that the safety man hasn't the technical knowledge to recognize. Those are things that we would like to get into, and things that we have got to get into if we will make our work what our companies expect it to be. We would like to know the characteristics of the various oils and the stills at various stages of operation. We would like to know when the process men take down a still, take off a still, whether they are pumping it at a safe temperature or not; whether the conditions that govern the routine methods in refinery work are as safe as they could possibly be made. And that requires a technical knowledge which you people have that we don't have. So I don't see why that wouldn't be a very logical basis for some kind of an affiliation.

DR. ANDERSON: I can't speak officially for the American Petroleum Institute. So far as I know, the directors of the Institute have not yet considered the question of cooperation with the Petroleum Section of the National Safety Council.

Speaking for myself, personally, and for the staff in New York, I may say, however, that we feel that there should be close cooperation between

the Petroleum Section and the National Safety Council and the American Petroleum Institute. We realize that the safety work of the industry should largely be carried out through your organization and through your connection with the industry. If we can help in any way we ought to do it.

I presume most of you know that we are contemplating a group session on safety at the meeting at Tulsa in cooperation with the Petroleum Section of the National Safety Council, and we hope in that way to start this good work along.

I feel sure, too, that if Mr. Wallace would present the thing he has in mind through the directors of the Institute with regard to detailed cooperation that his suggestion will be given very thorough consideration.

THE CHAIRMAN: If there are no further questions to be drawn I will entertain a motion to adjourn.

MR. WALLACE: I would like to incorporate a vote of thanks to our past chairman and those who have so ably assisted him in the worthwhile work that has been carried on in the Sectional meetings, not only for the program we have been listening to for the last four days, but the real advancement that has been made in the work out in the fields where it counts. And there has been in the last three years a real advancement in safety work—in the production fields and in the pipe lines and in the refineries; and I think that our past officers should be very, very proud of the work that has been done under their jurisdiction. I would like to ask for a rising vote of thanks to our past chairman and his associates at this time.

(The convention rose and applauded in accordance with Mr. Wallace's suggestion.)

MR. WALLACE: We would like to hear Mr. Currie say something about the flowers.

MR. SENNE: Mr. Chairman, I am afraid that perhaps our worthy chairman is not aware of the purpose and intent of these flowers. I rise to the occasion.

At this time, Mr. Chairman, if you will permit, it gives me great pleasure on behalf of the boys of this Section, to present to you this very small gift and token of our esteem and evidence of our high regard, wishing you a very successful year. (*Applause.*)

THE CHAIRMAN: To tell the truth, I didn't know exactly what was intended, because the good looking young lady that brought the flowers in a while ago said they were for Mr. Senne. So I was just awaiting the opportunity of presenting them to Mr. Senne on this occasion.

ADJOURNMENT

Plant Publications Section

New Officers of the Section

CHAIRMAN: FORREST W. BOSWELL
Buick Motor Company, Flint, Mich.
VICE-CHAIRMAN, RAILROADS: CHARLES E. KANE
Illinois Central Magazine. Illinois Central Railroad Co., Chicago.
VICE-CHAIRMAN, GENERAL: SPENCER G. HORD
Eastman Kodak Co., Rochester, N. Y.
VICE-CHAIRMAN, PETROLEUM: C. A. WARD
Pure Oil Co., Columbus, Ohio
VICE-CHAIRMAN, CHEMICAL: BRONSON B. TUFTS
Hercules Powder Co., Wilmington, Del.
SECRETARY: N. L. DEVENDORF
Consumers Power Co., Jackson, Mich.

Committees

MEMBERSHIP: N. L. DEVENDORF, Chairman
Consumers Power Company, Jackson, Mich.
PROGRAM: G. A. DOELLER, Chairman
Dayton Power & Light Co., Dayton, Ohio.
PUBLICITY: E. T. WILKINS, Chairman
General Electric Company, Schenectady, N. Y.
SERVICE: ERNEST AUGUSTUS, Chairman
Mead Pulp & Paper Co., Chillicothe, Ohio.
JUDGES: S. W. ASHE, Chairman
General Electric Co., Pittsfield, Mass.
SPENCER G. HORD
Eastman Kodak Company, Rochester, N. Y.
RALPH H. WHEELLOCK
Narragansett Electric Lighting Co., Providence, R. I.

October 26, 1926

G. A. DOELLER, Chairman,
The Dayton Power and Light Company, Dayton, Ohio

THE opening session of the Plant Publications Section of the National Safety Council, held in the Ball Room of the Statler Hotel, Detroit, Mich., convened at 9:50 o'clock, Mr. G. A. Doeller of The Dayton Power & Light Company, Dayton, Ohio, presiding.

CHAIRMAN DOELLER: We are very pleased to see such a good turn out. I think this is the biggest group we have had at any of our meetings in the past five years. Perhaps the attendance has been stimulated by the contest.

Each representative here will be interested in knowing that we have 145 entrants in the contest. The judges have had some job, as they will tell you at the meeting tomorrow noon, and I am hoping that every one of you will be with us at the luncheon meeting. Mr. Ashe, the chairman of the judges committee, has a lot of interesting things to tell us about this contest.

This past year we had two very interesting regional meetings. The first was in April. At the invitation of Mr. Ashe of the General Electric Company, the Section met at Pittsfield, Mass. We had a very interesting program, a profitable meeting, and we were entertained by the General Electric Company with a demonstration of their man-made lightning.

Then in June, at the invitation of Mr. R. H. Ferguson of the Bureau of Safety, Chicago, we met for a one day session in Chicago. That was another very interesting meeting.

There is a little problem that confronts our Section, that is, tying it in with the other 20 sections of the Council, each of which has its own peculiar accident problems. Our Section doesn't have any particular hazards, but we, through our magazines, spread the gospel of safety, and the problem, then, is to tie in with other organizations in the Council.

We are planning this year to take that thing into consideration by electing four vice-chairmen instead of one, as we have in the past. These four vice-chairmen will represent some of the larger groups, such as, perhaps, the steam railroads, public utilities and some of the other groups in the Council. It is an experiment. We are going to try it out for a year.

Nominating Committee Is Appointed

At this time I will appoint the Nominating Committee and they will make their report at our meeting tomorrow afternoon. Miss M. T. Stevens of the Baltimore & Ohio Railway, chairman, Mr. N. L. Devendorf of the Consumers Power Company of Jackson, Mich., and Mr. H. F. Lovering of the New England Power Co., Worcester, Mass.

The program calls for reports of committees. Most of our activities have been taken care of by our regional meetings. Will Mr. Augustus report for the Service Committee?

ERNEST AUGUSTUS (Mead Pulp & Paper Co.): I have received communications from a number of editors and I have reported to them the activities of the Plant Publications Section and tried to help them out, giving them the information they wanted; and I think there have been several new members added to our Section as a result of that.

There is just one other thing I forgot about at Chicago and I have been requested to bring it up here; that is the idea of reviving or start-

ing up a new publication, along the line of the "Blue Pencil" by Bert Barnes.

I got in touch with several printers and I haven't gotten very much satisfaction. The thing they want to know before they will agree to go ahead and put out a publication of that kind is what circulation we can assure them. I have one man who is willing to put up the money. I told him the Section didn't have any money to finance the thing. He is willing to put up the money and start the publication provided we can guarantee a certain mailing list. That is something your Service Committee for next year might think over.

CHAIRMAN DOELLER: Mr. Price, chairman of the Membership Committee, have you anything to report?

Membership and Publicity Committees Report

W. D. PRICE (Warner Gear Co., Muncie, Ind.): The Membership Committee of this Section has had rather a difficult job. I believe it is more difficult to get attendance at these conventions and the regional meetings than to get membership in the industrial sections. There has been quite a good deal of effort put forth by the committee. I believe some of the results are evident here today by so many new editors coming into the sectional meeting.

There is a big job ahead. I think every one of us should consider himself a member of the Membership Committee to spread the gospel of how plant publications may promote safety work in our industries.

CHAIRMAN DOELLER: Miss M. T. Stevens, of the Publicity Committee, have you anything to report?

MISS MARGARET T. STEVENS (Baltimore & Ohio Railroad, Baltimore, Md.): We have had a page in each issue of the **NATIONAL SAFETY NEWS** since the last meeting, I believe; and Mr. Fish, the editor, has been kind enough to publish everything.

We receive in our own office a great many exchange magazines. Whenever a new magazine has come in, I have always taken the matter up with the editor of that magazine and invited him to the Plant Publications Section and told him something of the work of the Section. I also call his attention to the page in the **NATIONAL SAFETY NEWS**.

Just before this meeting, we collected a group of photographs of the different officers and individuals concerned in the Plant Publications Section and sent them, together with a description and history of the Plant Publications Section, to the Detroit papers. I haven't been able to check up on the papers to see whether they have used it.

CHAIRMAN DOELLER: The current issue of the **NATIONAL SAFETY NEWS** has a write-up by Miss Stevens telling somewhat in detail of the work of the judges.

We try to keep our membership list up to date. Of course, it is very difficult with a list of almost 900 names of editors of plant magazines, so if you will give us your name and address, we will be glad to put it on the list.

Just one other small matter and then we will hear the papers—that

is, cooperation with the other safety agencies. I don't mean by that the other sections, but other groups fostering safety. For instance, I have learned we have 65 local safety councils throughout the United States. Do you editors cooperate with the council in your own city? There is the Education Division of the Council. This is a wonderful source of material for your papers, particularly those that run a home section and a kid's page. They have all sorts of good material that you can adapt to your paper, particularly in the line of posters that the children prepare. Some of them are good enough for covers.

We would like for you folks to sponsor regional meetings. Let's have a half dozen this year. About the only way we can have them is for someone to invite the Section to come to his town. The officers of the Section will help in formulating your programs.

Our first paper is by Dr. W. A. Sawyer of the Eastman Kodak Company, Rochester, New York.

SELLING HEALTH TO EMPLOYEES THROUGH THE PLANT PUBLICATION

Dr. W. A. Sawyer, Eastman Kodak Company, Rochester, N. Y.

We believe that health for employees means a knowledge of how to live with the fewest days "laid up" for repairs, to work and play abundantly, and to attain a ripe and enjoyable old age. Our effort has been to sell such health.

Perhaps we have had a better insight into the existing state of health of our workers than many organizations, because of our intimate touch with them through the sick benefit plan. We feel that we can put our finger on the principal causes of sickness, and on that as a basis much of our propaganda for health is built.

We know that some employees are sick many days each year because a concept of health has never been presented in a way to arrest the attention or intrigue the desire. Daily personal routine and present and future health status seem to many quite irrelevant, giving a rather fatalistic idea of health as a thing one is born to possess or as a something bestowed upon one from some intangible source, and not at all a condition to achieve or to be maintained.

In an attempt to offset this so-called blessed state of ignorance, our magazine has carried a monthly message to the employees giving them information in as delectable a form as we could on subjects pertaining to health.

Rest, food, clothing, ventilation, elimination, recreation; the proper balance and relation of these, their quality and quantity, are entirely too often matters of chance and feeling, or circumstance and environment.

Health education with emphasis put on the positive side is stimulating and life-giving. Such knowledge encourages. Health education is not helpful which stresses aches and pains. This answers the criticism that too much knowledge of self leads to self-centeredness and imaginary ills.

We have been trying to put across a definite program since 1920, and we believe the corner-stone of the work is to gain and maintain confidence. This is accomplished in many ways, through sincerity, sympathy, and real "delivery of the goods," whether the contact be great or small.

The procedure, or how we do this, can best be discussed by going over the titles of the articles which have appeared in our *Kodak Magazine*. They may be grouped under following general heads:

Service given through the medical department

Physical examinations

Ventilation

Respiratory diseases and their prevention

Infectious diseases and their prevention

Teeth and tonsils

Eyes

First aid

Nutrition

Quacks and nostrums

Miscellaneous

In our procedure we have tried to keep in mind the importance of keeping all articles on health as short as possible, using simple language, avoiding technical or scientific words. Space does not permit of entering into a subject deeply, and furthermore most people do not have the foundation to understand a detailed discussion of such subjects. We have tried to present the subject in a human-interest way so as to make it readable. This is difficult.

We never believe in advising a thing without giving a reason. Just telling a person to do a certain thing without a reason, means nothing.

We keep in mind the family circle back of the man or woman, and often prepare material for the benefit of the family. This is perhaps one of the most valuable opportunities to exert real influence. The printed page carries great weight in the home.

We realize that we do not know the one best way to do it, but our experience as we go along guides us.

Now as to the titles of our articles. They perhaps indicate our way of approach, and comprise an outline as follows:

Health Articles in Kodak Magazine—1920 to 1926

Medical Department, Visiting Nurses, Health Classes

Our Medical Staff

Medical Department (three installments)

Visiting Nurse, Industry's Humanitarian

Friendly Visitors (Visiting Nurses)

Health Classes for Girls at Premo

Health in the Home (Health Lectures in Schools)

Physical Examinations

Value of Physical Examination

Taking a Health Inventory

Our Health Examinations—A Letter of Appreciation

Ventilation

Home Furnace
Hot Water Heat in the Home
House Air
Open Windows—Why?

Respiratory Diseases

Preventing Colds
Colds
It's Just a Cold
I never Have a Cold
Influenza
Keeping Fit in Cold Weather
Pneumonia—Will It Get You?
Pneumonia

Infectious Diseases

How to Avoid Diphtheria
Avoid Typhoid on Your Vacation
Tuberculosis (Taking a Health Inventory)

Teeth and Tonsils

Importance of Good Teeth
Your Children's Teeth
Dental Hygienists
"Save the Surface and You Save All"
Pyorrhea
Tonsil Operations at Dental Dispensary (two installments)

Eyes

Your Eyes (article and insert)

Accidents, First Aid, Resuscitation

In Case of Accident (telephone numbers of medical staff)
Accident Cases Treated by Medical Department
The Chance Taker (neglect of small injuries)
First Aid
Fresh Blood (folder)
Uses of Iodine
How to Revive a Suffocated Person
How to Revive a Drowned Person

Nutrition

Eat Right to Keep Right
Milk Habit Growing
Nutrition Adviser
"Munching Habit"
Daddy, Give Me a Penny
New Tonic Versus the Old (spring tonics)
Health Coupon
How to Win
Diary of a Flapper's Stomach
Faulty Food Habits
Why You Should Eat Breakfast

People Who Do Not Like Sugar
Why Drink Water?
Up-to-Weight
How to Get Your Money's Worth
Much Heat—Less to Eat
Keep Candy from Children
Nobody Loves a Fat Man
Sandwiches for That Lunch
Christmas Breakfast
Let Vegetables Do the Work
Your A, B, C's
Excess Baggage
Training Under Twenty
Your Christmas Dinner
Something Hot
Do You Need a Food Change?
Just Enough, Too Much, or Too Little
Most for the Money
Too Fat?
What Vitamins Do
Eating Bread to Reduce
Way to a Hundred Years

Quacks and Nostrums

Selecting Your Physician
Medical Miscreants
Rotten Spots
The "Get the Money" Specialist
Commercial Doctoring
Careless Physician
Taking Chances with Disease
Nostrums
Friendly Enemies (self-medication)

Miscellaneous

Family Medicine Cabinet
The Rounder (headaches)
Keeping Fit—How the Medical Department Can Help
Lost Time Due to Illness
Poison Ivy
Skeeters, Sunburn and Poison Ivy
Superstitions About Health
Vacations
Walking for Health
What Does Your Baby Put in His Mouth?

We expect such returns as any educational program through the printed page achieves:

- (1) Growing general interest and confidence in the subjects.
- (2) Individual instances of benefit.

- (3) A clearer knowledge on our part of method as a result of success and failure.
- (4) The realization of a fundamental advertising principle, that where emphasis is repeatedly placed, an impression will be made.

Such work as selling health to employees is a long-time campaign, and will only bear results in any large way after many years. Knowing that we have made an impression in a few cases gives us sufficient faith to go on hoping to reach the larger group eventually.

We have been so prone to measure things by figures and what we so often like to call "hard cold facts" that we forget the intangible and necessary element in such venture—faith—or a vision of the possibilities, which encourages us to push on for the good that is unquestionably done, though immeasurable.

All health truths must be iterated and reiterated until they become a part of the subconscious mechanism and to be practiced without effort. This can only be done when in some way the individual has been impressed with a health expectancy.

CHAIRMAN DOELLER: Dr. Sawyer, I wish to thank you in behalf of the Section. I now have pleasure in introducing Mr. D. C. Hunter of the National Cash Register Company, Dayton, Ohio, who will discuss Dr. Sawyer's paper.

DISCUSSION BY MR. D. C. HUNTER OF DR. SAWYER'S PAPER

I shall make a few remarks about selling health, not confining myself to selling health through the plant publication, but just selling health and safety in industry, because, after all, you men as editors and we who are here as safety men and health men are reaching for the same goal—we all want to make this business of selling health and safety a success, and whether you do it through the plant publication or the doctor's office or through posters, lectures or talks, whatever it may be, we all want to reach the same place.

Some weeks ago I was attending a meeting in Dayton and the speaker talked about the cumulative curve of knowledge, and that sounded pretty highbrow to me; but the longer I listened, the better it sounded, and I tried to apply it to selling health and safety to the folks in industry.

It started something like this. We all start out here at the same level. We take the new man who comes into our factory and he starts right here. His first contact is in the employment office, and there he gets a little knowledge. This curve of knowledge starts up. Then if you have physical examinations, he goes over to the doctor and is examined, and this curve goes up a little higher. Later he goes out in the department and his foreman talks to him. He tells him what you are trying to do along the lines of health and safety. He tells him about the guards on the machines and that sort of thing. Finally this curve comes up, way up here some place. Then the foreman forgets about the fellow and nobody else pays any attention to him and the curve starts

down. It gets way down here some place and the first thing you know that man is injured. We say it is his own fault; we told him all about that when he came in here. We blame him for it when, after all, I wonder if it isn't our own fault because we didn't carry our selling plan all the way through.

We are inclined to lose our enthusiasm. When we start out we are all worked up and raring to go, but we sort of quiet down after a little while and lose our enthusiasm.

I believe if you ask any sales manager: "What makes a good salesman?" he will say, "One of the first things is enthusiasm." A man has to be sold on the product he is going to sell and he has to have that unbounded enthusiasm to carry him all the way through. I believe that is one of the assets of a safety man or doctor in industry. He has to have that pep and enthusiasm to keep on going regardless of how black things may look at times, and he must be able to impart that enthusiasm to the man on the bench.

Safety Departments Are Selling Organizations

Speaking of selling health, do you know I like to think of our safety departments and medical departments as selling organizations and advertising departments, because, after all, they are very much the same. It is hard for us to see the results of what we do. It is hard for the advertising man to see the results of his advertising. I believe if you asked a merchant to tell you the direct results of his advertising, he would be unable to do it. If you asked him to cut it out, he would tell you to jump into the lake; he couldn't afford to quit advertising. It is the same way with the executives; if you asked them to eliminate the medical and safety departments, they would tell you they couldn't afford to do it.

I heard a story about a farmer who ran a general store. A newspaper man persuaded him to put an advertisement in a weekly paper. Six weeks passed and another newspaper man came along and again asked him to put an advertisement in his paper. He said, "Nothing doing. The last time I did it, I sold everything in the store. You will never get me to do it again." In our industries we keep selling and advertising but our results don't come quite so fast.

We will say that our medical department and safety department are sales organizations. The next thing we have to have is salesmen, and in industry I believe the foreman in the factory is the best salesman you can get. He is the key man, but you have got to sell him first before you will get results. How are you going to do that? There are many ways. You have got to get him to come to you with his problems. There is nothing that does me any more good in the office than to see our foreman come into the office and start an argument about some condition in his department. When he does that, he knows the medical department can aid him, or he wouldn't come. You have got to get him to consult with the medical department.

Our medical director said to me, "You have only two foremen in the

go a lot better than some gruesome story about a man who had his hand cut off. There are times when you want that sort of thing.

To go back to the start, don't lose your enthusiasm. Keep on trying. Don't become discouraged. It is hard to see results. But you must remember Rome wasn't built in a day.

CHAIRMAN DOELLE: Mr. Hunter, I wish to thank you in behalf of the Section for your discussion of this paper.

We will now take a few minutes for your questions and your part of the program.

JAMES E. WEBER (Swift & Co., Chicago): I am wondering if any of you run against the same problem that I do, whether it is purely local in my outfit or whether it is general, and that is getting the proper kind of cooperation from your medical department; I mean on preparation of written material?

The Doctor Thought the Material of Little Value

I had a rather unusual situation a while back. I picked up some material, I don't know where, that I felt was of value so far as plant health was concerned, health to the employees, and I sent it up to the medical department with a recommendation that the head of the medical department lend me his signature on the thing, or use it in the preparation of some article of his own. He sent it back with a refusal based on the fact that it wasn't sufficiently technical, it didn't have enough figures in it. That is a point of view that might possibly be rather general. I have been trying to get my medical men there to talk in the plant language when they use the plant publication. If there were any method by which we could put the screws on gentlemen of this same description, I think it would help a great deal.

I don't believe a great deal in the efficacy of outside health articles. I believe your greatest help comes when the articles are signed by someone whom the men in the plant know. You should have your local men do it. How to sell this cooperation to the men in my plant to a greater degree is my problem.

FRANK L. GREENYA (Fisk Rubber Co., Cudahy, Wis.): I think that there is a general tendency on the part of the medical profession to keep their knowledge pretty much to themselves. There may be isolated cases, but my experience is that they desire to lend a certain mystery to the medical profession, and in very few cases have we been able to get the proper kind of cooperation.

However, we are running a column on health in our paper, rather a short column covering various things that may be in season, such as rheumatism in the fall and artificial respiration in connection with swimming in the summer, and a few more things like that. Here is the thought that has occurred to us and we intend to carry it out and I think will connect up about as well as an article written by the local plant physician.

We have purchased for all of our employees for the last three years

the calendars issued by the National Safety Council. Every one of those calendars goes into the home. On the calendar for 1927 the back of each month covers a treatise on various diseases. We intend in our column to cover in brief just what is covered on the back of that particular calendar and then refer them to the calendar which is hung up somewhere in their homes, which is making a tie-up possible. We feel that would be as good as a personal message from our plant physician because this message from the physicians of the National Safety Council is of sufficient importance in the minds of these men to properly guide them. I offer that as a suggestion and possibly a solution of this gentleman's problem.

H. D. LIVERS (Southwestern Bell Telephone Co., St. Louis, Mo.): I am not inclined to accept any statement like that for this reason, as a rule I don't believe the doctors are writers. They don't know anything about writing and generally they are so busy that if they could write, they wouldn't have the time to do it. If they had lots of time to do it, I doubt whether we would want that kind of a physician to take care of our people. We like the fellow who is up and doing, has plenty to do in his own line of work, and let him forget about writing for us. We tried to get them to write for us and we found it was impossible. They just can't write. That is not the only thing that is true of a doctor generally; he can't even keep his own books. The fellow would starve to death if he didn't have a secretary.

Working in Cooperation With the Doctor

As far as our health articles are concerned in our magazines, not so especially in our plant paper for employees only (we also have a paper that is distributed to employees all over the Southwestern System), we are trying to present a concise treatise on health, prepared by a layman and approved by our physical director. We have selected a young lady who by research finds out for herself the things that our people ought to know, and she writes them in the language that they can understand, not the technical article that you would expect from a doctor.

I hope I have helped the doctor just a little bit. I don't believe in blaming it all on the doctor. We really believe it is up to the people in charge to get it over the best way possible.

W. A. TIRUS (Western Electric Company, Chicago, Ill.): We have a rather large staff of doctors, about 15 of them, and we have, of course, a variety of points of view from which to draw.

In an effort to give our doctors the supervisor's point of view in connection with accident and sickness problems, we have made use of the entire staff to teach our lay instructors in first aid courses; selecting these instructors entirely from the supervisory group. Those doctors have carried their classes through a full series of instructions, under Red Cross supervision and they have had a chance to meet the men at close range, find out wherein they failed to get the hospital or the doctor's angle of the problem, learned what it was the doctor must

say to the laymen in order to carry the story to them and how it must be said.

We also have a system of supervisory staff meetings which we carry on through the winter season each year. We propose this winter to have doctors address those staff meetings on the particular winter hazards of respiratory diseases.

With respect to the plant publication angle, we select the doctor, send one of our staff publication men to see him and interview him. He comes back and writes the story in lay language, submits it to the doctor for his approval to print it over his name. That method has proved effective in our experience. In fact, a series of articles have been printed in both our general company organ and in our local plant organ, and it has proven to be of sufficient interest so we are preparing to reprint them in booklet form.

CHAIRMAN DOELLER: I would like to have some of the editors of the smaller companies give us their experiences. We have heard the experiences of the larger groups that have staff physicians. The problem then is, what are you going to do in the case of the small company which does not have a full time doctor?

The Average Material From a Doctor High Class

S. W. ASHE (General Electric Co., Pittsfield, Mass.): I have been interested in the judging to see the way the health material has been handled in the different magazines, and I don't know that I am in entire sympathy with the suggestions that the doctor can't write, because, as you know, Dr. Oliver Wendell Holmes was one of our greatest physicians. You take Dr. Sawyer's material in the *Kodak Magazine*; it is the finest material you can get hold of, and if you listened to Dr. Sawyer's paper, you know it is not a hit and miss proposition; he has been studying. I would say that the average material that came from a doctor is better material than came from the average editor. I think it depends entirely on the personality and the training of the individual himself, and if a doctor has a certain amount of creative ability, and they are usually pretty deep students of human nature, the editor can perhaps help him a little bit. I think he gets an insight of human nature that probably the editor doesn't get.

Regarding the small plant, we are doing a little thing that might help the small plant. Last fall I was put on the committee to investigate tuberculosis in Massachusetts and we are getting up a special inserted page of material on how to drive tuberculosis out of industry. It also discusses general health material. If any of you want material of that sort (it is very carefully edited), we would be very glad to send you a copy of that page. It doesn't necessarily confine itself to tuberculosis. It takes in different things. We are distributing the page throughout New England as a way of getting the editors back of it.

MISS RUTH CADE: We have about 1,500 employees with just one physician. Our physician writes an article for us every month. It is hard work. I work harder with the doctor in getting the article from him than I do getting out the whole magazine.

The doctor writes in an interesting manner. He uses common English that everyone understands. He gets his message across. He writes on general health problems, not confining the articles to the men in the plant. He generally consults me early in the month to see what I am featuring during that month and then he tries to tie his article up with the rest of the magazine. Many people tell me that even though they don't read the whole magazine, they tear out the doctor's article and keep it.

HERBERT W. ALLEN (M. Wile & Co., Inc., Buffalo, N. Y.): Mr. Ashe stole all my thunder. Of all the magazines that come to my desk, I admire the *Kodak Magazine* most, particularly the articles that Dr. Sawyer has written. They have a lot of punch and they get right under the skin of the employees in the plant.

In Buffalo we have a hard time getting doctors who will write things of that sort. I always thought it was a very healthy city and the doctors hadn't much to do.

I would like to know if Dr. Sawyer would consent to letting others have his articles to publish in their magazines under his signature. I don't believe it makes a lot of difference what the signature is, so long as the article hits home.

Experience in Cooperating With a City

MR. LIVERS: When I made the remark that doctors were not writers, I wasn't picking on Dr. Sawyer because we get his paper every month and we like it very much. I was talking generally of doctors as writers, and I still maintain that doctors are not writers.

EUGENE T. WILKINS (General Electric Co., Schenectady, N. Y.) Through our magazine, *The Schenectady Works News*, we have been cooperating with the city in trying to eradicate diphtheria, and I think that is a big proposition for all plant publications—to help in civic work, because if the city doctors are trying to put over something in your city or town, the plant publication is undoubtedly of assistance in that work. The medical profession in Schenectady is highly pleased with the work that is being done through our paper in helping them to promote this propaganda.

I must say that sometimes I have a little difficulty in cooperating with my doctor in the plant because he is such a busy man. He has 20,000 people to look after, and naturally he can't write very readily; he hasn't the time for it. So usually when an article is to be prepared, I write it myself through his suggestions and then submit it to him for approval, and in this way I think it works out all right. It is best for plant publication editors to do that kind of work. Don't depend on your doctor. Interview him first, write the article, take it back to him for correction and I think in nine cases out of 10, he will approve it.

I want to ask Dr. Sawyer about enclosures. Usually when enclosures are put in the plant publication and are delivered in the plant, we

find that sometimes they are strewn on the avenue and through the street because it is an unexpected thing that falls out of the paper when they receive it and oftentimes it is not picked up. Therefore I have done away with enclosures because I feel they are sometimes overlooked.

I don't know what the experience has been in other plants. In our plant the publication is delivered at the pay window and they are in a hurry to get out. They pick up the magazine, or it is handed to them. The enclosure drops out and they haven't the time to pick it up. I don't think you get the same results as when it is bound in and taken home.

MR. AUGUSTUS: It seems to me the editor himself has to sell safety. The editor can do a whole lot to sell safety. Of course, it depends to a large extent upon whether you have a full time doctor or whether you have a periodic medical examination, but you can link up the experience in your own plant with health, if you have a medical department.

Articles for the Magazine Written by Many Doctors

We have tried out the idea of taking the records of the medical department of the time lost for various causes. All of us are intelligent enough to know what the fundamental principles of good health are. We don't need to go to a doctor and have him tell us to drink six glasses of water a day and get enough rest. The only thing is to call it to the attention of the men in the plant.

We also try to get the local doctors, not only our company doctors but various reliable physicians around town, to write articles for us or else give us an interview and in that way we are not trying to put over a company proposition in the man's opinion. If you have a company doctor who writes articles on health month after month, the employee believes the doctor is paid to do that and consequently doesn't pay much attention to it. Then there are men who have family physicians and they believe what they say. If you have an article by his physician one month and the next month there is an article by another physician, he has confidence in those physicians while he may not have confidence in your company physician. I believe these articles written by outside physicians are read much more than the articles written by our own physicians or someone on the staff.

I want to ask Dr. Sawyer one question. In cases of smaller plants where they do not have full time physicians or possibly no physician at all, what is your opinion of the service put out by the Life Extension Institute and also by the American Medical Association? They put out health articles free of charge to the medical profession.

DR. SAWYER: Somebody said the articles should be signed, or at least they should be known as some one individual's articles; in other words, there should be a personality back of it. I think that is an excellent idea. Take the articles appearing in the daily press. They largely get across because of the men who write them, their personality and style of presenting the subject.

Someone said they used material that came to them from other sources because their doctor was too busy, didn't write or couldn't. That is a good idea. I would suggest that you use your ideas. If the doctor doesn't like them, maybe he will get busy and write some. There are many sources from which to secure health articles. The American Medical Association is publishing a health magazine. If you haven't read it, get acquainted with it. They are sending them out to anybody who wishes shortened summaries or summaries of articles that appear in the magazine and it is very good material, written by the best men in the country, and you can't go wrong.

Our own New York State Department of Health sends out material that has been broadcast through the Schenectady station. The insurance companies also have good material. The Life Extension Institute material is very good and it is presented very well for popular consumption.

You said doctors are not writers; that is probably true, by and large, and yet it is surprising what good articles you can get from doctors if you can get them interested in this phase of medicine. The average doctor is patching up health. We were taught in medical school to heal the sick; we weren't instructed to teach prevention—that is something new. Those in industries have gotten that slant; perhaps the safety people have given it to us, trying to prevent the thing from happening. Doctors who once get it are tremendously enthusiastic about it, and perhaps if you keep at it, you can get your doctor to go after it. If he can't write, you can do it for him.

The Problem of Enclosures with the Magazine

Spence Hord writes a good many of the articles in our publications. I wish I could, but it takes a lot of time if you want to do it well. We are having several people do it. Our articles on nutrition and diet are thrashed out with our nutrition adviser. She and I work it out ahead of time and she does the actual work. Sometimes Spence Hord does more work on it. Lots of times I give him some few facts and he whips them into shape.

Concerning the enclosures, I don't know what to say. I will ask Spence Hord to answer that question. And the question of whether copies of our articles could be used I will refer to him also.

SPENCER HORD (Eastman Kodak Co., Rochester, N. Y.): Answering the question about the enclosures, when a man gets the magazine, the first thing he does is fold it and put it in his pocket. We have kept close track of every magazine thrown away and also these enclosures. It is seldom that we find a magazine thrown away or an enclosure lost out of the magazine. In fact, for six years I have had a standing offer of a dollar a copy for any magazine thrown away and I haven't spent a dollar yet.

MR. LIVERS: I would like to know whether there are statistics among the different industries represented here that prove that a healthy man has fewer accidents than an unhealthy one?

CHAIRMAN DOELLER: That is a good question. Dr. F. L. Rector, Editor, *The Nation's Health*, Chicago, Illinois, can answer that question. He will look into it and send you a report.

We now come to the fourth part of our program, "The Value of Pictures and Cartoons in Safety Work." We shall have the pleasure of hearing from Mr. A. D. Gans of the Safety Department of the Baltimore & Ohio Railroad Company, Baltimore, Maryland.

THE VALUE OF PICTURES AND CARTOONS IN SAFETY WORK

Arthur D. Gans, Safety Agent, Baltimore and Ohio Railroad Company, Baltimore, Md.

Safety is my job. I am sold on it, both as a job and as an element necessary to national and civic life. I consider that the safety man, who endeavors to save life and limb, holds a job second only to him whose duty it is to save souls—your minister or your priest. For this reason I feel it to be an honor to address a gathering of men and women such as are represented here, for I know of no class of people who have the power to do more in the cause of saving life and limb than you editors of plant publications.

Think of it! The power of the press is recognized; "the pen, truly, is mightier than the sword"—but all the newspapers in the world, all of the books in the great libraries of this country are no more widely read among your own group of employees than is your plant publication. Even the men who are foreigners will take home the plant paper for their children, now in our free schools, to read. And how simple a way is this for you to spread safety education!

The only question that arises then, is: how can we best present this information? The answer is simple—by pictorial illustrations. The old saying, "what your eyes see your heart believes" is a true one. I tell you of something unusual that I have seen; perhaps you will believe me; maybe you won't. But if I happen to have taken my camera along and snapped a picture at the time of the happening, then you open your eyes in wonder and say, "Well, I'll be darned!"

The same holds good with the printed word; the picture clinches the story and makes it the more conceivable, the more believable, and therefore, the reader remembers it long, long afterward. No matter how well written a story may be, or how well the details may be brought out, it will be made more interesting by the addition of a picture or a cartoon.

Thousands of years ago, it is said, human beings first communicated with each other by means of signs and gestures; then came the drawings—the hieroglyphics. About 3,000 years ago several nations conceived and used, in part, the alphabet; by mixing "ear pictures" with "eye pictures." There is a certain analogy between speech and writing, and it is easy to believe that the first written imitations of sound were associated with objects.

From the letters of the alphabet, words, phrases, sentences were formed. With growth of consciousness and intelligence, primitive man found a need for a better way to converse and transmit thought. During all these thousands of years, signs and gestures were a part of the communication of thought. As man became more experienced in speaking, he, to an extent, gave up the use of gestures. Only when in a hurry, or excited, would he use his hands in motion. Pictures in action were printed with written words and descriptions. Even today many people depend a great deal on their hands to express their thoughts. There is an old saying that if you tied some people's hands, they couldn't talk.

In the case of a child we can assume that gestures at first accompany all vocal utterances, and that they convey more definite information as to the child's wants and feelings than his half-murmured, unintelligible words.

It seems to be an innate necessity, not only among primitive people, but among our groups today, gathered for a common activity, with hands or feet, that the vocal chords be used. Sailors rowing, laborers pulling on a rope, track men moving ties sing or chant. The college yell accompanies a football game and spurs the players to renewed activity.

Action Puts Pep Into the Illustration

Action, gestures, were at first undoubtedly an aid in spoken language. And in transcribing our thoughts to writing, if we leave out pictures or cartoons and depend entirely on written and printed words, I feel that we are making a mistake and not taking advantage of the teachings of 3,000 years.

Action is eloquence, and the eyes of the untrained more learned than their ears.

An untrained man will remember what he sees longer than what he hears or reads.

As an example to prove this, let your imagination work a bit and pretend that you are factory workers or railroad shopmen attending a safety meeting. I am telling you about four men, one of whom lost an arm, another a leg, the third his head and so on. What I tell you, perhaps, goes in one ear and out of the other. But watch me illustrate it like this:

Now, my friends, we will imagine that this sheet of paper represents a man, or a number of men, all of whom are healthy, vigorous, strong and in full possession of their mental faculties—clean-cut railroad men.

The tears I make in the paper will represent the years of work and experience these men pass through in pursuit of their daily duties.

I believe that we all realize that railroad work is no more dangerous than other work. Careful railroad men are in less danger than men working at many other trades.

The slogan, **SAFETY FIRST**, is not a selfish one. It does not mean, "Look out for your own safety first, and let others take chances;" it means, "First of all, think of safety, your safety and the safety of all those who are working around you, and those who are directly or indirectly affected by your work."

The average American seems to delight in taking chances—with his money in stocks and bonds, a quiet game of poker, or "galloping dominoes." And he takes chances daily, running in front of street cars, automobiles, jumping on and off moving cars and in hundreds of other ways. He gets used to taking these chances and coming out unscathed. But one day, something happens. He miscalculates the distance, or his foot slips and he is done taking chances.

Every Man Has One or More Dependents

Almost every man has someone depending on him financially and for his love and affection. Every time he takes a chance he not only risks his own life and limb, but he jeopardizes the happiness of his family and friends, who will suffer by his death or by his partial or total disability.

Try always to remember the A, B, C's of Safety—**ALWAYS BE CAREFUL**. For the sake of your family and friends, for the company by whom you are employed, and for your own sake.

Then, when your day's work is done, your family and friends will have the pleasure of your love and company, and you will not be handicapped by the loss of an arm or a limb.

And when you are through your trials and tribulations in this old world, and pass to the great beyond, I am sure that you would prefer to go as these boys have gone.

Everyone of these men knew his A, B, C's thoroughly, lived to a ripe old age and made his last trip, carrying full equipment.

Now, if they had not practiced safety first, this man would have taken a chance, slipped under a car, and lost his legs. This man would have lost his right arm. This man would have lost his head. This man would have refused to wear goggles and lost his eyes.

(At the end I have four skeletons, hand in hand. Design torn from a sheet of plain white paper.)

Now, I'll warrant that even some of you "highbrows" will remember that. It's because your eyes saw it.

Pictures and cartoons are a quick way to drive home a message or thought. On Sunday morning the newspaper is delivered at my doorstep. Do I read the news section first, the sport section, or the advertising section? I do not. I pick out the eight pages of funny cartoons and they get first attention. Visiting friends early on Sunday, I have seen the children looking for the cartoon section, but father gets it first and the children have to wait.

I do not believe, of course, that we can do away with writing and use only pictures and cartoons and blue prints to convey thought.

On the other hand, I don't believe we do the proper thing when we turn out a finely written book, magazine, pamphlet, etc., without illustrations, particularly if it is meant for workers to read.

And we need to be careful in using pictures and cartoons to see that they convey the meaning we wish them to illustrate. This brings to my mind the story of an Englishman, in a Parisian restaurant, who had his mouth set for mushrooms. He could not read, write or speak French, so on the edge of his bill of fare he sketched, as best he could, a mushroom. And the waiter brought him an umbrella.

In safety work we have to appeal to the workers not to take chances, violate safety rules, or indulge in unsafe practices. We make our appeals by safety talks and by safety bulletins, through the pages of our company magazine, pamphlets, booklets, circular letters, etc. Over 90 per cent. of our appeal must be a printed one. The amount of personal contact with the worker that we would like to have is impossible. We must teach him safe methods, warn him of dangers, caution him against taking chances by the means of the printed word and descriptive pictures and cartoons. All during the year I come into close contact with men in all branches of the railroad world. I find that they will keep and read an illustrated article, but in most cases they hardly glance at a printed leaflet which is not illustrated.

The Picture or Cartoon Must Attract

In order to make the pictures or cartoons attract the man, they must be of something that he will recognize at a glance, of a man doing something that he does, or sees others do. They must be full of action—interesting. If the picture has an auto in it, make it a "flivver." The average worker won't appreciate the lines of a Rolls Royce.

The average worker likes a good laugh. Amusing things appeal to him more readily than those of a serious nature. He is interested in photographs. He will read and enjoy cartoons more quickly, possibly, than any other kind of a picture you can give him. He will take a clever cartoon around and show it to his friends, and comment on it.

It has been said by some safety men that human safety is a serious matter and should not be made light of. But the right kind of a cartoon does not make light of safety; it emphasizes the need of it. Sometimes it does make fun of the careless worker, but I believe there are some men who need to be shamed into working safely, all other known methods having been tried and failed. The right kind of cartoon simply translates the safety story into the language of the worker.

I have heard some safety men give safety talks, and I have read articles written by safety experts that I have found two serious faults with. First, the men talked too long, and the articles in question were too long. Secondly, the men used words in their talks and print that the man on the firing line did not understand. They have forced me to resort to the dictionary and I feel that in some cases the man who prepared the talk did the same thing. It is my humble opinion that

as long as we give this sort of talk and write this kind of article, just so long will we fail to realize our desire—to plant the safety message on fertile ground.

This reminds me of the story of the instructor who had charge of the final exercise where thirty young men were to be ordained and sent out as ministers. In his final talk he told them: "You are about to go out and take charge of a church. You will be at the head of that church and in many things you can do as you please. If you so choose on Sunday you can give a sermon that will last two or more hours. No one will be able to say you nay. However, I want to caution you from my own experience. After the first half hour's talk, you will not save any souls."

When we talk to little children we don't pick out the longest words in the dictionary to use in telling the story to them. Neither do we talk down to them with baby talk. But we tell the story in the simple language that they understand. Otherwise the message falls "flat," because it goes over their heads. And "Applesauce!" "Bunk!" you'll find them commenting to each other when the lecture is over.

Set before the average worker a page of generalities, such as

"Safety is the most important element in the life of a human being. In order to guard against the manifold dangers to mankind, if we would live to the allotted age of threescore and ten, etc.," and you'll find that the workman, like the children, will yell "Bunk."

Write About Safety in Human Interest Stories

The workman wants concrete examples. And if you want safety stories to "go over" you must hand them to him in a manner that is so attractive he'll reach out and get them. Educate him, YES. But don't depend on the process of education to avert all disasters today. Education takes time and results will show themselves tomorrow. But how about today? "Tonight's the night" as the boys in the army used to say.

My plea to you is to write safety stories, human interest stories. Lots of them, short and snappy, so that he who runs may read. And illustrate them, if you would insure their "soaking in."

After I had started to write this paper, Miss Margaret Talbott Stevens, associate editor of the Baltimore and Ohio Magazine, better known as "Aunt Mary," sent me samples of many of your plant publication magazines to read. On perusing their pages I was agreeably surprised and pleased to see that many of them had grasped the same idea; they had clever cuts and cartoons and short, snappy stories on safety that drove home the safety message. So, to an extent, I feel that you are already doing just what I am asking you to do, to run safety human interest stories, short and to the point, without a lot of generalities, illustrated, to drive them home. But there is room for more safety in 99 out of every 100 plant magazines.

From 1913 to 1924, 966,428 persons lost their lives in all kinds of accidents; the injured list runs into many millions. There is certainly no

greater work, no higher service, than in attempting to reduce this terrible toll of death and injury. The combined circulation of the magazines and papers represented here must amount to hundreds of thousands. You have in your hands the means of rendering a real human service. Regardless of what you have done in the past, I beg you to give more thought and space in your publications to safety—in the homes, on the streets, in our shops; on the railroads, public safety, industrial safety, every phase of the accident situation.

Teach safety to your men, your women and to your children. The children of today are the workers of tomorrow. Translate safety to them by pictures, cartoons and stories. And impress upon their minds this greatest of all human commands, "safety first."

CHAIRMAN DOELLER: I want to thank you, Mr. Gans, for the very interesting talk you have given us. The next speaker will be Mr. R. T. Solensten, formerly of the National Safety Council, now with the Elliott Service Company of New York City. He has two viewpoints.

DISCUSSION OF MR. GANS' PAPER

R. T. Solensten, Elliott Service Company, New York City

Being designated to open the discussion on this subject, it was my privilege to read an advance copy of Mr. Gans' very excellent paper, and as I was going through it this thought came to me: that possibly I could make better use of my time if I did not try to elaborate any of the points which he brought up in his paper, but rather try to offer a few suggestion to the safety man who is called upon to contribute a safety page or section to his plant magazine.

Undoubtedly if there are safety men in the audience who have heretofore been sold on the use of illustrations, they certainly must be now, after listening to Mr. Gans and witnessing his interesting, instructive and convincing demonstrations.

The most convenient and practical type of illustration which a safety man can use in connection with the plant publication work will be the photograph. Every safety man should have a camera or should have photographic facilities available to him. The best pictures which he will be able to obtain are those which can be taken in his own plant. Photographs are interesting because life is interesting. Photographs reflect life. We are most interested in those aspects of life with which we are most familiar and which are closest to us and which most directly affect our own personal welfare. Whether we realize it or not, it is probably true that every one of us is more interested in seeing his own picture in the paper than seeing the picture of the Queen of Roumania.

The photographs which the safety director will be able to obtain will fall into three general classes; first, the news pictures; second, the instructive or purely educational pictures; and third, the picture with an emotional appeal.

There are numerous possibilities in every industrial plant for interesting news pictures which can be given safety application. For instance, in connection with this present congress. Undoubtedly many plants are sending as delegates, foremen and employees who have made good records in accident prevention. The safety director should not miss the opportunity to take a picture of the delegates boarding their train or starting off in their fivers to attend the congress. This, of course, should be accompanied with a write-up telling workers why these men have been selected and written in such a way that it will stimulate interest so that other employees will strive for similar recognition.

Another possibility for news pictures is the installation of any new safety device. This is not only a matter of general news interest but it will also give the safety director an opportunity to help sell to employees the idea of using this new device. If a picture is taken showing the foreman or superintendent operating it, the picture will carry the suggestion that these men are thoroughly sold on its use and that the workmen should be likewise sold.

Another suggestion for news pictures is the portrayal of danger points in the shop which have been guarded at the suggestion of the safety committee. Such pictures will be most effective when shown with contrasting photographs showing the condition before and after the safety committee's inspection, and later improvement. It is suggested that when such pictures are taken, men be included in the composition of the picture so as to bring life into it. Inanimate objects are less interesting when shown alone, and for that reason it is always better to portray them in connection with something that has life.

Articles Written About the Long-Service Employee

Another possibility is to hunt up employees with long service records who have had no accidents. Some of you plant publication editors will recognize that I am not saying anything particular to you here because I know a great many of you have done this, but there are also many publications which are starting up from time to time and whose editors have not had the experience you have had, and new safety contributors are not as keenly alive to the problems as you are.

These articles on the long service employees should be illustrated with pictures of men at their jobs rather than simple photographs which may have been taken in a photograph gallery and borrowed for the purpose of making a cut. You don't want a photograph album; you want a publication of pictures which have life and action and impression in them, pictures that will be recognized as natural in the shop in which you are employed.

If you ever have such a wonderful piece of news as one workman saving the life of another, for instance by administering the prone pressure method of resuscitation at the crucial time, by all means play that up in a story and illustrate it with pictures not only of the victim but also the man who saved the life; and furthermore, if the man

who saved the workmen's life is given a medal for it, by all means arrange to have a little ceremony in presenting this medal and take a picture of the general manager or president of the company presenting this token of honor to the man who saved his fellow workmen's life.

Those pictures are not only interesting, but they also inspire others to make greater records and greater achievements in behalf of safety.

Another possibility is pictures of men who have been winning prizes in your scheme of getting suggestions from employees.

Another possibility is the more or less ordinary but effective picture of men who have saved their eyesight by wearing goggles in conformity with safety rules. The picture of a man's goggles with one or two lens broken, showing that his eyesight had been saved by the use of this safety device, is always effective and it is nearly always heeded. Similarly when a man has been operating a machine with gloves where he should not have been wearing gloves, if his glove is caught and torn, you can sometimes get a very effective safety lesson across by showing the picture of the torn glove and telling what might have happened to the hand if he had not been able to release it, or telling what happened to the hand that was not released.

Pictures in Connection With First Aid Work

Very often it may be effective to show the man who was injured, if the injury was not too severe, standing in front of the machine and holding the glove and thereby making it more emphatic and impressive.

Another possibility for a news item or a news picture is in connection with your first aid work. One of the most effective means of showing the value of first aid is to show that the doctor who administers first aid does actually use first aid himself, that he practices what he preaches. So if you hear of a medical director cutting his finger while changing the tire on his car, by all means go out and pose him in a picture getting first aid and then write your story showing that our doctor believes in practicing what he preaches. That is always effective in intensifying the idea of getting first aid for minor injuries.

Then again there are numerous possibilities of getting interesting news pictures of the results of accidents which occur from time to time in the plant. These, of course, should be used very judiciously, and always when using them, the article accompanying the picture should point out how the accident could have been prevented, and if possible, run pictures illustrating the method by which this accident might have been avoided.

Another possibility which I have not seen used very often is in connection with your bulletin board. Nearly every plant which has a shop magazine also has a bulletin board. Very often it is difficult to get men to take proper interest in the bulletin boards. Therefore, it might be interesting and helpful to show a photograph of the most interesting posting of your bulletin board during the month and have one or two men looking at this board, and write up a little article the purpose of which would be to arouse a little curiosity as to what

was being posted on these boards to stimulate interest and get the men to go and see what is on the boards. In such cases it is necessary to have material on the boards which when reduced in the size of your cut, will still be legible.

In the matter of instructive pictures, the most common and perhaps the most serviceable type of pictures are those which show the right and wrong way of doing things. I don't mean that the employee will first learn how to do things by reading your plant publication. I don't mean that at all, because in any well organized plant your foreman will show your men how to do their work, but by illustrating these things and running them in the publication, you back up the foreman's instructions and you not only have an interesting picture which will make your magazine more attractive and useful, but you also help the general plan of production by backing up the foreman's instructions.

Other possibilities for interesting pictures in the instructive line are pictures of workmen's feet, showing the kinds of shoes they wear and how good shoes will prevent accidents and how bad shoes will contribute towards causing accidents.

Along the general line of clothing, we might show a picture of a young housewife hanging out her husband's overalls after the washing and calling attention to that as a feature of safety because if a man continues to wear greasy overalls in the plant, he is making his garments a fire hazard.

Pictures May Suggest Lessons Indirectly

Then there are possibilities of both direct and indirect suggestions. Take such a common thing as the projecting nail in a board. There is a possibility of not only winning support for your safety work from unsuspected sources, but also developing an interesting picture by getting hold of some less well known employee in some humble capacity and pose him in the act of picking up a board with a nail in it and disposing of it so it will not be a hazard to anyone else.

These are little things, of course, but they are the things that count in preventing accidents. Then there is the possibility of combining also with that the thought of the accident avoider as against the accident preventer. The accident avoider will see that nail and he will step over it and won't get hurt, but the accident preventer will see it, pick it up and put it away so it can't harm anyone, and thereby prevents accidents to others.

Pictures of neat, orderly conditions in the shop are helpful in stimulating interest and suggesting that such conditions make not only for efficiency but also for safety. Pictures of labor safety devices can be played up showing that they not only save time and muscular effort, but that they also save men from possible injuries, and there are plenty of possibilities of showing contrasting pictures, the old method with the new method, and showing how much more efficient and safe the new method is.

I want to mention one or two examples of what I speak of as the picture with emotional appeal. Pictures of children are always interesting and always appreciated by the workmen and their families to whom the plant publication is brought. Many times interesting and appealing illustrations can be prepared from group pictures of employees' children, babies, and writing a sort of sentimental, emotional appeal with it, pointing out that the future of these children depends on the success attending our safety efforts in this plant.

Another possibility for pictures with an emotional appeal is something that may appeal to the pride of the workman, that will stimulate his taking pride in his plant. For instance, I can well imagine a series of pictures that a plant publication editor might run which would be entitled, "Things We Are Proud Of." Among the things that can be featured under such a general series would be the accident record which the plant is making, and many fine illustrations could be prepared by making graphic representations through charts or diagrams or specially prepared models or something of that kind for photographing, and then showing the president of the company or the general manager and some of the safety committee congratulating each other on this splendid record.

Things to Keep in Mind in Taking Photographs

In taking photographs there are just a few things to keep in mind. Pictures to be interesting and effective must have life in them or they must have action or they must have dramatic qualities and they should have the feature of novelty. Furthermore, they should be as far as possible, pleasing and should not be depressing. Pictures of men doing things should be taken in close-up views and an effort should be made to get clear pictures which are properly focused and properly exposed and have them printed on glossy paper so they can be reproduced to the best advantage in the magazine.

I have been talking most of the time on photographs, but I think you all realize how important it is always to encourage whatever local talent you have to submit drawings and photographs for reproduction in the magazines. These may be crude, but nevertheless they are effective because they are recognized by employees as being done by Tom or George; it is not professional, but it is our own.

I think that the safety man can very well afford to spend a very great deal of his time planning and taking pictures. If an analysis were made, I think it would be true that the safety movement, the wonderful success of the safety movement owes just as much to the illustration, the photograph, the drawing, the cartoon as it does to all the eloquence and oratory that has been given here at these congresses for the last 15 years; and therefore, my suggestion is that you get a camera, learn how to use it, spend time in planning pictures and taking pictures, keep your editors supplied with good, live, interesting photographs, with good well-written articles on safety, and I am sure that the plant publi-

cation, as is indicated on your blue print poster here, will help to reduce the accident rates.

CHAIRMAN DOELLER: Mr. Solensten, I wish to thank you for your paper. I will appoint the resolutions committee as follows: W. D. Price, Warner Gear Co., Muncie, Ind.; V. H. Kupferer, Studebaker Corporation, South Bend, Ind.; and A. A. Belmonte, Union Carbide Co., New York City.

MR. ASHE: Gentlemen, the editor who is the winner in the contest this year, Mr. Bergh, of the Northwestern Bell Telephone Company, has just had a very serious operation and is in the hospital, so he will not be in our sessions.

It has been suggested that it might be a nice thing to send him a little telegram of condolence and congratulation and some flowers, so if any of you want to give a little contribution to Mr. Price, he has agreed to take care of it, if that meets with your approval.

ADJOURNMENT

WEDNESDAY AFTERNOON SESSION

October 27, 1926

The meeting convened at 2:40 o'clock, Mr. G. A. Doeller, presiding.

CHAIRMAN DOELLER: It is very encouraging to see the growth of this Section.

Before calling for the report of the Nominating Committee, I might preface it briefly by saying (as I explained yesterday), that we are changing one of the sections of the By-Laws to provide for four vice-chairmen instead of one. The thought back of it is this: with the growth of the Section and the growth of the whole safety movement, it was thought wise to have a more intimate contact with the other sections of the Council. As an experiment, we are selecting candidates to represent some of the larger industrial groups. With that brief introduction I will ask Mr. Lovering to give the report of the Nominating Committee.

REPORT OF THE NOMINATING COMMITTEE

MR. LOVERING: Your committee submits the following candidates for officers for the ensuing year. For chairman, Forrest W. Boswell, editor *Buick News*, Buick Motor Car Company, Flint, Michigan.

Vice-chairman for Railroads: Charles E. Kane, Illinois Central Railroad, Chicago, Illinois.

Vice-chairman for General Industrial Group: Spencer Hord, Eastman Kodak Company, Rochester, New York.

Vice-chairman for Petroleum: C. A. Ward, Pure Oil Company, Columbus, Ohio.

Vice-chairman for Chemicals: Bronson Tufts, Hercules Powder Company, Wilmington, Delaware.

Secretary: N. L. Devendorf, Consumers Power Company, Jackson, Michigan.

With the chairman representing the Automotive Section, and the secretary representing the Public Utilities Group, there are six general classifications on the slate.

CHAIRMAN DOELLER: You have heard the report of the committee. What is your pleasure?

(Upon motion duly made and seconded, it was voted that the report of the committee be accepted.)

CHAIRMAN DOELLER: It is in order, if you see fit, to make nominations from the floor. I hear none, therefore a motion will be in order to instruct the secretary to cast the unanimous ballot for the officers as nominated.

(After motion duly carried the secretary cast the unanimous ballot for the officers as nominated.)

CHAIRMAN DOELLER: Mr. Secretary, can you tell us approximately what the registration is?

SECRETARY STRICKROTT: We have about 125, I would say.

CHAIRMAN DOELLER: Those who were in attendance yesterday heard the report of the Service Committee on the possibility of starting a magazine. There wasn't any reaction to that report, and unless you want to make any suggestions at this time, we will give the committee further time on that. They will perhaps circularize the entire membership of the group with a questionnaire. The whole thing hinges on the possibility of building up enough circulation to make it worth while. We will give you a final report in the mail.

ERNEST AUGUSTUS (Mead Pulp & Paper Co., Chillicothe, Ohio): I would like to say that this printer I talked to agreed to make us a proposition with the understanding that we editors would cooperate with him in editing the magazine. If we select a committee that would take care of submitting the material to him, he will take care of the printing and any advertising. We will have to take care of the editing end of it. We will have to contribute various articles to the publication, and edit those that are contributed by others.

CHAIRMAN DOELLER: I think it would be fine to have a little plant publication of our own. It would act as a clearing house for this group of editors and those who are affiliated with the Section but who can not attend the meetings.

Section News in the Headquarters Magazine

A. H. RICHARDSON (General Electric Company, Erie, Pennsylvania): I think that instead of starting up a new publication (we have so many to read and view each month now) that we would all obtain more benefit if we cooperated and helped put over the Plant Publications page in the **NATIONAL SAFETY NEWS** and possibly get it increased to two or three pages. We might obtain the same results from that as we would from starting another publication that we will have to help edit and work out ourselves. I would like to make that recommendation that the committee take this matter under consideration.

CHAIRMAN DOELLER: The committee will do that. We have heard some very good suggestions. If there are no further suggestions on this, we will leave the subject.

Regarding the question of what we, as editors, can do to further the safety program, I would like to leave this thought with you: that each one of us act as a center in our own industrial groups, if you please, and try to sell memberships in the National Safety Council and in our own Section throughout this coming year. Let's try to double the attendance at our meeting next year; let's have 300 present. We have over 900 on the mailing list. We have, however, to take into consideration the great distances that some of the men have to travel. That is the one objection to the annual congresses, so we are planning regional meetings.

We had two successful meetings last year, and we are hoping that the new officers will see fit to have at least two and perhaps four this

year in the various sections of the country, permitting the editors who otherwise could not attend to meet and talk over these problems.

This brings us then to the business of the afternoon. We are to hear, first, from Mr. Milton B. Herr, editor of the *Pennsylvania Telephone News*, Philadelphia, Pennsylvania.

THE COLOR IN BLACK AND WHITE

Milton B. Herr, Editor, "The Telephone News," Philadelphia, Pa.

When the curtain is rung down on this little talk of mine, I feel sure you will be convinced that there is at least some truth in the maxim that art is long and time is fleeting. Not that this is to be a studio talk. We'll leave the question of technique, mediums and kindred topics in the hands that hold the palet and ply the paint brush. We'll forget, as much as possible, the mechanical processes of the engraving shop and the printery; and we'll confine ourselves, in a general way, to the interesting art of laying out and making up a magazine. It's a long story. I can only hope to touch on it.

I called it an interesting art. I should have spoken of it as a fascinating art. In my opinion there is nothing more absorbing in the work-a-day life of an editor, nothing in connection with his job that will give him more of a "kick" than a serious application to the problems that determine the appearance of his magazine.

Every magazine, regardless of its classification, has a personality. Just as with human beings, some personalities are good, others are bad and a whole lot are just plain indifferent.

Appearance has a great deal to do with personality. You've often heard it said that clothes make the man—but before you get the clothes you've got to have the man. A skeleton in a Brooks suit and a Stetson hat wouldn't make a successful stage Johnny. Nor would a string of empty sentences and silly phrases dolled up with the finest illustrations and decorations of the period make a successful magazine. Give some real, virile copy a good suit of Sunday clothes, however, and you've got a house publication combination that can't be beat. It'll come close to hitting the bull's eye every issue.

As with all types of creative art, no rule of thumb governs the presentable appearance of a magazine. To get the right result is simply a matter of exercising good taste and common sense, after a knowledge of the possibilities and the limitations of type, engraving and printers' ink has been acquired and the amount of money to be spent has been determined.

With many, the amount of available money seems to be the most important factor. Certainly the more there is to spend, the more art work, plates and colors may be employed by the editor. That money is the keynote of success in the matter of appearances, however, is an erroneous idea.

A magazine may be elaborate; it may be plain; or it may be some-

where in between; but it can always be good. You will find there is color in ordinary black ink; and beauty in plain printing type—providing thought and care and discretion are used in their employment.

"What face and size of type shall I use in my magazine to get the best results?" you might ask me. "How many illustrations shall I use, and how much, in proportion, shall I spend on art work?" Frankly, I don't know the answers to these questions. They are matters for you to decide—and you'll not be able to decide them over night, either. To produce the best within your means requires much thought and concentration. In this business, as in everything else, the law of compensation applies. Never be satisfied with your first decisions. They may be the best, but take time and trouble to prove this to yourself.

In trying to arrive at an answer to these questions, recall to mind the purpose of your magazine. The dress of the issue is always tied up with the editorial aims and purposes.

First of all, the success of your publication depends upon its being read, and therefore your main consideration is the legibility of the type you employ. There are too many periodicals on the market for people to bother straining their eyes with mean, small and irregular type. They just won't do it. The conservation of their sight is more important than the information to be derived from the text.

There Are Many Excellent Type Faces

Now, there are a number of excellent type faces that may be selected from the hundreds of styles made. Here is where your printer can be of valuable assistance. If you feel your type is not as legible as it should be, go over the matter with him. Pore through his type books and get his opinion. He's supposed to know more about type styles than you are. It's his business. And if he's worth being called a printer he won't suggest any tricky type with queer descenders and flourishing seraphs for the body of your book. He won't advise the use of a job-lot assortment of a number of faces and combinations like they used in Victorian days before the dawn of the plant publication.

Legibility, of course, does not depend entirely upon the style of type. Once you have picked out a face that is clear, bold and well rounded you must turn your attention to its size and spacing. Five or six point type—even eight point—is too small to use for the body of a magazine. Choose a size that stands out, line for line and word for word, and yet blends into a harmonious whole. Set it in a width measure that is not too long to tire the eyes as they run across the lines. Frame it in a margin of sufficient width to make the type stand out like a picture. Then, without illustrations or decorations of any sort, you will have a page that will be both legible and attractive.

So much for type. Let's think some about dressing it up. First, illustrations.

As you know, there are many types of illustrations; many mediums in which they may be effected. I use the term illustrations in this case in its broadest aspect.

Most common of all with plant publications is the photograph. Then come the productions of artists, like pen and ink, pencil, charcoal and dry-brush drawings; oil paintings; water-colors, opaques, temper paintings, etc.

Depending on the ability and the reputation of the artists, this latter class of illustrations is expensive—at least when the circulation of a magazine is limited. Publications that run only into the hundreds can seldom afford to pay a reasonable price for art work, and regardless of circulation, no magazine can afford to buy cheap work. You get what you pay for, usually, and it doesn't pay to run poor drawings.

But photographs are different. Certainly they vary just like drawings and paintings—but the variation is not as noticeable to the layman's eye. Many photographers command as much money for their pictures as the average good commercial artist and I mean by that that one print often exceeds the hundred dollar mark in cost.

On the whole, however, photographs are comparatively cheap. Many of them can be taken by the editor, many of them are contributed by the readers, the "hard ones" can be snapped by a professional at a nominal cost. And since it is these classes of photographs that we editors mostly deal with, let's look a little closer into the interesting possibilities they present.

Amateur Photographs Are Often Commonplace

As they reach the editor's desk, photographs are often commonplace in appearance. They have a square finish. The garden variety is usually devoid of interesting composition, and oftentimes show figures with amputated feet, clipped hats, sliced arms, etc. In most of them, the background either predominates over the real center of interest or is monotonous and uninteresting. There is sometimes too much foreground; there is sometimes too much sky. In short, the perfect photograph is a rarity. So the question is: "What treatment shall I give this picture to make it interesting, attractive and effective?"

That, then, brings us to the matter of layout.

The arrangement of a printed page—which is the unit of a magazine—reflects either care or carelessness. If the type and illustrations are just thrown together, then the question is one of simple mathematics where the problem is to fill a given space with something or other—and that's that. The result will show it.

But a good looking, well balanced page is a crystallization of something that was first an idea, a creation of the mind. Where a thing is only in the mind it can be shifted around and arranged at will according to the dictates of the imagination. When it's frozen into type and engravings, and running on the press, well—that's the end of it. So, in laying out a page, I'd suggest that you spend a good deal of time in silent thought. It's no crime to stick your feet on the desk, your thumbs in your vest, puff a cigarette and let your body loaf while your mind does some high-powered thinking.

Here's the problem to work on: given a certain amount of copy and a

certain number of photographs, figure out what arrangement will lend to them the most attractiveness.

Experience is the best teacher in gauging the amount of space that will be occupied by the copy on hand when it is set in the type that you use. When this has been estimated, you will know, roughly, how much space on the pages is available for the illustrations.

Some editors have their type set in galley form before they think of placing the illustrations. In this case, the cuts are usually made in either column or page widths and are pasted in the dummy along with the galley proofs that are cut to fitting sizes. Now while that is the cheapest and the easiest method of making up a page, there is another way of doing it that will produce infinitely better results, that will add considerably to the attractiveness of the issue and that will relieve the monotony of the pages because of the variety of combinations that can be produced. This method requires the making of the engravings before the printer starts to set the type. For want of a better name, I'll call it the "run-around method." Incidentally, if you exercise care, it does not cost a great deal more than the galley method of make-up.

Planning the Attractive Page Make-up

This is how it is done!

When you have visualized the appearance of the pages to be laid out, get out your pencil and some sheets of paper. For this purpose in *The Telephone News* office we use regular layout sheets which we have our printer prepare for us in quantities. Sketch out on the paper, roughly, your idea of how you imagine the pages should look. Rough out a lot of different combinations. Remember that it's a whole lot easier to rub out a pencil line on a piece of paper than it is to look at an ugly printed page of your own making. And remember, also, that hundreds of other eyes besides your own look at the printed page. Don't be afraid to make changes and alterations. It's not wasted time. Do it a dozen different times, if necessary, until you're completely satisfied with the result. You need not be an artist to do this, any more than a man who makes blue prints need be a skillful painter. These roughed out pages, in reality, are the blue prints of your magazine.

Remember in making your layouts that, excepting the front and the back covers, no page in your magazine stands alone. Every page has a companion page opposite and the two should harmonize in balance, arrangement and "color". When you do your page planning, therefore, consider as well the page that is to go opposite it. Otherwise there will be a clash of contrast and perceptible rivalry for attention.

On determining the position of the different pages, I have found that drafting a tentative program of the contents of the coming issue is of decided helpfulness. This program is arranged so that the opposing pages are shown at a glance. The program consists of two columns, with the title of the articles listed alongside the page numbers they will occupy. Page 1 stands by itself on the right hand column. Pages 2 and

3 are opposite each other, as are pages 4 and 5, 6 and 7, etc.—just as they will appear in the bound magazine.

To get the proper composition and balance, do not run all of your photographs with a square edge. Employ curves and ovals; cut in the corners where it can be done judiciously; overlap your illustrations for the sake of variety; and sprinkle in a few vignettes and outlined figures. In using these different shapes and combinations, caution, of course, is necessary. Never try to make a page look too "tricky." Beware of outlining profiles, lest the nose, the brow or the chin be altered in the engraving. Queer, unexplainable shapes and indentures should be tabooed.

Feet that have been cut off in the photographic print can be painted in—skillfully—by your engraver at a nominal cost; likewise missing hat tops and other appendages that would spoil the picture. Where these can not be painted in, stripping another photograph over the one that is incomplete, oftentimes solves the problem. It requires actual photographs and actual conditions to determine an exact treatment.

Strive for a "swing" across the opposing pages in the arrangement of your pictures. Curves are always more pleasing than straight, angular lines. The symmetry of a Grecian urn is more graceful than the hard edges of a cubical box. A sweeping arc is more charming than the cold outlines of a pyramid. Bear these shapes in mind; they will assist you in planning your magazine.

Adapting Drawings to the Page Plan

In the event of your using drawings instead of photographs have the artist make his pictures in the shape that you think will look well in the magazine. Drawings can not be tampered with like photographs because the artist eliminates everything that is not essential to the picture, and altering its shape when it is finished will usually spoil the picture. The time to change a drawing is when the artist submits a sketch of what he intends to draw. That can be changed around as much as desired or discarded altogether.

On every hand you will find examples of good make-up. The big magazines all employ skillful, high-salaried art editors to plan the appearance of their pages. These art editors are experts and their work bears study—and imitation.

While imitation is to be recommended, the execution should be done in a professional way. The subjects involved should be of such type that they will fit harmoniously into the composition. Otherwise imitation is a dangerous and foolish thing.

And above all, when in doubt stick to simplicity in layout. Never, under any circumstances, become extravagant or tricky or foppish. Always there is safety in simplicity.

When General Lew Wallace arrived at the climax of his masterpiece, "Ben Hur," where his task was to describe that most famous of chariot races, he chose a style that was the essence of simplicity, yet that carried with it the excitement, the tumult and the thrill of the packed arena and

the speeding chariots. "The race was on," he wrote. "The souls of the racers were in it. Over them bent the myriads."

As with writing, so it is with art and magazine layout. Simplicity in appearance imparts strength and bespeaks sincerity. Consciously or unconsciously a sincere and attractive appearance will win and retain the support of the readers of your magazine. They will look forward to its delivery. They will contribute to its columns. They will heed the advice and assistance that is offered them.

After all, that is the mark that editors shoot at.

CHAIRMAN DOELLER: Mr. Herr, I want to thank you personally and officially on behalf of the Section. I will now call on Mr. Bronson B. Tufts, of the Hercules Powder Company, Wilmington, Delaware, to lead the discussion.

DISCUSSION OF MR. HERR'S PAPER

Bronson B. Tufts, Editor "The Mixer," Hercules Powder Co.,
Wilmington, Delaware

There are four elements that enter into make-up, and paper, I think, is the first one. You can get a good layout, a good photograph, and if you have poor paper, it spoils it all.

Mr. Herr said that money, to his mind, is not a deciding element in getting out a magazine. I differ with him there, because good paper and good photo-engraving cost money. I find that the printer and the photo-engraver can help you a lot, the photo-engraver especially, because he can take the poor photographs as they come to you, and he can get out of them a great deal more than is in them.

In making up the magazine, or rather the page, some of you are in the same position that I am. I can't devote all my time to the magazine. I get a whole lot of photographs in the morning mail, but I haven't the time to look them all over. I send them to the photo-engraver and tell him that I want such-and-such a photograph in the middle of the page and to build the others around it, and he makes up the page for me. Of course, I have to pay for that. You can go to a cheaper man to have it done, but he may spoil them.

Mr. Herr spoke of two ways to make-up the magazine; first, galleying your matter, having the cuts made, and the run-around method. In making up my magazine, I use these sheets. Probably a good many of you use these or ones similar to them. Our measure is two columns, each 21 picas wide. The back of the book is a three-column, 13-picas wide. We have 12 pages of this measure (indicating) and 12 pages of this measure (indicating). We have an editorial page and the balance of the magazine is for the pages of 13 pica width.

This is a two-column, 21 pica page. I have always been taught in making up a page of this kind where you want to use a large photograph, that you first should have the caption or heading, and in between your heading and the body of your story to have the picture, because it is

always much better and always more attractive. Still, I notice the *Saturday Evening Post*, for one, puts the heading, then the picture, and then the story.

Of course, in making-up I generally reserve the page opposite the editorial page for miscellaneous pictures. You may get a lot of pictures late, or you may have some that you wouldn't want to put anywhere else, so I just group them altogether on this page.

You see, our main office is in Wilmington, Delaware. We are a little differently situated than many of you people. We have approximately 20 plants, from New York to California, and from the Mississippi up into Northern Michigan. I can't get around to see them all, so I have to trust to the correspondents at the different plants to send the photographs and the information in to me.

I think I will probably be disputed on this, but I think one curse of the plant magazine is the amateur cartoonist. You probably have all had trouble with him. I know in our organization we have a fellow who is a good friend of mine, but he is a cartoonist of this kind. He comes to me and says: "Why don't you use my material?" I hate to tell him that it is no good, but it is the truth, and I will have to do it some time.

When we use a cartoon, we try as much as possible to use first-class work. We pay for it. You have to pay for it, if you want good, first-class work, but it is worth it, I think.

The Back Page Carries a Company Advertisement

This is a page that we made up for the summer number. One of the young ladies at our plant wrote this verse. I wanted to use it here, so I took one of these sheets, which I always use when I have a page like this. I tried several different ways of making it look attractive and finally I sent it to the artist and asked him to read it and to give me his ideas for a border. He did that, and this is the result. This artist, incidentally, draws for the *Country Gentleman* and other magazines of that type.

On the back page, we generally run one of our company advertisements. We want to let the employees know what kind of advertising we are doing. They don't all see the advertisements unless we do that.

Mr. Herr has said that simplicity is the keynote to success, and I agree with him. I think some of our pages may be criticized as being severe. Personally, I don't like too many curves on the photographs, and I would rather spot three photographs that may square than to make them fancy. I think they always look better.

CHAIRMAN DOELLER: Mr. Tufts, we want to thank you also for your contribution to this program.

At this time I want to interrupt just a minute before we get into the discussion of these papers, and introduce a distinguished visitor who is internationally known and who knows more about the human interest problems than any other man in the United States. I am going to ask Mr. Whiting Williams to give us a word at this time.

WHITING WILLIAMS: I feel that I am out of my element in talking on the technicalities of the magazine. On the other hand, I don't take second to anyone in my belief in the tremendous possibilities of the plant magazine in these days, especially of the approach—it might be called, the dramatic approach.

The fault I find with the ordinary magazine that I take up is that it is too aesthetic. This is not true of the plant magazine. I believe what the average reader of a plant magazine desires is the approach to any subject in terms of some specific experience. One of the great words around the plant is, "Let me tell you my experience." The worker never attempts a generalization; he don't know much of concepts, except in the terms of a definite experience. I believe if the plant magazine has that sort of approach, there is a tremendous opportunity for the plant magazine to do a much bigger job than the ordinary magazine attempts.

Educating the Employee in His Own Job

Today we are so specialized in these individual jobs, that there is no possibility of trying to do away with specialized workers. There is no possibility of getting a man to do in his work a part of the process which gives him an idea of the entire process. Just that fact, however, gives a big opportunity to the magazine to supply the frame of the picture, which gives meaning to the individual thing that he does.

I must tell you a story along that line. About the time the electric iron first came out, the men who worked in the steel plants, rounding out the steel didn't know what it was used for. I went around and asked each one of these men individually what this steel was for, and not one of them could tell me, except that you had to be damn careful. About three years later I went around again and asked the men where the stuff went to. One of the men said to me, "Can't you see it goes over to the inspection department, you damn fool." That was as far as I got.

I visited Mr. Ashe and others there at the General Electric and they asked me how I would like to see what they did to make the motors. I never will forget the thrill I got when they took me into the plant and showed me the big piles of steel, and said, "Here is where the thing starts," and then I went all through the process.

So you see, the plant magazine can help people to see what they make is used for. It is absolutely necessary that you teach them, because the average man is apt to think that all that men work for is money, and they don't care what it is all about.

There is one more story I must tell of what the foreman said to a lot of foreign workers that were supposed to be interested in money. They didn't care what they had to do as long as they got the money. The foreman said: "Dig me a hole six feet deep." About a half-hour later he said, "Dig me another hole about six feet deep." A half-hour later he said, "Dig me a hole six feet deep." Those fellows went on digging. They cared nothing about the purpose of the work, and they would go

on indefinitely if we paid them the money. One of the fellows, however, said to the foreman, "No, we quit. We damn fools for nothing. What the hell!"

The foreman said, "What, you don't understand? We have got to find a water pipe. The drawings have been lost and it is up to me to find it. I will lose my job unless I find that water pipe, and I wish you would help me."

The workmen said, "All right, we will help to find the pipe."

Now, the plant magazine's big function today in this era of specialized industry is to help to give the man a picture of the value of the work that he does by indicating what goes into it and what becomes of it, and what the meaning of the whole thing is. It will help him to realize the part that he is playing in the manufacture of that thing. That is done by means of the dramatic approach. It seems to me that the plant magazine plays a part in the industrial relations, and in the contentment and in the worthwhileness and the entire effectiveness of the organization that is secondary to no other thing I know about.

CHAIRMAN DOELLER: Thank you, Mr. Williams, for this word of advice you have given us. I know it is appreciated by all of us.

We will now proceed with the discussion of this last topic.

Queer Shapes in the Pictures May Be Overdone

G. F. CLOSE (Commonwealth Steel Company, Granite City, Illinois): I have been quite interested in the way in which the cuts are dressed up and dolled up in some magazines. In some magazines they are taking the background away, and particularly you will see the cuts rounded on the top or possibly straight on the top and rounded on the bottom and all kinds of things done to make them look different. I just wonder how far, in the experience of the editors here, is that a good thing? I am inclined to think that we can overdo it. My thought is that a page with the cuts mostly square or occasionally with a variation makes a better looking magazine than where most of the cuts are put into all kinds of different shapes.

I was just wondering what the impression of the editors here was as to whether that sort of thing does particularly appeal to the reader of the magazine or not, or whether it does not perhaps take away something from the dignity of it?

MR. TUFTS: I don't believe in having them square. A few curves at the top of the pages and sometimes an oval or a circle in a group layout are good, but I would much rather see a page severe and plain, because too many curves are bad. I don't like them.

M. L. HENDERSON (Bucyrus Company, South Milwaukee, Wis.): I have been a commercial artist for a good many years, touching up the photographs. I agree with you that a lot of severity is a good thing in a plant publication, but if the pictures that come in are donated, they generally have poor photography in them.

About a month ago, we sent our photographer to get a bunch of pictures of a picnic. One of the pictures I had in making the layout was a group of 10 or 20 girls on the grandstand, but the background was very dark. The only way to bring out the picture was to touch it up.

Other pictures that we get are construction pictures, which show long roadways, or a lot of machinery, and in order to bring out the details, it is absolutely necessary to outline it.

Last week I had a bunch of pictures of operators working in the dead of winter with shovels, and the machinery was in around the trees. The way the picture was taken, it was absolutely impossible to make out the machines, and therefore, we had to cut out part of the trees, so as to show where the machines were. So, it is absolutely necessary to cut up a lot of those pictures.

Amateur Cartoons Are Often a Problem

The question came up a while ago of using pictures at the head of the page. Many articles are headed with the main headline and then the sub-headline. If it is an important sub-head, put your main headline at the top and then cut your photograph, cut it up so as to draw attention from your main headline down to your sub-headline. Work the layout the way the advertising people do it. Use the picture with the same effect as you would an arrow, but cutting it out and leading the attention down from the headline to your sub-headline, bringing emphasis on it.

MR. AUGUSTUS: I would like to have an expression from the editors as to whether they think amateur cartoons a good thing or not. Are we putting out the magazine for ourselves or for the boys who read them? Personally, I have been running a page of them for six years. When the men receive the magazine, that is the first thing they look at. If I cut it out, they will come to me and say: "Aren't we running the cartoons any more?" Aren't we putting out the magazine for our readers and not for ourselves? If we are putting it out for the boys in the plant and they like it, shouldn't we give them what they like?

VICTOR H. KUPFERER (The Studebaker Corporation, South Bend, Indiana): All I have got to say is that Augustus is lucky to have a fellow draw a page for him every month.

G. F. CLOSE (Commonwealth Steel Company, Granite City, Ill.): We don't use cartoons very much. We have a man in the office, a photographer, who is more or less of an artist, and when we get cartoons that we want to use, we just ask the man if he has any objection to us reproducing them in a better artistic form without changing the subject, and we find he is glad to have us do that.

MR. KUPFERER: I don't think there is any way of bringing out a point stronger than by use of the cartoon. If the man will go to the man who makes the cartoons and say to him, I have a certain idea, and give it to him and ask him to make a cartoon of it, he will do so. If the editor gives this man the idea that he wants to put across, the cartoon will do it for him.

CHAIRMAN DOELLER: How many of the editors use paid service, that is, buy the cartoons or photos?

(Six raised their hands.)

CHAIRMAN DOELLER: How many use local talent?

(About 50 raised their hands.)

J. C. BETHURUM (Buick Motor Company, Flint, Mich.): I believe the argument was against the cartoon that was on the face of it so amateurish. I would like to feel the men out on whether or not it is worth the money it would cost you to have the ideas drawn by somebody who knows the business rather than by the amateur.

CHAIRMAN DOELLER: The consensus of opinion seems to be opposed to the amateur. Maybe it is a matter of economics. Let's have some discussion on that.

MR. HERR: I think a lot of people believe that the average man in a plant has no conception of beauty and that anything drawn up with a very amateurish touch is good as long as it has an idea to it, and it will get across with him. Perhaps that is right. I don't know. I do contend that everybody, regardless of their standing in life, does appreciate beautiful things, and they unconsciously or consciously realize the difference between amateur work and professional work.

Helping the Cartoonist With Various Suggestions.

A cartoon isn't necessarily a piece of art, but there is a professional touch to it that you can see and feel. I think it is much more worth while to present a good drawing that will help the appearance of your page than to present something grotesque. A cartoonist caricatures, but he does not make his subject necessarily horrid as amateurs, try as they will, can't help doing sometimes. In engraving, you will find that the amateur drawing of a cartoon with ordinary writing ink won't give you the possibilities of giving a real reproduction to his work. Sometimes it is a matter of experience, and sometimes it is a matter of keeping your crowd happy when you use these things. Personally, I think that your best solution is to get good art work when it is done, just so long as it has a good professional touch to it, and you as editors are the judges of that.

HERBERT W. ALLEN (M. Wile & Company, Inc., Buffalo, New York): I usually furnish the would-be cartoonist in the plant with a sheet of paper on which he does his cartoon work. I give him the sheet and tell him the cartoon must fill the sheet, and then when they are reduced they look very much better. I then get it done over by an artist.

FRANK CHIVERSON (Olds Motor Works, Lansing, Mich.): Being an artist as well as an editor, I can give you a solution to some of the troubles. If you have a cartoonist in the plant, furnish him with a photograph of the subject you want cartooned. Have him take his pen and simply draw over the features of this photograph, a pen-like drawing. You can get from your photographer a solution which will then simply dissolve your photograph entirely, leaving your pen-like sketch on the top, which is a good portrait of the thing you want cartooned.

HARRY D. LIVERS (Southwestern Bell Telephone Company, St. Louis, Mo.): I am not an editor, but the Hercules Powder man made some statements that I didn't like, and I just want to ask him something about them. Should an editor turn out bad copy or depend on the printer or engraver to do his job for him because he thinks he don't have enough time or should the management hunt a new editor?

MR. TUFTS: Well, it wasn't bad copy I was talking about, it was bad photographs. The editor is not responsible. If you give him a poor photo, you are not going to get good results. Many times you get out of them more than is in them.

MR. RICHARDSON (Erie, Pa.): I think I can answer the gentleman's question. I think if the management has the idea that they want to get out the plant publication, they should let the editor give his full time to the preparation of that paper, and not have him do some other duties.

MR. LIVERS: What is an editor, what does he do, and what is he for?

MR. TUFTS: One of his duties is to get the engraving done the best but at the cheapest price. If you are going to buy a good suit of clothes, you are going to a good tailor, and that is what I do with my engraving.

New Classification of Points for the Contest

G. F. CLOSE: I believe an editor ought to do all the work he can himself. There are a lot of things of a technical nature where technical assistance is very desirable, but on ordinary work, I think the editor ought to do it himself. Our paper, *The Commonwealth*, is printed by a printer whose first name is service. Anything along the line of advice or suggestions as to arrangements and cuts, he is more than glad to give. He gives us all the service we want. I think it is a good idea to take all the assistance we can.

Somebody asked, "What is an editor?" The answer is that he is a goat. "What is he for?" He gets nothing if it is good and he gets hell if it ain't.

CHAIRMAN DOELLER: For those who were not at the luncheon today, I want to announce that a new classification of points will be in vogue next year for the contest. For "Safety," 25 points instead of 40. "General interest," 20, the same as it was. "Educational features" was raised from 15 to 25. The "General Character" of the paper, the same as it was, 10. "Make-up and Art" was raised from 10 to 15. "Unusual Features" will be the same as it was, 5 points. This probably will also be announced through the NATIONAL SAFETY NEWS.

One other thing was suggested in that meeting, and that is, that we have two classifications for basis of judgment, the purely magazine type and the newspaper type. It has been rather hard to throw the two together under the same heading, so we are making two classifications next year.

Is the Resolutions Committee ready to report at this time?

VICTOR H. KUPFERER (The Studebaker Corporation, South Bend, Indiana): I want to say that Mr. Belmonte and myself were looking to

Mr. Price for some good help on the resolutions, but we found out at the last minute that Mr. Price was called away on account of illness of his father. If there are any deficiencies in the resolutions, we hope that you will charge it to Mr. Price and not to Mr. Belmonte and myself. Resolutions are hard things to get up anyway.

We present the following resolutions for this Section:

Resolutions Passed by the Section

Whereas, The officers of the Plant Publications Section of the National Safety Council, namely, Mr. G. A. Doeller, chairman; Miss Ruth E. Cade, vice-chairman, and Mr. A. G. Strickrott, secretary, have during the past year generously given of their services and efficiently directed the work of the Section, which has resulted in the considerable growth of the Plant Publications Section and culminated in one of the most interesting and best attended conferences ever held by the section; be it

RESOLVED, That the members of the Plant Publications Section extend to those officers their whole-hearted thanks in recognition of their services.

Whereas, Miss Margaret T. Stevens, Mr. S. W. Ashe and Mr. Spencer Hord, gave unstintingly of their time, thought and energy to the most stupendous and at the same time extremely delicate task of judging the publications entered in the Plant Publication contest, this being the second year of their service in this respect; be it

RESOLVED, That the members of the Plant Publications Section express their sincere gratitude for this great service and commend the judges for the highly satisfactory manner in which the judging of the publications was accomplished.

Whereas, The National Safety Council has during the last year heartily cooperated with all the efforts of the Plant Publications Section, especially in the promotion of meetings of this Section, and in giving space in the **NATIONAL SAFETY NEWS**; be it

RESOLVED, That we, the members of the Plant Publications Section, extend our appreciation to the National Safety Council, and particularly to Mr. Kershaw for his part in furthering the cooperative activities of the Section and the National Safety Council.

Whereas, Plant Publications Section members have noticed with considerable pride and have read with interest the page conducted by Miss Margaret T. Stevens, Chairman of the Publicity Committee on Plant Publications in the **NATIONAL SAFETY NEWS**; and

Whereas, we have also noted her excellent publicity work generally; be it

RESOLVED, That this body thank Miss Stevens and recommend that she be requested to continue her activities on publicity, especially in connection with her page in the **NATIONAL SAFETY NEWS** for the ensuing year.

Whereas, The General Electric Company, through Mr. S. W. Ashe, has provided excellent facilities in the form of display racks for exhibiting the plant publications entered in the contest; and

Whereas, The said racks have been presented to the Plant Publications Section as its permanent property; be it

RESOLVED, That we acknowledge with sincere appreciation this generous contribution of the General Electric Company to the work of the Plant Publications Section.

Whereas, Those in attendance at these meetings realize the value accruing from various conferences of the Plant Publications Section as well as from the interchange of ideas throughout the year, and from other activities of this Section; be it

RESOLVED, That we urge the promotion of the membership to include as many editors as can possibly be enlisted, and that each member give the officers his hearty cooperation to this end.

Signed

A. A. Belmonte,
Union Carbide Co., N. Y. C.
V. H. KUPFERER,
Studebaker, South Bend, Ind.

(Upon motion duly made and seconded, it was voted that the report be accepted as read.)

Section Committees Are Announced

CHAIRMAN DOELLER: I would like at this time to introduce to you your newly elected chairman, Mr. Boswell of the Buick Company, who will announce, I believe, the chairmen of the committees for the coming year.

CHAIRMAN ELECT BOSWELL: Mr. Chairman and Members of the Plant Publications Section: I am just beginning to appreciate more forcibly the job you hitched on to me this afternoon.

The committees for the ensuing year are as follows:

Program—G. A. Doeller, Dayton Power & Light Company, Dayton, Ohio; F. E. Heibel, Nickel Plate Railway, Cleveland, Ohio; G. E. Close, Commonwealth Steel Company, Granite City, Illinois.

Publicity—E. T. Wilkins, General Electric, Schenectady, New York; Milton B. Herr, Bell Telephone Company, Philadelphia, Pa.; C. T. Fish, National Safety Council.

Membership—N. L. Devendorf, Consumers Power Company, Jackson, Michigan; Victor H. Kupferer, Studebaker Corporation, South Bend, Indiana; Ruth E. Cade, Staley Manufacturing Company, Decatur, Illinois.

Service—Ernest Augustus, Mead Pulp and Paper Company, Chillicothe, Ohio; Albert H. Richardson, General Electric Company, Erie, Pa.; L. H. McReynolds, Jeffery Manufacturing Company, Columbus, Ohio.

Judges—S. W. Ashe, General Electric Company, Pittsfield, Mass.;

Spencer Hord, Eastman Kodak Company, Rochester, New York; Ralph H. Wheelock, Narragansett Electric Lighting Co., Providence, Rhode Island.

While I am on my feet, I wish you would indulge me for a moment. This is your Section and what we get out of it depends upon what we put into it. A year ago I prepared a paper which I read at the Cleveland conference and I am sure that I, personally, got more out of the preparation of that paper than any other person got out of my reading it.

There are a good many jobs around here. Most of you could do the jobs just as well as any of those who have been appointed or elected today for the ensuing year. It has been the policy of the committees in the past (and I think it is a good one) that the jobs be rotated from year to year so that everyone gets his or her chance to do what he can.

The officers of this Section will succeed in making the meetings next year valuable or otherwise, depending upon the cooperation which the members give to their officers. You will be asked to make contributions and I wish that everyone who is here (you have manifested your interest by your attendance) will be willing to make suggestions when called upon by the various officers and committeemen. You will have some suggestions, I am sure, to offer with reference to some of the things that are discussed here and we would like to have them. The program committee, no doubt, will be asking you for suggestions as to what you think ought to be discussed or something that we can hook in or tie in to this program that will make it worth while. It is easy enough to set up a program, but the question is, "Are we going to put enough meat into it so that the members will say it is worth while?"

I thank you for the honor you have conferred upon me in electing me your chairman. I assure you that I am not unmindful of the responsibility it carries.

A Characteristic Mark Twain Story

CHAIRMAN DOELLER: We will now proceed into the second part of our program for this afternoon. The subject is, "Getting the Most Out of Your Magazine." We have been fortunate, I think, in having all of our speakers who are on the program appear, but in the case of the next speaker, he will be unable to be present. We received a letter from him and among other things he says: "All along I have looked forward with anticipation to this meeting. I must disappoint myself. One of the members of my family must go to the hospital at that time, and I will be unable to leave Scranton." This letter is from Mr. D. C. Vandercook, director of the International Correspondence Schools. In his absence, we are asking Mr. Ashe to read the paper, which Mr. Vandercook has sent in.

S. W. ASHE: This is a job that I don't enjoy—reading somebody else's paper. I would much rather read a radio talk to you.

Mark Twain was out with a party of friends hunting. They had a cook they thought a good deal of. The cook had an accident—everyone has

accidents. He fell into the fire and was burned to a crisp. Everyone wanted to do something; they all felt badly about it. To Mark Twain was allotted the task of writing the epitaph. So, on the bottom of the Tombstone Mark Twain wrote: "Well done, good and faithful servant. Rest in peace." That is what I would rather do than read this. I will read it rather slowly so that you will be able to get it. It is a little difficult to read somebody else's paper.

GETTING THE MOST OUT OF YOUR MAGAZINE

D. C. Vandercook, Director, Business Service Department, International Correspondence Schools, Scranton, Pa.

When that fateful day arrives for balancing budgets, "Getting the Most Out of the Plant Periodical" usually is transformed into "getting enough out of it to pay to continue it."

The publisher, who foots the bill, thereupon uses his own particular yard stick to determine whether he shall say thumbs down or thumbs up. Like those who buy advertising space to reach paid circulations, he expects the overpraised "Power of the Press" to influence in his favor the potential reader public, his employees; to create in them confidence for him; to build their faith into loyalty; and to stir this loyalty into team action.

"It's for their good," he may say with sincerity. "Our interests are quite mutual." Nevertheless, this is "a business proposition," and results "must be measured"; and they are measured by the distance the printed pages have gone in changing the minds of employees, or in moving them along the highway toward the objective which he has pointed out to the editor.

Off to the other side stands the reader, and whether he is passively quiescent, mildly curious, or eagerly alert, in effect he is saying with varying degrees of intensity, "I dare you to get my attention. I dare you to change my mind!"

"Here's the medicine they ought to be given," commands or suggests the publisher, pointing to those abstract qualities of confidence, loyalty, thriftiness, team spirit and creative productivity.

"Guess we know what we want," challenges the reader. "We're interested in ourselves—our families, our homes, our pay check, a steady job, and other working conditions."

And, then, looking at the poor editor in the middle of the sandwich, they shout in unison, "Pour the gravy all over him! Let him suit us both—if he can!"

To which the editor may retort, if as quick on the trigger as was Abraham Lincoln when competing hat manufacturers brought samples of their craftsmanship, "Gentlemen, you have mutually excelled each other."

To get enough out of your personnel periodical, there must be reader receptivity: what are your readers able to take in, to hold, to contain? What are they willing to take in, to hold, to retain?

First, then, the editor must know his audience. What races are represented among his potential readers? What is the percentage of illiteracy and literacy? What per cent of them are out in the shops? In the front office? What proportion are executives and supervisors? These and other questions must be asked and answered, either in detail or in a general way, that the editor may know what his readers are able to take in, to hold, to contain?

Reader Interest—what readers are willing to take in, to digest, and retain as their own, is quite a different matter. Dry statistics may help, but they must be interpreted in light of numerous contacts, observation and experience. Interpreted in the light of each day: a changing process, for "nothing is permanent but change." Interpreted, too, by personal contact at frequent intervals. The editor's job is not merely to sit at a desk, waiting in solemn dignity for his "staff" to send in their modest contributions. He needs to go out where they live and work, to know what they say when relaxed and off the job between shifts, or en route to their work or their homes. He must know individuals in a cross-section of his audience well enough so that they will fill his ear, when he holds it close to the ground. Being a great editor is something more than filling pages with printed words and pictures: to be a great editor is to understand human wants and motives, and what will move human beings to action; it is to ride the current and the cross-currents of a torrent of thoughts; it is to look back, but only that one may look forward; it is to help to make history, as well as to write it, by participation in the world of affairs; it is not alone to report, but to interpret, to prophesy, and to stimulate. This he can only do as he gets out where "the world do move"; to learn first hand not only what his readers are able to take in and hold, but what they are willing to take in.

Points That Prove the Bacon Is On the Fire

Now, how can the editor best prove to his boss that he has brought home the bacon, that there have been undeniable demonstrations of reader receptivity and reader interest? Here are suggested a dozen units for his standard of measurement:

1. By the expressions of anticipation when an issue is due, or overdue.
2. By the reception accorded it when it appears. By the number of copies thrown away. By workers seen reading it riding home on street cars, walking away from work, or seen taking it home. What they say when handed it.
3. By the criticism, favorable and unfavorable, which each issue provokes, in letters, by telephone calls, personal interviews, etc.
4. By the enthusiasm and interest of staff contributors who are not paid for their work.
5. By the willingness and the anxiety of readers to be photographed for its pages or written up.
6. By the suggestions of editorial changes, policies, and programs volunteered. Who makes these suggestions?

7. By the expressed desire of various company or employee organizations, groups, committees, department heads, and individuals of the rank and file that the periodical shall give publicity to certain events, causes, enterprises, etc.

8. By the volunteered comments which reach the ears of the editor through the ears of the management, both favorable and unfavorable. By the general comment "behind the back" of the editor.

9. By requests for extra copies of current issues.

10. By the life of given issues. How old are the issues requested? WHO requests them: Management? Department heads? The rank and file? Members of their family? The local press? Other companies?

11. By unsolicited requests of outsiders to be put on the mailing list.

12. By a large paid subscription list, rather than a free circulation!

Here is where I suppose I shall be classed as a "*Bull-she-veekee*," and perhaps thrown out of the synagogue for being unorthodox. Have patience, my brethren, until we have thought about this matter for a moment. "Why is a paid subscription list a better criterion of reader receptivity and reader interest than a largely free circulation?"

That Which Costs Something Is Valued Most

A few weeks ago, when I visited a great industry employing close to 20,000 people, a great executive told how the company had for years operated a summer resort at a nearby lake. "At first," said he, "any employee might ask for a cottage at that lake, and enjoy it with his family for a week, without paying any rent. Our company planned great picnics, provided free transportation to and from the picnic grounds, hired a band, bought the picnic dinners—and saw but a few accept its hospitality. The lean years came, and the company decided to ask a \$10 rental fee for those cottages; it provided free coffee, cream and sugar, but left it to our employees to provide their own picnic dinners, their transportation, and their programs of amusement. Of course, the company helped, but it no longer offered to pay the bill. Now there are not enough cottages. Now, through the summer, picnic grounds are in constant use. Never have we seen such great crowds of our employees at that lake."

There may be exceptions, but as a rule that which costs something is valued above that which is given away. The so-called "plant" or "employee" publication is not much different from other obnoxious "welfare" activities, when given away. For how the upstanding, liberty-loving, flag-waving, eagle-screaming, sesqui-centennial celebrant does demand the privilege of keeping his self-respect! How he does hate to be forced to buy something he does not want. "Oh, but he isn't," say you who are giving them away. "The company foots the bill." Not in the worker's mind. He says: "If the company will spend its money for that paper, it will spend it for other things we don't need or want. Anyway, I'd rather decide for myself how I spend the money I earn." If you don't believe this, check up on it when the lean times come, when there are lay-offs, or when there is complete suspension.

Then, too, when the publication is put on a subscription basis, the attitude of the reader-worker is changed, because he is paying for it because he wants it. For brief periods men may buy that which they do not want, "just to help out," but not for long. Folks only continue to put their "good money" continuously into a subscription because it genuinely interests, satisfies, amuses, stimulates or serves them or their loved ones.

Furthermore, the attitude of the editor, or would-be editor, is changed, when a subscription price is charged for a worker's periodical. Fewer would decide today and start tomorrow with those toy balloons which so soon will be punctured, if they thought that literally they must produce a publication, so good that they could sell it to the worker-reader. Also, if the workers share the cost with the management, then the editor has good evidence that he is actually working for both, that he must keep in mind the interests of both, and that he must make good with both.

Paid Circulation a Standard of Read Interest

Again, although I have not the evidence to prove it, I believe that the life of the periodical is likely to be stabilized and prolonged. The management has a very accurate standard of measurement of reader receptivity and reader interest when there is a paid circulation.

Take, for example, the Audit Bureau of Circulation, which has 1,919 members, of which 1,482 are publishers of newspapers, magazines, farm and business papers with a circulation of single imprints of approximately 13,500,000 copies in 1925. "Over two-thirds of all newspaper and periodical advertising appropriations, amounting to many hundreds of millions of dollars, are placed with security and confidence in A. B. C. mediums." Circulations are audited because "what the advertiser wants above all else is a standard of reader interest, as determined by a statement as to those who want a publication bad enough to pay for it." Keyed advertisements have repeatedly demonstrated that the periodical with the free circulation does not get results proportionately as large as do paid circulations. Now we all know that the advertiser pays more than the subscriber toward the actual cost of putting out newspaper or magazine. And why isn't the management of an industry in a similar position? Why hasn't he the right to expect the largest returns, if his workers are permitted to pay something toward the cost of their factory paper?

Take, for instance, *The Arrow*, published at Spray, N. C., by the Carolina Cotton and Woolen Mills Company. Its editor, J. O. Thomas, says that its subscribers have always been charged for it. Until the first of the year 1926, the price was \$1.50 a year; now it is \$1 a year. Over 90 per cent of its circulation is paid for on this basis. Free copies are given to its reporters. "We count our paid circulation by the actual number of paid subscribers," says Mr. Thomas. "We have about 1,600 names on our mailing list. Nearly 85 per cent of these are employees of the company. A number of business men in our village subscribe, and a great many employees send copies to their relatives in Virginia and

other places. Our circulation is mainly in Leaksville, Spray and Draper, N. C., and in Fieldale, Virginia, at which places the plants of The Carolina Cotton and Woolen Mills Company are located.

"In 1925, our subscriptions returned about 15 per cent of the total cost of getting out the paper. The advertising returned about 25 per cent, but advertising has not been good, owing to depressed business conditions. We compete with one weekly newspaper here, which is printed by the same publishing house which prints *The Arrow*.

"Our employees seem willing to pay for *The Arrow*. We have thought of giving all of them a copy gratis, but we feel that they will appreciate the paper more to pay something for it."

And now in conclusion, how can an editor create reader interest? By filling his columns with articles of genuine human interest. Henry Albert Phillips declares that a good test of human interest, or dramatic interest, can be found in the answer to the question: "Does it produce emotion, or feeling, within the breast of its audience?"

"Contrast," he goes on to say, "is the salt of life; it is the most prolific source of human interest."

"Contrast taps the wellsprings of curiosity, wonder, amazement, surprise, incredulity, amusement, passion, anger, hatred, admiration, adoration, love, pity, pathos and sublimity. In art, they call it light and shade, or chiaroscuro."

"If the incidents, the characters, and the settings are all alike, there will be no conflict, no contrast, no drama."

Then he proceeds to point out that the sources of human nature are to be found in the extraordinary in our midst, in the novel, in the evidences of nobility about us, where we did not expect to run upon it; pathos, where we expected comedy. Human interest is to be found in expectancy, in intensity, in exciting curiosity, in the appeal to the heart of humanity.

By touching the larger proportion of its readers, potential and actual, at the most points. And every contact gets attention. Attention stirs up interest. Interest excites emotion. And emotion should lead to action.

CHAIRMAN ELECT BOSWELL: I regret that Mr. Vandercook couldn't be with us today. I am sure that those of you who have met him regret that he couldn't be here.

The discussion of this paper is to be made by Mr. H. J. Burton, of the Consumers Power Company.

DISCUSSION OF MR. VANDERCOOK'S PAPER

H. J. Burton, Consumers Power Co., Jackson, Mich.

I agree with Mr. Vandercook's paper, at least a part of it. I do especially agree with the part where he talks about the contrast:

In that part in which he talks about the paid subscription, that is, employees should be charged for a company publication, I absolutely disagree with him. Further, I disagree with the premises that he points

out for a paid circulation. I subscribe for several magazines. I pay \$1, \$2, \$3 or \$5 a year for them. I don't value the one at \$5 any more than the others. I don't remember which is the \$5 magazine until I get the bill. Furthermore, if the editor were to say to me, "You can have it for nothing for five years," I think I would still read it.

A company publication, as I said before, is to sell an idea to employees, and I don't know why we should charge them for this magazine. It isn't what they pay for it, but what is in it, what they get out of it. As I say, I absolutely disagree with the idea of paying for a plant publication.

Mr. Vandercook just gave me a synopsis of his paper, and I didn't hear it until just this moment. I made some rather hurried notes as these thoughts came to me. It is the spirit back of the paper that makes it valuable and sometimes to make it interesting, you have got to show it.

Further Discussion of a Charge for the Plant Magazine

He said (I may not quote him exactly), "If you give a magazine away, it resembles some of the other obnoxious welfare activities of a company." If your plant publication is obnoxious, it is not going to be what you are trying to put over.

As I say, in a plant publication we have got to sell an idea, we have got to instruct the readers, if you please. If you want to amuse them, why you can subscribe to *Life* for them or make them pay for it. We are getting an idea over which is a part of our organization, just as important a part as anything else.

In the synopsis of the paper he said to me, "We always value a gift according to what is paid for it." I think we value it no matter what amount the one who gave it to us put into it. I was talking to a man some years ago, in New Jersey, just after Christmas time. He showed me a little gift he had received, a little piece of pasteboard. It probably didn't cost even a cent, and it was perforated with pins. It was made by a little child. This little child for a month or so before Christmas—the child was about three or four years old—worked on this and finally it worked out a little cross. He told me that every time he went into the house, the child would run with this pasteboard to its mother and say to him, "I am making something for you for Christmas, but you can't see it now." He showed more pride and cared more for that thing than anything he had ever gotten.

I just have one more little note here that I made while Mr. Ashe was speaking. A plant publication must have an objective, and we must accomplish that objective whether an employee likes it or not. The main objective of the paper is to make him like it. If they don't like it, we should educate them to like it.

CHAIRMAN BOSWELL: This meeting is open for discussion. I think we ought to confine the discussion to one speech to a person until everyone who wants to speak has done so. Have you any questions you wish to ask?

H. P. ALLEN (Charles H. Tenney & Company, Boston, Mass.): How many of the editors here charge any rate for their paper?

MR. BELMONTE: We charge \$2 a year for our magazine. This magazine of ours is not primarily an employee's magazine, it is a club magazine, and the members of the club are the employees of the organization. The dues are \$6 a year, and \$2 of the dues are applied to the magazine.

The magazine was just for the employees in the Metropolitan district, but lately it has been sent throughout the country. We have about 40 plants and 160 sales offices. These fellows are pretty insistent that we send the magazine out to them. We simply charged them \$1 initiation fee and \$2 a year for the magazine. It now goes all over the country.

I just stepped into our Detroit office to find out how they liked it. They tell me it is great, and that they would pay \$2 alone for some of the stories that are in there. We are running a history of the subsidiaries of our company and information of that type which has never before been given to the employees, and these men out in the field especially are simply grabbing it up.

A Successful Magazine Presents Concrete Things

The men don't mind paying for it. Two years ago we started with a four-page magazine, and now we have run it up to about 20. We are getting jammed with a lot of stuff, and I think it is read fairly well. I was going to ask that same question, how many magazines are sold to the employees and how the employees like it? Personally, I don't like the idea of charging for the magazine. The corporation wants to charge for it, so there is nothing else to do.

There is another thing I would like to talk about while I am on my feet. I have read a lot of stuff on what we ought to do and what we can do, but I think what we want to know is how it should be done. When I started in this work, I was pretty new. I wrote to Mr. Ashe and a couple of others and asked them "How do you do this thing, and what is it all about?" I got some very fine ideas from these gentlemen. I think in order to make your magazine successful, you have got to make things concrete. You have got to state, "Well boys, we have got to be careful," and then cite some specific illustration. I recently purchased a book, and it contains 900 pages. The word "concrete" appeared 600 times in that book, and that is a thing I want to leave with you. Let us be concrete in our magazine work.

E. E. CRISWELL (The New River Company, Macdonald, W. Va.): When a large department store goes to sell anything to its customers, it does not make a charge for style service, it sends out bulletins. Do you think for a minute they would sell the amount of goods they do if they made a charge for those bulletins? Personally, I don't think so, and I think the employees' magazine is in much the same position as the large department store.

We have something to sell to the employees of our company. If we make a charge for that magazine, I don't think that it will reach as

many employees as it reaches now, therefore, I don't think it will make as many sales. That is my idea on the subject of subscriptions.

S. H. LIBBY (General Electric Company, Bloomfield, N. J.): A careful questioning brings out the fact that every employee does not subscribe for that magazine. Further careful examination indicates that if 60 or 75 per cent of those employees do subscribe for the magazine, it is the balance that we want to sell the thing to more than any of the others, and we have left them out of it.

I am heartily in accord with practically every one here that we should not attempt to sell the magazine to the employee. I think, as someone else has said, make it so good, give them so much good material that the matter of who pays for it will be lost entirely, and we will put the thing over that we are trying to put over, service to the men in the shop as well as service to the company.

HERBERT W. ALLEN (M. Wile & Company, Inc., Buffalo, N. Y.): We took up the matter of charging for our magazine when it first came out merely as a matter of form. We didn't believe in doing it, but we wanted to consider it. We resolved the matter by deciding that it was the employees' own magazine, published by the company for the employees and published through their cooperation. We make them believe that it is their magazine, and their part of it is to furnish the stuff that goes into. The company furnishes the money to pay for publishing only. If it is their magazine, why should they pay anything for it, except the efforts they put into it?

Employees Interested in What They Do for Themselves

ARTHUR M. COON (Dunlop Tire & Rubber Company, Buffalo, New York): I don't know anything about the actual expenses, because we have never charged for our paper. I am inclined to think it would go over better if we charged something for it. We have found in the plant that whatever we have done isn't as well appreciated as if the employees do it themselves. When we gave them the picnics in the past, the company would pay all expenses, furnish coffee and prizes and things of that sort. This year we tried having the employees run the picnic themselves, and it turned out much better than it has ever been in times past. We find that other things work out the same way.

They are fixing up at the present time a recreation room for the employees. The employees are doing a good part of the work themselves. They stay after hours at night. We have cleared out a wing of the factory. We feel that when they do it themselves, they appreciate it a good deal more. I am inclined to think that if we charged something for the paper it would be appreciated more.

MR. WILCOX (Larkin Company, Buffalo, N. Y.): I believe Mr. Coon is right. My conception of the origin of practically all plant publications is the plan of doing something for itself. If it were not, we wouldn't be here and have our jobs. If we think of a paper as a welfare item, obnoxious or otherwise, it might be all right to charge, because I think

Mr. Coon is right that along those lines anything that they get is more valuable to their paper. This is something that the company is doing, our employers are doing, and it is not something we are doing for the employees.

CHAIRMAN ELECT BOSWELL: That is a very valuable thought, and is really the crux of the whole thing.

G. A. NOXON (Ralston Purina Company, St. Louis, Mo.): I might state first that I am not an editor. I am looking at this question just from the production man's point of view. It seems to me that in art and literature we have an exception to the general rule. This is evidenced by our public libraries and our public museums. We all take an interest in art and literature; we all get something out of it even though we don't pay anything out of our own pocket when we go to these places.

I read a good many magazines. Like one of the speakers here, I pay from \$1 to \$5 for a good many of them, and others are sent free of charge. I know that some of the free magazines that I receive, such as *Business*, which is put out by the Burroughs Company, and one or two others of the like, are more valuable to me than some others which I pay for.

Good Business to Give the Magazine to the Employee

MR. LIVERS: I wonder when we are thinking of our publication and thinking of charging the employee for it, whether we are going to raise a spirit of antagonism in their hearts. Nobody yet has said anything about this, and I may be criticized for it, but I am going to say it. There is no question at all in my mind but that it is mighty good business to give to your employees the stuff that you will put in your magazine that you want them to get. It is good business, and I contend it is good business for the company to put that message across to the employee. It is mighty good business for the employee to get it. It don't cost him anything. We don't want it to cost anything. The minute you put a price on it, well, our friend here told us that 40 or 60 per cent might take it. The others have the idea that we are trying to put something over and make them pay for it, and we never reach them.

MR. ASHE: I have always been very much interested in this matter of charging. I think the whole thing comes down to a matter of economics largely, and in things of that sort if they are successful they have got to be built firmly on definite fundamental principles. If you are going to give a magazine away free to people, as so many have stressed here today, and that is going to be your medium of feeding the stuff out that you want to get over to your people, it seems to me that the proper thing to do is to give it away free.

If you are going to charge for that magazine, it seems to me that immediately it becomes the employees' magazine. The minute you charge for it you have got the situation that you are going to let the employees tell you how they want that magazine published, and what they want in it. It is their magazine. It is not the company's magazine. You have

got to choose which way you want to do it. You can't go half way on this business. You have got to be 100 per cent. You can't let them pay for it and then publish it the way you want to publish it. That is a purely economic thing. It is not going to get you any distance, because you have got everything against you, and, therefore, you have got to make up your mind, it seems to me, as to whether you are going to charge for it or not.

I think if you have something enforced that is going along 75 per cent or 80 per cent well, it is a good thing to have that the definite policy and stick to it, rather than to change and try something else. Find out what the weaknesses are and why you can't get it to go the extra 10 per cent, rather than say we will try it this way, and then the other way. The minute you make a change of policy and go from one way to another, you never get back, because the minute you have done that, you have lost all you have built up over those previous years. Those are the two ideas I have in connection with that. If you are going to make a change, you want to be awfully careful what you do.

A Third Session at the Congress Suggested

CHAIRMAN ELECT BOSWELL: The question has been asked whether we have had enough time devoted to these discussions in the program this year? How many think we ought to throw in a third session?

(All raised their hands.)

CHAIRMAN ELECT BOSWELL: That will give the Program Committee something to work on.

The members of the Executive Committee of the Plant Publications Section, (the personnel of that committee comprising the chairman of the various committees that have been appointed this afternoon, and the officers), will have a meeting on Friday morning at 9:30. We will have an announcement made in due time where it will be held. We will proceed with our discussion.

MR. CLOSE (Commonwealth Steel Company, Granite City, Ill): There is one phase of this matter of charging for magazines which I think is important and that is the type of employees. We have a steel foundry, with a great many men who are more or less ignorant, and I venture to say that if the matter of charging for the magazine were brought up, it would have to be presented to the men when they came to work probably. They would be pretty sure to get the idea then that the company wanted them to subscribe for it. If we didn't do that, we might be put in the position of seeming to force our employees to buy it, which would be very unfortunate and would spoil the whole effect. It seems to me that that sort of a proposition can't be worked out successfully. If you are going to have the right attitude toward a magazine, it is necessary, it seems to me, to give it to them.

MR. WILKINS: I think if you charge for your magazine that the reporters for your paper should be paid, or anyone else who contributes anything. If the employees' magazine is given away free, your reporters

are perfectly willing to give their services. I think you get better cooperation through a paper that is handled in that manner than you do from a paid publication. I know of one publication that charges one cent a copy. They maintain a staff of two or three girls and in order to get that one cent from the employees it costs them five cents.

I have a list of about 15 reporters. We have a meeting once a month. We have a dinner once a month. Those men sure do cooperate with me in this work. All of them are willing to give their services, and I think that is one of the vital issues in this charging. If it is a paid magazine like any other, a contributor should be paid for his services.

A Perennial Question at Every Congress

MR. RICHARDSON (General Electric Company, Erie, Pa.): This is one of the perennial questions that have always come up in any convention I have attended of the Plant Publications Section. It has been interesting to me that the preponderance of opinion has always been that it would be very unwise to charge the employees for the paper. The principal thing seems to be, in the final analysis, that when you charge you begin to compete with the immense number of periodicals that are on sale on the news stands, and the ordinary factory staff is not equipped to maintain any decent competition at all. Therefore, as has been expressed so many times this afternoon, if you have a message to get across, the best way to get it across is to hand it out to the employees, make it interesting, and you stand a very good chance that it will be read by the very people that you want to get it to.

HERBERT W. ALLEN (M. Wile & Company, Inc., Buffalo, N. Y.): Is it a fact that the magazines which charge are those published by the principal industry of a small town and that they use it as much for the town paper, you might say, as anything else? I ask this question as a matter of information.

CHAIRMAN ELECT BOSWELL: That type of magazine is put out by the sales department, I should judge, or put out by business-getters.

L. F. McREYNOLDS (The Jeffrey Manufacturing Co., Columbus, Ohio): There is another phase of this charging business that has not been brought out this afternoon. There was a time when plants, the majority of them, were so small that they didn't care whether they had a plant publication or whether they charged or gave it away. The company grew, of course, I am speaking more of mine (every company has been growing in the last 10 years) and we have been putting out *Service* since 1924. As the company grew, of course, the president or the general manager couldn't get out and get that contact. They couldn't get out and see 1,500 or 1,600 men, so they started to issue an employees' publication. I know that Mr. Jeffrey feels the same as we do, that it wouldn't do to charge for it.

In the depression in 1921, the secretary of the Jeffrey Company suggested that they discontinue *Service*, not altogether, but to make it once

every two months instead of monthly. It was taken to the president, and he said, "Absolutely not."

Jeffrey Service is purely an employees' publication. I know that Mr. Jeffrey personally gave it a lot of careful thought. It is making the Jeffrey Company one big family and we are proud of the fact in Columbus that we have the Jeffrey family. I think by charging you would lose that contact among the employees and they wouldn't feel the same about it. You can realize, of course, that in a big corporation, the president or the general manager can't go around and shake the hand of John in this department and Jack in the other, and so on. They do, however, get out once in a while. I know that we would lose the purpose of the *Jeffrey Service* if we started to charge.

FRANK L. GREENYA (Fisk Rubber Company, Cudahy, Wis.): The matter of division was discussed to some extent in the judging of the plant publications in the future. Has there been any disposition made of that particular subject? Has any provision been made for having a committee arrange to study the division or anything of that sort?

CHAIRMAN ELECT BOSWELL: I don't know whether there was any action taken at all. Have you something to offer?

MR. ALLEN: I believe they divided it into two divisions, the newspaper and the magazine type.

MR. DOELLER: It was left in the hands of the Judges Committee, whoever they may be during the coming term.

Opinions of Some of the Women Delegates

MR. GREENYA: I don't think under the present basis that the smaller magazines or the newspapers have a chance against the elaborate magazine put out by the Northwestern Bell and the others. Just as a matter of fair competition, I think something ought to be done along those lines.

CHAIRMAN ELECT BOSWELL: There are some others that agree with you.

MR. GREENYA: From the discussion back of the screens, there are plenty that agree with me on that subject.

CHAIRMAN ELECT BOSWELL: It was suggested that the ladies haven't participated in this discussion this afternoon.

Mrs. C. B. COXE (Atlantic Refining Company, Philadelphia, Pa.): In our company, our employees as a rule resent anything that shows paternalism at all. They don't like any of the things that the company does for them. They don't, however, resent the plant publication at all, because they think it is a fifty-fifty proposition. They furnish the material and the company pays the bills. The reporter is not paid. The only thing we pay for is the actual cost of the work done by the printer and the photographer and the photo-engraver. They don't consider it in any way as a paternalistic idea to have a magazine free of charge. I don't think they like to pay for it at all.

MISS BETTY C. SHORT (Barber-Colman Company, Rockford, Ill.): We have a free magazine and we have free entertainment. We have a picnic each year that the company gives to the employees. We have a 75 per cent representation at both the picnics and the parties.

We have a staff of 15 reporters on our magazine. They have three dinners a year, and they are given at cost to the reporters. The company gives us the free use of the club house for the parties and everyone seems to be very happy.

I don't think there would be that good feeling if they had to pay for the magazine. As the man across the aisle said a few minutes ago, the employees magazine is good advertising for the company; it is 95 per cent advertising for the company. I know, because I worked on a newspaper before I went into this work. I was a dramatic editor for one of the newspapers, and I know more companies through their magazines than I had ever known before. I never knew what the companies were until I started to receive the magazines. They sold themselves to me in that way. Of course, our company is small. We only issue about 3,500 copies each month. Everyone who gets one of those copies knows of the Barber-Colman Company. It does seem wrong to sell advertising to the people who give us the material for it. I agree heartily with the plan of giving the magazines away free.

ADJOURNMENT

Public Utilities Section

New Officers of the Section

CHAIRMAN: GEORGE C. A. OPP
The Detroit Edison Co., Detroit, Mich.

VICE-CHAIRMAN, ELECTRICAL INTERESTS: C. J. RUTLAND
Texas Power & Light Co., Dallas, Texas.

VICE-CHAIRMAN, GAS INTERESTS: C. HOWARD STEWART
Laclede Gas Light Co., St. Louis, Mo.

VICE-CHAIRMAN, TEL. & TEL. INTERESTS: H. L. MEADE
Ohio Bell Telephone Co., Cleveland, Ohio.

SECRETARY: HARRY M. KELLER
Northern Indiana Public Service Co., Hammond, Ind.

PAST CHAIRMAN: B. B. McCULLOCH
Bureau of Safety, Chicago, Ill.

Committees

PUBLICITY: H. F. WEBB, Chairman
West Penn Power Co., Pittsburgh, Pa.

POSTER: IVAN L. SCOTT, Chairman
Wisconsin Power & Light Co., Madison, Wis.

FIRE PROTECTION AND PREVENTION: H. B. HARMER, Chairman
The Philadelphia Electric Co., Philadelphia, Pa.

MEMBERSHIP: F. S. ARMSTRONG, Chairman
Central Illinois Public Service Co., Springfield, Ill.

ENGINEERING REPRESENTATIVE: C. R. BEARDSLEY
Brooklyn Edison Co., Inc., Brooklyn, N. Y.

COUNCILLORS:

C. B. SCOTT.
Bureau of Safety, Chicago, Ill.

H. W. MOSES
Edison Electric Illuminating Co. of Boston, Boston, Mass.

J. C. HUBBARD
Western Union Telegraph Co., New York City.

H. M. WEBBER
Illinois Bell Telephone Co., Chicago, Ill.

B. FRANK DAY
The Philadelphia Electric Co., Philadelphia, Pa.

C. E. MORRISON

Utilities Mutual Insurance Company, New York City.

HERMAN SPOEHRER

Union Electric Light & Power Co., St. Louis, Mo.

October 26, 1926

BUFORD B. McCULLOCH, Chairman
Bureau of Safety, Chicago, Ill.

THE Public Utilities Section of the National Safety Council convened in the Blue Room of the Tuller Hotel, Detroit, Michigan, Tuesday, October 26, 1926, at 9:50 o'clock, Mr. B. B. McCulloch, Bureau of Safety, Chicago, Illinois, presiding.

CHAIRMAN McCULLOCH: The first matter of business on the program this morning is the report of the officers. I will read the report of the chairman for the past year.

REPORT OF BUFORD B. McCULLOCH, CHAIRMAN

The year which closes this week has been the most successful in the history of the Public Utilities Section. To review in detail the accomplishments of the Section during the past year would, no doubt, be a repetition of the information contained in the reports of the committee chairmen which will be presented at this meeting. Only a brief statement will therefore be made in connection with the activities of each of the four committees.

Shortly after the Cleveland Convention, Mr. H. F. Webb, of the West Penn Power Company, Pittsburgh, Pennsylvania, was appointed chairman of the Publicity Committee. This was the first time that such a committee had been appointed in the Public Utilities Section and its purpose was to provide information, not only to members of the Section, but to public utility companies throughout the United States, this information to cover various phases of accident prevention in connection with the operation of public utility properties.

Through the efforts of Mr. Webb, valuable papers on accident prevention subjects have been secured and furnished to the *Bulletin* of the National Electric Light Association and to the monthly publication of the American Gas Association. These articles, which have been gratefully received by the editors and which have been credited to the publicity committee of the National Safety Council, have been the means of keeping the name of the Council before a large majority of the electric and gas companies of the country. In addition, articles have appeared regularly in the NATIONAL SAFETY NEWS. The service rendered by Mr. Webb will undoubtedly cause the Public Utilities Section to continue a publicity committee.

The Poster Committee, under the chairmanship of Mr. Harry M. Keller, of the Northern Indiana Public Service Company, Hammond, Indiana, has greatly improved the type and quality of posters reproduced monthly in the NATIONAL SAFETY NEWS. Each month, three posters have been published, one each for the gas, electric and telephone and telegraph divisions, and the demand for these posters has been an indication of their popularity and the improved quality. The Sectional Poster Catalogue, published during the last month by the National Safety Council, is the first Sectional Poster Catalogue ever to be published. The copies which are available to all members of this Section, together with the poster exhibit which has been prepared by the National Safety Council with the assistance of Mr. Keller, will undoubtedly prove of value to all members in selecting the posters most suitable to their individual needs.

To mention the work of the Program Committee, under the chairmanship of Mr. B. Frank Day of the Philadelphia Electric Company, appears to be unnecessary, as the program which you have in your hands and the papers to which you will listen during the next three days are the result of Mr. Day's efforts, covering a period of several months. Mr. Day is deserving of great credit for his part in the preparation of the program and the securing of speakers.

Remarkable Section Increase in Membership

Probably the outstanding record in connection with the activities of the Public Utilities Section during the past year, is the remarkable increase in membership. This has not been accomplished by any one person, but because of the organization which was created by Mr. Carl J. Rutland, of the Texas Power and Light Company, Dallas, Texas, who is chairman of the Membership Committee, and because of his follow-up system in connection with membership expirations, he is entitled to a large portion of the credit for our unusual record. A total of 73 companies (including subsidiaries) have been accepted as members since the Cleveland Convention, a gain of 21 per cent, while the cancellations have amounted to 16, or five per cent. It is of interest to note that 10 per cent of the new members secured by the National Safety Council during the past year have been public utility companies, and they represent over 40,000 additional employees who are receiving the services of the National Safety Council, increasing the total number of employees served by this Section to approximately 750,000.

So much for the review of the past year's service. It has been made because of a feeling on the part of your chairman that the Section is properly subject to criticism for not keeping its members better informed during the year as to its activities through monthly news letters and otherwise.

This Congress marks not only the close of a year of successful endeavor, but also the beginning of what we trust will be a greater one. The new Executive Committee which will be elected should look forward with enthusiasm to its opportunities and in the hope that this

report may contain something of value to them and something that will assist in their program of work during the coming year, the following recommendations are submitted:

1. That every effort be made to cooperate with and secure the cooperation of the Accident Prevention Committees of the Utility Associations. During the past year our Executive Committee has enjoyed a fine spirit of cooperation between the National Electric Light Association and the American Gas Association. Such cooperation was, in a measure, due to the fact that our Executive Committee contained members from each of these associations. The value of such representation lies in the fact that it avoids duplication of effort and makes available to each organization the records and reports of the other associations.

Regional Conferences Are Emphasized

2. It is recommended that, if possible, regional safety conferences be held by this Section. In planning these conferences, it may be well to take into consideration the advisability of holding joint meetings with other Sections in which are problems of mutual interest. This would apply particularly to the Electric Railway and Plant Publication Sections.

3. The supply of safe practice pamphlets on the subject "Protection of the Public," issued a number of years ago, has been exhausted, and, before reprinting, the information contained in this pamphlet should be revised in order to care for modern hazards such as those in connection with radio installation. It is recommended that a special committee be appointed for the purpose of revising the data and illustrations in this pamphlet and that this be done as soon as possible because of the requests which the National Safety Council now have for additional copies.

4. The Public Utilities Section has confined its activities almost entirely to its own Section and has thereby overlooked a broader field of education on utility safety problems within the other industrial Sections. This is a matter of policy which is of considerable importance and deserves the serious consideration of the new Executive Committee. It is possible that the engineering representative of this Section is the logical one through whom this point of contact should be established. As an example of the character of the work to be done in this connection, the revised booklet on "Electrical Equipment in Industrial Plants" should be given as much publicity as possible and an effort should be made to secure a wide distribution of this booklet among the member companies of other industrial sections. This would be a step towards educating the employees of industrial plants as to the hazards incident to electric and gas service and equipment and would tend to reduce public accidents and claims.

5. To secure any degree of success in accident prevention, it has been found necessary to concentrate activities upon one problem or subject at a time. The effectiveness of the work of this Section could undoubtedly be materially increased if such a policy were adopted in connection with the preparation of its yearly program. It is therefore recommended that a series of subjects be planned for in advance, one subject to be emphasized each month, and that this program be followed closely by the Bulletin Committee in the preparation of posters, by the Publicity Committee in the publication of papers, and by the secretary in the distribution of news letters. This would result in the efforts of the Section being confined to one subject each month, and if a series of practical and important problems in connection with the hazards of utility operation are carefully outlined at the beginning of the year, the following of such a plan will undoubtedly increase the value of the service rendered by the Section.

I will ask the Secretary to submit his report.

REPORT OF EDWIN R. DOBBIN, SECRETARY, PUBLIC UTILITIES SECTION

As secretary of the Section my report is of necessity short. During the year at the request of your chairman, his meetings of the Executive Committee were both held in New York City—one in December and one in June. Routine business, reports and discussions on the activities of the membership, publicity, bulletin and program committees, as developed in these meetings have, under the directions of your chairman, resulted in the excellent program you now have before you. The increase in membership and the excellence of the work of the bulletin committee, as shown by reports submitted, can not but make you feel that real progress is being made.

The News-letter, to which was attached a questionnaire relating to accident cost comparisons, brought in but comparatively few replies. These were routed through the chairman to headquarters for its use. The other services which your secretary rendered were negligible, it being only routine correspondence.

It is my humble opinion, if I may be allowed to express it, that your secretary should be selected from a locality near that of your chairman. This would give closer personal contact and the secretary could give better service and more of it. As it stands now your chairman has done much of the work that should have been done by your secretary—and the fact is hereby acknowledged.

CHAIRMAN McCULLOCH: I will ask Mr. H. F. Webb to submit the report of the Publicity committee.

REPORT OF H. F. WEBB, CHAIRMAN OF PUBLICITY COMMITTEE

The expansion and growth of the Public Utilities Section, National Safety Council, brought the need for an additional means of advertising the wares, and the progressive spirit of the Sectional officers caused the formation of a Publicity Committee. The function of this committee hardly needs explanation or description, since the activities were mainly confined to satisfying a normal desire of executives, engineers, foremen, and others interested in the prevention of accidents for safety information directly applicable to the public utility industry. The quest of desirable manuscripts containing substantial information directly concerning the promotion of greater safety in the electric and gas industries was not an easy task, but your committee feels that it was fairly successful, at least in supplying continuity of publication.

Altogether nine manuscripts were received, eight of which have been published in such journals as the NATIONAL SAFETY NEWS, *N. E. L. A. Bulletin*, *American Gas Association Monthly*, and *Safety Engineering*. One manuscript has been held for near future publication. As a matter of record, this report contains a brief recapitulation of published manuscripts and the names of contributors for prevention of possible duplication.

SUBJECT	CONTRIBUTOR	PUBLICATION
Public Safety Education	E. F. Tucker, Coun- ties Gas & Electric Company	NATIONAL SAFETY NEWS
Hydro Electric Acci- dent Hazards	T. C. Stabley, Penn- sylvania Water & Power Company	NATIONAL SAFETY NEWS & <i>N. E. L. A. Bulletin</i>
Analyzing Accidents in the Electric Industry	N. L. Devendorf, Con- sumers Power Com- pany	NATIONAL SAFETY NEWS <i>N. E. L. A. Bulletin</i> <i>A. G. A. Monthly</i>
Safe Handling, Trans- portation and Storage of Explosives	J. W. Koster, E. I. du Pont de Nemours and Co.	NATIONAL SAFETY NEWS <i>N. E. L. A. Bulletin</i> <i>Safety Engineering</i>
Industrial Housekeep- ing	Leo D. Woedtke, Fred T. Ley & Company, Inc.	NATIONAL SAFETY NEWS <i>N. E. L. A. Bulletin</i>
Mental Aspects of Acci- dents	Dr. Edwin M. Cham- berlin, Boston Uni- versity	NATIONAL SAFETY NEWS <i>N. E. L. A. Bulletin</i>
Safety in Tower Line Construction	H. S. Brubaker, Mo- nongahela West Penn Public Service Corp.	NATIONAL SAFETY NEWS <i>N. E. L. A. Bulletin</i>

The Trend of Accident Prevention in the Gas Industry	M. L. Mix, Peoples Gas Light & Coke Company	NATIONAL SAFETY NEWS <i>A. G. A. Monthly</i>
Selling Safety to Gas Men	F. E. Drake, Lynn Gas & Electric Company	NATIONAL SAFETY NEWS <i>A. G. A. Monthly</i>

Your committee would like to express our appreciation of the cooperation on the part of the author contributors listed in this report.

An additional work accepted and accomplished by the Publicity Committee was the re-edition of "Personalized Safety" pamphlet, published by the NATIONAL SAFETY NEWS to more exactly fit the Sectional need. A number of the form letters contained in this pamphlet were revamped, and several were removed for replacement with other selected letters. The completed pamphlet which contained 15 form letters suitable for executive use in promoting safety interest among foremen, was accepted verbatim, and republished by the NATIONAL SAFETY NEWS for distribution to public utility members.

Your committee would recommend that the Publicity Committee be continued as a definite part of the Public Utilities Sectional activities for there is no discounting the value of continuous advertising attack.

CHAIRMAN McCULLOCK: Mr. Day, have you anything to report in connection with the program activities?

MR. DAY: Mr. Chairman, there is nothing additional to report. The program has been printed and placed in the hands of each member. I desire, however, to express my grateful appreciation of the assistance given by each member of the executive committee in the work of preparing the program, and I would like also most cordially to thank each one who has so willingly agreed to prepare a paper. Those papers involve considerable work in the life of busy individuals, and I would like to have them know that as chairman of the committee I very much appreciate their kind assistance.

CHAIRMAN McCULLOCK: I will ask Mr. Keller of the Northern Indiana Public Service Company to submit the report covering the activities of the Bulletin Committee.

REPORT OF H. M. KELLER, CHAIRMAN OF THE POSTER COMMITTEE

The present Poster Committee of the Public Utilities Section has prepared three posters per month since the last Safety Congress at Cleveland. This committee consisted of H. D. Harper, Kansas Gas & Electric Co.; W. H. Oelschewsky, Western Union Telegraph Co.; Ivan Scott, Wisconsin Power & Light Co.; W. H. Mulligan, Hydro-Electric Power Commission of Ontario, Canada, and H. M. Keller, Northern Indiana Public Service Company, as chairman.

Of the three posters issued each month, one dealt with hazards encountered in the gas industry, one in the electric, and one in the

telephone and telegraph division. Considerable time and effort has been spent in attempting to make each and every poster of this section one which would convey to the workmen such an impression that the picture would not be forgotten.

The National Safety Council recently printed a four-page catalogue containing miniature reproductions of some of the posters issued during the past year. This is the first and only sectional catalogue they have published and copies are available for everyone.

Special credit is due the Peoples Gas, Light & Coke Company for their splendid cooperation in this work, although none of their representatives were appointed as members of this committee. We also wish to express our appreciation to the Texas Power and Light Company, Western Union Telegraph Company, By-Products Coke Company, Wisconsin Power & Light Company, and the Hydro-Electric Power Commission of Ontario. All of the photographs used were supplied by these organizations, and the Northern Indiana Public Service Company.

Posters Depicting Hazards of Meter Men Needed

Your committee hoped to issue a number of posters dealing with hazards encountered by meter men, and took the matter up with the N. E. L. A. meter committee. In April suggestions for posters of this type were forwarded to them, asking for comments, but because of the delay in replying to our correspondence, only two such posters were issued. We therefore recommend that this be given consideration by the new Bulletin Committee.

A number of valuable suggestions have been received from various sources which can be used to good advantage during the coming year, but everyone here should take it upon himself to assist the new committee by sending photographs or suggestions to the chairman. If you can not send pictures, simply set down your ideas in writing and arrangements will be made elsewhere to photograph them.

This sort of cooperation is just as important as any other activity in which you may participate to aid in the prevention of accidents, and I can assure you that such assistance will be greatly appreciated by both the Poster Committee chairman, and the National Safety Council. As Mr. VanBrunt stated last year, "The Council can not get out the posters and the chairman of the Poster Committee doesn't amount to a tinker's damn, unless he has your assistance." So let's all get behind this proposition and help, not so much to save the chairman's reputation, but the reputation of the Public Utilities Section. It is the best now—and we want to keep it on top.

CHAIRMAN McCULLOCH: I am very sorry it is impossible for Mr. Carl J. Rutland, of the Texas Power & Light Company, to be present to report in person the progress made by the membership committee of this Section. I want to give you an idea of the extent of the organization which Mr. Rutland accomplished. I believe it is the best membership record ever made by any Section in one year. Mr. Rutland divided the country into 14 geographic divisions, and appointed a chairman in charge of each.

It was Mr. Rutland's intention to introduce personally the representatives of all the new companies which have been taken in since the Cleveland convention, but because of the delay in starting our program this morning, I am afraid we shall have to eliminate that. As you know, there are 73 companies on which we would have to call for representatives and it would take more time than we can allow this morning.

On the nominating committee to nominate the officers of the Section for the coming year, I am going to appoint Mr. Harry M. Webber, of the Illinois Bell Telephone Company, of Chicago, as chairman, Mr. Harry J. Burton, of the Consumers Power Company, Jackson, Michigan, and Mr. Harmer, of the Philadelphia Electric Company. This committee will submit their report at the beginning of our session tomorrow morning.

The first paper on the program this morning will be presented by Mr. C. R. Beardsley, engineer of station construction, of the Brooklyn Edison Company, Brooklyn, New York.

Mr. Beardsley has been very active on the accident prevention committee of the National Electric Light Association, has made a thorough study of this subject and is well qualified to present a paper to us this morning.

SAFEGUARDING OF WORKMEN DURING CONSTRUCTION, ALTERATION AND INSTALLATION OF POWER HOUSE EQUIPMENT

C. R. Beardsley, Electrical Construction Engineer, Brooklyn Edison Company, Inc.

It is hardly necessary to answer the question, "Why do we need to safeguard?" It is still true that in bravado the boy is father to the man. Years must elapse before the average workman can be educated so as not to feel a little ashamed to admit a fear of hazards, especially those inherent in his line of work, and with which he is contemptuously familiar. Pride in skill often leads men to incur risks that should not be taken. Caution and care of self and fellows grow with advancing years. Acquisition of family responsibilities often steadies a man into more careful work.

Study of accident records of New York State and the Province of Ontario, including more than 100,000 cases, shows that the great majority of accidents and the high frequency rates occur to men under 30 years of age, who are liable to be more careless. The progressive utilities have recognized their responsibilities and strive, with increasing interest of executives and officials, to prevent accidents. Our assignment is to answer "How?"

The responsibility for elimination of physical hazards, for selection, placing and instruction of workmen, for correct application of holdoff system in live stations or on steam lines, for enforcement of other safety rules, must be fixed.

Regardless of the nature of safety organization which obtains in any company, the man in authority in the field, to whom workmen or sub-

foremen look for direction, seems to me to be the logical selection for this responsibility. His authority over men and movements is essential in securing safe working conditions.

In power house construction and alteration, there exist some obvious hazards. The accidents they cause are so frequent and severe that only the most callous attitude of mind can ignore and permit their continued existence. Not long ago, I heard a building construction superintendent argue that railings and guards for open wells are worse than useless, because they tend to make men less careful. I may add that this man's record of accidents was frightful, and together with other causes, necessitated his being superseded, whereupon the job record was sharply improved. I believe the time is rapidly passing when a superintendent, however able and experienced, will be considered effective and thorough if he allows the continued existence of physical hazards.

Operating utilities, the larger general contractors, electrical and steam-fitting contractors and others, have recognized the value of securing reputation for low accident experience, as a builder of their own personnel and an actual saving in expense. It is to be regretted, however, that many smaller contractors and foremen, too often blinded by the immediate measurable cost of hazard removal, overlook the intangible loss of efficiency due to slowing up of work and the man power loss to industry and suffering caused by accidents. Such people selfishly rely on their compensation insurance coverage for their own protection, and fail to rise to the moral obligation of protecting their men.

Order on Job

Among the obvious hazards worthy of special mention is disorder and the confusion of a newly organized job. A careful check of accident reports on jobs aggregating several million dollars in construction expense has proved conclusively that the higher frequency of accident occurs in the early stages of the work. The blocked aisles and littered walkways, concrete form stripping and brick masonry, handling of large quantities of materials of all kinds, including heavy pieces, falling materials, density of traffic, unfamiliarity of new gangs with the job, all tend to increase frequency of accident. This dictates to a careful foreman the necessity of just as careful planning for safety as for construction progress, and he must not wait until the job is in progress, when everyone is too thoroughly engaged by other activity to worry about hazards. Good housekeeping is one of the best safeguards. Good housekeeping can be secured by planning the arrival of materials to the job on a minimum headway in advance of actual needs, and the immediate disposal of crates and packing materials.

It will therefore be sufficient merely to call attention to the following list of physical hazards, assuming that any progressive and humanely directed utility will provide inspection and necessary cost of removal.

The question then arises, having removed physical hazards—have we entirely eliminated accidents? It is a happy official who can answer in the affirmative.

If accidents continue to occur after removal of physical hazards, then we must look to the more intangible causes and devise preventive measures.

Analyses of nature of work and actual accident occurrence often disclose unsuspected danger points, but more frequently lead to the workmen themselves as a responsible contributing factor. It is therefore very productive to engage in a study of the workman, his habits, his mental processes in normal pursuit, but especially his reactions under strain and pressure incident to rush and overtime work, in emergency, under bad weather or temperature handicap, on "blue Monday," after an indigestible lunch, after a row with his mother-in-law, or a plate-throwing contest with his "storm and strife." Ridiculous and irrelevant as it may appear, we have traced some accidents in which mental aberration was the immediate cause, to some unhappy condition in the home which prevented the workman from concentrating on his work.

Ascertaining Health and Mental Condition

It is difficult to ascertain the existence of and safeguard against such conditions. Friendly, confidential relations between foremen and men, and between officials and foremen, help in bringing to light conditions that might result in confusion. I have known a man to be shifted to less hazardous work or sent home because of impending fatherhood, or because of whooping cough among his children which caused him loss of sleep.

Safeguarding against such causes must commence at time of employment when physical examination may disclose defects in eyesight, hearing, nerve and muscular control, digestion, teeth, general health, etc. Further examination in home conditions after employment, by visiting nurses, will disclose other conditions which may predispose to accident.

The Brooklyn Edison Company, of which I am an employee, makes a determined effort, at the instance of its president, Matthew S. Sloan, to eliminate overtime work. Although much of the work in our group of 750 to 1,000 employees associated in electrical construction must be scheduled over week ends or at night, for the last two years, during a tremendous construction program, we have incurred less than 2 per cent of annual overtime referred to the total normal working hours of the group. No individual is allowed to work in excess of 10 per cent annual overtime. Formerly, the group overran as high as 25 per cent, and individuals as high as 50 per cent and 100 per cent for long periods, in accumulated overtime hours.

Certainly the men now have more time for recreation and home life, and it is a fact that wives appreciate the regular hours of work. Since this reduction of overtime and a similar reduction in accidents are coincident, I am convinced that it is one of the heavily contributing causes of the improvement.

As men are hired or advance in ability to the point where they may be assigned more hazardous duty, it is not sufficient to expect them to assume the new responsibilities and immediately be cognizant of all

dangers. They should be coached and watched for a time by someone who has been through the mill and can be depended on to point out dangers.

In this training more than mere rules and obedience to them are necessary, more than mere rehearsal of mechanical moves. As an example, let me cite one feature in the test routine performed by the Electrical Construction Bureau, Brooklyn Edison Company, incident to placing cable and apparatus in service.

High voltage tests are applied by use of stationary sets in generating stations or portable trailers, containing Kenotron Test Sets capable of producing D. C. voltages as high as 250,000 volts. Standard test on 27,000 volt cables is 135,000 volts phase to phase, or 95,000 volts to ground for five minutes. On long cables when insulation is good a heavy condenser charge is built up. On completion of test it is therefore necessary to thoroughly discharge cable and dissipate stored energy by grounding, before any further connections can be safely made. The difference between mere mechanical performance and an intelligent conduct of test lies in the understanding of what constitutes thorough discharge of energy and the reasons for the routine necessary. To connect to ground for a few minutes is not sufficient, for the reason that the cable insulation "soaks up" a charge with an apparent mechanical stressing which does not relieve itself even after voltage has been reduced to zero; that is, the voltage of the charge will again build up after removal of ground, to a part of original value. It requires at least 15 minutes of grounding to relieve the stressed dielectric and dissipate energy. Therefore, a tester may safely remove test leads only while they are grounded and by use of an insulated handle.

Supervision and Esprit De Corps

Recently a large manufacturer succeeded in effecting a considerable reduction in the supervision expense in his factory by means of a higher degree of training and responsibility fixed on group foremen. Among the old New England metal and machine trades, mechanics and foremen combined manual dexterity with knowledge of craft so that less supervision was required than with the lower class employee of the present day. Largely automatic operation has succeeded the old skillful manual worker.

The analogy can be drawn in the utility field today in construction work. Does the utility group obtain high grade supervision, low turnover of skilled field labor, *esprit-de-corps*, and personal interest of executives and officials in the field man? If the work is to a large degree contracted out, it is difficult to build up these aids to safety and efficiency, as the contractor and his supervising group act as a barrier and the field man has no direct responsibility to the utility. On the other hand, if opportunity exists to maintain and train a group of utility employees, whose term of employment is reasonably continuous and turnover low, the effects of training and spirit of cooperation are evident in reduction of necessary supervision.

Contractor foremen on lump sum work have difficulty in interesting themselves in safety measures. On percentage work, they often feel precautions are at cost of progress, although experience should indicate the reverse.

Among hastily assembled groups of contractor men there is a lack of the kindred personal feeling that grows in a group of men who have worked together for some years.

Results in accident occurrence in a large group of contractor men as compared with results in similar work of equal volume performed by utility employees shows a frequency much lower in the utility group. Severity can not be compared, due to lack of data on the outcome of contractors' accident cases.

For greater safety it is necessary to limit contractors to "dead station work" and turn over work in operating stations or operating parts of stations, to utility construction forces thoroughly familiar with the system and rules, and trained for accident prevention.

Designing for Safety

With the increasing concentration of power, the results in accidents are of increasing scope and magnitude. Designs must not only be calculated to produce K. W. hours or cu. ft. of gas at low cost and with continuity of service, but must allow for safety to operating and construction forces. Mishaps, which a few years ago would have been confined to small area, may now involve adjacent busses and apparatus, due to metallic conducting vapors given off in large volume from short circuits fed by larger power units. It would be interesting to compare the number and seriousness of accidents in which the effects are due only to heat and gases, and without actual contact with current carrying parts, with accidents caused by contact and shock alone.

In my experience, by far the greater frequency and severity are due to heat effects. I would be very glad to have the comment of others in this respect.

A further consideration is that in confined spaces, unless prevented, oil vapors may mix with air in proportions such as to form explosive mixtures. Design should prevent this possibility by ventilation, or scavenging. This ventilation should also be designed so as to give quick outdoor discharge of conducting gases and vapors caused by short circuits, before they cause short circuits on other live parts. Sectionalized switch groups, phase separation, etc., have a marked effect on limiting the scope of such accidents.

The amount of expense warranted for prevention of possible accident can only be determined by estimate of probability of accident. Such estimate is often largely conjecture. Difference of opinion may readily exist between designers and those who have responsibility over men who are subject to hazard. Experience indicates it is well to err in the direction of being safe, rather than sorry, which I am happy to say is the policy of the executives in my company.

It is safe to say that there are few if any executives who are not desirous of eliminating accident. However, the desire itself is not sufficient to achieve results.

For several years the unflagging personal interest of President Sloan and his efforts as chairman of the Brooklyn Safety Council have inspired other officials of the Brooklyn Edison Company to constant care and gratifying success in reduction of accident occurrence.

Happily, few executives are so wholly engaged in pressing financial problems that all other matters assume a money complexion. Such executives must first be impressed by statistics of compensation and medical cost, consequent damage to apparatus, interruptions to service and consequent loss of prestige.

If there are any such executives who, while desiring to limit accidents, do not take personal interest in accident reports and preventive measures, these results are liable to prove unfavorable.

Progressive utility men have wider horizons. In order to protect their policies, they realize that the best medium is a contented, well-trained personnel. Properly harmonious relations with consumers, on which stability and prosperity of utilities must depend, begin with the "gang" as an integral part of the population served. Attention of executives has therefore been directed to a greater extent than heretofore to the general make-up, training, living conditions and welfare of all their employees. This closer personal interest in the men should be the means of a changed viewpoint, a much greater sense of intimate loss, when men are taken by accident.

Executives Should Have Personal Interest in Men

Too long we have received accident reports with the comment "Too bad! Jim was a good man! Now, who will get his job?"

Too little have the responsible executives taken personal interest in the results to Jim's family; how the widow will manage; what kind of education the children will receive.

It may be argued that the executive should be shielded from this sympathetic strain and loss of time. I say he should be shielded by preventing the accident; that a part of the necessary safeguarding is that he himself maintain a continual personal interest in prevention; that the best way to keep up that interest is to know intimately the tragic results.

It is at least as important that an executive check the effectiveness of his supervisors of men in their accident prevention work as in their efficiency of production. Continued executive interest is the required spur in either case.

My challenge to you men interested in safety, then is: "Does safety work in your company cease, so far as your executives are concerned, after appointment of a safety director, appropriation of a few paltry dollars, and the securing of compensation and liability insurance?" Or do your executives evince a continued interest that impels a study of each accident, suggestions for preventatives, a follow up of the men or

the families they leave, and a greater helpfulness even than the law requires, so that they continuously inspire the whole personnel to conscious safety effort?

When this spirit is general we will have the beginning of real accident prevention. The spirit of the executives will color the thought and actions of the whole personnel of the industry, and safety will be a dominating movement.

SOME HAZARDS IN POWER STATION CONSTRUCTION

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| 1. Caveins. | 15. Flying chips. |
| 2. Unsafe walkways or runways. | 16. Flying ashes, coal, dust. |
| 3. Unsafe or slippery floors. | 17. Operating machinery, gears, belts, chains. |
| 4. Littered floors. | 18. Upturned nails. |
| 5. Steep stairs. | 19. Projecting nails, wires, slivers. |
| 6. Unsafe scaffolds or ladders. | 20. Unguarded fire pots. |
| 7. Open holes or stairways. | 21. Hot compound. |
| 8. Low head room. | 22. Fires. |
| 9. Low clearance (electrical or mechanical). | 23. Steam pipes. |
| 10. Poor insulation. | 24. Acids. |
| 11. Live busses or circuits unguarded. | 25. Edged tools. |
| 12. Poor lighting. | 26. Defective tools. |
| 13. Cranes in use. | 27. Gas, fumes, steam. |
| 14. Falling materials (improper slings, etc.). | 28. Handling pipes, rods, lumber. |

CHAIRMAN McCULLOCH: The discussion of Mr. Beardsley's paper will be led by Mr. J. F. Connor, safety supervisor, U. G. I. Contracting Company, Philadelphia, Pennsylvania.

DISCUSSION OF MR. BEARDSLEY'S PAPER

J. F. Connor, U. G. I. Contracting Co., Philadelphia, Pa.

Mr. Beardsley used a phrase about temporary checking up. That brought to my mind a little story that I read recently in reference to an electrician and his helper running a line, and through some reason or other he forgot which end of the circuit was the positive and which was the negative, so he called to his helper: "Hey, Bill, get hold of one of those lines." Bill got hold of it. Then he said, "Do you feel anything?" "No." He said, "That is good. I forgot which line it was. Now be careful, don't get hold of the other one; it has got 6,600 on it."

Mr. Chairman, I have not prepared any paper on this discussion. Mr. Beardsley has presented his subject in such an able manner that it hardly appeared necessary to go to the trouble of preparing a paper, but

I do want to emphasize some of the points which he has brought out. Stress has been placed on having the field engineer responsible for the safety of the men.

To my mind and from my experience I feel that the greater responsibility is in getting the executive so thoroughly imbued with the safety vision that by reason of that feeling he lets it be known all down the line. Now, unless we have the executive interested, that is, the executive directly in charge of the field officer or the field engineer, we find that the field engineer is not going to take the responsibility. He feels that it is an added expense to his work. He is afraid of being jacked up, and he is not going to interest himself to any great extent. His attitude is then reflected in the foreman, and from the foreman on down the line to the workmen.

That there is a crying need for reduction in the accident frequencies in the construction end can not be gainsaid. We have felt that in Pennsylvania in our Department of Labor and Industry for a period of a couple of months. They took their inspectors from all other work and centralized them right on construction work. I will just give you a few figures. In Pennsylvania in 1925 we had 245 fatalities in the construction end, which represented 12.2 per cent of the accidents occurring in the industry. We had 20,008 non-fatal accidents in the construction work, which represented 11.5 per cent of the total industrial accidents. During the first six months of 1926 we had 106 fatalities, which represents 10.9 per cent, and 9,067 non-fatal accidents, which is 10.7 per cent of the industrial accidents.

Most Accidents Due to Minor Causes

The majority of these fatalities and non-fatal accidents are due to very minor causes: falls from scaffolds and ladders, falls from buildings, falls from runways, floors and stairs and falls from other elevations, falls through floor openings and into excavations, and falls on the level. That means congested passageways, objects lying in the passageways, causing a man to slip. Now, you can see that most of those conditions can be readily taken care of without any appreciable expense. All that it requires is that the field engineer or superintendent be so imbued with safety that he is supervising the construction all the way through.

Mr. Beardsley mentioned that it is hard to control sub-contractors where part of the contract is let out. I agree with him in that. It is very hard, but a way to overcome that, I think, can be found. In most contracts we find a clause in which the sub-contractor is to indemnify the principal contractor or purchaser, or both, in the event of any damage which the principal contractor or purchaser will be required to pay on account of any damage caused by the sub-contractor. That is a very good clause for protecting the principal contractor and the purchaser, but why not insert in the contract that the sub-contractor shall perform his part of the contract with the reasonable care for the protection, not only of his own men, but of the other workmen on the job?

That can be readily incorporated, and with that clause in the contract this will give the field engineer the authority to supervise the method in which the sub-contractor does his work. It has been our experience, the same as Mr. Beardsley's, that unless you have some means for controlling the sub-contractor, all he thinks about is getting through his end, regardless of what hazards he exposes other workmen to on the job.

Another important feature in any construction work is good "house-keeping." That is the guarding against ordinary perils, or the guarding of hazardous conditions. They can be taken care of, and I know it to be a fact that if those two features are looked after it will bring about a material reduction in the accident frequencies.

Cautious in the Employment of the Applicant

Then the field engineer must go a little bit further. He must be watchful in the employment of the men, not simply take a man on because he wants a man to work, but in talking to the prospective workman, size him up, find out how his eyesight is, whether he is subject to any fainting fits, or anything which plays an important part in accident frequencies. We have overcome that in some of our large operations to a great extent by subjecting all employees to a physical examination, not merely on entering the job, but sometimes every two weeks; or if a man comes to the doctor for treatment for some minor injury, the doctor inquires then casually as to what other conditions he might have which might lead us to believe that he was not a safe man to have on the job.

Then again, no workman should be required to go into any hazardous location without being first apprised of the hazards involved in it. I say that because only recently I saw a painter painting guard rails around live installation that was carrying 110,000 volts. Several years ago we had a painter doing a painting job around lightning arresters, and the tip of the paint brush, as he was getting along the inside of the guard rail, came close enough to form an arc across, and the man was killed. Now, we make the point that if painters are going into any live installation to do any work, a competent electrician be right on the job with those painters. It is an extra expense, but it pays.

If a man is going, say, into the purifier house of the gas works, the man should be apprised of the danger; otherwise he might strike a match or carry some other exposed flame. He might get away with it the first or second time, but he may go in there another time when there happens to be an explosive mixture in that compartment or room, and we would have an explosion that would cause a very serious interruption to service; just the same way as the short circuiting of some circuit may cause a serious interruption, and which could be guarded against by the man being properly instructed before taking up that line of work.

In spite of all of these hazards that we have found in the construction work, I dare say that if any of you men would go on any construction operation, the hazards would be self-evident to you. I am speaking of that generally, but of course I know of many instances where the safety

program is being carried through with considerable force. But unless the executive is sold on the safety movement, he can not get the field engineer to give his best interests. Therefore I say that if we are going to get the results in this prevention of accidents in construction work, or any work, we first have to get the executive so thoroughly imbued with the subject that his instructions to his subordinates will demonstrate that the safety program must be carried out to its fullest extent. Unless you have that cooperation from the head, we are not going to get the cooperation down the line, because the men below are going to be governed by the attitude of the man in charge of the work.

CHAIRMAN McCULLOCH: Mr. Beardsley's paper shows a list of hazards in connection with power station construction that I believe is worth taking the time to read. It is a list of 28 hazards, and it may help in connection with the discussion of this paper.

Now our time is limited on the discussion of this subject, but we can devote a few minutes, so let us make it snappy.

H. F. WEAS (West Penn Power Company, Pittsburgh, Pennsylvania): Mr. Beardsley brought out some very interesting things about the mental condition of the men. That certainly does produce a good many accidents among electrical workers. I think there is another thing that perhaps some of us may have overlooked, and that is that a good many accidents come perhaps from over-ambition on the part of young workers.

The Too Ambitious Man is a Dangerous Employee

Last year we built a very large outside steel substation structure. Several young men in the gang were very ambitious and they wanted to climb. They were given positive instructions that they would not be allowed to climb under any circumstances. But when the station had been cut in, and there was some power on top in the buses, especially, the foreman, who was an experienced man and a very safe worker, took his entire gang down underneath the concrete platform to do some work. He thought he had them all, but unfortunately he did not. This young ambitious boy saw a block and fall hanging up in a steel structure and he knew that had to be removed. It was a job for a trained man to remove it, but he waited his opportunity, and when this gang was under the concrete platform, he proceeded to climb that structure. When he got up on some of the diagonal lattice bracing, unfortunately it was wet, he slipped through and fell directly on a 25,000 bolt bus.

Now to add to the trouble, just as soon as the men rushed up there, a young cadet engineer who also had no business whatever climbing structures (and he knew it), in the excitement he shinned up that steel structure like a monkey and in a few seconds was on an adjacent bus that was also energized, and within a few seconds two men were dead. They could not be revived. There is a case of over-ambition, and I think that is a thing that should be watched out for with these younger fellows.

To make it brief, as Mr. McCulloch suggested, about three weeks ago down at another of our power stations in the outside structure, a young fellow was killed who had no business climbing and who had been given

definite orders that he positively could not climb, because he was inexperienced. Some men were to do some work on a dead part of the structure. It was only energized on the very top. It was perfectly safe, that is, to men who were experienced. This young man came to the foreman and said, "I would like to climb up and help those fellows there." The foreman said, "You keep down from there. You have no business there." Then he went around and started to walk to the cage, and before anybody could see that young fellow, he had climbed to the top of the structure which was charged with 66,000 volts, and you know what happened. These are two positive cases of over-ambition on the part of young workers. You have got to watch those young fellows, and not let them get too ambitious.

Many Young Men Are Over Ambitious

Mr. MOTT (Illinois Bell Telephone Company, Chicago): I wish to verify what Mr. Webb has said. He is talking, I presume, more or less about steel structures. When a young man comes before me, and is over-ambitious, and he falls from a pole, in nine cases out of 10, I get hold of him and sit down and talk to him, and he says his spur cut out. If any of you young fellows know about climbing, you know there is no such thing as a spur cutting out if you are careful. "How long have you been climbing?" "About two weeks." He tries his utmost to impress me with the idea of how fast he can get up and down a pole. A boy climbing two weeks tries to hasten it, tries to be rapid in climbing a pole! I find a vast number of cases of that. A young man has not been properly instructed, or does not know about the spurs cutting out. The young man that I have to contend with is the fellow who won't use one of our ladders or go to the trouble of getting it. He goes and borrows almost any kind of a ladder.

Mr. PACKARD (Connecticut Power Company, Middletown, Connecticut): Almost all construction accidents result from doing something which should not be done or from following an improper method. The main reason for that, in the opinion of many of us in safety work, is improper assignment. Your construction man, be he contractor or central station man, is faced with a tremendously difficult problem. Oftentimes he must build up a big organization, build it up quickly, and get it functioning quickly. The result is improper assignment of the new help that is taken on. Switchboard operators are put up climbing steel structures and vice versa. The men are doing things for which they are not fitted either mentally or physically, and that, to my mind, is one of the biggest things we have to contend with on construction work.

An interesting method has been followed by some executives. In connection with Mr. Beardsley's plea for executive attention to these things, I know of one company in the east which lost an old employee whom they valued very highly. This old employee had been very instrumental in the safety work of the company, yet he was killed in a very silly accident. In order to perpetuate his memory, the company set aside a fund of \$75,000. That fund is distributed among employees who are exposed to

electrical hazards, provided there has been no fatal accident in that group of employees during the six months immediately preceding.

This income is divided into a number of shares, depending upon the number of employees involved, and the distribution is made. An employee who is a first class lineman, for instance, would get ten shares, a ground man might get three shares. That is, the extent to which each electrical employee participates in the distribution of this money, depends upon the degree of his exposure. The result has been that every ground man watches the lineman on the pole, and if that lineman does something that the ground man knows from his safety rules and instructions is wrong, he calls the lineman's attention to it. It has practically eliminated that old spirit of bravado among electrical workers in that particular company. It has been going about three years now and the accident record looks a whole lot better. Whether there is any relationship between the improved accident record and this so-called "McCauley Foundation" nobody knows, but we think there is.

CHAIRMAN McCULLOCH: We are going to make a slight change in the program because one of our speakers is required to go into the electric railway session to take part in their program, so instead of calling on Mr. Gillette first, we are going to have Mr. James Harmon, of the Kentucky Utilities Company, Louisville, Kentucky, describe to us one way to "keep from getting old."

ONE WAY TO KEEP FROM GETTING OLD

James Harmon, Kentucky Utilities Co., Louisville, Ky.

I think the time has come when all well-regulated utilities companies have attempted to standardize on their safety work. I think most every utility company and railway company conducts its safety work along about the same line. Some man will get up and say he believes that the accidents occur to the new men. Another will say that all of their accidents have occurred to the old men. The other day an engineer in our plant, who has been there for 12 years, went out to pull a fuse on a circuit and failed to pull the disconnect and was burned up. Now, he would not have let anybody else do that in his organization, but he does it himself. I want to show you that just as a comparison. You might expect it sometimes to the old men.

Some accidents have occurred on our property recently to men who have been supervisors, who have held the position of superintendents. They go out and do things they know absolutely are wrong, and they admit they know they are wrong. They do not have any excuse for it. They could not tell you why they did it. So, I say all utility companies have standardized to a certain extent on safety work. That is the proper thing to do. But even at that, with all the energy and all the efforts that you put forth, and all the support that you have from your executives—and I think most of them have the backing of their executives—even at that there is always something happening which you wonder at.

The subject assigned to me is "How to keep from getting old." I am going to refer to an accident on one of our properties. I should have a map to show you the contour of the ground where this accident occurred. This is in the mountain district of Kentucky down near Harlan, Kentucky. Every once in a while somebody wants something done real quick. The regular construction gang is out building a transmission line and they are away off. They do not want to bring them in for this little job, a week's job, we will say, and you only send your foreman out to do that work. He gets out in the community in which he is going to do the work. Maybe he picks up one lineman or two linemen. It is not really work or energized equipment but it is work in close proximity thereto, and he picks up his own men in that territory. All he wants to know is whether they can work, usually, and in this particular case this was a very steep mountain job.

Building a Line Up the Mountainside

They had built a line this way. They go up one side, they build the line and complete it on top of the mountain. What they are doing is stringing a line under a 33,000 transmission line. They come up and get on top of the mountain and they are going down. The men working can't see one another 20 feet apart on account of the contour of the ground and the underbrush they have to work through. It was necessary to use horses and mules and men to take the slack out of the line. They were laying it on the ground getting ready to put it up on some cross arms under a 33,000 volt line.

In this particular instance they had a foreman on the job. We had a superintendent on the job, or he was supposed to be on the job. We had a general superintendent who had visited the job just previous to the accident, but at the time the accident actually occurred, none of these men was there, and there was no one there to supervise the work. The men who were doing the work were untrained men. They were qualified to do the work they were doing, but they were not experienced enough to know the danger which they were working close to.

In coming down this mountainside half way down they had a team of horses or mules which were pulling the slack out. Down a little further four men were stationed on a turn, and they were also pulling out the slack. A little further down the mountainside were a mule and two boys. What they had been doing and what their instructions were, when they were stringing this line and laying it on the ground, was that it was necessary to use block and tackle to pull the slack. It was necessary to fasten the block and tackle to the base of the pole. They did that all along until, because of the contour of the ground, they put the block and tackle up the side of the pole instead of putting it at the base of the pole. One of the men later said that the reason he put it there was that the boy who was driving the team told him to do it.

At any rate, the fellow put the block and tackle on the pole and he hollered to the boy to take up the slack. You can imagine, on account of the transmission line coming down like that, when he took the slack up,

it pulled the line right up into the 33,000 volt line. That is the thing briefly. It killed three men, injured two, and killed a couple of horses. It took all day to find out how the accident happened. Every fellow was protecting the other fellow. The real fact is that there was not any experienced men on the job. The foreman had gone away and had not left proper instructions. I said to the lineman on the job at that time, "Didn't you know better than that? Aren't you a first class lineman?" He said, "No, I am a second class lineman." I said, "What do you mean by a second class lineman?" He said, "I don't draw as much money as the other fellow."

I mention that to show you that we all sometimes feel that our safety organizations on our property are the best. We sit down comfortably and feel at ease and think that we are doing everything that we ought to do, and off in some isolated place something like this happens. We have absolutely fallen down on the job. We have not even touched the places we ought to touch.

You go ahead and hold your local meetings in towns where you can get a lot of employees who attend regularly and take an active part, but the fellow you do not attend to is the fellow out in the hills, whom you can't reach unless you have somebody go out and personally interview him. The time has come when you have to give more attention to the places where there are not so many men and not so much attention given as in meetings where we make speeches and make them all feel good.

I feel that the time has come where you have to do more personal work in your organization and not so much in a general way, because the accidents which occur on our properties are to fellows who have been employed to do work which they know nothing about. They have not been properly instructed and therefore they are not qualified to do the work which they are supposed to do. The foreman also is the fellow you have to check up pretty carefully and often not only from his conversation, but by your observation. It is a most important thing, in my opinion, because the accidents are not always occurring to the new fellow who has not been properly instructed. It is sometimes the fellow who has been properly instructed and the fellow who knows better and still goes ahead and does it.

CHAIRMAN McCULLOCH: Mr. W. F. Gillette, General Operator of the Detroit Edison Company, will give us another means, for substation operators, to keep from getting old.

A SUBSTATION ACCIDENT

**W. F. Gillette, General Operator, The Detroit Edison Company,
Detroit, Mich.**

The education and training of operators for substation work is one of the important problems confronting the modern public service corporation today and the type of employee required for this important position must possess a cool head, be able to think quickly and keep his mind on the various operating duties demanded from time to time.

The routine operating duties (or switching) which are performed day after day seem to develop a spirit of carelessness among certain types of operators and this carelessness sooner or later results in an accident or an interruption of service.

An operator's training covers a period of 18 months, during which time he is allowed a two hour study period each day, and attends the operator's school one-half day each week. During this period of training he is classified as a helper and acts directly under the supervision of a qualified operator, and in order to give him the required proficiency he is allowed to perform certain operating duties.

An operator was given the order by the system operator to change a 2,400 volt lighting circuit from one phase to another phase, and as his helper had reached the period of training where he was allowed to help in such operations, he was given permission to pull the jumpers in series with the switch.

The operator had opened the switch, killing the circuit, and the helper, being desirous of demonstrating his ability as an operator, rushed to the basement and pulled the jumpers on another circuit which was in commission before the operator could stop him. The resulting arc burned the helper about the body, face and arms, with such severity that he died the next day.

As all jumper compartments are plainly marked and this helper understood thoroughly the particular part he was to perform, this accident was the result of carelessness on his part, carelessness in checking jumper compartments before opening jumpers and disobeying orders in not waiting for the operator.

As a result of this accident a closer check is made of helpers during their period of training and the habitually careless man is dismissed from the service or transferred to a less hazardous occupation.

CHAIRMAN McCULLOCH: We will have a description of two accidents in connection with gas operation, the first of which is an employee on the consumer's premises, by Mr. H. M. Keller of the Northern Indiana Public Service Company of Hammond, Indiana.

AN EMPLOYEE ON CUSTOMER'S PREMISES

H. M. Keller, Northern Indiana Public Service Company, Hammond, Indiana

Mr. Harmon's statement of the trouble encountered in making an investigation after an accident and the men trying to cover each other up, reminds me of that story of the lady who, when her husband did not return home by midnight, picked out the names of several of his best friends and sent out telegrams and said, "Jim not home. Have you seen or heard from him?" Within an hour seven telegrams came in and said, "Jim is spending the night with me."

The fatal accident, which I am about to describe, is one which occurred before our company had adopted organized accident prevention measures.

One of our fitters was notified of a gas leak in a customer's residence at East State Street, Hammond, Indiana. He responded and was told by the lady of the house that in her opinion the combination gas fixture in the kitchen was leaking. So the fitter, accompanied by the customer, proceeded to the kitchen, where he placed a table under the fixture and then a chair on top of the table.

According to the statement of the customer, the fitter looked over the fixture with the aid of a flashlight. "Then he put the light in his pocket and struck a match—the match was of the common type. There followed immediately a terrific flash and a loud noise; the flames seemed to shoot down upon us. He jumped right toward me. His clothing was on fire and so was mine. He ran down stairs with his clothes in flames into the street, then turned and ran up stairs where one of the roomers threw a rug over him, partly extinguishing the flames."

The statement goes on to tell how violent the man was and finally that he was taken away to his home where, upon advice of a physician, he was removed to the hospital, where he died two days later from the burns he had received.

Accidents About Gas Leaks Are All Too Common

The records show that the victim had been in the employ of the company for six years and had 15 years of experience in gas fitting. A fellow employee stated that this man had been warned scores of times about using matches in his work.

What might be considered a contributory feature in this accident is disclosed in the report of an employee who was sent to the scene of the explosion soon after it occurred. He stated that gas was leaking from the fixture. He went to the basement and found the shut-off cock in a position that ordinarily would shut off the gas, but upon closer examination he found this cock worn and defective, which allowed the gas to proceed through the pipes to the fixture and appliances.

We had an accident shortly afterward (which fortunately did not end in a fatality) in which a lady handed a candle to a fitter's helper who was searching for a gas leak. He found it—and later he was also found, with a few minor bruises, under the cement blocks which had once been the foundation of the house.

Our company now has a strict ruling that all tests for leaks must be made with a soap and water solution, and we have every reason to believe this rule is being complied with, as we have not had an accident which can be attributed to this cause since the rule was made.

CHAIRMAN McCULLOCH: I have just asked our vice-chairman, Mr. J. C. Hubbard, of the Western Union Telegraph Company, if he will not introduce the next speaker who is to describe another fatal accident.

J. C. HUBBARD (Western Union Telegraph Company, New York City): When the Section asked the telegraph company or the telephone company

to produce an example, we were rather hard put to it to find something that would be of general interest. Everybody of course puts up his own problem, so after going over several hundred cases, we selected one in which a fatal accident occurred to a man who was doing some reconstruction work on a pole.

It is of special interest to telephone and telegraph companies, but also we think will be of interest to power companies, whether they use wood poles or not. A great many of you here are safety engineers. You are spending your time on this work. We selected a man from the ranks, a man who has been through the work himself, started as a ground man, became a lineman and is now supervisor of telegraph work, handling the state of Florida. I take pleasure in introducing Mr. Morgan from Atlanta.

A FATAL ACCIDENT

E. C. Morgan, Maintenance Supervisor, The Western Union Telegraph Company, Atlanta, Ga.

There is nothing that depresses the minds of those interested in safety work more than a report that a fatal accident has occurred, and we immediately begin to wonder how, with all the precautionary measures we have taken, such an accident could have crept in.

After detailed reports are reviewed we are sometimes struck with the simplicity of it all, and find it hard to realize how it could possibly get past us.

I sometimes think that if we were to purposely plan a fatal accident, our scheme would be so apparent that the victim would detect our purpose before the plan could be carried out.

Let me describe to you a fatal accident which snatched away the life of one of our men. Also let me explain to you how easily this accident might have been avoided.

For a number of years, each lineman employed by the Western Union Telegraph Co. has been served with a written notice at the time of his employment, advising and warning him of the danger in climbing poles without first inspecting them to ascertain their condition. Each employee is instructed and warned not to climb a pole if there is any doubt about it being strong enough to support him safely and any strain which he may place upon it. When there is a doubt as to the condition or strength of a pole, he is instructed to take the necessary steps to strengthen it before climbing. Poles are tested with a pike pole or rope, the tests are made by pushing or pulling the pole across the line, not with the strain in line with the wires.

Employees are warned not to untie the last wire on a defective pole until the pole is securely held by guys, braces or pike poles. It is often possible to lash an old pole to a new pole while the old pole is being dismantled.

These warnings, among others, are accepted by the linemen as part of their job, and they enter vitally into their every day work.

Picture, if you will, a small group of plant workmen carrying on under the direct supervision of a city foreman, in an average size town, where the telegraph company has, in addition to its main telegraph plant, circuits that are distributed over town in some sections on other companies' poles, in order to reach patrons with their time, messenger and other classes of subsidiary service.

The city foreman knows his men and their capabilities, each of them is skilled in his work, accident prevention methods have been discussed and the safety first thought has been absorbed by the men who get out around town and work alone. Safety first has become a feature of their every-day work and when no accidents creep in to disturb the daily routine, the foreman is apt to forego repeating instructions on safe working practices to his men, and he takes it for granted they will realize where danger lurks and will take precautions to protect themselves.

In the course of a day's work, one of the linemen notices a pole of another company from which its wires have been removed, but upon which the telegraph company has two wires used as a clock circuit. The other company has rerouted its wires and it is apparent to the lineman that the pole is to be removed. It will be a simple matter to transfer the wires so that they will clear this pole and release it. On his return to headquarters he reports to the city foreman the necessity for the work. The foreman asks how much assistance he will require, and the lineman, believing the work can be easily accomplished, replies he can use one man, and without hesitation the city foreman assigns a man to assist with the work, instructing them to take whatever material and tools are necessary.

Another Accident That Could Have Been Avoided

The first thing the next morning, the two men proceed to the scene—they will be designated as Mr. "A" and Mr. "B". No pike poles are taken and there is no evidence that the pole is tested. Mr. "A" puts on his climbing tools and climbs the pole. Mr. "B" remains on the ground. "A" reaches the crossarm, throws his leg over it, and unties the wires. "B", from his position on the ground, sees the pole start to fall, shouts a word of warning—too late, the pole catches in the limbs of the tree and its weight with its human burden tears through and strikes the ground, with Mr. "A" underneath. The pole was rotted 21 inches below the ground line. Mr. "A" was killed.

How could this accident have been avoided?

(1st) Had warnings and definite instructions been followed by the men doing the work, no accident would have happened. When Mr. "A" stood on this scene the day before and planned in his mind the work necessary, he completely overlooked the hazard there might be in a pole to be abandoned.

(2nd) The city foreman to whom the necessity for the work was reported, also failed to picture in his mind a dangerous condition and when he told the linemen to take whatever material and tools were necessary, he was not definite enough and should have sensed a dangerous

condition, even if his other work made it impossible for him to make a personal inspection.

(3rd) Both Mr. "A" and Mr. "B" failed to heed instructions and warnings that had been given them; they did not take the necessary tools and material to do the job safely; they should have taken along pike poles and ropes so that the pole might have been tested, and even if a pike pole test failed to show the defect, as a precaution, the pole could easily have been lashed to a nearby stub.

Mr. "A's" position on the pole was wrong, there was no necessity for going above the crossarm, his proper place on the pole was under the crossarm on the side of the pole, away from which wires were pulling, in a position where he could hook his leg around the pole and reach up, untying the wires. In this position he would have had a much better chance when the pole started to fall.

To prevent an accident of this character, nothing must be taken for granted, instructions must be followed, warnings must be heeded by the men actually doing the work.

Foremen and others who direct work must never let a chance go by to repeat a warning and stress the necessity for precaution. The city foreman in this case should have said, "Don't climb that pole until you have tested it with pike poles; then guy it or lash it to an adjacent pole before you climb it."

We see from this accident that despite warnings, despite instructions, despite direct supervision, accidents can creep in, and only by anticipating such an accident and taking proper steps to see that instructions and warnings are followed, can they be avoided.

Trying to Save Time in a Coal Yard

CHAIRMAN McCULLOCH: We still have about half an hour in which to discuss the subject of fatal accidents. It has been my experience that if there is any one thing a safety man likes to talk about, it is how his accidents occur. Here is your opportunity. The meeting is yours for half an hour.

W. L. ANDREWS (Dayton Power & Light Company): We recently had a case in the northern part of our city where a man had been killed in a coal yard. They were in a considerable hurry in endeavoring to move a coal conveyor. At this particular location we had a 33,000 volt line at the top of the guy wire coming down between a 6,600 volt line. The coal people did not care to take the time to lower their conveyor to pass the guy wire. They thought that they could use precaution and endeavor to steer the top part of the conveyor under the guy wire; the owner practically admitted that he appreciated the hot voltage above, but unfortunately they were not successful. The conveyor hit the guy wire, which of course was not insulated. They swung into the 6,600 volts and the workman who was operating that conveyor received 6,600 volts and was instantly killed.

This brought up a point to our company to make a survey of the

town, of the coal dealers particularly, and other construction men who are using cranes, and so forth, where they may be swinging into the 6,600 volt lines or other voltages. We have made this survey and at least we have the coal operators or dealers on the alert to guard themselves against such conditions.

MR. SPRINGER (Detroit City Gas Company, Detroit, Michigan): I want to bring out the difficulty with employees who are experienced and have become confident of their work. In this case a man had a fall which proved fatal. It was a job which was to be done in a hurry. The men who were on the job were thoroughly experienced in that class of work and capable of doing it. But owing to his perfect intimacy with that class of work on high elevations and high steel work, the workman simply neglected the possibility that an old piece of structure might have a joint which was rusted out or which might become loose under pressure. Perhaps in working around this somebody actually leaned up against this particular piece of timber or steel work when the structure was more firmly bound together and found it was tight. After removing some other pieces, this may have removed the support. This man leaned against it and it fell. This is the point I want to bring out. The older men are liable to overlook some of the things that a newer man might not become aware of.

Accidents While Unloading Heavy Poles

CHAIRMAN McCULLOCH: It is not necessary to limit ourselves to the discussion of fatal accidents. If you have any accident, serious or fatal, or otherwise that can bring out any lesson of value to the other companies, this is a good place to explain it.

MR. GREEN: (Ohio Power Company, Canton, Ohio): We had an accident about a month ago. In unloading poles, the guys had been cut. There were stakes on one side of the car track and stakes on the other side of the car track. On examination, these stakes were found to have about 60 per cent dry rot. A man was caught and crushed when the poles broke and rolled the other way.

MR. DILLON (Central Illinois Public Service Company, Springfield, Illinois): We have had several accidents unloading poles. We do not unload any poles now without going over the top of the pole. We absolutely make sure that the pole will not break and go the other way.

I want to relate an incident that occurred in the ice industry. We had recently taken over a new property at Centralia, and the C. B. & Q. railway was trying for part of the fruit business of the south, and in order to service those people we had some ice trucks that would hoist ice to the top of the car and a man could drag the ice truck into the bunkers. On the first night they shoved into the yard 13 cars to be iced. The men on the job were new. The truck was new. There were seven or eight of the Q. officials there directing the work instead of having our men direct it. They took that job upon themselves and they had our fellows all scared to death.

The fellow who was the chauffeur, or the truck driver, started to raise

his truck. He was so excited, at least that is what he says, that he could not get it to function. The foreman standing back behind the truck saw that there was something wrong and he told him, "You have got to hurry, because we can only stay here so many minutes." He grabbed the crank and started to raise the truck by hand, and by the time he got it started, the truck driver got his mechanism started, and of course this started the handle going about 50 miles an hour, and instead of turning it loose and running, he attempted to pull it off and escaped with only three ribs broken. I think this brings out that the foreman did not have control of his men, or complete control of the job.

MR. BENNETT (Northern Indiana Public Service Company, LaFayette, Indiana): Most of these accidents described have been the fault of material, or lack of supervision. I went to tell you about an accident that occurred on our property that was not the fault of supervision. We have not been able, on investigation, to lay it to faulty material. It appears to have been more an act of God than anything else.

A Peculiar Accident When a Tree Limb Interfered

There was one of our line gangs running a line just outside of town. There was a high tension line running to another town, 22 miles away, 66,000 volts. This new line was being run 12 feet below this high line which was energized. Eight phases had been run and tied in between section poles. In starting to run "C" phase, which was the outside, on the other side, the phase caught on the limb of a tree. "A" phase had been tied in at least half an hour before, and was presumably all right. The foreman sent a young lineman who was considered capable up into this tree to loosen the "C" phase. Going up into the tree, he could not reach it without putting on his belt, so he put his belt around the trunk of the tree and had to lay back. Just as he reached the wire, "A" phase snapped loose and instead of falling down, which it would do in nine cases out of 10, it flew up, wrapped itself around the 66,000 volt line and energized the tree, making a veritable electric chair out of it. The sorry part of this was that this line was being energized from this other town and it took 10 minutes to get them on the phone and get them to cut loose. In the meantime this man was burned on both shoulders and both feet.

The foreman had presence of mind. Another man in the gang grabbed an axe and started after the tree but was stopped by the foreman. You know what would have happened to him if he had got to the tree. He stated afterwards that was the last thing on God's earth he thought would occur. Just what to lay that accident to we have never fully decided.

MR. LUECK (Commonwealth Edison Company, Chicago, Illinois): During the past year we had five fatal accidents and not one of them could we attribute to a direct cause, as we analyze our accidents. We had one man who was working around a railway crane. This man was given to understand that he was not to ride on the step of that railway

crane. He did step on it one day and the crane turned around and forced his body between the body of the crane and that of the railway car.

We were building a new service building. We had got up to the fourth floor. Understand that this was a contract job. On one of the openings, (which would be a stairway later on) they had placed a platform. They were pouring concrete. The platform was built by the contractor and we had a man there to see that this concrete was not poured into the conduit; and while they were walking across this platform with a concrete bucket the platform collapsed and our man was thrown down to the basement and instantly killed. Another man on the first floor was seriously injured, but recovered.

We had a trouble man, one of the best that we have ever had in our organization. He went out one week to flash phases. It could have been done very safely in the position that had been outlined for him, or in which it was customary to do that work. However he mounted to a point where he was able to get his head against a trolley feeder and was instantly killed.

We had only very recently an oil switch repair man killed. He is the man we seldom hear about getting into trouble. In fact, it is the first one we have had. He was sent down in the reactor compartment to stand by until they killed the particular reactor that they were to work on, and when the men returned they found this man was dead, lying in front of the reactor with the door ajar. A spot was rubbed off the reactor and his finger tips were burned. The rule was a man was to touch a reactor only in the presence of another man.

Of all these fatal accidents, there was not a thing that we could do to prevent them. You can't detect the slow acting mind. You can not tell the absent minded man. They are not absent minded always, but sometimes.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The Public Utilities Section of the National Safety Council convened in the General Assembly Room of the Detroit-Edison Company, 2000 Second Avenue, Detroit, Michigan, at 9:30 o'clock, Mr. B. B. McCulloch, Bureau of Safety, Chicago, Illinois presiding.

CHAIRMAN McCULLOCH: At this time we will hear the report of the nominating committee.

**REPORT OF HARRY M. WEBBER, CHAIRMAN OF THE
NOMINATING COMMITTEE**

In compliance with your request, the nominating committee has the following names to submit for consideration as the officers of this Section for the ensuing year:

For chairman, George Opp, safety engineer, Detroit Edison Company, Detroit, Michigan.

Vice-chairman, Electrical interests, Carl J. Rutland, safety engineer, Texas Power & Light Company, Dallas, Texas.

Vice-chairman, Telephone and Telegraph interests, H. L. Mead, plant supervisor, Ohio Bell Telephone Company, Cleveland, Ohio.

Vice-chairman, Gas interests, C. Howard Stewart, assistant treasurer, Laclede Gas Light Company, St. Louis, Mo.

Secretary, H. M. Keller, Northern Indiana Public Service Company, Hammond, Indiana.

Signed, H. M. Webber chairman, H. B. Harmer, H. J. Burton.

CHAIRMAN McCULLOCH: You have heard the report of the Nominating Committee. What is your pleasure?

(It was moved and properly carried that the nominations be closed, and that the Secretary be instructed to cast the ballot for the election of the officers.)

SECRETARY DOBBIN: Mr. Chairman, the secretary casts the ballot for the officers nominated.

CHAIRMAN McCULLOCH: The first number on our program this morning is an address by Mr. A. J. Van Brunt of the Public Service Corporation of New Jersey, Newark, N. J.

ACCIDENT PREVENTION IN THE GAS INDUSTRY

A. J. Van Brunt, Public Service Corporation of New Jersey, Newark, N. J.

Colonel O. H. Fogg's paper, presented at our session last year, completely and ably covered the subject of cooperation in accident prevention work as applied to the ability of the safety man to sell the thought to his executives.

Let us assume, therefore, that the safety man has sold the thought to his executives and they are willing to give him 100 per cent cooperation; that all proper safety appliances necessary for that type of gas plant have been purchased and installed; that all are in order and the mechanical guards operating efficiently. I am willing to admit right here, of course, that I am a very presumptuous fellow and that this condition as I have outlined it is not apt to exist in its entirety, but for the sake of argument we will assume that the condition is so. This is not enough. It is only a good beginning and the least important part of the completed job. In order to have efficient safety conditions prevail, we must reach the superintendents, the foremen and all of the other employees.

It has been truly said, that of the accidents in the gas industry only about four per cent are attributable to the industry; 96 per cent are of a type that occur to any industry. Also carefully worked out tabulations based on reports from a large number of gas companies appear to prove that 81 per cent of the accidents occurring in the gas industry are due to carelessness; only 19 per cent can by any possibility be attributed to defective appliances, tools or material.

Include Every Employee in the Safety Organization

So if, from a humanitarian standpoint, we wish to cut down the accidents, and if from a financial angle we desire to save the damages paid to injured employees, the wages earned by them while convalescent, and the money cost of training new employees because of their unfamiliarity with their jobs, we have got to reach way down below the executive officials and the safety man. We must include the superintendents, the foremen and absolutely all of the employees. We must sell them the safety thought, so that each of them will recognize that it is a worth while thought, not merely a measure that will benefit the company or the boss, but each of them personally; and having sold them this thought, having succeeded in getting into their understanding the conviction that the safety educational work being done is as much for their benefit as for the company—after that we have to keep everlastingly at it.

What means shall we use? All possible means. How shall we do it? In every way. No one way is best, no one way will do it all.

One safety man says bulletins, another says the spoken word, another relies on the printed word; one on safety committees, another on investigation of the accident and the posting of the result of the investigation where the employees can and will read it; still others put their faith in meetings of the employees, competitions between groups with a reward for the best results obtained, praise of individual employees, outings, suppers, entertainment, motion pictures, etc.

All efforts and every effort that can possibly be made—first the impression and then the reimpression of the desirability of considering personal safety of paramount importance to the individual—are good and all are necessary. In my estimation no single one is adequate, and

so far as our individual situation will permit we should use them all. Each man in charge of safety work must consider the conditions existing in his own territory and use every possible effort to convince those under him that the thought for safety is the first thought of self. First, convince the executive officials that it is best from all angles; next be absolutely sure you have secured the real cooperation of the minor officials, superintendents and foremen, and then in every way possible convince the employees that the safety thought is a worth while one and that it makes for their comfort, happiness and financial welfare.

I consider it unnecessary to name here even approximately in detail the many conditions in and around a gas plant which are dangerous. My presumption is that you all know as much if not more about those things than I do. But I know that the safety man is too apt to rely upon one or two, or possibly three or four types of educational safety effort, and I want to succeed in getting across to you the one thought that there is nothing you can possibly do in the way of safety educational work to all of your people all of the time that is not worth while.

If there is a person here who is not thoroughly familiar with the Schafer Prone Pressure Method of Resuscitation, you are behind the times. It is your duty to familiarize yourself with the method and see that it is taught to, and practiced by, every person over 12 years of age in every plant you have access to.

The results obtained by the Company members of the A. G. A. and the N. E. L. A. in the use of the Schafer Prone Pressure Method justify me in saying this in this way.

Discussion Following Mr. Van Brunt's Paper

CHAIRMAN McCULLOCH: Before proceeding with the discussion of Mr. Van Brunt's paper, I want to make an announcement or two. Because of the inadequate room facilities yesterday, it was almost impossible to get a proper registration of members present. But the registration cards show that there were a total of 156 who registered at yesterday morning's meeting and I am told that there were approximately 75 who were turned away because they could not get into the room. These 156 men represented 22 states, the District of Columbia and Canada. Today we are anxious to get as complete a registration as possible, and I will ask that you please fill out your cards at this time.

There are two matters that the Public Utilities Section is sometimes criticized on. One is the fact that the Gas Companies do not receive sufficient consideration on our programs, as compared with the time devoted to the electric companies; the other is that there is not sufficient time left for the discussion of papers; that our programs are too full, that we attempt to cover too many subjects on one program.

We have attempted this morning to avoid criticism on these two points by limiting the program to two subjects, the first of which is accident prevention in the gas industry; but you will note on the program that the formal discussion has not been assigned to any one person. The discussion is, therefore, an open one, and is turned over to you entirely. I

hope that everyone will feel free to get up and discuss Mr. Van Brunt's paper or to bring up any suggestions or recommendations in connection with accident prevention in the gas industry.

MR. GLIDDEN (Ohio Public Service Company, Mansfield, Ohio): Mr. Van Brunt made the assertion that all of us had heard the paper given in Cleveland regarding the methods of selling the executives on the subject of "Safety First." I would like to remind him that there are some 72 (isn't it, Mr. Chairman?)⁴ new members who probably are present, and I am one of those. I wonder if someone would give me suggestions as to methods of selling the idea to executives?

CHAIRMAN McCULLOCH: There is a good subject that we ought to have plenty of answers on. Who is going to be the first?

MR. VAN BRUNT: I think I have been fairly successful, but if there is any other man in this room who has not tackled that job, and thinks it is easy, I want him to change his mind right now. That is the hardest job. There is no one way that you can sell your executives the thought of the desirability of carrying on intensive safety work in your plants. In talking with your executives there are so many things to be borne in mind.

There are executives who are "Hail fellows well met," and they feel that they are no better than you are; there are others who are so puffed up with the idea of their own importance that you have to take your hat in your hand and ask their private secretary if you may have an appointment with them four weeks hence; there are some who have come up from the bookkeeping and auditing departments, and you must talk dollars to that kind of fellow—that is the only thing he can see. Unless he is an unusually wide-visioned man, if he has come from the financial end of your company to the point where he is an executive, put the almighty dollar in front of his eyes, so that he feels that it is the best way to save money.

There Are Many Types of Executives

Now, if he is the other type—and there are so many types that I can't name all of them—if he is one of the other types, a big, good-hearted fellow, who pats the little kids on the street as he walks along, who does all that he can for the crippled kiddies in the orphan asylums and in the hospitals, who is a member of the various organizations that devote considerable time to the young ones, appeal to his heart, point out to him that when he can go to bed at night—and many of you have done just that thing, I guess most of you have—feeling that he has saved a leg, an arm, a hand, a foot or a life, that is worth all the dollars it cost.

It will be impossible for any fellow who is not connected with that individual company to tell you what to do. I can only tell you what I do, and I did both of those things and then some more. I have had to go to our financial men and show them (and it is a fact) that you can save money, large quantities of it; I had to go to the man with the big heart whose tenderness was devoted toward humanity, and show him that al-

though the dollars were saved, nevertheless, the good that the work did was almost as great, if not greater, than any other work that possibly could be done. Does that answer your question, sir?

MR. GLIDDEN: Yes. Thank you very much.

CHAIRMAN McCULLOCH: Has anyone else anything to add to that? It is not necessary to confine our discussion to the subject of selling executives. The subject is "Accident prevention in the gas industry." It covers inspection, it covers organization, it covers education, any branch of the safety work in connection with the gas industry. I am sure that is a wide enough subject to warrant a 25 or 30 minute discussion.

R. H. KRONE (Union Gas & Electric Company, Cincinnati, Ohio): I suppose there is no company in America that produces gas or manufactures artificial gas that does not have some trouble with carbon monoxide, and Mr. Van Brunt did not tell us anything about that.

Experience With the Inhalator in Electric Cases

I happen to have in my pocket a treatise on the subject of resuscitation, written by three different authorities in one pamphlet, and it is the best thing that I have been able to get through any of the national organizations; and I should like to lay it on the table for anyone else who is interested in it. It pertains not only to the Schaefer Prone Pressure method, which is strongly recommended throughout the country, but deals also with the inhalator and with other mechanical devices. Now, I will let the report speak for itself, but I will say this one thing in connection with it: the pulmotor or the breathing machine, so-called, is a thing of the past. The inhalator—I don't care what make particularly—has been tried by our company and has been found to be very successful.

MR. VAN BRUNT: I would like to ask if there is any member present who has tried any type of inhalator on an electric case, and, if so, what the result has been? We use them only on the gas cases, having been advised that is all that they are fitted for.

C. HOWARD STEWART: (Laclede Gas Light Company, St. Louis, Mo.): We tried the inhalator on a couple of electric cases simply on account of the man being in a weakened condition. We figured that he needed just a little pep to revive him in a quicker manner, and the mask was applied to him just for the purpose of getting a few breaths of the contents, and we think it is a good thing. We had a rather unique experience within the last two weeks. Our crew was called out in the case of the birth of a child, and the child apparently had died while being born; and the physician in the case put in a call for our inhalator; our crew responded and worked on the little baby for about an hour and succeeded in getting a few gasps, but the doctor could not revive the child after we had gotten that far with it, and the child finally was declared dead. That is the first child birth case that our rescue crew has been called out on.

CHAIRMAN McCULLOCH: Before I forget it I would like to ask Mr. Krone if he will just read the title of that paper and who it is published by, for the information of the other members?

MR. KRONE: It is "Resuscitation After Electric Shock," by Wills Mac-

lachlan and others. That is the way it is published in the literature of the National Electric Light Association, at a price of five cents a copy. I am not advertising the National Electric Light Association; I have merely made a study of resuscitation and have found this to be the best treatise on the subject.

In connection with the inhalator for electric shock cases, I have inquired of experts on that subject, and they tell me that it is not necessary for an electric shock case; but in an electric shock case where there is intermittent breathing—that is, where the patient resumes breathing and drops it and we have to start on him again and he drops it again—if you use an inhalator on a case like that, they say it works to great advantage.

MR. VAN BRUNT: The reason for that is that it produces greater inhalation. The person being treated with the inhalator breathes more deeply, takes in more air than you and I do ordinarily, and much more than can be produced even by the Schaefer Prone Pressure method; it does produce much more and in a safer way than either the lungmotor or the pulmotor.

Pulmotors Thrown Out of the Hospital

One of the gentlemen that preceded me told of a particular case. I want to crave your indulgence while I tell something that occurred within two weeks. We make a safety educational motion picture every year. This last year, I put a hospital scene in, using the Cooper Hospital in Camden, New Jersey, because the doctor in charge of that hospital is 100 per cent cooperative. When we went there, we taught 45 of the nurses that were taking the nursing course resuscitation by the Schaefer Prone Pressure method. The good old doctor delivered a little bit of a talk after the motion picture was shown, and the result was that we had a pulmotor, a baby pulmotor, and one other machine thrown out of the hospital. They are now on the junk heap, and any babies that do not breathe immediately will be resuscitated by the Schaefer Prone Pressure method.

CHARLES B. SCOTT (Bureau of Safety, Chicago): Mr. Chairman: I have been wondering whether I ought to say what I am going to, because I feared it might be premature. The subject of resuscitation has been so conspicuously brought to the minds of public utilities, and our efforts on resuscitation problems have been so successful, that executives in the industry are very much interested in it.

About a year ago a group of these men felt that the investigation and study of what really happened to the physical body when electrocuted or asphyxiated, the organic change that took place in the body, had never been thoroughly and scientifically determined. Men that have contributed so much to resuscitation, like doctors Henderson and Drinker and others, have never really made a complete record of effects other than as observed after the victim was shocked or asphyxiated.

Some men who are prominent in the electrical industry have raised a fund and a meeting has been called for the 15th of November to start a real and scientific investigation of the physical change which takes place

in the body in an attempt to find the best remedy to apply in cases of electrocution or asphyxiation. The credit for this new move is due to Mr. John Lieb, of the New York Edison Company, who has made it possible to get the finances to carry on this investigation. Doctor Flexner, of the Rockefeller Institute of Medical Research, is to be chairman of the body which will include a number of scientists.

I am sure you will all be interested in knowing of this new development. I venture to say that when this study and research is completed and when this commission makes its report it will be up to date and that there will be many things brought out which will be not only of great interest to you but of great assistance in this problem. I venture to say we shall all be very much pleased with the results.

That is all I have to say on this subject, Mr. Chairman. You don't know how pleased I am to see the growth of this Section. I have been accustomed to attending meetings of the Public Utilities Section ever since the National Safety Council was organized and my interest has always been in the Public Utilities Section. When I now see this group of men, which is so much larger than the original National Safety Congress, I am proud of the place that the Public Utilities occupy in the safety program of this country. Our industry is to be congratulated on the interest manifested.

Prone Pressure Resuscitation Strongly Urged

WILLS MACLACHLAN (Consulting Engineer, Toronto, Ontario, Canada): I wish to congratulate Mr. Van Brunt on a practical, straightforward paper and to emphasize his point that we must use a number of different methods to prevent accidents.

In Toronto, early in the year, we carried out a series of experiments on laboratory animals to endeavor to learn the effects on animals of the passage of electrical currents. The report will appear shortly in *The Journal of Industrial Hygiene*.

After a thorough examination of the field and with full knowledge of the results of our experiments, one is forced to the following conclusions in regard to resuscitation from electrical shock: that prompt and efficient application of Prone Pressure Resuscitation should be carried out until the patient breathes or the body stiffens; that suitable heart stimulants be administered by attending doctor; and that after resuscitation the patient be very carefully watched and put to bed.

I am fully advised and appreciative of the excellent work carried out by Dr. Yandell Henderson and his associates in developing the method of administering oxygen and five per cent carbon dioxide in gassed cases. Primarily, the object is to free the blood of carbon monoxide and in gassed cases this method is most successful. In electrical shock cases, the carbon monoxide in the blood is not an important factor, even if it be present and the use of the inhalator is not indicated as far as our present knowledge goes. Experimentation to clear up this point is now underway. The use of inhalators on electrical shock cases should be discouraged until the results of this research are available.

Now (leaving resuscitation entirely), I would like to point out possibly one way of getting over an extremely difficult type of accident; call it carelessness if you will,—I don't think it is carelessness. A man is thinking about something else than the work in hand. That may mean the world's series game, which we know caused two fatal accidents in this country, or the good hand he held the night before, or the dance he is going to tomorrow night, or something of that kind. Now, how can you get away from those accidents? The man's mind is some place else.

When you go into your own home and run up the stairs in the dark you won't trip. When you walk into your home in the dark you walk around the furniture, and don't bump into it; you have done it hundreds of times before and habit is carrying you through. Now, why not take that habit and apply it to your industry? I am not saying that we should not educate our men, train our men, but when we are through with the training and the educating and everything else, we are going to have that odd case of accident, the case where the man forgot or was not thinking of what he was doing. Analyze some of those difficult or dangerous jobs; you have got to do it.

Let's take one of them for example: the use of rubber gloves on a pole with 2,200 volts. That is an average case. Every one of us has had the accident of the man going up and working on 2,200 volts live with his rubber gloves on, leaning back on his belt, taking his gloves off and putting his hand into 2,200 volts. You have them; I have had a number. Teach your men to put on rubber gloves, say, at the bottom of the pole, before they go into high tension; teach your men to put on their gloves and take them off only at the place where they put them on. Do that for two or three months and you will never have a man pulling his gloves off when he gets to high tension, and he won't go into it.

Cases of Interference With Prone Pressure Method

MR. RALL (Kansas Power & Light Co.): One point brought out by several speakers that I thought was very good, was the use of the Schaefer Prone Pressure method. I enjoyed the paper that was read this morning very much. The point that we are following in our work is in line with Mr. Van Brunt's paper; and then we are having each one of our men, engineers and all, know the Prone Pressure method of resuscitation; that is, including all the outside forces and every man that works with us or has any contact with us in any way, shape or form.

We are also insisting on their knowing it properly. In our safety meetings we have the company doctor show us the Prone Pressure method, and he times it, not going too fast, giving it a very thorough attention, so that the method is performed in a proper manner. Our idea is for each man to carry it home to his wife and show it to her. I do it with my own son at home (he is only three and one half years old), but it is remarkable how he understands it, and he knows how to be the victim as well as to get on top of his own dad and try it on him. I think we should even train our wives to do this thing. We have found it to be a very good

thing, and it has borne fruit, gentlemen, for it has been a great educational means.

Another point that I want to bring up before this committee is that I have been experiencing a great amount of interference from the city ambulance doctors. They are young and ambitious, so to speak, and they have no use for the old Bible adage which says: "Young men for war and old men for counsel." They seem to know it all. Two weeks ago on the street, while about 2,000 people looked on, I was working on a man and I had to spend about 10 minutes arguing before I could work on this man. The point is this: we must, through some means of our safety council, in our city, have a direct contact with our city council; there must be real cooperation of some kind so that we can practice this method without any argument.

Laying aside resuscitation now, I would like to ask one thing in regard to those electric properties that have underground systems. You have several manholes which must be made watertight. In other words, they are locked in such a way that the water can not get into them, and you must seal them down, watertight. There is, of course, a good chance for gas to accumulate in those things. We do not like to put those in, but we must use them in some places, and I would like to have you tell me how they take care of the proper ventilation of a watertight manhole.

Handling a Difficult Situation in New Jersey

MR. VAN BRUNT: There have been numerous plans discussed for ventilating manholes. Some have gone so far as to say that all manholes should be ventilated, not alone watertight ones, and various plans have been devised; your accident prevention committees have discussed the matter. No definite conclusion has been arrived at, so far as I know, so that we could make a concrete recommendation.

If I may leave that subject just for a minute and speak on one other I would like to say, as I did a minute ago, that the doctor has sometimes been a thorn in our flesh. Those men are not doctors; they have all the conceit but damn little of the knowledge.

I will tell you what we do to them in the state of New Jersey. We have our electric men and our gas men on their toes because we have instructed them this way: "If you are at work on a public service employee, gas or electric, don't let any doctor or policeman stop you."

"Mr. Van Brunt, what will I do?"

"Well, what would you do? Lick them? Sure."

And they do. They sent one young interne back to the hospital and he was on a cot for several days before he recovered, and the man whom they were at work on, and that he tried to stop them from working on, came back to the gang almost 100 per cent.

There is present here this morning our Mr. Robert O. Bentley, Superintendent of Electrical Distribution of Public Service of New Jersey, and he can answer your questions about those manholes better than I can, because he has had more technical terminology.

CHAIRMAN McCULLOCH: I would be very glad to have Mr. Bentley talk at this time.

MR. BENTLEY: I do not know that I can add anything to what was said in reference to ventilating manholes. It is a rather difficult proposition, because if you seal them so that water can not get in, if there is any possibility for the gas to get in it is very apt to stay there. Of course, if they are sealed very tightly, and if there are no gas leaks in the immediate proximity of the manhole, why, you are not so apt to be bothered with gas.

But we have experienced a great deal of trouble on account of gas in manholes, and our men exercise a great deal of care about entering these manholes, and we find that about the safest method to guard against that is to ventilate the manhole, say, before working in it, even by placing a fan in the manhole to blow the gas out, or any foul air that might be in there.

A very simple means that is employed frequently when it is not possible to put an electric fan in there, is to take a blanket—I presume a great many operating men have done the same thing—putting it down in the hole and fanning it back and forth for five or 10 minutes, and it will usually remove any gas that is there. If there is considerable gas in the hole, why, we often keep that process up all the time the men are working in the hole.

Fatalities Following Use of Unprotected Gloves

One thing that many electrical operating men here have been confronted with, and it may be of interest to some of you who have not had this trouble—we have lost three or four linemen recently by electrocution, men working on poles. We found they were shocked through their hands by the current; and in each case the foreman standing on the ground looking at the men thought they had their rubber gloves on. We use a very high grade rubber glove and it is quite fragile. We cover it with a buckskin protector, and in each case where the foreman thought the lineman had his rubber gloves on he found that he had removed the rubber gloves from within the protector and was working on 4,000 volts with buckskin gloves.

So we issued orders and instructions that no employee was to wear unprotected gloves for any purpose. They were all wearing buckskin gloves all the time they were working. We have it arranged so if they want to wear other gloves while doing their work, why, they can't get gloves that look like protector gloves that we use over our rubber gloves. Not very long ago, we lost three or four men from that one cause. They would get up on the pole with their rubber gloves, their protectors and the belt on, remove their rubber gloves and put the protectors on, and then were electrocuted. I thought that might be helpful to some of the men.

C. W. MOAC (Hydro-Electric Power Commission of Ontario): I am connected with the Hydro-Electric Power Commission, and the big end of my business is to teach the employees the Prone Pressure method of resuscitation, which I have been doing for years. We have standardized our system of teaching to the point where I think we could have employees from any part of the province, and they would all carry on exactly the same methods.

Now, I want to stress the point of practice. I will cite you just one instance where failure to practice makes a man fall down. We had one man who had to his credit the resuscitation of three drowned victims two years and a half ago. Just recently I noticed that this employee was not carrying on his regular practice, and I had some new employees in and I thought he would be a real typical man for the purpose of a demonstration. I asked him for the demonstration and he fell down badly. He said, "I don't know what is wrong." I said, "I am going to tell you what is wrong. It is pretty nearly a year and a half since you have had any practice. That is what is wrong, is it not?" He admitted his fault.

Now, we maintain with the Prone Pressure method of resuscitation, that you have got something. We give it to our men. They can carry on without an instrument. They have always got it with them. They don't need to run to get something. I could cite you an instance in the early days of the pulmotor where we lost a man through having a pulmotor. The man got 2,200 volts. There were three employees with him that were trained in the Prone Pressure method, but the Prone Pressure method was not in their minds; the pulmotor was in their minds. They went to get the pulmotor and when they returned it was too late.

I think I can safely say that in 80 per cent of our cases we are successful with the Prone Pressure method without using any other means. We have a man who was burned on the 2nd of November with 44,000 volts. He was so badly burned that he lost his right leg and his left arm. There was only one lineman with him. He lowered the man from the pole and resuscitated him in some 10 minutes. I think that is an example where it will show you that if you know that method you have got the right thing.

Many Men Living Who Were Pronounced Dead

MR. BARADA (Laclede Gas Light Company, St. Louis, Mo.): Mr. Van Brunt made the statement that the M. D. is sometimes a thorn in his flesh. Of course, I suppose none of us will take exception to his statement. We have had quite a few cases of that in St. Louis where one of the men would be working on a man and two other men would be fighting the cops off. However, that is years ago and things have changed since then. But the point I am trying to bring out—in fact, I am looking for information—I am just wondering how many men present know of authentic cases where the patient has been pronounced dead but the operator of the Schaefer Prone Pressure method went ahead and revived the man?

We have one or two cases of that kind in St. Louis. We feel as though there must be more but there seems to be no way that you can find that out, other than by just asking at a gathering like this. We had one case in St. Louis where eight doctors pronounced a certain negro janitor dead. Our man would not take their decision for it, but worked three and one-half hours on him, with the result that the negro is still a janitor in St. Louis today. But what I want to find out is how many men here have had any experience where the patient has been pronounced dead and then later revived?

MR. VANBRUNT: One gas and one drowning case.

CHAIRMAN McCULLOCH: Could we just see the hands, please, of everyone who knows of accident cases like that?

CHAIRMAN McCULLOCH: At least 16. Possibly some of them have knowledge of three or four cases.

MR. BARADA: That answers our question.

MR. STEWART: Mr. Van Brunt talked about the trouble with their men with rubber gloves. We operate an electric company in addition to a gas company at St. Louis, and we try to cover that situation to a large extent in our rubber gloves test. Our gloves are tested every two weeks, and we have several pairs of gloves assigned to each man. Every two weeks when the gloves are tested, the initial test is 10,000 volts and the subsequent tests are 5,000. We have the man receipt for his gloves, and on this little card there is an absolutely definite instruction to him (which he receipts for) that the gloves are to be worn when he is on the pole or handling what we term "Hot stuff."

That might be of some help to some of our men here this morning.

Method of Testing for Gas in Manholes

MR. HARPER (Kansas Gas & Electric Company, Wichita, Kansas): We are getting quite a lot of information now. I would like to ask Mr. Bentley to outline his way of testing for gas in manholes.

MR. BENTLEY: Why, the experienced underground men that we have can usually smell that just as soon as they open up a hole. The gas that we are bothered with most is illuminating gas. It is not very hard to detect it. We do not often have anyone overcome by gas, although we have had cases where they thought there might be a little trace of gas there, and there was more gas than they really figured on; by the time they were down there three or four minutes, they got groggy and came out.

MR. KELTON: We have had considerable trouble this year with gas in the manholes, and when we open the manhole we have a regular miner's lamp, a safety lamp, that we let down in there. In using the miner's lamp, we have to watch the flame, as I understand it, to see if it is working or not; but when you let it down in the hole you can not see it. We let it down in there for five or 10 minutes, and then we go ahead and get down in the manhole. We had several bad flares and the men have been burned. We have had them work in there for a couple of hours and had no explosion. If there is any other method but the lamp, I would like to know it.

MR. DUFFEE (Hammond & Co., New York): I think for the benefit of a number of persons here, I would like to take a moment to outline what I consider the most extensive program that has ever been attempted in a public utility field to my knowledge. The Consolidated Gas Company of New York and the affiliated Electric Companies have recently attempted the problem of training 28,000 employees, 15,000 of whom will be trained three times a year and 10,000 twice a year. We appreciated that standardization in the teaching of the Prone Pressure method was one of the

things to be desired, and to accomplish this we carried on a course of training, having instructions which consist of three lessons of two hours each; and at the termination of the course, in order that an instructor be qualified to receive an instructor's certificate, he had to maintain an average of 75 per cent. He was also instructing the women, the work being done twice a year by a registered trained nurse.

To answer the gentleman's question about detecting gas in a manhole, there is an apparatus made which has been perfected by the Bureau of Mines, and it was used very successfully in Pittsburgh and New York for the detection of sewer gas in manholes. It is called the monoxide detector. I don't recall the author of the paper but it can be found in the Bureau of Mines.

On the question of a man being pronounced dead and being revived, we had a very unusual case in New York in which the employee received a medal. Two doctors had pronounced the man dead. He had been dead without any effort being made to revive him for some minutes. This employee came in, a blanket was thrown on the man and he was laid upon the table. As I say, he had been pronounced dead by the use of the stethoscope by two different doctors. This employee worked for several minutes and the man began to breathe and then stopped again, and he was revived the second time. Before they got him to the hospital, that man had been revived four different times, and six days later he was back on the job.

The Light Down in the Hole is Suicide

MR. MORR (Illinois Bell Telephone Co., Chicago): In connection with underground work and ventilation, up to the present time, I do not believe there has ever been a successful ventilating plan put in. When they first put in the underground in New York City every manhole was sealed with rubber gaskets. They had a blower system in several places. They went so far as to run pipes from the manhole up to the roofs in various places. So I do not think that you can depend upon any system and devise a real test for discovering gas in a manhole outside of the human element.

My friend here mentioned about putting a light down in the hole. I think that is suicide. He mentioned about the man being down there for some time and having an explosion. Now, here is the point you don't want to overlook: you open up a manhole, you ventilate it, get all the gas out, you may put a blower in there and blow it all out, and the men go down there and work; they are down there for two or three hours. Fine, no gas. The wind will change to another direction and blow the gas into that hole. How are you going to overcome that except by the human element discovering it? There have been a number of men killed in the manner I speak of. Absolutely no gas in the hole at all when they started to work; the wind changed and blew it in from another hole.

MR. DILLON (Central Illinois Public Service Company, Springfield, Illinois): Mr. Van Brunt said something about the M. D. being a thorn in the side. The Central Illinois Public Service Company experienced that trouble, as the rest of you folks have, and we started an educational system on the Schaefer Prone Pressure method and cooperated with the

medical association, and we have never been turned down by any one of those associations. Every time we went before them we have had their promise that they would always assist us in this work. In addition to the medical association, we have gone to the fire department and into the police station and have taught this method to those fellows; and in several instances, we have had the pulmotor and the lungmotor thrown out of the fire department and police stations and they have taken up the Schaefer method of resuscitation.

In addition to that, along with the education of employees, we have been teaching our employees this method for a number of years, and we have several crews scattered throughout the territory at the different plants. We have weekly meetings in which this method is practiced at every meeting. All office forces practice it monthly; the others weekly. We not only teach them just how to practice it, but we teach them the method of changing from one operator to the other without any loss of time. I think that is one of the most important parts of artificial respiration, the changing from one operator to another without a loss of breathing.

Prone Pressure Information for the Doctors

CHAIRMAN McCULLOCH: That brings up a question that I believe we could afford to spend just two or three minutes on, and that is what the companies are doing in the way of securing the cooperation of the doctors and getting this information to them in regard to the Prone Pressure method. Some companies have gone into this quite extensively and have developed plans that have proved successful. I believe we could hear just a few brief statements on that subject.

MR. VAN BRUNT: We have visited every medical society in the state of New Jersey and addressed them on the subject. We hired a room in Atlantic City during the state Medical Convention and we got all the doctors we could get in the room.

We had two men in the room who know considerable about this subject. Mr. MacLachlan has done more along this line than any other man present.

CHAIRMAN McCULLOCH: Mr. MacLachlan, have you anything to add?

MR. MACLACHLAN: I do not believe Mr. Van Brunt's statement is quite correct; I have not done more than any other man. In 1924, due to the cooperation of the American Medical Association a Symposium on Resuscitation was arranged and presented at the annual convention. This was taken part in by Dr. Cecil K. Drinker, Dr. Yandell Henderson and myself. The reception that we received was most gratifying. I have also lectured in the Technical Lecture Theatre of the American Medical Association at this and other annual conventions and the reception from the medical profession has been all that one could ask. The medical profession individually in county or national association has been always willing and anxious to cooperate if the matter of resuscitation was presented in a clear way. The professional dignity and ethics of the doctor must be protected and respected. When someone close to you is ill, you

wish to have the utmost confidence in the attending doctors. Do not let us do anything to interfere with the respect for this high calling. It is not necessary to smash a mirror to clear a little fog from the face.

You who have been in this work from the inception 15 years ago, should think back to the cooperation we received then and compare it with what we receive now. I feel that all we need is a little patience and to use all of the diplomacy and tact that we have.

CHAIRMAN McCULLOCH: I am afraid we will have to close the discussion on this subject. We have devoted a little over an hour and a quarter to it. We have another subject which I believe is of equal importance and interest this morning: the subject of "Fire prevention."

Our next speaker will be Mr. P. W. Eberhardt, of Walter Kidde & Company, New York City.

FIGHTING FIRE WITH SNOW; OR FIRE PROTECTION THROUGH THE USE OF CARBON DIOXIDE

**P. W. Eberhardt, Engineer, Walter Kidde & Company, Inc.,
New York City.**

I want first to impress upon you, the safety engineer, the fact that fire protection is one of the major responsibilities that rests upon your shoulders, whether you realize it or not.

Too often this matter is left to an inspector who refers to his rules book and tells you that one approved extinguisher must be supplied for so many square feet of floor space. No consideration is given the possible magnitude of the fire, the conditions under which it must be fought and the hazards to which the operator of the extinguishing apparatus may be subjected.

All of you know what to expect should the extinguishing media be a conductor of electricity; you know the hazards presented by poisonous fumes generated from combustion of oils and insulating materials, as well as poisonous gases generated by the action of heated materials on some of the extinguishing agents employed.

The question may be raised as to the use of gas masks to overcome this latter objectionable feature; but don't overlook the fact that fire in a power plant or sub-station usually occurs like a bolt of lightning out of a clear sky. Your operators, in an endeavor to perform their duty, will think of nothing except putting out that fire, forget all about gas masks, grab an extinguisher and rush to the blaze. I do not mean to infer that gas masks should not be used; they are absolutely essential to safe operation under certain conditions, but are usually not used in the first emergency.

Another point that must not be overlooked is the tripping and falling hazard, always present where excitement reigns, and no matter how well your men are trained, when the emergency arises there is always some confusion.

The matter of fire protection for public utilities involves to a great

extent conservation of life and prevention of accidents, therefore placing the responsibility directly on the safety engineer or those responsible for safety of the workmen.

The extinction of fires through use of carbon dioxide overcomes many objectionable conditions and lends itself very readily to use around electrical equipment because it is a non-conductor of electricity.

In addition, carbon dioxide is non-poisonous, non-corrosive, will not freeze under the most extreme climatic conditions, produces no residue, and does not deteriorate. It can be automatically applied by means of thermostatic or relay control, entirely eliminating the necessity of close proximity to the conflagration on the part of workmen.

In comparing carbon dioxide with other extinguishing media for public utilities use, it may be well to divide the types of protection into three classes, namely:

1. Generator Protection.
2. Oil Switch & Transformer Protection.
3. Telephone Switchboard protection and other similar low potential wire networks.

Generators

In the past, generator fire protection consisted usually of steam or water rings anchored to the inner side of both end-bells, directly opposite the air-gap between the rotor and the stator, the steam or water being injected in time of fire by manually opening two gate valves after the potential was removed from the machine. This operation produced a time lag of from two to five minutes, in which most of the fire damage is caused. After wetting down the generator in this manner, it is necessary to dry out the coils uninjured by the fire after the fire damaged coils are replaced, or reinsulated, before the machine can be put into operation.

In a few cases, carbon tetrachloride has been applied in about the same manner.

With the Lux carbon dioxide system, all manual operations may be eliminated, the trip mechanism of the fire apparatus being tied in with the differential protection of each generator.

On the operation of the differential relays, which in approximately 95 per cent of the cases indicates fire within the generator, the carbon dioxide is automatically released into the ventilating system, extinguishing any flame that may exist in from 10 to 15 seconds. At the same time a delayed release mechanism is set into operation which causes additional cylinders of carbon dioxide to be injected into the machine at intervals throughout the entire deceleration of the rotor, thereby maintaining an inert atmosphere for several hours after the machine comes to rest, preventing any possible rekindling of fire from incandescent carbon that may have been present.

The injection of CO₂ into a generator wherein no fire exists, representing the remaining five per cent of differential operation, can cause no damage to the windings, the only loss being the cost of gas which would be less than one hundred dollars.

Power plant operating engineers are of the opinion that this loss is overshadowed by the value of having an automatic fire extinguishing system.

Several manual remote control stations, as well as a mechanical control at the apparatus, are also provided in case the relays fail to function or the source of electric supply is disconnected, insuring positive operation of the system in case of fire.

In extinguishing generator fires with carbon dioxide, the actual damage is limited to the immediate loss by the fire involved in the rupture, thereby greatly reducing repair expenditures, as well as permitting the generator to be returned to service in a shorter time. This feature is of utmost importance because the average utility is unable to keep pace with power demands and does not have sufficient reserve capacity available for such emergencies. Consequently some of the load is dropped and the consumers suffer.

Oil Switch and Transformer Compartments

Apparently no fixed or standard set up for oil switch and transformer fire protection has been adopted by the utilities at large, although recommendations have been presented by the N. E. L. A. In visiting the properties of the various companies, one finds a conglomeration of types and kinds of extinguishers, although the individual company is striving toward fixing standards.

Originally, fire protection for sub-stations, wherein oil switch and transformer compartments are more common, consisted of stand pipes, sand buckets and soda and acid extinguishers placed here and there upon the walls.

This apparatus was eventually replaced with carbon tetrachloride extinguishers of the one quart size and still later with the one gallon extinguisher under air pressure. (A few one gallon types have direct pump mechanism similar to the one quart).

Foam, in various size portable containers, has also found its way into the properties of the public utilities.

With the use of this type of apparatus, the electrical equipment is usually taken out of service, if not automatically disconnected, and electrical potential removed from adjacent equipment. It also causes the operator to approach through smoke and fumes to a vantage point before being able to apply the extinguisher effectively.

The Lux system of carbon dioxide treats the condition in a different manner. Standard Lux cylinders are manifolded together and connected to a piping system that leads to the various compartments to be protected. In the event of fire, it is only necessary for the operator to open a directional valve in the piping system (directing the gas to the proper compartment) and to operate an electrical control switch, thereby releasing the gas to the compartment in distress, extinguishing the fire, at all points, in about ten seconds.

This operation may be performed without any regard to the presence

of electrical potential. As a matter of fact, tests run in the laboratories of the Brown Boveri Company, at Milan, Italy, on the dielectric quantities of carbon dioxide gas, showed that the flash-over value of an insulator, when subjected to a CO₂ atmosphere, was increased from 158,000 to 185,000 volts, thus proving that no concern need be given to the effect of CO₂ on energized equipment, the insulating values of air being increased by the presence of CO₂.

As in the generator installations, the carbon dioxide is conveyed through pipe, in its liquid state, to the compartment or room to which the directional valve has been opened. Here it expands to a gaseous state, the gas being discharged through monel nozzles located at vantage points around the entire circumference of the room. These nozzles are so designed that freezing at the point of expansion is prevented and are so arranged that the gas is directed over the apparatus to be protected as well as on the floor or platform ledges where burning oil may be collected.

The entire space thus is almost instantly flooded with sufficient gas to reduce the oxygen content in the room below the point where it will support combustion, a sufficient volume of gas being provided to care for openings that may result from windows or doors being either blown open or permitted to remain open.

Tests were recently conducted for a large electric supply company in England where the object was to retain a sufficiently high concentration of CO₂ for a period of one-half hour in a room where in an electric arc was maintained over insulating oil subjected to 365° F. (open flash point): this stipulation being presented by the operating forces so that conditions under which they operate would be duplicated.

The chamber in which the test was conducted enclosed a space of 5340 cubic feet in which was placed a tank containing 287 gallons of switch oil. The oil was ignited by means of gasoline and high tension spark and permitted to burn for five minutes, at which time 320 pounds of carbon dioxide was injected. The fire was almost immediately extinguished and reignition was prevented for a period of 13 minutes.

Three windows, one door and three ceiling ventilators were provided, forming a total area of 87 square feet so that conditions similar to those found in their average stations would be presented.

I should also point out here that due to the extinguishing agent being applied in a gaseous state, all inaccessible ledges and crevices where smouldering may exist are sought out and extinguished immediately.

Telephone Switchboards

Those familiar with telephone switchboard fires know the damaging effect of soda and acid or any other liquid extinguisher and the use of extinguishing agents of this type causes many times more damage than the actual fire.

Carbon dioxide has been used for years by various telephone companies and its value in extinguishing telephone switchboard fires has

been proven. This extinguisher was adopted by the American Telephone & Telegraph Company and is now being supplied to its associated companies.

General Description

In general, the Lux system as designed for central station use, consists chiefly of a battery of standard Lux cylinders to which is fitted a special quick release valve connected to a syphon tube. The valve outlets are manifolded together and are connected to a piping system that leads to the generators or rooms to be protected.

For the purpose of eliminating maintenance the entire cylinder assembly, together with the trip mechanism is mounted on a platform scale to detect accidental discharge or leakage of the gas, each cylinder being charged to 50 pounds of carbon dioxide at a pressure of 850 pounds per square inch at 70° F. To the balance beam of the scale is connected a signal alarm, giving a constant check on the condition of the apparatus.

Equipment supplied for generator protection consists of two batteries of cylinders, one battery being simultaneously discharged immediately on the functioning of the differential relays, the other being discharged, one cylinder at a time, by means of a delayed release mechanism. The time lag for the discharge of each cylinder is predetermined by tests conducted on each generator. The delayed release of CO₂ gas serves to compensate for leakage, thereby maintaining the desired inert atmosphere throughout the entire deceleration period.

Where the system is required to protect more than one generator, electrically operated directional valves are introduced and function on the operation of the system, directing the carbon dioxide into the proper machine. Tests conducted on generators equipped with the Lux system showed that within from 10 to 15 seconds after the operation of the differential protection, a sufficiently high concentration of CO₂ was present to extinguish all flame. About 30 seconds later, sufficient gas was present to permit the dissipation of heat and at the same time compensate for the readmission of air, thereby eliminating the possibility of the fire rekindling.

This concentration was maintained by means of the delayed discharges of gas injected into the ventilating system throughout the deceleration period by means of the delayed release mechanism previously mentioned.

Representative tests for transformer and oil switch compartment protection, where 100 gallons of oil and flowing gasoline were permitted to burn for several minutes in a room having a content of 10,000 cubic feet, showed the fire extinguished in the order of from three to five seconds.

The rapidity in which fires can be extinguished by the Lux carbon dioxide system is based on the principle of carrying the carbon dioxide, in its liquid state, to the point of discharge where it expands to a gaseous

state, at a ratio of about 1 to 450. The rapid discharge is made possible through the use of a special quick opening valve that functions on the propelling of an arm through an arc of about 120°, the arm in turn driving a special circular cutter through a disc, liberating the contents under its own pressure into the piping system. This disc also functions as a safety valve.

Specially designed monel orifices are fitted to the pipe outlets, where expansion takes place, eliminating the possibility of freezing.

With the general trend to increase the capacity of generating equipment as well as transformer and oil circuit breaker equipment, wherein larger quantities of oil are involved, it is logical to believe that fire protection has been proportionately increased. Unfortunately this has not been the case. Fire fighting equipment that may have been adequate 15 years ago when a plant having two or three, 5,000 or 10,000 K. W. turbo generators was considered a fair sized plant, is not capable of meeting conditions of the present day when we speak of 200,000 K. W. generators and of turbo generating stations of 300,000 and 400,000 K. W.

A glance at reports issued by the National Fire Protection Association, as well as reports from insurance companies, shows that fire losses are on the increase. In the United States fire losses for the first six months of this year have increased about 16 per cent over the same period last year, the losses being respectively \$228,785,700 and \$197,547,300.

Fortunately, losses of life from fire causes have slightly decreased. Nevertheless, if injuries involved in fires run true to form, we may consider their increase for the first half of this year to be equal to the increased per cent of fire damage, namely 16 per cent, it being reported that no unusually large individual fires caused this increase.

It is almost impossible to collect data as to the losses experienced by public utilities, but it is reasonable to believe that they have kept pace with the general increase.

A Few Examples of Recent Costly Fires

Here are just a few of the more recent and costly fires.

- (a) Five oil switches fail—fire lasting 1 hr. and 15 min. Loss \$10,000.
- (b) Oil switches and transformers fail—fire lasting 1 hr. Loss \$100,000.
- (c) Switches fail—fire lasting 30 minutes. Loss \$7,500.
- (d) 30,000 K. V. A. turbo generator fails. Loss approximately \$45,000.
- (e) 30,000 K. V. A. turbo generator fails. Loss approximately \$45,000.
- (f) 35,000 K. V. A. frequency changer fails; duration of fire 2½ hours. Loss \$60,000.

In each of these cases, hand apparatus was used (with the exception of the generators where steam was used) without any material effect.

Does this not prove that more consideration must be given to fire protection which is capable of taking care of the severest condition without subjecting your employees to the hazards of fire?

Compensable accidents and fire losses can be materially reduced by employing a fixed system with the use of carbon dioxide as the extinguishing agent, thereby limiting the losses to the actual loss caused by the incipient fire, without subjecting your workmen to unnecessary hazards.

Discussion of Fire Prevention and Fire Fighting

CHAIRMAN McCULLOCH: We still have 20 or 25 minutes in which we can have a discussion on the subject of fire prevention or fire fighting equipment. It will be necessary, then, to leave in order to get over to the Tuller Hotel in time for the luncheon.

MR. HARMER: I would like to have Mr. Eberhardt go into the subject of the maintenance of this class of equipment. We all know that the maintenance of fire equipment is one of the greatest factors in maintaining efficiency. I would like to have Mr. Eberhardt answer how you can inspect this class of equipment thoroughly and how you can maintain it and how you re-fill the containers? Has he any system that he would suggest?

MR. EBERHARDT: Maintenance, I might say, is nil. Carbon dioxide does not deteriorate and is good until used. The only possible chance of it being necessary to recharge the cylinder is where it might leak or might be used on fire, of course. For maintenance purposes, we install the larger assemblies on a platform scale. That scale is connected to an electric contact and will indicate in the operating gallery, or wherever you may want to locate it, where the cylinder may be individually weighed, which one has been tampered with, or is low. The smaller apparatus contains $7\frac{1}{2}$ pounds of CO_2 and is weighed periodically every six months (we recommend), to determine its contents. The CO_2 itself will not freeze under severe climatic conditions and you do not have that condition to worry about.

As to re-charging, any carbon dioxide gas manufacturing company, and there are several hundred in the United States, can recharge your equipment. We have a list of about 100 who are thoroughly familiar with the re-charging and can take care of it, usually locally. Any place where they are making CO_2 for soda water, you can get your cylinders re-charged. The cost varies with the location of the source from which they get the CO_2 , and varies from three to five cents a pound, which is relatively cheap, meaning about 50 cents for a small cylinder.

MR. STEWART: Mr. Eberhardt, I would like to ask as to the reduction of insurance charges. It is of vital importance to the operating company if it knows what the effect is on their fire insurance rates where this equipment is installed.

MR. EBERHARDT: That question is quite frequently put. There is no direct influence on fire insurance rates. We have submitted to the under-

writers certain equipment and we hope in a short while we shall be able to get some discount. In Sweden, a reduction of two-tenths per cent is permitted providing the discount does not exceed the cost of the apparatus; it comes near that for a three year^{ly} term.

In the Marine field, the equipment is recognized and insisted on as an alternative for steam. In plant installation, we have another class of insurance to deal with and it is relatively new. We hope in a short time that some consideration will be given it. I know that the insurance companies with whom we are in contact heartily approve the extinguisher, and have recommended it in quite a few cases. As a matter of fact, that is how most of them get in.

MR. LUECK: Mr. Eberhardt, how close does that extinguisher have to be to your switchboard to make it effective?

MR. EBERHARDT: Your equipment is designed for low tension equipment; and within four feet is close enough for switchboard wiring. The other systems are piped in.

Additional Organization on Fire Protection

MR. HARMER: Due to the close relationship between the fighting of fires and accident prevention, I would like to make a motion for the new administration to consider, and that is that we have a division in our Section—we have one now on electric and gas—I would like to make a motion that we have one on fire protection. We, as accident prevention men, can not lose sight of the fact that we are interested vitally in the protection of our properties from fire. We all know that we have many accidents due to fires in stations and in properties that we very rarely touch on in this Section.

I would like to make a motion like this: that we create another vice-president in our Section in charge of Fire Prevention in Utilities.

CHAIRMAN McCULLOCH: Would you want to include in that, Mr. Harmer, that for this year that vice-chairman be selected by the newly elected executive committee?

MR. HARMER: Yes, that is what I meant.

The motion was seconded.

CHAIRMAN McCULLOCH: You have heard the motion that a new office of "Vice-Chairman in charge of Fire Prevention" for the Public Utilities Section be created. Is there any discussion?

MR. MACLACHLAN: Mr. Chairman, I would like to make an amendment to that motion. If we start creating vice-presidents for every phase of the work that we are vitally interested in, I am afraid we will all be on the executive committees. Wouldn't it be better to create a committee to take this matter in hand under a chairman to look after the situation for this year and leave the matter of the creation of an office until next year? I make the amendment that a committee be appointed under a chairman to go thoroughly into this question and make a report at the next meeting.

MR. HARMER: Mr. MacLachlan's amendment is very satisfactory to me, Mr. Chairman.

CHAIRMAN McCULLOCH: All right, that will be recommended, then, to

the new executive committee, that a committee chairman be appointed by the executive committee, this chairman, of course, to select his committee to consider this subject during the coming year. Is there any discussion now on the motion?

MR. MULLIGAN (Hydro-Electric Power Commission, Ontario, Canada): As both Mr. Harmer and Mr. Eberhardt say, fire protection is closely allied to every safety engineer's work. There was an excellent paper or report of the National Electric Light Association, by Mr. Rutland, who was committee chairman last year. As Mr. Eberhardt mentioned, in electrical fires, our main thing is speed, get the fire out quickly. If we have an oil fire, your station becomes covered with soot; you not only have your interruption due to the fire and destruction of apparatus, but you have got the cleaning up of the station. If you are maintaining service and attempt to clean up a station, all you gentlemen know the hazards that are presented. So speed in putting out a fire is essential. For protection of generators, the carbon dioxide protection, I think, is wonderful for turbine generator sets. On water wheel driven generators I do not know as I have seen any installation where it has been successfully installed as one of your big troubles is ventilation. We went into the matter very thoroughly and found that it was very, very difficult.

Quoting a Paper on Generator Protection

Last May before one of the Sectional meetings of the A. A. I. E., at Niagara Falls, Mr. Johnson, an electrical engineer of the Niagara Falls Power Company, gave a very good paper on generator protection. They used water. Their system is so arranged that if carbon dioxide is further improved, carbon dioxide may be used in place of water. For ourselves, at the present time we have had good success in our new installations by straight relay protection. If your relays operate directly and in a fraction of a second there is very little to burn. Of course, that is coupled with maintenance. It keeps your machines clean and you have good relay protection and you will never be troubled very much with generator fires.

For transformer rooms and all switch compartments, I think that the question of carbon dioxide protection must be taken into consideration when the plant is being designed and the rooms built accordingly. Otherwise, I think it would be an impossibility. For switchboard work, there is a field for an extinguisher such as the type that was demonstrated this morning. We all know the mess that soda acid makes on machines. This machine, I think, will overcome that.

I would like to ask Mr. Eberhardt the length of time of discharge for a cylinder of that nature and the probable area which it would cover? And while I am on my feet, there is one question I would like to raise: the Underwriters insist on sand pails in stations, why do they do so? Our experience has taught us that they are not worth a continental except to throw the sand around the floor to keep the men from slipping, but in putting out a fire in an electrical station we are convinced that they are

absolutely useless, but the Underwriters insist on so many sand pails in so many hundred square feet of area.

MR. EBERHARDT: That depends on the opening of the cylinder, the opening within the cylinder, and the amount of gas; about 40 seconds. On a 50 pound cylinder, we discharge in a shorter length of time by having a larger orifice with the smaller unit, which is fully as adequate; we discharge in the air in about eight seconds, discharging more gas than is in this particular apparatus.

Putting Out Oil Fires in the Tanks

MR. ATWOOD: I wonder if any of you have this type of extinguisher on oil tanks?

MR. EBERHARDT: There has been considerable experience in Marine work on oil tanks. I know of about four cases where CO₂ has been used to put out oil fires in the tanks. In plant experience we have only had one experience, and I have been asked not to mention the particular name of the company using it, but the installation on there is descriptive, where oil kettles are used, boiling kettles. A fire occurred in July of this year. The engineers stated in writing us that the "Fire was more severe than during your test. All that we did was push the button and the fire was out." They immediately went back to work after ventilation. The Marine installations have been quite successful. We have not had any failures as yet. We do not want any.

MR. WILSON: This is a little bit off the line of electrical hazards, but I would like to ask Mr. Eberhardt in estimating that CO₂ for an oil burning kettle, would you pipe that directly to a hooded cabinet?

MR. EBERHARDT: It is possible to apply CO₂ to a hooded kettle by creating a CO₂ blanket over the open spaces. That is accomplished by an arrangement, a nozzle arrangement, whereby the gas will come out in spray form. A certain amount of gas is provided for closing off the opening, and the remaining gas is injected into the space itself. It is preferable, however, in rooms such as shown there, to flood the entire space because of the fact that a flash in one kettle may mean the fire is extinguished from one to the other. They are hooked up to a common ventilating system of some sort that usually causes a fire to continue from one kettle to the other.

MR. RALL: I would like to speak of an instance that came up in the refilling of a carbon tetrachlorid extinguisher. We should use an extreme amount of care to know that that is absolutely carbon tetrachlorid for this reason: there was a mistake involved in one case that I intimately know of in which the carbon tetrachlorid was not put into that extinguisher, due to the fact that they were using the chemical expression and they used one of the most hazardous things that I know of, carbon bisulphide. But they happened to notice it and a catastrophe was avoided. There is only one way to avoid that, and that is to smell of it. Carbon bisulphide smells like rotten eggs. But we have got to watch that carefully.

MR. HARMER: The most simple test for all of us to make, to be sure

that we are using proper carbon tetrachlorid, is to take a box of safety matches, any box of matches, fill it with the liquid that you are going to use, take your match out, and if it lights on the side of the box, it is carbon tetrachlorid. Be sure there is no moisture in the solution that you are using and it is a proper solution. You can make your test in a few seconds. We are instructing our men in testing our extinguishers to make that test every once in a while. I wish we had some carbon tetrachlorid here and I would show you. Tomorrow, I will borrow an extinguisher and show you just exactly how the test is made.

CHAIRMAN McCULLOCH: I am afraid we will have to close the discussion on this subject. We have just 20 minutes to get over to the joint luncheon. I am going to ask that you remain until the final announcements are made in order to avoid confusion.

I feel that I would be remiss in my duties if I did not thank the Detroit Edison Company for providing us with these quarters this morning. I am sure it has been a great help to our meeting, and on behalf of the Public Utilities Section, I want Mr. Opp to convey to the Detroit Edison Company our appreciation.

While on the subject of Mr. Opp, I just want to mention some of the work that he has done for this Section. Four years ago he was chairman of the bulletin committee that provides the posters for this Section. The next year he was elected secretary of this Section. For the past two years he has served as vice-chairman in charge of electrical interests. I am sure we were all pleased to hear this morning of his nomination and election as chairman, and I want to be the first one to congratulate him on this office, and ask him if he wants to say just a word to us.

MR. OPP: There really isn't much, gentlemen, that I can say at this time. You always get the stereotyped appeal from the new, incoming officers, for your help. I am not going to ask for it because I know I am going to get it. I want to measure up to the efficiency demonstrated by the new office boy who came to the boss and said, "Here are my 10 answers to this question." In other words, the same attitude as the school master, possibly, who asked the boy if he were learning anything; and the boy said, "Yes, I am listening to you."

Now, we don't want you to take that attitude with us. Don't expect us to tell you things. We just expect you to help us do things, and I am sure that with the help that has been demonstrated in the past, there isn't any question but that our Section will continue to grow. We have a real responsibility to meet, and we have an increasing membership to serve, and all in all this job spells responsibility. I guess I realize it more than anybody else. If I can, in anyway, have you share that responsibility, I am going to feel free, and I know I will get your cooperation in the solution of the things that need to be done.

I sincerely thank you for my selection to the high office of this particular Section, and you have my promise to do all that I can possibly do.

ADJOURNMENT

THURSDAY MORNING SESSION

October 28, 1926

The meeting convened at 9:50 o'clock, Mr. B. B. McCulloch presiding.

CHAIRMAN McCULLOCH: I want to call your attention to the sectional poster catalogue issued for the Public Utilities Section. This is the first sectional poster catalogue that has been issued by the National Safety Council, and I am sure that it will prove of help in selecting posters to meet your individual needs.

The secretary has gone over the registration cards and finds that there was a total of 163 registered at our meeting yesterday, representing 18 states and Canada. I am sure our attendance is nothing to be ashamed of this year.

It was suggested by one of the members of the Executive Committee this morning that the Public Utilities Section should take into consideration Accident Prevention in water works operation in addition to the electric, gas, telephone and telegraph divisions. I would like to see a show of hands this morning by all those in the room who are interested in water plants. By that I do not mean hydro-electric stations, but water works.

(Six raised their hands.)

CHAIRMAN McCULLOCH: It would be well for the new Executive Committee to take into consideration the rendering of some service to those companies, and that matter will be taken up at their meeting today.

Mr. Opp told us that an unusual accident occurred last night, and I have asked him to take a few minutes before we start our regular program to tell us something about it.

GEORGE OPP (Detroit Edison Company, Detroit, Mich.): This is rather confidential information. Shortly after getting home from the banquet, the lights went down suddenly in my home and finally went out for a period of a minute. Immediately I realized that there was some trouble. The telephone began ringing and I was informed that an operator had been injured and that he was being rushed to the hospital. There were no details available, so we immediately went out to the scene of the accident and found some circumstances that tied in very closely, very vividly, with the remarks that Mr. Dow made yesterday afternoon, and the remarks of Mr. Kettering last night at the banquet.

This young man who was hurt was a modern Romeo. Upon his person we found a book in which he had a directory of the dames within his acquaintance. He had them checked off with various symbols, which perhaps represented the various days of the week.

He had without any instruction made the comment to the operator, "I am going out to look over the plant," and about five minutes later, bang! and the station went flat. He had been asked at 11:00 o'clock, the

time at which he reported for duty, to report in here this morning for an investigation into the accident to which Mr. Dow referred yesterday.

It developed that this same young man was asleep on the job the night this other accident occurred. It is the rule of this company that two men perform any operation. This man who was asleep at that particular time was to be reprimanded this morning. He also had not received recent raises as he expected, so I guess he put two and two together and apparently decided that his jig was up.

On top of that, we found out in making our investigation that he had been asking very peculiar questions of the operators with whom he was associated. In his 14 months with us he had been with quite a few, since the operators, after a brief experience, didn't want him because they said he was no good for the company. They would complain about his going out in front of the sub-station and sleeping in his automobile occasionally while he was on duty. One of the men told us about an instance when he went out to the top of our Navarre station, an outdoor sub-station, to test out the Leopold-Loeb theory of whether a cat lands on all fours when dropped from a great height.

Tragic End of an Erratic Young Man

Incidental to that, he wondered what happened on a rotary converter? He asked another operator if the wrong transformer connection was made, what might happen? He had a very inquisitive mind. He was clever and bright; in fact, although only 29 years of age, he passed the first-class radio operator's license test. Although he was clever and bright, the class of literature we found at the plant indicated the kind of mind that he had.

All this went to show that he had stored in his mind a problem that hadn't been settled, and being on the verge of being fired, he wanted to settle it for himself. We found that he had taken a wire, about a number 12 and had attempted to make contact with the live side of the disconnect switch while standing on a part of the steel structure of the station, and what happened was that the current came down through the wire that was wound around his arm, burning open his arm at the biceps, went down through his middle part and out through two points on either foot. He died three hours later.

There is an example of the kind of mind that Mr. Dow mentioned yesterday in his address at the Public Utilities-Electric Railway Sections Joint Luncheon. The kind of reading that lad was doing was indicated by the book topmost in his drawer, which was one of these lurid-literature magazines. Those books were being read contrary to the company's rules that no literature of this kind be permitted on the premises.

It is the mind that is responsible for a lot of these happenings, and as Mr. Kettering indicated last night, there isn't any question but what that lad was working on impulse rather than on thought.

We stayed up all night; three of us haven't touched the bed yet. In the course of our investigation, we made trips back and forth from the hospital to the scene of the accident in an effort to get the last bit of detail from the man himself, and invariably that same stolid answer came

back, "I don't know! I won't tell you! I don't know," indicating that he was going to hold out until the last.

At the hospital I saw the most pathetic scene I have ever witnessed. His father is a blind osteopath, and his mother is about as small as a bit of humanity can be. She was trying to console this big, blind doctor and he in turn was trying to console her.

CHAIRMAN McCULLOCH: I am sure we all appreciate this frank description of the accident by Mr. Opp. If we were all as frank in describing our own accidents without attempting to cover any details, we would get more benefit from our meetings.

The first paper this morning is to be presented by Mr. E. J. Kallevang, Chief Engineer of the Wisconsin Power and Light Company at Madison, Wisconsin.

GROUNDING PRACTICES

E. J. Kallevang, Wisconsin Power & Light Company, Madison, Wis.

This subject is rather broad and can not be adequately covered in a brief paper.

There are two general divisions under the subject that will be considered: first, the permanent grounding of electrical circuits, and second, the temporary grounding of electrical circuits.

Permanent Grounding

The advantages gained by grounding low voltage lighting and power circuits are now well established and grounding of these circuits is almost a universal rule. However, there remains a great deal to be learned about grounding material and the best method to use for the various soil conditions encountered.

Occasionally one is informed that shocks are received and even deaths caused because the system was grounded. This brings up another matter which I shall not discuss, except to say that the cause of the shock or death was due to faulty construction or improper use of the device or wiring and is not chargeable to the practice of grounding where grounds properly belong.

Most utilities place one or more grounds on each transformer secondary or use a common neutral or grounding wire which is connected to earth at many points. Whether the individual transformer grounding method is used or the common wire, there must be sufficient ground capacity to insure effectiveness of the ground connection under excess current conditions caused by accidental contact or grounding of any ungrounded conductor of the circuit or adjacent circuits including the failure of the insulation in the transformer.

The location of the ground connection must also be such that in case of a break in the conductor between the transformer and any utilization equipment that the source of supply will still remain grounded. This

requires that the ground be at the transformer in the case of a single ground or on adjacent poles in case of two grounds.

There is much to recommend a common or system ground. The cost of such a conductor is not much more, if any, than providing individual grounds for each transformer. Where the water mains are used for grounds, the common grounding conductor will provide economical ground connections for a very large part of the distribution system.

As communities grow, transformer capacities or the number of transformers increase, and additional individual transformer grounds are invariably required, but not always supplied. If the common ground wire is used, the expense of driving pipes or making new connections to water pipes can be avoided.

Types of Grounds

The most common grounding device is a galvanized iron pipe ranging in diameter from one-half inch to two inches and in length from five feet to about twenty feet.

The usual standard is one inch diameter and seven feet long.

There are available a number of patented grounds in the form of cylinders or cones filled with some moisture retaining material and copper covered steel rods. Some of these cones and cylinders are supposed to store water during wet seasons to be given out during dry seasons. There is no doubt that this is their performance, however, the volume of water that these containers can store is very small and is absorbed by the soil in a short time. In spite of this, however, they do have some advantage over driven pipe, in that they furnish a much larger contact surface at the lower end than pipe. The copper covered steel rods have no advantage over galvanized pipe other than increased life and cleaner contact surface. The usual copper covered steel rod is smaller in diameter than the usual galvanized pipe, presumably on account of its cost. This is a disadvantage.

Plates buried in the ground are generally supposed to provide excellent earth connections. Copper plates as large as three-eighths inch by four feet by six feet and in some cases larger, have been used. This type of ground is very expensive on account of the cost of copper plate and because of the large excavation required. I believe in some localities the use of plates has decreased, as in most places the same results can be obtained at considerable less expense by the use of pipes or cylinders.

As to water mains, there is not much to be said except they offer means of obtaining the best earth connection possible, and should be used wherever they exist.

Salt is frequently used to lower the resistance of grounds. While salt does accomplish this at least for a time, the continued use of it will destroy the ground pipe or plate. It is better to spend the extra effort in providing grounds that do not need salting.

To place grounds in service and operate grounded systems without knowing the value of the earth connection in various locations and under

varying conditions, is somewhat like starting the units in a power station and operating them without the aid of any instruments.

If there is a difference, it is because we think we can get by in the first case and in the second we feel that we can not. The many records of accidents due to improper grounds should be convincing statistics that we are not getting by with poor grounds, and we should not continue to fool ourselves, but test and know.

There are many methods available for making tests, none of which are very complicated, nor do they require expensive equipment, the simpler ones being the use of a magneto, single voltmeter, fuse or lamp bank. The magneto and single voltmeter method has very little value, because of the small amount of current used. The fuse and lamp bank is somewhat better, its value depending entirely on the size of fuse or lamp bank used. The voltmeter-ammeter method is to be recommended, of which there are several variations that can be employed.

Again I want to suggest that grounding of secondary lines is essential to safe operation, both along the lines and on the customers' premises.

If there are any states where the Safety Code does not require grounding, the operating utility should include in their construction standards rules and methods for providing adequate grounds. The Company's Service Rules should include rules covering the installation of grounds on the customers' premises when the place is being wired or rewired before service is established. Briefly:

1. Make good connections to earth.
2. Keep a record of all locations and types of ground.
3. Test at regular intervals, the frequency of which will depend on the kind of soil and type of connection.
4. Improve all grounds that are inefficient.
5. Maintain proper mechanical protection over the connections to avoid destroying them and prevent accidental contact by the public and employees.

Temporary Grounding of High Voltage Lines

The grounding of high voltage lines to make them safe to work on is a different problem from permanently grounding low voltage lines.

It would seem some improvements can be made to devices used and their method of application. The devices not in general use are chains, of all descriptions, flexible metal ropes used in the same manner as chains, a combination of conductor clamp and ground clamp connected with flexible metal rope, and permanently installed disconnects other types of switches. Here and there one finds some kind of popular kink used for grounding lines. The use of such kinks should be forbidden and nothing but a business like device considered.

If lines have no permanent overhead ground or static wire and wood supports, temporary ground rods must be used. In the use of the temporary ground pipe lies the first hazards. The placing of a small rod in the ground but two or three feet is not sufficient, except in rare cases.

A good substantial contact with the earth is as essential here as in making a permanent ground for any other purpose. At least the connection must be adequate for the period it is used.

The connection to the pipe ground is usually a chain. Most utilities have at one time or another used arc lamp chains for this purpose and some still consider this a safe practice. An improved chain is made of short twisted iron links heavily copper plated. The short twisted links slide over the conductor more readily, kink less (or perhaps I should say, unkink more easily), and the copper plating increases the conductivity not only along the sides of the links but especially at the joints or contact surfaces between links. These are important features, especially the last.

Connection of the chain to the temporary ground must be well made and should, of course, be made before the chain is pulled up over the conductor.

The length of chain used or available for pulling up over the conductors should be such that the person applying it can not get a hold of the chain. In other words, assuming a 35 foot pole (30 feet above ground) and one 10 foot crossarm, the available chain should be about 45 feet long. In order to avoid carrying chains of varying lengths to meet different heights of poles, a longer chain may be carried and necessary length adjusted at the grounding point.

Two Ropes Should Be Fastened to the Chain

Pulling the chain over the conductors by taking hold of it is a dangerous practice. Two ropes should be fastened to the chain. These should be about $\frac{3}{8}$ -inch treated rope absolutely free from any conducting material. One rope should be fastened to the ungrounded end of the chain with a length such that it will reach over the conductor to the ground. A second rope, to be used in removing the chain, should be attached to it about 15 feet from the other rope. With this arrangement, it is not necessary to come in contact with the chain whether you are pulling it off or on.

Grounding chains have little value as a grounding device unless they are taut. For this reason no one should be in contact with or stand close to a chain when it goes over the line. Should the line be energized and capable of carrying considerable power, the chain would melt or even explode. It is well to have some rule regarding the tension of chains when in service. If the strength of conductors permits, there is no reason why the tension should not be 50 pounds. The minimum should not be less than 25 pounds. Circuits of flat construction carrying three or more conductors should not be grounded close to the arm if chain is merely pulled over the top, as this prevents getting a good contact with the middle wire. The chain should be placed at least 25 feet from any crossarm.

It is the practice of some companies to run the chain around two of the conductors and then back over the third. This arrangement gives very good contact on all three conductors and special provision for shorting two of them.

Let me suggest to those who are especially interested in producing new and useful devices that they direct some of their efforts toward providing

a flexible non-snarling copper cable, whose lasting qualities would be better than that of copper conductor cable for the purpose of replacing the chain now used. A cable of this kind would provide all the carrying capacity necessary and eliminate the hazard of chains exploding.

There also is need for better equipment to be used by field crews in determining whether lines are dead before applying the grounding device. I think in most cases nothing is used to determine this. There are many types of voltage detectors that can be purchased, some of which are light and small in size, hence easy to transport, that can be used by field crews for determining whether a line is charged or not; but practically all of them under some conditions give a false indication, that is, the voltage that causes them to operate may be power or it may be induced from adjacent lines. Some forms of insulator testing sticks can be used in the same manner.

While my experience with devices for this purpose is somewhat limited, yet I believe that several of the present high voltage detectors can be modified to meet this requirement and give positive readings. Some of the insulator testing sticks or instruments now will give a pretty fair indication if comparison in readings is made between a line carrying power and the line that is supposed to be cut out. Testing for voltage on an isolated line—that is one removed from the influence of any other line—is quite simple and generally reliable. The commercial voltage testers are not designed for operation on the higher voltage lines, the limit is somewhere between 15,000-25,000 volts.

There remains, therefore, the insulator testing devices for determining the presence of voltage on the very high voltage lines. Some use the hook stick that is used for applying the grounding clamp to determine if the line is dead, and in stations the disconnecting pole is used. This is better than nothing but not always reliable, especially if no comparison is made with adjacent live lines.

Potential Transformers May Determine Voltage on Line

In stations potential transformers can be used for determining the amount of voltage on a line. This provision should be included in the design if no other means are available.

I think the operators of high voltage lines would welcome a better device for testing out dead lines before applying the ground. Those who have any means for research along this line should do what they can to bring out this very important apparatus.

When lines are constructed using wood poles and no ground wire, there should be included as a part of the standard and cost of construction ground facilities along the line. This can be done by driving pipes near the pole at every half mile. The poles having ground connections should be stenciled "Ground" or other suitable designation. This facility would hasten repair work and avoid some of the accidents we now have, due to improvised earth connections.

Lines having permanently grounded metal supports or ground wire can be grounded quite readily by using a clamp which is first attached to the

tower or ground wire and connected to the conductor clamp by flexible cable; then the conductor clamp is attached to the conductor by the use of an insulated pole or hook stick. The clamps must be so designed that when once attached they will not be loosened by the usual movement of the conductors when worked on. The tower clamps are generally held in place by a set screw and the wire clamps in place by either spring clamps or screw clamps. The latter seems preferable.

Wherever possible permanent grounding devices in the form of single or gang operated disconnects should be provided at stations. While these may not prevent shocks to linemen due to static or induction, they would make the application of local grounds along the line much safer. These switching devices would serve best if so arranged that they would go in place as soon as the line is dead and would be interlocked with the breaker in such a manner that the breakers can not be closed as long as the ground disconnects are closed. These operations can be performed electrically or mechanically. If the electrical supply is not absolutely dependable, then mechanical interlocks and mechanisms are preferable. Reliable equipment for this purpose is a standard product with many manufacturers and has given excellent service.

Voltage Picked Up by a Dead Line May Be Considerable

No definite rule regarding the location of grounds with respect to location of linemen should be made unless local conditions are known. Single circuit lines located a long distance from any other high voltage line will not require grounding as near to linemen as a double circuit line or separate lines along the same right-of-way.

Generally it is sufficient to ground within one mile and on each side of linemen on isolated single circuit lines, and within a half mile and on each side of the workmen on double circuit or its equivalent in single circuit lines along the same right-of-way.

The voltage picked up by a dead line that is close to a live line is considerable and must be guarded against. The amount of induced voltage from adjacent lines will depend on weather conditions, frequency, voltage and load of live line.

The same precautions used in making repairs must be taken when building new lines adjacent to lines in operation. It is also good practice to ground new isolated lines at different points, although either end may not be connected to any station or lines in service. There always is in the air a certain amount of static that if permitted to accumulate on the conductors may cause a shock. Then, of course, there is the hazard from lightning.

I think it very necessary that all ground equipment be only first class, both as to material and workmanship, and further that men operating these devices be fully acquainted with their use and the electrical system on which they are applied.

The man applying a ground expects that all previous operations have been made in regular order, however, he must not assume that the part he is to perform is simple. His is the last operation in killing high volt-

age lines and on him rests the responsibility of making sure that the line will be safe to work on. If through some error over which he may have no control at the time, the line is actually alive, the grounding must be done in such a manner that no accidents to persons will result.

It is very desirable that a "Hold Card" or similar identification be placed on grounding devices if they are not located in the immediate vicinity of the crews who are protected by them. Ground chains that reach the ground should be guarded by one of the crew, if there is the least possibility that they will be tampered with by children or others. I know of one case where a grounding chain, that was in service, was stolen by a farmer living near its location. This was done when the crew was on the opposite side of a hill and about a half mile away.

Statistics Upon Electrical Accidents

In my own state during the year of 1924, electricity caused a total of 87 injuries of which 14 were fatal. During the year 1925, there were a total of 77, of which 22 were fatal. During 1925 there were 10 less accidents, but eight more deaths. Some of the fatal accidents were caused by improper grounds or grounding methods or no grounds at all. For example, one man attempted to place a grounding chain or similar device on a line that he thought was dead. This accident should, of course, have been prevented by having a clear understanding that the line was still alive. However, had the grounding apparatus been applied with the proper precautions, no accident to the man would have occurred.

In another case a lineman was making up the dead ends of a line that was located on the same structure with a high voltage line. His foot slipped, the end of the new wire came in contact with a high voltage line. An effective ground at or near the structure the injured man was working on would have prevented this accident from being fatal, at least.

A grounding chain had been placed over a 33,000 volt line and after the work was completed two men were to remove the chain, and a third was to close the switch after the chain had been removed. The chain was too long for the particular location and as soon as some of the chain had been pulled off the ground one of the men started to coil the chain. The motions of this man's arms were taken by the person who was to close the switch to mean that they were through. The switch was closed while the chain was still on one of the conductors, causing serious injury to the person coiling up the chain.

A lineman attached a ground chain to his belt, then climbed a pole and threw the chain over a high voltage transmission line, apparently thinking that he was on a 2,500 volt line, which had been cleared for him.

A lineman forgot procedure in removing ground chain. He first removed chain from tower and then took hold of conductor to take the chain off. He received serious burns to his feet and hands before another workman grounded the conductor and released him.

A lineman on a steel tower threw a grounding chain over a 100,000 volt circuit which was alive through a misunderstanding. The tower stood on a rocky hill so that the ground current was not sufficient to trip the circuit

breakers, but when the lineman who, of course, was aware that he had grounded a live line, climbed down the tower and placed his feet on the ground, was knocked down and also his helper who went to assist him, and finally a team of horses, tied about 200 feet from the base of the tower, was knocked down, but later got up and ran away.

A brass grounding chain was thrown on a 22 K.V. line entering a substation. The chain was given two turns around the station ground bus. The grounded bus paralleled a 66 K.V. circuit for several miles. After grounding, the workman climbed a ladder to clean some bus supports and with one hand on the conductor happened to touch the steel frame-work with the other. He received a severe shock and was thrown to the floor 18 feet below, the fall being somewhat cushioned by a lightning arrester so that he was not hurt beyond severe bruises. Upon investigation, a small portion of the chain was found to be coated with a film of oil and when shaken there was severe flashing from induced currents coming over the 66 K. V. line. This accident illustrates the importance of keeping ground chain absolutely clean and in putting it on the line to have it pulled reasonably taut in order to get a positive metallic circuit to the ground.

Grounding and Ungrounding Can Be Done Safely

These are records of accidents, each with a different cause. There are many more records which list accidents due to grounding. Again I wish to repeat that if mistakes are made in clearing a line, it must not be during the last operation or in energizing a line, no mistake must be made during the first operation.

Grounding and ungrounding can be done safely. There must be a thorough knowledge of conditions; clear and complete rules are necessary, and these followed; men must be trained to know how; equipment must be designed for the particular work and capable of withstanding the capacity of the line and applied in a manner that insures safety.

There are other important factors, I believe, in providing adequate grounds, grounding methods and the prevention of accidents. Briefly, these are:

Design, management, and foremanship; in other words, the engineer, superintendent and foreman. The design or arrangement must be such that it is entirely adequate to meet all usual requirements and many extraordinary conditions; it must be safe and easy to operate and maintain. The foreman is the right arm of the superintendent; therefore, he should be regarded as the most important member he has. To give a foreman a print or letter and tell him here is the job and then forget it, is not entirely fair to the foreman and the men under him. The foreman's work is not always pleasant nor easy, he needs the superintendent's support, not at the office only, but right on the job. It is the engineer's duty to make the plans, and the superintendent's job to assist the foreman in doing the work called for. The superintendent who places too much confidence in the foreman and leaves too much up to him is putting his right

arm in a sling. Some of the accidents that have been charged to the foreman are largely due to the man above him.

The closest kind of cooperation is essential between these three positions.

The necessity for safety is not accidental. It is scientific and research is essential. In every public utility a safety organization, which includes the entire personnel, is an investment on which the utility and community have a right to capitalize, as it will return tangible dividends and bring to all of us some reward.

CHAIRMAN MCCULLOCH: The subject of grounding is of interest to all men in the electrical industry. It is a subject that has been purposely avoided by the Public Utilities Section for the past few years because of the divergence of opinion among the engineers themselves. It was necessary this year, however, on account of the number of requests, that it be placed on the program, and I am sure we are all glad that it has been done.

About a year ago, the National Electric Light Association, through their General Accident Prevention Committee, assigned this subject to the accident prevention committee of the Great Lakes Division under the chairmanship of Mr. Burton of the Consumers Power Company. Mr. Burton appointed a sub-committee to make a report. Mr. Ivan L. Scott was chairman of the sub-committee, and in the preparation of his report he had the assistance of Mr. Kallevang, who has just presented this paper. The discussion of the paper will be led by Mr. Scott at this time.

DISCUSSION OF MR. KALLEVANG'S PAPER, "GROUNDING PRACTICES"

Ivan L. Scott, Wisconsin Power & Light Company, Madison, Wis.

This subject has been covered so thoroughly and in detail that there is little left upon which to comment. However, there are several things which may be added, and upon which some emphasis may be placed.

Ground connection to electrical equipment is made for several reasons. Among these are safety of equipment, improved operating conditions, discharge of lightning or other abnormal voltages, but one of its most important functions is to prevent accidents by making a path from the equipment to ground so that in case of leakage or breakdown the person who may be called upon to work on or near the equipment will not be exposed to electrical shock.

The importance of grounding lines and equipment can not be overestimated, but it must be recognized that grounding is not a cure for all the ills and evils that beset electrical equipment, and will not make any equipment "accident proof." In fact, there are some cases where it is not advisable, from the standpoint of accident prevention, to ground the case or other equipment.

Grounding secondaries or service transformers and instrument transformers has become a standard practice with most public utility companies. Where this is done, the grounding of instrument cases is not so

necessary. In case the circuit is not grounded, there is considerable hazard connected with the handling of the external parts of any instrument or equipment connected to that circuit, and the safe method is to ground the ordinarily dead parts which it is likely the operator or other person whose work may take him near such instruments or equipment will be apt to touch or closely approach.

It is desirable to ground transformer secondaries first because of the possibility of personal injury or death, and, secondly, because of the fire hazard created when the transformer secondaries are not grounded. If for some reason the primary and secondary coils of a transformer should come in contact with one another the primary voltage would naturally follow the secondary circuit. Any person then touching any part of the secondary circuit would of course ground the primary voltage and the result would be very serious and in all probability fatal.

Insulation Is Very Often Faulty Protection

Most appliances in use on a secondary circuit are ordinarily insulated against secondary voltage. The insulation on many such appliances will not even give protection against voltages as low as 110 volts. It is evident therefore that in such a condition as the one mentioned the insulation of these appliances may break down and cause a fire from the short circuits which would follow.

The proper grounding of transformer secondaries will of course prevent such occurrences as these, and it is here that the securing of proper grounds should be stressed. Testing of grounding connections is important and in no case should this be overlooked if the ground is to serve the purpose for which it is intended. It is not sufficient to make a test of the ground connection at the time of its installation, but these should be tested periodically at regular intervals, to insure that conditions have not arisen that would render the grounds ineffective. It is especially important that the ground connection be tested where the transformer is located a considerable distance from the building served by its secondaries. It sometimes occurs that a secondary ground connection is effective in preventing abnormal voltages on the secondary system only within a relatively limited area. Such conditions as these are due largely to the poor conducting properties of the earth at the point of the ground on the secondary system.

In discussing the grounding of station apparatus and equipment it should be borne in mind that some apparatus is very dangerous even after it is disconnected from the source of energy. Aluminum cell lightning arresters, for example, have a heavy condenser charge for some time after being disconnected, and the cells must be discharged to ground before they can be touched in safety.

Station switches and cables are usually mounted in cells and duct runs so that they are not easily accessible for testing and grounding. The cables are usually heavily insulated and are run in confined spaces so that special methods of testing are necessary for the safety of the men doing the work. Oil switches are usually electrically controlled and there

is always the possibility of a fault in the control wiring that will prevent the opening of the switch or may even cause it to close again after it has been opened.

On account of the enormous amount of power available in a short circuit in stations, the methods of testing must be such as to remove any possibility of a short circuit or ground occurring in case the apparatus tested is found to be energized. It is usually dangerous to place temporary or makeshift grounds on switches or cables, on account of their proximity to other energized equipment. Permanent ground busses with mechanically interlocked grounding devices would seem to be a logical solution of this problem.

The average oil switch carrying distribution primary voltages is something of a hazard if the case and frame are not grounded. Switchboard frames, switch handles, generator and motor frames are all safer to handle if they are solidly grounded. The man handling the equipment is generally forced to stand on a concrete floor. This in itself is a hazard, but the hazard is greater than is usually realized in that the average station floor has reinforcing steel, pipes and conduit imbedded in it so that at many points there will be a thin layer of cement over a grounded metal pipe or rod.

Rubber Mats, Insulated Platforms and Stools

Rubber mats and insulated platforms or stools are used in some places, but the former are apt to be filled with conducting dirt and in some cases painted over, perhaps with paint of a conducting quality, and portable stools and platforms are awkward to move about and their use is often neglected. The grounded switch handle, instrument case or switchboard frame will make the same potential between the equipment and the floor so that should a man come in contact with such equipment his body is shunted by a path of low resistance that makes the flow of current through it practically impossible unless contact is made with an energized ungrounded conductor.

Now, in going from the application of permanent grounds to that of temporary ground connections we are confronted with almost an entirely different problem. It differs in that the methods and devices used are widely varied.

I shall not attempt to discuss the various devices in use for temporary grounding of lines, as this has already been fully covered with a description of such devices and their use. Further, I can only briefly elaborate upon some of the methods which have been considered.

Overhead distribution lines of the usual distribution voltage are seldom grounded and are more often worked hot. There are cases, however, where distribution lines parallel transmission lines for a considerable distance and of course there is some protection in grounding distribution lines in a situation of this kind.

The method of grounding depends largely upon the type of line construction encountered. In working upon steel towers the phases are usually grounded to one of the tower legs. On some pole type construc-

tion the overhead ground furnishes a means of grounding the line. But on other types of pole construction the common method of using ground chains must be resorted to.

Many times safety depends upon the grounds placed on the lines by the operators at the station. In case of parallel transmission lines station grounds do not afford ample protection to men working some distance from the station. In a case of this kind it is possible for the de-energized line to pick up sufficient voltage by induction to cause a very serious accident to the man working on the line, and it is extremely important that additional ground protection be provided near the place where work is being done.

When the common method of grounding by the use of chains is used, every precaution must be taken by the men in applying and removing these chains. These precautions have also been covered before, and I merely wish to emphasize the importance of using the hand lines and rubber gloves in applying and removing ground chains.

Procedure in Using Grounding Chains

Where grounding chains are used much depends upon the proper procedure in clearing the line to be worked upon and the proper application of the grounding chains. Workmen should be very careful not to approach high tension lines or attempt to place the grounds until satisfied that nothing has been overlooked in making arrangements to ground the line at the point in question. The line to be worked upon should first be disconnected from every possible source of energy by opening all oil circuit breakers and disconnecting switches. After this has been done the operator at the substation or power plant should accompany the foreman who is to be in charge of the work and check the actual physical disconnection as well as the grounding connections, and hold cards or tags that have been placed on the opened switches.

As has been said, the chains should not be placed upon the lines until a good ground connection has been established. Again I wish to emphasize the point made in the preceding paper, and that is that it is just as necessary to obtain a good ground in a case of this kind as it is to obtain a good ground when applying permanent grounds. I believe that in many cases linemen feel that the ground chain is used primarily to short circuit the phases of the line rather than to secure an effective ground upon the line. In removing the grounds every precaution must be taken, the same as in applying the grounds.

I have found that some companies require that an identification tag be attached to the ground rod containing information as to who placed the ground, whom it will be removed by, the reason, time, date, etc. This appeals to me as an excellent requirement, because of the fact that the removal of a ground may cause a very serious accident.

I do not believe that I have added anything new to what has already been said upon this subject. In conclusion, however, I wish to state that it is recognized that the proper type and method of applying protective grounds must be governed by the equipment and the operating conditions

of each individual company; and I would like to urge that more consideration be given this subject because of the great hazard involved when improper testing and grounding methods are used.

CHAIRMAN McCULLOCH: Mr. Kallevang's paper was also to have been discussed this morning by Mr. Paul R. Kuhn of the Penn Central Light and Power Company of Altoona, Pennsylvania. I have a telegram from Mr. Kuhn regretting his inability to be present, but his discussion will appear in the records of this session.

I will ask Mr. H. B. Harmer if he will not discuss this subject for a few minutes.

H. B. HARMER (Philadelphia Electric Company, Philadelphia, Pa.): I would like to bring up at this time several phases of grounding practices. We are interested primarily in the prevention of accidents. Our duty, regardless of the apparatus, is the prevention of accidents.

Unpleasant Experiences With Grounding Practice

The grounds that I refer to are those that we have all had unpleasant experiences with, caused by our men coming in contact with foreign wires on our poles. In other words, a grounded circuit of another character or kind, for instance, telegraph, telephone wires, and so forth. We have had very many unpleasant experiences along that line.

There is also another ground that men get in contact with that I will illustrate. A line-gang is installing a service along the back of houses for lighting. One of the men in making the ties on the insulator on the back of the house, leans over the side of the house, laying his neck on a copper rain conductor, and reaches over and tries to tie in a live line. He receives a shock. The shock is of such a severe character that it paralyzes his tongue, and he is choked to death before they can get him away.

That is the grounding question that I think we ought to pay particular attention to. It is not so much the grounding construction, because our engineers are thoroughly conversant with that phase of the situation. It is those grounds due to accidental contact that we have to worry about.

Incidentally, I just want to emphasize a certain kind of accident prevention. Last night I had the pleasure of sitting alongside a man who was connected with the Department of Labor of Pennsylvania. He said to me, "Harmer, we didn't have a fatal accident in our last month's report in Pennsylvania. We had an intensive accident campaign, and we didn't know it."

M. C. ALLEN (Western Union Telegraph Company): Because of the very delicate equipment we have to protect, and because of the operators who come in direct contact with that equipment, we have for a number of years been interested in the handling of grounds. I want to ask if, in the measuring of grounds by the utility companies, they determine the resistance of that ground and if they find certain limits to that resistance which are necessary? The telegraph company and the telephone companies have required that.

I want to give two instances which perhaps show the difference. I was personally involved in the state of Connecticut where we were using submarine cable and exposed it across the Connecticut river. We found after spending a lot of money, that by going 100 feet outside of the river bank and driving the pipe 25 feet that it has entirely cured the trouble.

We had another case where, in a test station the telephone wires were coming in contact with high tension wires that entered the station; and because of the poor ground, jumped to the ground plates and then to the wires leading all over the country, which caused trouble in at least 10 of the stations. We spent all kinds of money driving grounds. We drove the pipe to a distance even of 40 feet without getting a ground that would operate. Finally we drove a pipe for probably half a mile and then we were able to attach it to a water meter which cured that condition.

I am not asking this with the intention of starting an argument, but do you find in your tests that it is necessary to determine the resistance of the ground, and do you find it necessary to check your grounds at least once a year?

Observations on Temporary Working Grounds

MR. BEARDSLEY (Brooklyn Edison Company): We test once a year.

I would like to speak on the subject of the temporary working grounds as applied to our system which is metropolitan and mostly underground. We made quite a number of experiments with various testing devices to find out whether we could get something dependable. We came to the conclusion that almost anything that would give a negative indication to insure safety was not dependable for our use. We therefore set about to make an actual ground test on telephone communications, first having the assurance of the operator that the switches and circuits were open. We started at the generating station on the last piece of apparatus which attaches to the outgoing circuits, a ground test switch. Possibly some of the utility people are familiar with our design down there, because it has been published.

We have a remotely controlled switch, and we call it a grounded test switch. It has a double throw. One throw puts the cable on, with which we can apply test voltages. The other one attaches solidly to the ground which is controlled by a separate operation and is separate from our neutral operation. We can place that ground without any manual application going farther out on the circuits, which are 27,000 volts. This thing can be operated from a point of application without any manual service at all.

In the 150 volt, we are not so well equipped. However, on some of the truck switching operations, which is a 27 volt switch, we also have that equipment. So, we can apply the ground and then close in the switch. We are now engaged in designing apparatus on the 4,150 volt circuit. We have had some accidents, quite serious ones, during the placing of the grounds.

On the cable system in manholes, we have a piece of apparatus con-

trolled remotely by two compressed carbon dioxide gas lamps. We hope before very long to have our system fully equipped with such apparatus that we will have no manual application of grounds.

MR. MACLACHLAN (Toronto, Canada): I would like to raise two points. One is in connection with the ground itself. Is it not general experience that outside of a water pipe ground we are simply kidding ourselves that we have a ground?

A year ago last summer I was called on a case about 40 miles from here. A man was found dead under a shed. On checking that carefully, we found the ground pipe driven 44 inches into wet soil and yet under operating conditions we could get from 295 to 305 volts between the ground pipe. By driving a chisel in the ground about four feet away from the pipe itself, it proved quite conclusively to us that the voltage grading at that point was not steep but very sloppy.

I have another matter in connection with the paper, and that is the use of chains for temporary grounds. I well remember a case in which we had chains solidly on both sides of men working. Unfortunately an outsider threw in a switch in a consumer sub-station which energized this section of the line. The switch was kicked out, I will grant you, but the two men were killed in between the chains. I think the time is coming when the chain ground will be a thing of the past. We will have to go to the use of other types of grounds such as flexible cable with the different types of contacts.

The Chain Is Not Considered an Ideal Ground

C. P. HUMPHARD (Detroit Edison Company): Mr. MacLachlan's last point is somewhat similar to the one I was going to raise. Suppose you have an ideal ground: that is, your copper ground chain, ground plate buried, good connection all the way around, a half mile each side of the line-man. Is that a sure way to have it so that the men will not be killed?

MR. KALLEVANG: I don't believe there is any such thing as certainty in a case of that kind. It is all a matter of what capacity you have got on the line. As I suggested in my paper, there are other things that are far better than a chain. As we know, a chain is limited in carrying capacity. We have got to get something that will carry a great deal more capacity than the present equipment.

It seems to me that as a system grows and gets about so big—and this is what I mean by about so big, we have lots of systems in this country which come into the meaning of being big—there is only one place to ground and that is to ground right at the point where you have the circuit breaker that makes that line hot, so that between the place where these men are working and between these breakers you have considerable line. It is better to do that than to ground right at the point where the fellows are working.

MR. REID (Central and Southwest Utilities Company, Dallas, Texas): In a great many of the towns we have no water system, and the earth in Texas is very, very dry during certain times of the year. We have found it absolutely impossible during the summer to maintain any

kind of a ground. We have experimented with copper plates, used bags of salt, and still there is no luck. That is the reason I was interested in Mr. MacLachlin's question. Our experience in Texas would indicate that we can not depend on any kind of an artificial ground outside of a water pipe.

F. W. BAGNALL (Detroit Edison Company): I would like to know how or what method is used in the grounding of a doubly constructed pole line? You made mention in your paper of the fact of pulling the chain over the line. I was wondering how the grounding of the line is used on a double pole construction?

MR. KALLEVANG: I don't see why you can't with proper rope attach the chains around a single circuit of a double pole line the same as would ground a single pole line. I assumed that the circuits are on separate sides of the pole. If you had two circuits on the same pole and they are both horizontal, it might be difficult to ground the top circuit and leave the top hot. I doubt if that is possible. It is certainly impossible, in my estimation, to ground a single circuit of a double circuit line with each circuit on each side of the pole.

DISCUSSION OF MR. KALLEVANG'S PAPER, "GROUNDING PRACTICES"

Paul R. Kuhn, Penn Central Light & Power Company, Altoona, Pa.

The address of Mr. Kallevang covers the subject of "Grounding Practices" in a comprehensive and able manner. I know we have all secured considerable benefit from his address and that it should be of value to us in our work.

Grounding is daily becoming of extreme importance to all of us engaged in the electric light and power industry. Grounding may be defined as a protective measure applied in the electric industry to insure constant service, afford protection to property, avoid possible fires, and to prevent accidents.

We are primarily interested in grounding from an accident prevention standpoint. This phase of grounding is demanding more and more attention each day. This increase in interest may be attributed to:

1. A wider use of electricity in homes, business places and industrial establishments, with consequent possible augmentation of electrical accidents.
2. A better knowledge of value and relation of grounding in preventing electrical accidents.
3. The interconnection of transmission systems and enlargement of capacity of generating stations and sub-stations, thus intensifying the possible accident effects of any "blow up" in electrical systems or apparatus.

Mr. Kallevang has appropriately divided his address into two divisions: "Permanent Grounding" and "Temporary Grounding."

Permanent grounding, as it relates to homes, business places and industrial establishments, is a tri-party problem for the electric light and power companies, the duly constituted national, state and municipal authorities and the consumers of electric energy. Many electric companies have specific service rules which require electric work to be approved before electric current is cut through. In addition to the company rules, the National Electrical Safety Code has been generally accepted as a basis for state and municipal laws and rulings covering electric installations. The National Electrical Safety Code contains certain specific provisions on grounding for interior wiring and electrical installations. The enforcement of these provisions from an accident prevention viewpoint should concern not only the light and power companies, the duly constituted authorities, but should be welcomed by the consumers of electric energy.

Permanent grounding as applied to electric light and power companies, partakes of several features. Grounding of transmission and distribution lines is being generally followed out today by the companies. The application of permanent grounds in generating stations and substations is also demanding extreme and minute consideration. The attention being given to grounding by the electric light and power industry, in-so-far as it affects generating stations and substations, is best indicated by the exhaustive report issued on the subject this year by the Electrical Apparatus Committee of the National Electric Light Association. The title of the report is "Practices and Methods in A. C. Substation Grounding." This report covers in detail: "Methods of Grounding," "Grounding Systems," "Equipment Grounded for Safety Purposes," "Inspection and Testing of Grounds," and contains six appendices with most valuable and original information on grounding. You will find this report not only interesting but fascinating reading. It will, without doubt, answer many questions which may have been giving you considerable trouble due to the pranks of electricity.

Temporary Safety Grounding

Temporary safety grounding, due to the circumstances surrounding its application, is of vital concern to those persons interested in preventing accidents. As the name indicates, grounding of this nature is temporary, which unfortunately means to some people, that it is not to be taken too seriously. Those of us engaged in accident prevention work know full well the evils wrought by the word "temporary." It has come to mean a synonym for accidents; therefore, temporary safety grounding is of particular interest from a safety angle.

In temporary safety grounding, the human factor forms the most important element. Temporary safety grounds are invariably applied to afford protection to workmen and the success of the protection depends to a great extent upon the intelligence and care manifested by the human element engaged in performing the grounding application.

Theory and practical experience have combined to teach us that merely disconnecting a line from the source of supply is not sufficient protection to the men working on a line. The line must not only be disconnected but grounded and every precaution taken to prevent re-energizing the line until the men are clear of the line. With this idea in view practically all companies have very definite rules and methods governing the grounding operation. The idea of illustrating the grounding procedure in rules and instructions is good, and it is worth while using in the printed rules and instructions if it is at all possible.

Notwithstanding the general acceptance by the light and power companies of the value of printed rules on grounding, some companies still depend upon verbal instructions. Many companies also assume a line-man or workman to be skilled in grounding work without any previous check up. These two things have been contributory causes, if not the exact causes for serious and fatal accidents. My only suggestion to companies still adhering to these two policies is to get busy and change them immediately before some misunderstanding brings on a fatal accident.

I have no time for chains as a grounding device. Their only present day advantage appears to be their ease of transportation. Too many good grounding clamps have been developed by the electric light and power companies and electrical manufacturers to justify the further retention of a chain as medium of grounding. This may sound revolutionary from an operating angle, but from an accident prevention standpoint it is far from being extreme.

The portable grounding clamps in use are all about the same in electrical principle, the only deviation being in mechanical design. Like every piece of protective equipment, the usefulness and value of grounding apparatus depends upon its periodic inspection, good care, and proper maintenance. This program should not be everybody's business in a company (which means nobody's business), but it should be delegated to assigned and responsible employees. Rubber gloves should form a part of the grounding equipment and the men should be informed that they are expected and required to wear them, especially on transmission lines, when applying and removing grounding devices.

Generating Station and Substation Grounding

Rapid advancement has been made during the past few years in protective grounding devices for generating stations and substations. Modern generating stations and substations are of such large capacity that carelessness in proper and effective grounding is apt to destroy property and produce serious accidents.

It is just as essential that proper grounding devices be available and rigid instructions issued in grounding at generating stations and substations as when work is being done on transmission lines. More complications are involved in generating station and substation grounding than in transmission line grounding and the hazard to life is in many

cases as great. The electric light and power industry is well aware of this fact and it is making every effort, as Mr. Kallevang mentions in his address, to arrange its grounding equipment to be fool-proof. In generating station and substation grounding the human element is again a big factor and the importance of printed rules and instructions governing this work is again of extreme importance.

Underground Cable Grounding

The adoption and usage of high voltage underground cable necessitates every bit as much care while work is being done on the cable as employed in overhead transmission lines and generating stations and substations. Grounding of cables and underground feeders is essential for safety to workmen. This problem is engaging the attention of companies operating in the large cities. They are sparing no expense in making equipment safe for their workmen, because they have found from experience that accidents due to absence of grounds or errors in grounding are in most cases serious and expensive ones.

The deduction to be drawn from Mr. Kallevang's address and the discussion thereon, is that proper and effective grounding is most vital in the prevention of accidents. Permanent grounding should engage the attention of the electrical industry at all times. However, its progress is bound to be a little slow, due to the many complications involved in having it rigidly carried out.

The adoption of a temporary safety grounding program is quite different from permanent grounding because its acceptance and use can be very readily effected by the light and power companies. It is chiefly a problem for the companies to solve within their organizations. It can be solved to a great degree through the following suggestions, if put in use by the companies:

1. Every company should have an explicit set of printed rules and instructions (with illustrations if possible) on temporary grounding.
2. Every company should have safe and adequate equipment for temporary grounding and the equipment should be regularly inspected and maintained by assigned and competent employees.
3. Every company should give their employees proper instructions and training in temporary grounding.
4. Every company should have temporary grounding performed under the close supervision of high class workmen.

CHAIRMAN McCULLOCH: So far, in our three meetings, we have devoted little time to the telegraph and telephone companies. We had a description of one of their accidents at the first session which was presented by Mr. Morgan with his interesting model. We now come to a paper which will be of interest to these companies. We regret that Mr. Charles E. Gardner, who is superintendent of the Department of Safety of the Michigan Bell Telephone Company, can not be with us this morning. Mr. E. B. Moore, who is safety engineer of that company, will present Mr. Gardner's paper at this time.

ACCIDENT PREVENTION WORK IN THE MICHIGAN BELL TELEPHONE COMPANY

**Charles E. Gardner, Superintendent, Department of Safety, Michigan
Bell Telephone Co., Detroit, Mich.**

For years before the war, accident prevention was the fundamental consideration of the management of the Michigan Bell Telephone Company through supplying safe tools, materials, and adequate supervision in the performance of work. However, the increase in our personnel made necessary by the demand for increased service in all fields of business, confronted us with the problem of training new employees in safe methods of doing our work. To accomplish this a series of safety meetings were held in which talks were delivered based upon slides showing accidents occurring to employees engaged in similar lines of work. To supplement this, payroll stuffers were used to call attention to various phases of accident prevention.

These things temporarily assisted in maintaining interest, but, as the tide ebbs and flows, so group enthusiasm rises and falls.

If we had a "pepometer" or some mechanical device to register the amount of enthusiasm and interest being expended in preventing accidents, our work as safety men would be easier, but since no such device exists we must continually evolve new methods of securing continued interest. This continued interest is particularly desirable in the telephone business since a large part of our men are working alone upon the highways and at isolated points, making it imperative that each man be largely his own safety adviser and do his own thinking in averting injury. To accomplish this, we considered instruction in first aid as a suitable vehicle to bring home the necessity of accident prevention.

The practice of applying splints to an imaginary injury affords the man an opportunity to visualize his own arm or leg broken, with perhaps the bone protruding, and is a sobering influence which returns when he is tempted to take a chance on some "short cut."

In the spring of 1921 a number of industries cooperated under the sponsorship of the Detroit Safety Council and conducted several schools; among them a school on fire prevention; a school for foremen; a school for chauffeurs; and a school of first aid to the injured. In the latter were placed a number of our men whom we hoped to develop into instructors capable of training the remainder of our employees. The method of instruction was to have lectures by physicians upon various phases of first aid, followed by class practice in various problems. During the period of practice work, the efforts to excel in the execution of bandage and splint work created a friendly rivalry which stimulated interest and helped materially in developing a knowledge of the subject. The general results were very satisfactory. In addition, we profited through the experience gained and found that demonstration work was the feature that appealed to our men.

In the fall we started our first drive to make every plant man in Detroit the holder of a First Aid Certificate, and the instruction of 1,100 men was no small task. The men instructors were drawn from those who had taken the course the previous spring, but to adapt the instruction to our particular needs, it was found desirable to give additional training. To secure a uniformity of instruction, it was decided to drill this group in the execution of specific problems composed of imaginary injuries which might occur in their own class of work.

We were fortunate in having in our organization a man who had been a scoutmaster and had had several years' experience in drilling competitive teams of scouts in first aid work. Placed in the position of chief instructor, with a class of selected men, he communicated his enthusiasm to them and was able to create a sufficient amount of curiosity upon the subject to impel them to seek additional information from the text book.

There is one feature of this work which may be of particular interest, as it illustrates how careful planning of the job assists its execution. Many of our outside men use various knots in their work and a problem which made use of a complicated knot was put first in the initial lesson. This was best accomplished by raising a question about an installer or other employee who, while working alone, might sustain a sprained ankle. What could he do for himself in getting assistance? This was familiar ground. All knew the possibility and the discomfort of a sprained ankle and the exhibition of the ankle bandage, which is merely a complicated knot, awakened interest and a desire to learn its use.

A Clever Plan for Interesting the Man

When each man was invited to try it and failed, his pride in tying knots was challenged. By the time he mastered it his attention had been secured, and a demonstration of the balance of the bandage ties made him eager to master them also. So the general first aid instruction in the Michigan Bell Telephone plant department was begun, and today over 95 per cent of our plant force, some 3,500, are trained first aid men.

These men are scattered over our territory, qualified and ready to render service to the public, not only in telephone work but in saving life and relieving pain. The public has profited in many emergencies by the prompt application of first aid measures.

In one instance in lower Michigan a child had fallen in the river and after considerable time was drawn from the water and lay apparently lifeless on the bank. Attracted by the throng which gathered, one of our repairmen went over to the scene of the accident. By the application of artificial respiration he was at last rewarded by a convulsive gasp and continued to assist until normal respiration had been restored. The gratitude of the parents of this child, which they had thought dead, is beyond the possibilities of word description. The satisfaction to our employee in saving this child's life, and to his company which gave him the knowledge to perform the deed, should be an inspiration to

every man here engaged on accident prevention and first aid work.

Instances of this kind have gradually spread the knowledge of our interest in first aid until the public has come to recognize preparedness of our employees to render this service. An interesting example is seen in the response of an applicant for employment, interviewed by one of our superintendents, who answered the question, "Have you ever had any experience in telephone work" by saying "No; but I have got something which I understand you people demand." And he explained that he had had a course in first aid in the Boy Scouts and later in a naval training school.

In addition to first aid training, another accident prevention feature which assisted us was the decision that responsibility for accident prevention should be delegated to Authority for Production and, to stimulate interest and to disseminate information regarding competitive standing, the "Foremen's Dope Sheet" was evolved. This showed, opposite each foreman's name, the number of months which had passed without an accident to any member of his crew.

Each Division Had an Objective to Strive For

To set up an objective to "shoot at," each division was requested to make an estimate in the nature of a "bogey." This placed responsibility directly up to them and was a reminder of their obligation toward their fellow-employees in averting accidents. The results of this estimate were set up on a chart, and each month the current accidents were posted opposite the "bogey" and enabled all employees to see the results of the contest. Large banners to display on the trucks were also awarded and they proclaimed that this group was a "Banner" or "No Accident Crew."

As a step on the part of the employees in fulfilling their part in the cooperative plan, it was thought that if the accident prevention experiences of all could be collected, this would enable every one to profit; and to obtain material for a proposed safety code, questionnaires were sent out to all plant employees urging them to give descriptions of accidents which had come to their attention and recommendations for avoiding similar ones.

As the questionnaires returned, they were edited by a committee appointed by the Employees' Association and finally evolved into a safety code. It is the result of the efforts of employees working in conjunction with management and is an example of what can be accomplished by everyone working together.

The interest shown by the men interviewed at stockrooms regarding a new type of accident, which resulted in injury to one of our men, prompted the thought that perhaps the periodical posting of a list of significant accidents on the bulletin boards would react favorably in enabling others to profit by them. The summaries are mimeographed on colored paper, a different color being used each time, and a heading is provided which is a terse comment on accident prevention written

as though coming from the boss. This is used to compel attention, while a free use of slang is made in comment on each item to secure a reading by the employees and stimulate discussion. Illustrated bulletins are also used and beneficial results are found to follow the prompt removal of old bulletins so that the boards are vacant part of the time. By this method new material secures notice by its presence.

CHAIRMAN McCULLOCH: I have received a suggestion that a telegram be sent to Mr. Lucas, treasurer of the Philadelphia Electric Company. Mr. Lucas, as you know, was very active in the work of this Section, particularly in the preparation of its programs, and always attended when his health permitted.

CHARLES B. SCOTT (Bureau of Safety, Chicago, Ill.): I move you, Mr. Chairman, that you be directed to send a telegram to Harry Lucas, expressing our deep regret that he is not present and expressing our wishes for his recovery from his illness, and that we miss him very much and remember the meetings in which he has been so helpful to us.

The motion was seconded and carried.

CHAIRMAN McCULLOCH: It has also been suggested that a telegram be sent to Mr. Rutland of the Texas Power and Light Company, who during the past year has been chairman of the Membership Committee (you have all heard of the remarkable work done by his committee) regretting that he was unable to meet with us and expressing to him the appreciation of the Section for the work that he has done this year. I believe it would be well to take some action on that.

MR. STEWART: I make such a motion.

The motion was seconded and carried.

CHAIRMAN McCULLOCH: It has also been suggested that a telegram of appreciation be sent to the Michigan Bell Telephone Company and the Detroit City Gas Company for their courtesy in connection with the inspections and visits to the plants.

The discussion of Mr. Gardner's paper this morning will be led by Mr. B. W. Farris of the Western Union Telegraph Company of Chicago.

DISCUSSION OF MR. GARDNER'S PAPER

B. W. Farris, Construction Supervisor, Western Union Telegraph Company, Chicago, Ill.

The paper presented by Mr. Gardner was indeed interesting and indicates that he has devoted much time and thought to the subject of safety. The information contained in his statements is based on facts, experience and statistics, and should be helpful and educational to anyone who is interested in the Safety First movement. I will endeavor to outline or express a few views for your consideration, which, I think, of major importance or which might, if followed, tend to reduce the number of accidents or personal injuries among the employees or workmen engaged in our line of industry.

The field for safety work in a large plant organization, like the Western Union Telegraph Company, the Telephone Companies and the Electric Light and Power Companies, is of such vast scope and there are so many different views and ideas as to how best results can be accomplished, that I find it difficult to arrive at a decision as to the best methods to pursue to accomplish the desired results.

I have, however, arrived at one definite conclusion, and that is the fact that the heads or supervisory forces of any organization must be interested and sold on the safety idea if the desired result is to be obtained. I mean, the interest and enthusiasm must be generated, conveyed and distributed by the ranking officials or supervisors and carried to the workmen by their immediate supervisors. If the foreman, general foreman or supervisor is not interested in safety and does not talk and indicate this by his actions, it is not reasonable to assume that the workmen will be as careful as they should.

Instruct the New Employee Very Carefully

From experience and inquiry, I am fully convinced that it is of the greatest importance to see that the new man be properly instructed in regard to safety rules and practices at the time he is employed, before he takes up his duties with the company. By this I do not intend to convey the idea that I have in mind the "green man" or inexperienced man only. I am referring to the "new" man, whether he be an inexperienced or experienced man.

My reason is that the "green" or inexperienced man has not been trained in the work he is about to undertake and does not know the hazards or dangers in connection with it. He may be a young fellow from the farm or factory or he may be a clerk or bookkeeper from the office who has arranged for a transfer to the field to learn outside construction or maintenance work; and in any event it matters not what his previous vocation has been, he probably has a very limited knowledge of the safe and unsafe practices to follow in the performance of his new work, and for this reason it is very essential that he be talked to and impressed with the safety idea.

In regard to the experienced man, it is, of course, reasonable to assume that he has more knowledge regarding safety, but it is astonishing and disappointing in many instances to learn that he gives but little thought to safety in performing his work. In such cases, even though the man is experienced, he has not been properly advised or trained on the subject of safety. Therefore, I am a firm believer that all new employees should be properly instructed on the subject of safety; and I will go further and say that the instruction should be by the foreman and not the assistant foreman or anyone else, as the foreman is the man whose advice the gangman will listen to and follow.

When a new man is employed, the foreman, who is the key man and upon whom the responsibility of the gang rests, should discuss the hazards in connection with the work and impress the man with the fact

that the performance of his work in a safe manner is of much importance; not only for his own benefit, but for that of his fellow workmen; and that carelessness will eventually lead to injury, pain and suffering and in many instances will result in him becoming a cripple or being the cause of such misfortune for others. The new men should also be told that the number of deaths as a result of injury due to carelessness has extended into the thousands annually.

To be more specific in regard to instructions to new employees, I would suggest the following:

The foreman should invite the new man to his office or room, have him sit down and make him feel at ease and comfortable, and have a short social conversation with him. He may talk about his present and previous vocations, being careful not to get too inquisitive regarding his personal affairs, but simply talk to him long enough to form some conclusion as to whether or not the man would make a desirable employee and is suited physically for our class of work. If the foreman decides the man is satisfactory, he should then tell him what his salary will be and explain the general nature of the work and what his chances will be for promotion, increase in salary, etc. If this is agreeable and the man accepts the position, the foreman should then tell him that the company has certain safety rules which he would be expected to carry out, and unless he is willing to be guided by same his services would not be desired; and right here the foreman should impress him with the fact that the execution of the rules and safety practices is far more for his own benefit than that of the company.

The Foreman Should Carry a Book of Instructions

The foreman should have in his office a book or folder containing a complete copy of instructions which have been issued by the company from time to time, treating on the subject of safety in connection with the work and he should call to the attention of the man some of the more important or most dangerous practices. He should then tell the man to take the book and look through and read it carefully.

I do not believe it a good practice to endeavor to get a new man to absorb too much at one time, but the most important thing is to get the safety idea instilled in him, and he will absorb more from time to time as he goes along. He should not be told too much at the beginning, for the same reason children are not given too much instruction or heavy tasks when entering kindergarten or primary grades. If they are not overburdened with too many lessons at the start they will master them and be eager for further information; and this is true with men in teaching them safety.

Pole line construction and reconstruction work with the Western Union Telegraph Company is somewhat different from that of other wire using companies, for the reason that a very large percentage of the work is along railroad right of way, whereas the work of most other companies is along streets and public highways; and for this, as well as other reasons, any specific ideas or practices which might be of the utmost

importance in the safe performance of our work on railroads might not apply in connection with the work of other companies. Nevertheless there are a great many things in our work which are the same as other companies and I will name a few of the practices which I consider of much importance and which should be discouraged, and, if possible, not permitted by any company:

1. Do not use defective tools.
2. Do not climb an old pole and untie all wires until convinced it is safe to carry a man's weight. If in doubt, use pike poles or ropes to make the pole safe.
3. Do not drop or throw material or tools from standing poles unless sure there is no one under or near the pole.
4. Do not throw or toss material or tools to man on standing pole. Use hand line and tool bag.
5. Do not stand or work under pole while man is working on pole.
6. Do not stand close to a moving train.
7. Do not get on or off motor car or truck while moving. Wait until it stops.
8. Do not stand up on motor car, trailer or truck while moving.

Safety Meetings a Part of the Regular Procedure

The safety idea with the Western Union Telegraph Company is not entirely new, for printed rules and instructions in regard to unsafe practices in connection with our work were in effect 25 years ago, but I must admit they were not carried out as they are today. The rules were printed on one sheet of paper of letter-head size and captioned "Warning to Employees"; they contained instructions in regard to the hazards in connection with the work, but the trouble was that the instructions, suggestions, good advice or whatever it might be termed, were not followed as of today, and there was not the effort to keep the safety idea constantly before the men.

Safety meetings are now conducted regularly at least once a month and in many instances more frequently, in each of our gangs, and at intervals division meetings are held by calling together a number of foremen with a man from their gang. At the gang meetings various methods are followed in conducting the meetings, but the general practice is for the foremen to preside and a general round table or free for all discussion is held and the men are all encouraged and requested to offer suggestions for improvement in methods to promote safety in the performance of the work, improvement of tools, etc. If the general foreman or supervisor is present when the meeting is held, he naturally joins in the discussion and helps the men along by asking and answering questions. The meetings are held during regular working hours on company time, as it is thought much better results are had, because the men will take more interest than if the meetings were held before or after working hours. As a result of these meetings, many good suggestions and ideas are presented and the men manifest much interest.

During the last year a moving picture film, which was presented at the National Safety Congress at Cleveland last October, has been shown at division safety meetings and to each gang in the United States. The picture, as some of you may recall who saw it at Cleveland, shows a gang engaged in regular work, such as distributing poles from work trains, setting poles, digging holes, attaching and removing crossarms and operating motor cars, etc., illustrating the principal hazards of the job and the wrong and right method of performing the work.

At the meetings where the picture was shown to the gangmen, it was run through at least twice and stopped and discussed by the men, and it is felt a great amount of good was derived, not only for the lessons taught, but it was of value in getting the men to talk and argue. In this connection it might be stated that the beneficial result of this first attempt by our company to use moving pictures in safety meetings was such a success that plans are now under way for filming other pictures to be shown in the near future.

The industrial edition of the Red Cross Manual has been furnished to all of our gangs and we find that it is being read and discussed by the men and they are taking much interest in it. The book is also discussed at the division and separate gang meetings. Demonstrations are given on resuscitation, dressing wounds, etc., and at intervals arrangements are made to have a doctor address the division or larger meetings and advise the men as to good and bad practice in rendering first aid in personal injury cases. As a result the men have learned much and are better prepared to render assistance and first aid at the time of an injury.

The Big Problem is Maintaining Interest

The greatest problem confronting us and any other organization is to arouse and maintain a sincere interest among the workmen and get them to realize the value of their efforts. We feel that we have accomplished much along these lines during the past four years as will be noted from our record since 1923, which is as follows:

1923—	12.46 accidents per 100 employees—	8,257 employees
1924—	10.04 accidents per 100 employees—	8,792 employees
1925—	8.33 accidents per 100 employees—	9,037 employees
*1926—	4.30 accidents per 100 employees—	9,218 employees

*9 months record only.

These figures show a reduction of approximately 53 per cent in our accident frequency rate.

At the beginning of this year we set a definite objective or goal of "20 Per Cent Less Accidents in 1926." For the first nine months we have shown a consistent reduction of about 30 per cent each month. We were convinced we could attain this objective if the idea was properly sold to the men and the results speak for themselves as to the success of our efforts. We are now developing plans for a continuation of this campaign for 1927, which we hope will produce better results, and we feel it can be done.

CHAIRMAN McCULLOCH: We have about one-half hour for discussion. I believe it would be well to divide that time, first, to take up a discussion of this subject of "What the Telephone Companies Are Doing to Prevent Accidents," and at the close of that discussion to devote the rest of our session this morning to an open discussion on any of the papers presented during the last three days.

If anyone has anything to add to Mr. Gardner's or Mr. Farris' discussion in connection with telephone and telegraph accident prevention work, we would like to hear from them at this time.

MR. THOMAS (Chicago, North Shore and Milwaukee Railroad, Milwaukee, Wis.): My name is Thomas and I come from Milwaukee. I guess most everybody knows something about Milwaukee, and nobody knows anything about me.

I have been attending the sessions of the convention from time to time. Of course, after the day sessions were over, I started looking for some kind of entertainment. The other evening I strolled into a show. One of the things that I saw during this show was where a fellow bet \$15,000 that he could tell the truth for one straight business hour. I sat there very interested and expectant and watched the whole thing. By the time the hour was up, he had lost the \$15,000 bet and about wrecked the man's business.

Observations of a "Doubting Thomas" Are Offered

Now, that just got me to thinking. I said to myself, "What kind of a session would we have in the National Safety Council if we all bet \$15,000 that we could tell the truth for one session?"

I don't know just what kind of men I am talking to here. I suppose we have some executives and some branch managers and some safety engineers. Possibly there may be some rank and file employees sitting out here, although I doubt it very much. Before I attended these sessions, I imagined I could come here and hear scientific discussions on accident prevention work and I would be able to carry back a lot of constructive suggestions that I could use on the folks back home. But, you know, I am sorry to say it reminds me a little bit of a convention I attended one time of the Methodist Church. They all got together. They said a whole lot of nice things about the Church, but when the people got back home, and they were asked, "What did you learn at the convention?"

They would reply, "I can't begin to tell you about all the nice people I met over there."

I imagine the same thing is going to happen here. When you get back and they ask what went on up there at the convention, you will say to the boys, "I met a lot of nice fellows, and the ball was a knock out."

I wonder if we are all doing the right thing all the way through? Are we playing square with the fellows back home? Are we telling the truth? I suppose there are a lot of managers sitting here. If I asked you what you were doing along accident prevention lines on your prop-

erty back home, you would probably say to me, "Well, I am making that property safe. I am putting up all kinds of safeguards. I do a lot of protecting. I belong to the National Safety Council. I have a safety organization out there on my property."

Are you really playing square? Are you doing everything you can do on your property to prevent accidents? Here is what a man sometimes does. He gets a safety organization, or he gets a safety director, and they hook him onto the organization somewhere. They would put him on the roof if it were possible, and then forget they had him. If the safety engineer wants something, they keep him waiting a week.

You know, I don't know whether that is true, whether anybody here is guilty of that or not. I think it is high time that we should tell the truth. Some of these safety engineers are good fellows and they mean well. They have an organization and they try every once in a while to get somewhere with it. A great many times they spend a lot of time thinking how alive they are and how dead the employees are, and then they do a lot of complaining. If you were to hear some of them talk, you would think that they had a hard job.

The kind of a man that gets somewhere is the man who gets there in spite of difficulty. Wouldn't it be a good thing if we told the truth, and started a little investigation of ourselves and found out truthfully whether it was the fault of the other fellow or whether there was something wrong with us and the Safety Council?

The Congress a Clearing House for Troubles

You know, I imagined before I came here that this was a clearing house for everybody's troubles. Instead of that, it seems to me it provides the machinery where a lot of people say a lot of nice things about each other, and have a lot of nice balls and dances and luncheons and all that sort of thing. I thought we were going to hear ways and means of meeting the other fellow's problems, but I haven't heard anything like that yet. The chief thing I have heard is the wonderful things that each and every one is doing on his own property.

To hear them, you wouldn't think there were 90,000 people being killed annually in the United States. On the other hand, you would think that this country is a paradise. Certainly we have all reduced our accidents in the last six or seven years. When you look at the newspaper and find that the total is increasing all the time, you don't know whether to believe these eloquent reports or not.

When I get back home, I am going to do just the same as the other fellow; I am going to tell about the fine bunch of fellows I saw in Detroit, and when I say that, I mean you fellows out here.

I hope you won't feel badly about this. I come from Milwaukee, and Milwaukeeans like to knock. We like to knock, because we believe that every knock is a boost, providing it is the right kind. Certainly I don't want to throw the monkey wrench into the machinery here, but I believe it would be a good thing for us all to remember when we com-

plain about the results we are getting, that the best thing to do is to clean our own house first.

CHAIRMAN McCULLOCH: I announced that we had one-half hour for discussion. We now have about three minutes left. If there are any more "doubting Thomas's" in the audience I will be inclined to reduce even that time.

Mr. Thomas said that every knock is a boost. If that is true there is no doubt that he is the best booster in the convention. He also said that he represented an electric railway, and I would like to know why he is not attending the electric railway session this morning at the Tuller.

Before he talked, I was feeling pretty well satisfied with our meeting. He reminded me a good deal of the man that the Toastmaster spoke of last night, that said the only time the employer said, "Well done," was when he ordered a T-bone steak.

I don't know how Mr. Scott feels about it, but if I were President of this Association, I would feel like getting up at this time and offering a little defense on this accusation that we are running an Elks convention here. I am going to call on Mr. Scott and ask if he won't say something.

CHARLES B. SCOTT (Bureau of Safety, Chicago, Illinois): Mr. Chairman, I would like to ask the gentleman a couple of questions before I reply to him.

Mr. Thomas, what position do you occupy with your company?

MR. THOMAS: I don't know that that has anything to do with this question.

Some Leading Questions Are Propounded

MR. SCOTT: Are you the safety man for your company?

MR. THOMAS: I am supposed to be the Service Improvement man.

MR. SCOTT: Have you any particular interest in safety?

MR. THOMAS: Yes.

MR. SCOTT: Have you ever been a car operator?

MR. THOMAS: I was at one time, yes.

MR. SCOTT: A motorman?

MR. THOMAS: Yes.

MR. SCOTT: How long have you been in this new job as Service Improvement man?

MR. THOMAS: Less than a year.

MR. SCOTT: Do you believe in safety work?

MR. THOMAS: Well, I believe in it to a certain extent, but I believe that we could improve on it.

MR. SCOTT: You think we are going at it in the wrong way?

MR. THOMAS: I haven't any very definite conclusion, but I thought I might get some if I raised the question.

MR. SCOTT: Is Mr. Oliver, the safety man for the North Shore road, here?

MR. OLIVER: Yes, here I am.

MR. SCOTT: Do you know Mr. Thomas?

MR. OLIVER: I know a little of him.

MR. SCOTT: Were you connected with the road while he was a motorman?

MR. OLIVER: Yes.

MR. SCOTT: What kind of a motorman was he?

MR. OLIVER: Average.

MR. SCOTT: What was his accident record?

MR. OLIVER: Well, I would say, fair.

MR. SCOTT: What experience did you have with him as a motorman, how long?

MR. OLIVER: Almost four years, and just within the last two or three months he has changed from motorman to Service Improvement man.

MR. SCOTT: For what reason?

MR. OLIVER: He has a good gift of the gab, that is all I know.

MR. SCOTT: When he was a motorman did he take an active interest in the safety work?

MR. OLIVER: Well, not a very active interest.

MR. SCOTT: Did he attend your meetings?

MR. OLIVER: Yes, once in a while.

A Man Not Interested in Safety Meetings

MR. SCOTT: Was he an interested attendant or a disturber?

MR. OLIVER: The only time I can recall his being at a meeting was when he got on his feet to knock some guy.

MR. SCOTT: Mr. Chairman and Gentlemen: I presume the fact that I have been honored with the presidency of this Council, and because of my long active association with its work and the years I have been in intimate touch with it will justify me in making a reply to this gentleman.

There are several thousand people attending this National Congress, many of whom have devoted a large portion of their lives to the cause of safety, and particularly to the prevention of industrial accidents. Because of my active connection with the Council I have the good fortune of a wide acquaintance in this group of men and am familiar with the purposes which prompt them to continue the work. This acquaintance convinces me that most of them are devoting their time and energies to the cause of safety, not through any mercenary motive but because of their desire to help others. As Doctor Jones so forcefully said last night, they are men who have a heart in their work and are thus prompted by the highest of motives and deserve commendation.

The remarks which you have just heard are more significant than you may appreciate, because they reflect an attitude of mind that is not altogether uncommon; a mind which is not in sympathy with such efforts as ours because of lack of faith in our sincerity of purpose; it typifies

a class of people who unfortunately may be found in almost any locality and a class to which we should give our earnest attention.

The gentleman who has just spoken has been very frank in his criticisms and has expressed the idea that the real underlying purpose of our efforts is not so much in the interest of our fellowman as in the interest of economy and the financial welfare of those institutions with which we are connected. He very frankly tells you this and asks that you "speak the truth" so that there may be no disputation about your real purpose.

Every Organization Must Be Based on Sincerity

Such frankness is to be admired, even though the thought of such a challenge may be so unpleasant to us. There are few of those, with thoughts like the speaker, who have the bravery to come before such a body and openly make such a challenge. Every man should be above all things frank and honest with himself; every institution, such as the National Safety Council, must of necessity be frank and honest with regard to its aims and purposes. No institution with the stigma of insincerity upon it can be influential or endure. One of the reasons for the existence of the National Safety Council and for the work you and I have chosen, is that there are so many people like the speaker who are given to loose thinking. If in this country of ours and in our industries we had any considerable majority of people who thus questioned the efforts of industry to do good and looked upon every such activity as ours as being a selfish one, then there would indeed be need for many such organizations as the National Safety Council to cope with such a deplorable situation.

I recall to mind the occasion mentioned by Mr. Oliver when this same man expressed similar opinions in one of the safety meetings of the organization of which he was a part and sowed the seed of discontent and doubt in the minds of his associates. At the particular meeting, a man whom you well know and who is present today (Mr. Gordon) had made a talk at the meeting of employees and had done what he could to present the subject of safety from the more human point of view. It was at this meeting that the gentleman took exceptions to the presentation of safety along the lines of human helpfulness—am I not correct in this statement, Mr. Oliver?

MR. OLIVER: Yes sir.

MR. SCOTT: On this occasion, this gentleman criticized his company for bringing into the meeting a man who had no practical knowledge of car operation, and expressed the idea that the safety department should not send out as an instructor a man like Mr. Gordon, who (as he said) did not know the difference between a trolley and a controller. It is fortunate that the management shortly after this meeting was so wise as to take this man out of the operating department.

It may be true, and doubtless is, that Mr. Gordon does not know how to run an electric car, nor does he pretend to tell trainmen that he has any expert knowledge of actual operation; nor was such information

as details of operation necessary to meet the situation which was presented at that meeting. The technique of car operation was not the needful thing for the group of men who had assembled to hear Mr. Gordon. There may have been, within the group, associates who had been influenced by the previous speaker—who like him may have been thoroughly familiar with car operation; but he and they needed a treatment of the subject entirely different from one of mechanical detail.

Most of you know Mr. Gordon and know that I speak truly when I say that he has made a great contribution to the cause of safety; not due to the fact that he has any trained engineering or operating knowledge, but because he is an outstanding example of those who have heart in the work and are striving to develop requirements more necessary than mechanical knowledge. Mr. Gordon has been very helpful in putting into the organization of the North Shore Road, that spirit of consideration of one man for another, that consideration of helpful service and spirit of loyalty to the company which has made this road prominent as one of the best operated in this country.

These Employees Thoroughly Believe in Safety Effort

Last year this property was awarded the Coffin Medal for its efficiency and advancement in railway operation. The real spirit of safety has permeated this entire organization and brought the men and the company very closely together. The employees very clearly appreciate there is something else in business more important than material and financial success and it is this appreciation that has been largely responsible for the improvement of the property. The gentleman who has just addressed you has a family and they travel on this road. He should certainly be grateful for their safety and for the confidence he has in their being protected by his associates. Most certainly he should have some feeling of gratitude for his connection with his employers and the safety of those of his own household.

Each one of us should profit by the lesson which has been brought out in the presentation this morning. Each one has some such person in the group of men with whom he has to deal in his safety work at home. The reason you have not found this out is probably because similar men in your own organization have been too timid to assert their convictions like this man has. There are many who have the idea that you and the other safety workers are not wholly sincere in your work. They have the idea that you have chosen your particular profession because it presents an easy job, or perhaps believing that you find it profitable. They believe the company has created the safety department and employ you in order that it may make financial gains because of the work you are doing. When you go back to your work you should remember that you will find some such doubters of your sincerity of purpose and those who are looking with doubt on your company's unselfishness in its interest in safety.

Those of you who heard Doctor Jones at the banquet last evening

certainly were given the true spirit of our cause. His talk alone would have compensated any one attending this Congress. It was good treatment for those who may have such "red" views of our work. There is quite a contrast between the estimation of the cause of safety as was portrayed by Doctor Jones and the sordid and contrary view which has just been given to you. It perhaps reflects the two extremes of views on the subject; the one so full of sympathy and the value of human interests—the other so cold and lacking in its appeal; each due to the attitude of mind and the conception or misconception of the better things of life. The one appreciative, unselfish, with a spirit of love. The other resentful, pessimistic and with an atmosphere of selfishness.

It is greatly to be regretted that there are those who have built up within themselves such antagonistic minds to any efforts directed toward the betterment or happiness of people and who are seeking justification of their feelings by looking with suspicion upon all such motives and efforts. There are men in attendance, many of them, who are making financial sacrifices to themselves and their families in following the work they are doing and who are prompted to continue making these sacrifices because of the conviction that they are doing something which is really worthwhile and which counts for more in life than physical comfort or financial ease. I believe this has been evident in all of these meetings where one can not fail to see the hearts of the men who have taken part and can easily determine the purposes which have actuated them in their presentations.

Safety Men Wish to Build a Safer, Happier World

Anyone who goes away from these meetings feeling there has been a lack of sincerity is indeed unfortunate and certainly has not caught the true note. It seems clear to me that nearly all of these men have had faith that their efforts would make this a better world in which to live. These men are factors in this development and are doing their part to contribute to a safer and happier people. These meetings have given us the incentive to renew our interest in our work and our appreciation of responsibilities. We are better and more efficient men for having been here and I am sure all of us are grateful that we are engaged in such a work and are thus permitted to fill a really important place in our industrial and civic life. We should have the satisfaction of knowing that our lives are unselfish ones; that we are doing something for others and we shall probably leave this world a little better than we found it. Such sentiment as this seems to prompt the hearts of the men here and to permeate this entire Congress.

We have no apology to make for the National Safety Council; we have no apology to make for its meetings in this Congress; its needfulness and work are well known; its sincerity of purpose is unquestioned and there are those who know it has served and will continue to serve a good purpose. (*Applause.*)

CHAIRMAN McCULLOCH: Before proceeding with the discussion I would like to make a statement: I hate to burst this bubble, but in de-

fense of Mr. Thomas, I feel that I should explain that this whole matter has been a frame-up. Mr. Chester Thomas was for years the best motor man on the Chicago, North Shore and Milwaukee Railroad, and because of his splendid record in the operation of the trains, including his accident record, he has been promoted to the office he now holds. We asked him to get up this morning to make such remarks as he has in order to break the regular routine of the meeting. I am sure he has carried his part well.

We are now ready for further discussion.

MR. ANDERS: Regardless of the frame-up, I have been lonesome at this Convention this week in comparison to last year. One of the greatest safety men that I have ever known passed away last Tuesday. His name was John J. McCarthy, and he was connected with the Ohio Bell Telephone Company for probably 20 or 30 years. I feel, Mr. Chairman, that the Public Utilities Section of the National Safety Council should express to the officials of the Ohio Bell Telephone Company their sympathy in the loss of such a wonderful safety man.

CHAIRMAN McCULLOCH: That will be done.

The Timid Talker Sometimes Has a Helpful Idea

MR. BEERMAN (Consolidated Gas and Electric Company, Baltimore, Md.): There have been times at these conventions when I have wondered if we have gotten down to a specific problem. We all like to go back with a particular suggestion that we feel we can cash in on and defray or make up for the expenses incurred in attending conventions.

We always receive quite a bit of inspirational remuneration at these meetings. However, I think at our meetings, during the discussion part, we could present a typical problem which will be and should be for our use. I have heard mentioned this morning a question in one of the papers of accidents resulting from alighting from trucks while in motion.

In our Company in 1925 we had a lineman who had been in our employ only 24 hours who was very anxious to get home and tell his wife how he had made out. He jumped off the truck before it stopped and was crushed under the rear wheels. We immediately set about an investigation and called all the truck drivers to our distribution department. A little fellow got up and stumbled and stammered a bit and then said, "I think we can put a bell on with regular rope and have a conductor," and immediately there was a burst of laughter. Well, we let him talk a little longer, and then we got the superintendent of distribution up and he spoke. The result of that meeting was that we now have these bells on. Our trucks are not allowed to make a left-hand turn unless the bell is rung and the man is given full signal to warn traffic behind. We have a conductor back there that stands with one hand on the bell rope. The truck is signalled to stop and nobody is allowed to alight until a complete stop is negotiated. That is just a point that came in our experience.

It may seem a small point, but there is room in these discussions for

these points. We have quite a problem on our hands. Our lines run out of the city of Baltimore about 35 miles to the north and 19 miles to the south. These lines are covered by our gangs in big three and one-half to five ton trucks. They carry from six to nine men and a driver; they carry reels of wire and they carry pike poles and tools of all sorts. Now, these men must stand up on their way to the job. A 20 mile ride in one of these trucks is not so good, especially when a man must shinny up a pole and do work of a tedious nature. I would like to know if anyone here has a blueprint of a truck arrangement whereby the men can sit down on the way going to and from a job involving linemen and the stringing of lines?

C. C. DRUCKER (Glover Gas & Electric Company, Kentucky): If this gentleman will meet me and give me his address after the meeting I will be glad to send him a blueprint of that kind of truck. We have them.

MR. MACKINNON (Nebraska Power Company, Omaha): After what happened to the last man that made some criticism, I am rather dubious about saying anything of a critical nature. However, in Mr. Gardner's paper, there are two main points, it seems to me, discussed. The first was first-aid, and he talked for some considerable time on first-aid. His second point was foremen's responsibility. The criticism I have to make of the paper is that those should have been reversed. Our job is accident prevention, first, last and always. Then teach our men how to resuscitate or patch up a man so they will be prepared for an electric shock or any other type of accident.

The Foremost Duty is to Prevent Accidents

I think that in our electrical industry and in many of the other industries, we are tending a little too much to lay emphasis on first-aid, and if I may say so, on resuscitation. Although I am very strongly convinced that both of these are essential training, we must give to our employees in the electrical industry the thought of safety first. I believe there is a tendency to slop over on that line rather than to hold to your first and foremost duty, which is to prevent the accident.

Another point that I would like to call attention to is the one brought up by Mr. Opp in his account of last night's accident here, and that is the elimination of the careless employee. I think that work can be done through our foremen in instructing their gangs and in teaching their men to think and act safety first. We must add to this the other duty of taking the man whose mind is off his work, who spends his time reading the dime novel, off the job. We have had in our company within the last year two such men, but luckily we got them both before the men actually pulled any bonehead pieces of work that resulted in an accident. They were not quite as bad as the kind Mr. Opp told us about, but they were unsuited to their jobs. They were not bad fellows, but they just simply were a hazard to our electrical system, because their minds were not devoted, not trained for that type of work. Both of them were switchboard operators.

MR. GLIDDEN (Ohio Public Service Company, Mansfield, Ohio): One of the papers brought up the subject of a safety manual. We are endeavoring to make one in our company. May I have your experience as to what is best to put into the safety manual?

CHAIRMAN McCULLOCH: Can anyone give us a little information on that subject? Mr. Glidden sent that question in on one of the cards. We can spend a few minutes on this discussion. The question is, "What should the safety manual contain; in what form should it be published and how often should it be revised?"

MEMBER (Western Union Telegraph Company, New York): The first-aid instruction or manual for employees, depends largely on the type of men you have. Some men prefer a very small pocket edition and some a large book. We have one that is about five by seven and we have used it successfully for about 10 years. I will be glad to send you a copy of it complete, and you can use it if you see fit. If there is any other information you want to know about it, we will be glad to give it to you.

Hazards of Employees Riding on Trucks

You will also find that the Bell System, Associated Telephone Companies have a very nice sized manual.

The subject raised by the man from Baltimore with regard to the hazard of employees being hurt getting on and off trucks interests me. In the Western Union Telegraph Company our employees use a motor railway speeder which a few of the utility companies do not come in contact with. We are compelled to work along the railroads, and many of them are high-speed railroads. Many of you fellows want to get back as quickly as you can, safely, of course. Just remember that somewhere along the line there are groups of 10 or 15 men working, trying to maintain lines of communication, so that should anything happen to you or some other member of your family you might reach them in the quickest manner possible.

These men have got to get to and from their work. Our problem has been to reduce accidents with regard to the operation of motor cars. These motor cars weigh anywhere from 1,200 to 1,800 pounds, and they carry from 10 to 20 men. Our chief problem is to keep the men from getting hurt in getting on and off these cars, and preventing groups from falling off the cars. We have solved the seating arrangement on these cars. I just mention that to bear in mind the class of work we which have to do.

The telegraph company differs in a great many respects from the public utility or the power-using companies or companies that maintain telephone lines. Possibly the seating arrangement which we use on the motor cars may be of some use to you on the automobile trucks. If you will write to some of these motor railway concerns they may be able to help you out. They may have a solution for your problem.

CHAIRMAN McCULLOCH: There were some question cards passed out among you a few minutes ago. Our time is so short that we will not

have time to collect them. If any of you have any questions, will you please submit them personally at this time?

MR. BURTON (Consumers Power Company, Jackson, Mich.): We have found that first-aid work, resuscitation, goes hand in hand with safety work. We put the emphasis, of course, on the accident prevention work. One phase of that situation that has come up several times when we first started to post notices regarding resuscitation was that it got the men thinking and talking about accidents. We have also found that first-aid properly done may prevent another accident. For instance, a man gets slightly injured; if he is not properly taken care of, he is liable to get into another accident, so the two go hand in hand.

We are not over-emphasizing first-aid or safety work, although I agree with Mr. MacKinnon that it sometimes appears that we might be doing that.

I don't know whether it is in order at this time, but we have had an exceptionally fine meeting this year, one of the best in the Public Utilities Section. I think part of this is due to the wonderful accommodations we have. If a motion would be in order to thank the Detroit Edison Company for the courtesy they have extended to us, I would like to make such a motion.

Example of a Very Unusual Accident

CHAIRMAN McCULLOCH: We didn't take official action on that, Mr. Burton, but our appreciation has been conveyed to the proper authorities.

MR. BURTON: I made a note while one of the former speakers was talking regarding unusual accidents. I met a man a week or so ago who is minus an arm. I asked him how he lost it. He is a rather wide-awake fellow and he said, "I was going down the street and a train was going by. I went under the gate and stood there and tried to count the cars as they went by, and the next thing I knew I ended in the hospital."

It appeared that he got dizzy or something, and he seemed to just fall over. That was a very unusual accident to me. You see hundreds of people every day under one of the gates. This was a young, wide-awake fellow, but he lost his arm in that way.

C. HOWARD STEWART: I just want to mention a few things here. There was a matter touched on lightly by Mr. Gardner in his paper. In cities where there is a local Safety Council it is the finest thing in the world for the utility in that city to support the work of the local Safety Council, not only morally but financially. We have a very active Council in St. Louis, that is supported by all of the public utilities operating there, the street car company, the gas and electric and telephone companies.

We have started a number of schools there which have helped greatly with the educational work of the Public Utilities Section. We had a safety school last year conducted by the Bureau of Mines, at which some 200 or 300 men received certificates. The Bureau of Mines is planning on having a similar school this year. We have a Safety Supervisors' course which has been operating now for six or seven years, attended

by 500 or 600 men every year. We have inspirational meetings for the foremen and superintendents which are attended by as high as 1,500 or 1,800 men. These meetings are usually held monthly. We occasionally have a meeting for the executives.

I realize that a good many of the companies represented here today are operating to a large extent in rural districts where this contact with local Safety Council work is not available, but I do want to urge on behalf of the local Councils, the necessity for more of the public utilities getting behind your local Safety Councils and getting your representation on their Executive Committee, if you can, and take an active interest.

We not only have the employee accident to deal with, but we have the public accident to deal with. You will secure a great deal of publicity on accident prevention by concentrating your work and efforts through your local clearing house or local Safety Council. The National organization today, I believe, has 65 local Councils operating with paid staffs. There are a number of volunteer Councils where the work is carried on in a voluntary manner. We have found it profitable in St. Louis. All of the utilities there cooperate to the fullest extent with our local Council. I hope you will give this matter consideration when you get back home. If any of you gentlemen are located in cities where there are local Councils, you ought to consider joining and giving them your heartfelt support.

CHAIRMAN McCULLOCH: We will have to end the discussion. We have one or two announcements, and we must adjourn by 12:45.

I am afraid if we don't watch out, we are going to have another fatal accident in the Detroit Edison Company before we leave. I wish I could borrow a straight jacket to put George Opp in. Since I landed here, he has arranged practically all of the details for the officers' breakfast, the joint luncheon, the plant visits, the room accommodations, and every other detail that you can imagine. He has had no sleep for 36 hours and yet he wants to make some more announcements at this time in order to properly take care of the delegates. I will ask Mr. Opp to make the announcements and then to quit.

ADJOURNMENT

Joint Luncheon Public Utilities and Electric Railway Sections

October 27, 1926

HOMER E. NIESZ, Toastmaster
Manager, Industrial Relations, Commonwealth Edison Company,
Chicago, Ill.

THE Joint Luncheon Session of the Public Utilities and Electric Railway Sections convened in the Ball Room of the Tuller Hotel, Detroit, Michigan, Mr. Homer E. Niesz presiding.

Toastmaster Niesz: Five years ago in this city at the annual Safety Congress, the first joint luncheon of the Electric Railway and Public Utilities Sections was held. Since then we have had these luncheons yearly and they have served to bring together these two closely related Sections of the National Safety Council, and I believe they have in a way helped in building up both Sections.

At the time of this first joint luncheon, the Electric Railway Section was not very active or very large. I believe that the intrusion of the electric power, the gas, and the cooperation of the public utilities have aided that Section in building up its program and its membership until now it goes alone instead of having, as we had for several years, joint sessions with the Public Utilities Section. I believe the bringing together of these Sections makes for unity of purpose and unity of action in the elimination of accidents in the public utilities industry.

Accidents do not happen; they are caused. This is illustrated by a story of a man of a Western state who applied for life insurance. He was asked by the examining physician if he had ever been sick and he replied that he had not.

"Did you ever have an accident?" the physician asked him.

"No, I did not."

"Were you ever laid up for any reason, disabled, not able to work?"

"Yes, I was bit by a rattlesnake once and nearly died. Another time I was kicked by a mule and was in the hospital for four weeks."

"Weren't those accidents?"

"No, they did it on purpose."

So there is a cause behind every accident and it is the elimination of causes that results in the elimination of accidents.

We have for our first speaker today a man who is a recognized leader in the central station industry of the United States; a man who is a power and a leader in his own community; a man who believes and firmly supports safety and other human relations movements in his organization. He always makes it a point to make his points pointed. I have the pleasure of introducing Mr. Alex Dow, president of the Detroit Edison Company.

THE ULTIMATE CAUSE OF ACCIDENTS

Alex Dow, President, Detroit Edison Company, Detroit, Mich.

I will begin by thanking Mr. Niesz for giving me a good start and thereby saving about three minutes of palaver, which I would otherwise have inflicted upon you.

Mr. Niesz says accidents are caused, they don't happen. I have been puzzling my brain at intervals when the brain was not overloaded with other matters, as to the ultimate cause of accidents. I tell you to begin with, that I have not discovered it. I must be getting near to it because I am working backward on its origins. I may of course be working in a circle, but I am going to present to you as the first installment of this talk, a very short installment, some thoughts as to origins and causes of accidents.

All our safety precautions fall into one class or the other, that is, either a mechanical device or a routine (which is the equivalent of a mechanical device), intended to prevent the establishment of conditions causing errors and permitting accidents. The responsibility for the design, maintenance and operation of these safety devices, safety routines, is transferred to a certain extent from the employee, who is up against the actual job, to some employee who by assumption is competent to deal with these cases of routine or of safety appliance. It is a transfer of responsibility.

After a while somebody has to supervise the safety man, and then somebody has to supervise him; and all the time we keep passing the ultimate responsibility backwards to a more select group. Some day in each of our organizations, even possibly in each of our states, we are going to have one ultimate safety man, and he will blow up. If you want such a man you will have to make the specifications for him and arrange to have his grandfather start getting that man in the usual way right now. He will be available 45 years from now. If you try to get him any other way it will happen just exactly as I have said—he will blow up.

Now, is this process of narrowing down going to continue? I am afraid that it must for a while. I look upon it, however, as ameliorative

and not curative. Let me illustrate from a report that was on my desk this morning.

A sub-station operator at such-and-such a station was given an order to phase certain cables and determine the correct rotation of the phases by means of low voltage, using one lamp between the conductors and ground, which is a perfectly orderly and usual routine. The operator picked up the phases correctly on the one cable and proceeded to the other cable of the pair. He went to disconnect the switch of the second cable and he struck his low voltage lamp on the wrong side of the disconnect switch. That is to say, he struck, in this particular case, a matter of 24,000 volts. The phasing equipment was destroyed, but luckily the operator escaped injury. No service was interrupted. From the point of view of the management of the company, of course, that last sentence was most important. The flare-up dissolved some switch gear and did some traveling around as it sometimes does when started.

What happened? A routine absolutely well established and within the competence of one man, which he had carried out correctly five minutes previously was not repeated. Of course the man was thinking about something else. Of course he just wasn't observing the routine. The natural thing to do under those circumstances is to see what is the matter with the routine, tighten it up and ultimately provide another safety device, and then provide a man to watch the safety device.

Another Accident Happened to a Competent Workman

Here is another item out of the same report. A construction man was doing work at a new sub-station. The flame of the oxy-acetylene torch he was using came in contact with, or in the near vicinity of, the live shell of the lightning arrester of the old station. There was a fence between and the man had one foot over the fence. He was considered a competent workman but he didn't realize that the absolute routine that forbade him coming inside that fence line with his equipment was a perfectly good rule. He could have passed an examination on it, no doubt, but he didn't realize that the flame of that torch was an ionizing device and would produce a flare. This is another sample of the sort of thing that happens. Yet the routine, the safety devices are all complete.

Here is another case from recent experience. Cables are sometimes three, five, or ten miles long and it becomes necessary to reroute them at times. They are all tagged, of course, carefully. They are excellently tagged and there is no question about the verification of the marking. There is also a routine that requires an electrostatic test device to be applied before there is an actual cutting in order to see whether the cable is alive or not. The purpose is to eliminate the chance of an assumption that the cable is dead and fit to be worked upon. Very well. A line was diverted quite recently and the section, left in the ducts and

idle for the time being, is to be used at a later date. You understand this is just a reroute.

Now the question comes up immediately, shall there be any change in the tagging or marking of those cables? The answer, carefully thought out, is, no. If you put on a tag that identifies this as a cable out of service, that will be just an invitation to some man a little bit too smart to omit his safety precautions. Consequently the live cable marking is left there, the assumption being that all cables are to be treated as alive.

A perfectly competent and experienced man is sent at a later date to make a necessary cut of the idle cable in a manhole in which the new rearranged cable is also. He has full warning, full instructions, and knows what he is doing. He is equipped to make the proper test. He assumes then he has found the cables properly numbered, knows that the live cable number is left on the old cable, and thinks he has the dead cable. He goes ahead, disregarding the test, and cuts into a live cable.

Two Fatalities Followed This Peculiar Situation

What are you going to do in a case like that? Put an inspector on top of him to say, "Here, maybe you are at the wrong cable—make the test."

Still another case. An excellent rule of good utility practice requires that the sub-station operator shall release apparatus that has to be worked on by a construction crew or a repair crew; that he shall not do anything without instructions from the chief operator and that these shall be checked back, and that the construction foreman shall confirm the check before the chief operator shall say, "Yes, release it."

In this particular case, the sub-station operator reports back everything clear, everything cleared. The foreman knew exactly what that meant, having worked on the same outfit twice before. He confirms that report. The apparatus is released. Then one of the men proceeds to make the final super-precaution of removing the fuse from the circuit, which by some chance might close an open switch and put current on some part of the work. These men say, "We are working behind the relay and the current can't get on," and the necessary precaution known to be required is delayed until after the men get to work.

Just at that time somebody drops a good, heavy load and jars the building. That particular relay is given a sudden jar, hits an instantaneous contact, the switch is closed and two men go to Kingdom Come in very bad shape.

What are you going to do in a case like that? You have all heard such things before. You men who deal with high pressure water, steam, air, you are accustomed to all these things. How far back are you going to carry the responsibility? How many super-checkings are you going to make? I think I hardly need offer the reported illustrations to show you by passing that trouble backwards by check and countercheck doesn't do anything but ameliorate it. It doesn't cure. What is the cure?

Now, I don't know what it is but I am going to give you some thoughts

as to its possibilities. It is not satisfactory of course to say that if this had not been done and that had not been done these things wouldn't have happened. It is not satisfactory to say the men were disobedient. What you want to do is to get at the item of human nature that makes perfectly sound men take chances and makes them go ahead and disregard the things they are supposed to do. What makes them disregard the safety rule, assuming it doesn't apply to them? Let us just step a minute into something else and see what the habit of thought is.

We have in this town an excellent rule providing stop signs on certain streets. That rule means that before coming upon or crossing one of these streets the operator of a vehicle shall bring that vehicle to a standstill, and that is all there is to it. Now, the assumption that a vehicle is not going to shoot out upon them from the side suddenly is taken by drivers as a license to speed on these streets, and they get into the habit of calling them right-of-way streets. There is no such provision. The man on the crossing first has the right of way. If two come together the man on the righthand has the crossing. But two-thirds of all the men who drive on these so-called "stop streets" not only treat them as right-of-way streets but call them right-of-way streets. What are you going to do about that?

The Problem of the Lamp Post and the Automobile

What are you going to do about another matter? You would think that an iron lamppost would be about the last thing that would be run into by an automobile driver. We are not responsible for the lampposts in the city of Detroit. I was responsible some years ago for the design of the present lamppost used in the underground district, and it has served its purpose for 30 years. I have seen that stocky lamppost positively double-up on being hit by a very light vehicle at high speed.

Outside of the city of Detroit my outfit is responsible for most of the lighting in the districts for 40 miles around. We average one lamppost per night that somebody wraps an automobile around and breaks. Any fellow that wants that contract has got to figure on one automobile accident per night. You have an action against the fellow that breaks it, but you might just as well try to collect from a beggar. You sue a beggar, you know, and catch a louse. You repair the lamppost and charge it up to the cost of operation—one a night, 365 a year including Sundays. On Sunday nights it is inclined to run rather high.

Yet, as I say, one lamppost per night is smashed and it shows a tendency to increase. What is the frame of mind that does those things? We are actually dealing with psychological conditions. Now, I am off on another jump for a little and then I will come back to the main track.

In the Century Magazine of October, 1917, the first article in the magazine was headed "Our Moral Anarchy Disclosed Through Grading the Ten Commandments." What the author did was to set up some 500 or 600 people with copies of the Ten Commandments in the King James version and a lead pencil, and say "Grade these Commandments, in-

dicating by number which is the most important; that is to say, Number One being the most important; and grade the relative importance of the Commandments as moral rules."

To the Safety Congress it may be interesting to note that a large plurality number (not a majority), rated as Number One "Thou Shalt Not Kill." The exhibit of the scatteration of ratings which is described as evidence of our moral anarchy is most interesting. You don't find, excepting by implication here and there, any logical rating of the Commandment in answer to the stated problem. In other words, not only those 500 people, or practically all of them, but even the author himself failed to observe that the question of the relative importance of the Commandments as moral rules is the question set up. They have interpreted the question to be as to the relative sinfulness of the breaches of the rules; that is to say, they consider that murder is the greatest sin. Therefore the Commandment against killing must be the most important Commandment.

Observations Upon the Ten Commandments

There is an utter failure to realize what the question is, and even the author comes under the implication of not being quite sure what the meaning of his question is. To show you what I mean: if you rate these as moral rules you must rate them with respect to collective morality and not as aids to the saving of the soul of the individual. They are group rules for the people at large, and a very slight analysis indicates that the Commandment against killing is by no means the most important. You must go further back and eliminate the inclination to kill. You must realize that one doesn't kill for the fun of killing. There is no pleasure in killing. Killing is an expression of a mental condition which has its roots in matters that don't contemplate any killing.

If you study these Commandments as moral rules you will arrive at a first conclusion such as, that society can not exist unless there is a reasonable amount of truthfulness. Therefore the Commandment, "Thou Shalt Not Bear False Witness" as a moral rule is most important. Second, you will place the Commandment against covetousness, because that establishes the right to personal property. Third, you will take the Commandment, "Honor Thy Father and Thy Mother," because that provides for the existence of the family. You will notice by observing these three Commandments you will have obtained, first, a society which can continue to exist because there is habitual truthfulness among its members. By observing the next you will have implied respect for the property, for the ownership, and ambitions, for the hopes and desires of other people because you will not covet. Then the family, which is, after all, the basis of our civilization, is provided for, and with these three you can have society, and without these you can not have society, and as moral rules these three are the most important.

Here are a representative group of educated people whose evident fail-

ure is to appreciate the force of the question and to see what is put up to them. What is wrong with them all?

Now I am going to jump off again in another direction. People say I am a pretty well educated man. I have good sense, I have studied and I have read. I began to scratch for my own living when I was entirely too young, but I was under the necessity of scratching. I now have to keep on as a matter of habit, and consequently my education is seriously incomplete from the point of view of the system of scholastic education. Nevertheless, my education has been a liberal education. Looking back upon my own experience I am again going back toward the root of things. I remember as a child of seven I was drilled in the habit of exactitude of expression. The question was "Do you mean that, or do you mean this," and then a correction. When 10 years of age I was drilled in parsing. I will venture that a good two-thirds of the people in this room don't know what the darn thing is, do not know the analysis of grammatical construction so that the expression of the idea shall be grammatically correct. They have accepted the way the crowd talks, or may have suffered from the latest vagary of education, which is self-expression, and they have continually a haziness that puts them in the same class as Don Marquis' Hermione, who used to say, "If you get what I mean."

Children Are Not Being Educated to Accuracy

Take a look at the people you are dealing with. Up to a certain point the more educated they are the worse they are. Now, let us take a look at the present system of education. It calls itself opening windows on to the universe for these young minds. What these young minds need is ability to understand the spoken and written language and to express themselves with precision in this language. What they need is a quick acquaintance with the simpler arithmetic. What they need is a chance to write with a hand that is legible so they will not find it necessary to pack a typewriter with them. These are the things they need. Given these, they have the elements of an education. They have the means to educate themselves. They have the possibility of doing what many of us have done, of developing a liberal education because precision of thought has been inculcated, precision of speech has been taught, precision of understanding, and the analytical mind,—“Does this mean what it says?”—have been drilled into them from the very beginning.

The drilling that I remember as having been of most use to me in this connection was what you would call “trick questions.” Such things have been recently rediscovered and applied in the army test, out of which we have been informed that the average American has the mentality of a 14-year-old minor.

I think that in this matter, in the scatteration, the dispersion, the triflingness of our education of today lies one of the roots, possibly the most important root, of our chapter of accidents. The feeling that an order

doesn't mean what it says, the feeling that there is something implied or permitted, is the feeling that causes us absolutely to overstate all our laws. We mean that people shall travel 25 or 30 miles an hour on a road and we write into the law 20 miles and a penalty above that. We mean that various courtesies and considerations shall exist, and we write something that becomes an exasperating mandatory law. We mean that people shall be truthful and yet we plaster up all our legal procedure with affidavit after affidavit. In the state of New York I discovered in the preparation of some official statements of financial affairs, to be filed for record, that one had to be identified and re-identified and that the notary public had to be identified and then somebody had to go and identify the identifier. The assumption is in point of fact running through all our practice that precision of expression will be non-existent. Accuracy in the nature of truthfulness can only be secured by imposing the penalty of perjury upon inaccuracy, and having imposed the penalty we never enforce it.

A system that catches our children and runs them through half-hour periods of this, that or the other thing; this, that or the other method of expression; this, that or the other interesting development, gives them just these dabs and dashes, and at no time undertakes to make them read precisely, think precisely back of the reading and speaking—that system of education is wrong, and it is out of this that comes disregard for the obvious, evident intent of safety instructions and safety routines.

An Absolute, Inefficient Method of Education

I commend that thought to you, that the most important root of our trouble is in our present inefficient method of education. A man has to get into the post-graduate classes in one of our universities before he discovers how much time has been wasted. Most people, however, have to begin to scratch for themselves at a reasonably early age; and it would seem to me that if one would take a much reduced curriculum, with precision and exactness of thought and speech in every branch, the curriculum would help wonderfully toward the bringing down of industrial accidents and would help wonderfully toward the efficiency of Americanization.

Now I will go to another part of my talk which is entirely unrelated. We are all working more or less to the glory of God and to the good of mankind. We may not express it just that way, but we at least like to feel that is about what it means. Therefore let us not talk altruistic motives. We don't say in these Safety Congresses and elsewhere, "I am my brother's keeper." Any motive that is altruistic is not to be considered, but is to be assumed.

What have been the driving motives of progress? Why is society better today than it was years ago? Why is business more orderly and industry more careful of our people? Is it absolutely the extension of what you might call the higher morality among us, or is it because an

enlightened selfishness teaches us that it doesn't do to impose upon our neighbors?

In other words, the motive of profit, the motive of saving (if you will call it so), the motive of personal interest—is that not, after all, one of the largest driving motives? It is there and there is no use denying it. We can do a few things for the good of our fellow mortals or for the peace of our own souls if we think we have souls, but all the same we must realize that most of the improvement in business methods, most of the betterment of business, is had through enlightened self-interest.

In safety you are a little inclined to get away from the motive of self-interest in its simplest form. I don't mean to say that you don't point out that accidents cost money; of course they do. Let me call your attention to something and let me give you a little suggestion on it.

The Cost of Accident Has Been Imposed Upon Industry

I am going to offer you a proposition that I think is heretical. What is the object of insurance? To distribute the burden of accidents. Does it always work as it should? Does the person who is insured always look upon his duty to the insurance company as a duty to his neighbor? A student of business ethics, and I have been such a one for a great many years, rather questions that. He recognizes the forcefulness of group ethics but he doesn't find in group ethics the regard for what may be called the common stock of resources that develops in the individual with regard to his own stock of resources.

Now in propounding this theory, I would say that one of the best results of the Workmen's Compensation Law was the improvement in general safety because the cost of the accident was absolutely imposed upon the industry, which is as it should be. I have observed, however, in many cases there is still this little inclination to say, "Why should we worry about it? Insurance covers it."

I wonder if we could bring into effect again the motive of personal profit by some such legislation as this: No factory employer shall be allowed insurance for more than two-thirds of the loss. The other one-third shall forthwith be a lien against his business and property, assigned automatically to the state. The state will make good to the employee and that lien will be equivalent to a tax lien.

That will mean that the man who makes more accidents than his share will actually suffer to a limited extent. It will mean that the cost of the accident will come right back to him. He will be obliged to figure in a different way from the way he does now on the cost of the necessary provision to reduce the probability of accidents.

Please think of it. I am asking you to consider whether it would not be worth while in all these schemes of ours—not by any means avoiding the condition that makes the state after all responsible for the payment of compensation—but seeing to it that directly out of each accident there shall fall upon the employer a direct and immediate part of the burden

attributed to that accident. The suggestion, as I have already given it to you, is that insurance shall be limited to two-thirds compensation, that the one-third shall forthwith and automatically be a lien, automatically assigned to the state and collectible by the state and against the employer and the employer's business.

Please think of it. I think it will help.

TOASTMASTER NEISZ: Gentlemen, again we are indebted to the great Detroit Edison Company for a most excellent presentation by Mr. Dow.

We have one more speaker whom I shall call upon now, who will give us a very brief account of the safety work in one of the great lamp factories of the General Electric Company. Last week we celebrated the forty-seventh anniversary of the birth of the incandescent lamp, an event which has done so much to advance the comfort and convenience of the people in the country and all over the world. I take pleasure in calling upon Mr. Harry C. White, supervisor of industrial relations, Edison Lamp Works of the General Electric Company, Harrison, New Jersey.

THE SAFETY THOUGHT

Harry C. White, Supervisor of Industrial Relations, Edison Lamp Works,
General Electric Co., Harrison, N. J.

I am not going to speak about the great plants of the General Electric Company. Mr. Neisz made a mistake when he said that. I am going to talk about America first—and this part of my talk did not come by accident—about the wonderful man whose birthday we have celebrated. This did not come by accident, nor did the day that we celebrated, the birthday of one of the greatest safety men that I know, come by accident. I know of no man who has contributed more to the safety of the people and the building of the great mightiness of America than he.

I am willing to wager as I visited Cambridge not so very long ago, that that particular day did not come by accident, but was perfectly planned by a Power greater than you or I, a higher Power above. I honestly do believe that the act that prompted the Pilgrims to visit this colony, and then the power that awaited their coming, was no real accident, because they absolutely had planned and were determined to hold back the mighty forces on the opposite side and send them back where they belonged, so that there might be a flag such as I stand in front of at this moment.

I am willing to wager, too, that the North and South misunderstanding was planned to unite and make possible a greater understanding of the people of America so that they might carry on the purposes and bring to fruition the great ideas which we so happily enjoy at this moment. We are not living in the days of ox-carts, but we are living in the days of airplanes and we are speaking through the elements to the farthest parts of the world. These things, my friends, were positively not accidents.

So I do honestly think that every safety man is here in Detroit because

of a program definitely planned away back in the early days. Maybe it is because time has not permitted the building up of a mighty Utopia that you men are meeting together to awaken in the minds of those whom you serve the pressing need for greater action now.

Might I suggest that you become better salesmen for the job which is yours? I can't think of a safety man as anything else but a salesman selling something that is vitally important to the great mass in and about America. I can classify your job as fully as important as that of any clergyman, priest, or rabbi in its privilege of making life easy and safe for those who toil for the corporations which you represent.

We are not living, gentlemen, in the days when they used a queer little lamp, like an open saucer. I want to build or profit by the progress made since then. That old lamp was used 600 years before Christ. But there are some people today who quite forget that we are not living back 600 years before Christ and that we are living in 1926.

Progress From the Ancient Days of Darkness

In those days they went out at night in darkness and light was little known; they brought back the body of their enemy and cut him up and put him in a bowl like this and burned it to keep the evil spirits away. My God, what a way to live! We are not living that way today—in darkness. It is a great job to help and to serve and to guide others out of darkness into safety.

I have here a little decorated pottery lamp. Gentlemen, I listened to those statements of Mr. Dow's, the wonderful laws of God. They are the only laws that are of real service in preserving the safety of man and country. But in the day of the pottery lamp man was not very much nor was he worth much to himself or others. Soon, however, he began to awaken to the fact that the earth held not only clay but it also held iron, which my forefathers were able to find and use both in lamps and in many other wonderful ways.

This lamp looks like a soup ladle. Well, I suppose it was used for that. They had a hook attached to it. They were satisfied with it because, as I have told you, there was little to live for, no place like we have today where they could go; rough roads; plenty of time, no use to hurry. In fact, I hardly believe they needed men with brains back in those days. They had no places to work, just a life like the Indian.

I want to pass through a great many changes. There was given to us in America a new birth and a new start. Take for instance the little whale oil lamp. It is a wonderful lamp. There was some danger, though. The people used to go out every night and kill a couple of whales so they could have light. Can you picture your wife saying to you, gentlemen, "I am glad you came home, dear, because there is no light. So, like a good boy, will you go down and get a couple of whales?" I want to tell you that we haven't any whales today, we don't need them. Now you can stay home and enjoy your nights. Safety—now we get the change.

Here is where our job began to come into being. They began to get away from the little community. They began to get out in the great metropolis and they got away from the center point of activities. Give us the days of yesterday when we used as a guide, comfort and inspiration the camphine lamp.

Some of us still stop for a moment to wonder if we have passed out of the ox-cart stage. If you would go to Mount Vernon, and George Washington could step out of that grave, he would say, "John, old boy, when is the next stage coach for Washington?" And you would say, "Why, George, you have been dead for 100 years. We are not riding in stage coaches. We are riding in high powered automobiles and we are talking through the air today. We have the radio and we are broadcasting to all four parts of the world."

Safety is a Thing Cautiously Planned

What you men need is the safety thought. Let us develop to the mightiness of it and let me stop just a moment to say that 600 years before Christ safety was not thought about; but in 1926 we are dealing with the masterpieces of science. We men have lived behind closed doors to make possible this change with the harnessing up of 30,000 watts, 125,000 candlepower. We are putting together enough heat and enough force in a small lamp that if I should drop it it would blow this banquet hall and the windows apart. That is then the point where safety starts with electricity. You say to me, "What is safety?" Well, it means the little things. You can now compare the two. Here I offer you the smallest lamp in the world. Now it is your job, but it isn't a big job.

However, it isn't a thing that is done in the twinkling of an eye. Safety is a thing which is cautiously planned. It is something that has a vision and a future ahead of it. It is something we must seal by that thing Mr. Dow spoke about, "Education and Power." You can't give the people a book and have them read it and understand it, but you have got to offer to them the little points in life. Safety is what I will illustrate now. I want to give to you the meaning of safety. I want to hold in my hand modern science. Safety is to be cautious in what we do. I frankly and honestly believe that if your corporations would be responsible for a certain territory around your factory and in the schools, not once a year, on "Safety Week," but every week, every month, awaken in the little children's minds what safety means, the safety idea, like the little light, would grow to mightiness.

A little baby creeping across the floor knows nothing about safety or cautiousness, and she will pick up a tack from the floor and place it in her mouth. Nobody is there to tell her it is dangerous. Even if her mother were near perhaps the baby wouldn't have understood. Well, we have machines, we have rails and signs about us, but somehow or other a baby will pick up a tack and do the very thing we hoped that it wouldn't. However, science has kept pace with you, and the pulmotor will bring life back again.

I stood by Dr. Coolidge the other night and asked him, "What does it mean when that little ray of light which is nearly a foot and a half from the point of that tube begins to blaze?" When I saw that blaze I closed my eyes and immediately I said, "My God, man, I hope it isn't the thing they are speaking about over in Europe that will be able to destroy life. Is it for the destruction of man or will it be your contribution for the construction of man?"

He replied, "I hope it will never go more than two feet from the tube."

I could see the building of tissue, the building of power, for in that ray of light we have radium, and it is so cheap that the poorest man in the world can use it. Lincoln said, "God must have loved the poor people because he made so many of them."

It isn't the big things that count, but the little things of safety we teach; and in conclusion I want to bring to you the man who largely contributed to your job. It will take me six minutes and then I will stop.

I'd like to talk to you about this particular fellow, Mr. Steinmetz. He was a small man and a cripple. If he were here he would not stand as tall as I do. But every stack that smokes, every mill that turns, every light that blazes, every generator that functions, does so because of Steinmetz. I want you to see him when he leans over his chair and watch him with his long stogey in his mouth speaking to you this wonderful afternoon.

Memories of a Meeting With Steinmetz

I was able to meet Steinmetz under very peculiar circumstances. I was walking down the corridor of the General Electric Company plant and Steinmetz was directly in front of me. As I passed to the side of this genius I watched him and I removed my hat. I want to tell you, gentlemen, he has contributed mightily to that progress in which we need safety men. He looked at me a moment and he said, "Who are you?"

I said, "My name is Harry C. White."

"Where do you come from?"

"Harrison, New Jersey."

"Why are you here, Mr. White?"

"I am here to speak to the students at Union College this afternoon at four o'clock."

Looking at his old dollar watch, he said, "It is now half past two, very near to this hour."

We entered that room in which those things were made that helped you to climb and he said, "Take a seat," and I was able to sit down. We talked a little bit about Edison and his life.

"Doctor," I said, "we have talked of Edison so many times and his mother. I never heard much about yours," and that brought from him this:

"Oh, Mr. White, I have never known much of my mother! She passed away shortly after I was born."

Gentlemen, that sacred night that Steinmetz entered the world there

passed through the eye of a needle this child, with a back so out of place, a body so tired.

"Doctor, your father?"

"He was a companion to me. More than once my father would sit around the table figuring the money that he earned, and with what was left, Mr. White, after my tuition was paid, we could eat, and sometimes we did not eat."

"Why did you leave Germany?"

"Mr. White, I was a damn fool; I talked too much. I was not a radical, I was not a socialist. I was constructively thinking of building up men, but they misunderstood me. My whole life was misunderstood. I did not leave Germany, I ran away. That night that I said goodby to my people, that night that I shook my father's hand, I left for some place, but I do not know where. I did, however, go to Switzerland."

"You came to America, doctor. Why?"

That brought from him the statement that he never knew a moment in his life without that pain in his back. He was leaning over the table, around the chair, and he stopped a moment and said, "God, please a moment, my back! Oh! That is better now." And he smiled a great smile with pain again defeated. It was Steinmetz, who contributed largely to the safety of millions, taking the drudgery out of life, awakening in men the power of God, locking up the electricity and making it a slave where yesterday men slaved!

"Now, lastly, doctor, you said you would never take any money from the people of America. What really prompted you to say that?"

"Oh, Mr. White! there are some people who can not be real honest. There are some people who can not be reasonable and decent. I was thinking, as I stood on the gangplank, that soon I would be in America. There was a man standing there who said I did not belong near the gangplank. I did not understand your ways and your language."

"That man pointed to me and told me to get out of the way, and then he ran up the gangplank and he threw me down and he laughed and said, 'You dirty cripple, in another year you will be a public charge.'"

"I asked somebody what he had said, and when I understood and when I was standing on the shores of America I raised my hand to the Heavens and said, 'As long as I may live I will never take a penny from the people of America except only that which will keep life within this body.'"

Steinmetz's salary was \$150,000 to \$200,000 a year and he never accepted one cent except that which would keep him alive, and the rest he would give to others.

Through kindness, willingness to help, and honesty, I believe when the safety men of America become salesmen and they form a partnership with those who are interested, the best part of accidents will be blotted away, for they will be thinking of others, not of themselves. Do unto others as you would have others do unto you, is my standard of a safety man's religion to humanity.

ADJOURNMENT

Quarry Section

New Officers of the Section

CHAIRMAN: L. R. CARTWRIGHT

Mid-West Crushed Stone Co., Indianapolis, Ind.

VICE-CHAIRMAN and NEWS LETTER EDITOR: D. C. SOUDER

The France Stone Co., Toledo, Ohio.

SECRETARY: A. C. HEWITT

American Lime and Stone Co., Bellefonte, Pa.

Committees

PROGRAM: J. A. HENNEN, Chairman.

U. S. Gypsum Co., Genoa, Ohio.

STATISTICS: FRED E. HATFIELD, Chairman

Indiana Limestone Co., Bedford, Ind.

MEMBERSHIP: JAY E. THOMPSON, Chairman

Toledo Safety Council, Toledo, Ohio.

POSTER: R. E. COLVILLE, Chairman

U. S. Gypsum Co., Chicago, Ill.

ENGINEERING REPRESENTATIVE: J. R. DAVIS

U. S. Gypsum Co., Gypsum, Ohio.

EXECUTIVE COMMITTEE: (The Officers and)

EDWARD E. EVANS

The Whitehouse Stone Co., Toledo, Ohio.

October 28, 1926

E. E. EVANS, Chairman

President, The Whitehouse Stone Company, Toledo, Ohio.

THE Quarry Section of the National Safety Council convened at 9:45 in Parlor B, Fourth Floor of the Book-Cadillac Hotel, Detroit, Mr. E. E. Evans, chairman of the Section, presiding.

CHAIRMAN EVANS: I see the faces of many of you who attended the joint session yesterday morning. To those of the cement industry who are present, I want to extend a cordial welcome. The meeting was a very successful one, because of the fact that we had so many interested cement men in attendance at that meeting. We want you to be equally interested in this, our Quarry Section.

Many of our problems are of the same nature. If we men of the Quarry Section can contribute anything that will be of benefit to you, we shall feel that we have accomplished results.

ADDRESS BY E. E. EVANS

As your chairman, I presume it proper that I should give you a brief resume of the activities of the Section since our last annual meeting. You will remember this Section was organized in August, 1924, in the city of Toledo, where a few Quarry operators met upon call of Jay Thompson, then secretary, now manager of the Toledo Safety Council.

Prior to that date, there was no concerted action on the part of the stone producers in the safety movement.

Since our last meeting in Cleveland there has been a meeting, or annual session, of the National Crushed Stone Association, which was held in Montreal last January. At that time the question of safety was brought to the attention of the members of the Crushed Stone Association, with the result that a resolution was unanimously adopted. That resolution I will read for your benefit:

"WHEREAS for humanitarian and economic reasons, safety is a consideration of primary importance to quarry operators, and

"WHEREAS the National Safety Council by organizing a Quarry Section, and the United States Bureau of Mines, by providing a separate statistical service for the quarrying industry in a National Safety Competition, have already demonstrated their desire and ability to assist producers of crushed stone in promoting safety.

"THEREFORE BE IT RESOLVED: That the National Crushed Stone Association in Convention assembled heartily endorses the activities of the Quarry Section of the National Safety Council and the National Safety Competition conducted under the auspices of the United States Bureau of Mines, and

"BE IT FURTHER RESOLVED: That the National Crushed Stone Association recommends to all of its members that they participate in these two worthy movements."

That action was taken by the National Crushed Stone Association. By the way, if there are any quarry operators here who are not members of the National Crushed Stone Association, I believe it highly important that you become affiliated with that organization.

During the past year there has been an 80 per cent increase in membership, which would indicate that the quarry operators are giving serious thought to properly safeguarding the employee against accidents. At least four meetings of Ohio operators have been held the past year, the last one at Columbus upon call of Mr. Kearns, Superintendent of the Division of Safety and Hygiene of the Industrial Commission. The stone producers are to cooperate with this Commission in preparing a code of safety rules to govern its operations in the state.

We find, in the application of safety rules and proper education of the employee in safety measures, that efficiency has been on the increase,

greater care is being exercised and more consideration extended to one another by fellow workmen.

Equipment maintenance cost has shown a decrease where safety is practiced, which is of economic value to the employer aside from the humanitarian element, which is a factor to be considered.

Some stone operators are not sold on safety and apparently give the safeguarding of the employee but scant consideration, which is unfair to those operators who are spending time and money in the interest of accident prevention. In fact, the laxity on the part of many of the operators, principally the smaller ones, who do not practice safety in their operation, means penalizing the operator who does.

When we employ an individual, a contract is made, the workman agrees to sell his labor which we agree to purchase. The workman expects and is entitled to safe employment. If hazards which can be eliminated exist, we, and not the employee, should be held liable.

A very good plan which I believe can be put into effective operation, is for the stone producers in each state or community to have representatives from individual plants form a safety group, and visit the plants in that state or community and check up hazards and apply corrective remedies. Doing this would very soon standardize Safety and make accident prevention a thing worth while.

With those brief remarks I am going to confine myself strictly to the program.

If there is any one duty I am going to perform this morning, it will be that of introducing to you the speaker who has been assigned the opening subject. To many of you crushed stone producers this gentleman needs no introduction.

He was formerly identified with the United States Bureau of Roads in the capacity of chief engineer, in charge of tests. Because of his fairness while conducting that department, the National Crushed Stone Association, desiring to acquire the services of a capable engineer to direct their business, were able to procure the services of Mr. A. T. Goldbeck, who now occupies the position of manager of the engineering department of the National Crushed Stone Association. It gives me pleasure to call upon Mr. Goldbeck and present him to you.

FINANCIAL ASPECTS OF THE SAFETY MOVEMENT IN THE CRUSHED STONE INDUSTRY

**A. T. Goldbeck, Director, Bureau of Engineering, The National Crushed
Stone Association**

Merely to consider the financial aspects of the safety movement, to the exclusion of the more vital phases of safety, seems almost inhuman. The complete subject of safety, however, looms up as a tremendous one when all of its ramifications are joined together. Each phase merits detailed study, the inhuman as well as the human, for their individual development can not but advance the entire safety movement.

If one is to consider fully the financial aspects of safety in the quarry

industry it is quite necessary that an analysis be made of a great many factors entering into the problem. It will be apparent that although many of the effects of a safety program are definite in character and may be accurately evaluated, there are a number of other effects which, although resulting in financial return, are difficult to evaluate.

As one crushed stone producer very aptly puts the matter, "Any campaign for betterment of conditions in which you are able to enlist the interests of all your men stimulates their minds; makes them favorable to the problem in hand and develops the team spirit and the desire to win, and we find that safety campaigns are no exception." He points out that through their safety campaign they are inducing a team spirit in their men with a resulting double benefit, less accidents and more and better protection. The installation of safety devices assists directly and indirectly in the betterment of operation. Such devices protect against machinery and they establish more confidence in the minds of the men. The men thus become assured that the company is trying to protect them from injury and such protective devices are also a stimulant to cleanliness; and cleanliness stimulates better workmanship and pride in the men, to the end that much better operation results.

Included in the Economic Cost of Accidents

When severe accidents occur, invariably the morale of the workmen is much lowered and production suffers for an indefinite period thereafter, even though the men do not actually quit work for the remainder of the day, as so frequently happens. These are intangible things in that they can not be evaluated but there can be no doubt of their financial bearing. As has recently been pointed out* the total or complete economic cost of human accidents must include:

- a—Premiums for compensation insurance to cover compensation paid for lost time and cost of hospital and medical attendance.
- b—The portion of the lost time wage suffered by the workman for which he is not compensated.
- c—The lost time and delayed production caused by the numerous occurrences of the production accident, represented by the human accident.
- d—The lost time and the temporary decreased production resulting from the breaking down of the morale, etc. (especially large if the accident results in a fatality).
- e—The lost time and delayed production resulting from the breaking in of a new employee.
- f—The increased liability of human and production accidents happening to or caused by the new employee.
- g—The economic loss through the killing of a workman who has no dependents. Few state laws require any compensation except burial expenses to be paid for fatalities to persons having no dependents.

*"Measurement of Accident Prevention by Compensation Insurance Rates," by Bryon O. Pickard, (Pit and Quarry, March 14, 1926, p. 61.)

h.—Incomplete compensation for fatalities. It is estimated by the U. S. Bureau of Labor Statistics that the economic loss through a fatality is 6,000 shifts. If each fatality was compensated for this amount of time at one-half time wages, using an average wage of \$5 per shift, the compensation for fatality based on the economic loss would be \$15,000, but the average actual compensation paid for each fatality is about \$3,000.

He further estimates that if the above items are considered in the cost, that the loss due to human accidents in industry is as great as, if not greater than, five times the amount paid out in compensation for lost time wages.

It is quite evident, therefore, that the losses sustained by the employer extend far beyond the mere payment of insurance premiums, although even this item is a very considerable one whose reduction would be well worth the effort. Such premiums are of necessity based on accident experience records and this is fundamentally so whether the insurance is carried with an insurance company or whether the producer is carrying self-insurance.

Experience records must serve as the basis for the control of yearly insurance premiums and if the accident experience record is a bad one in any industry the premium rate must be correspondingly high to permit the insuring company to finance the accident cases and continue to do business. Obviously if a group of producers is to enjoy a low insurance rate, that group must demonstrate that such a rate will properly care for the accidents which past records indicate are likely to ensue. A low accident experience is therefore necessary to bring about a reduction in premiums and this can result only through the development of safety measures and the carrying on of safety campaigns in ways such as are being discussed at this conference.

The Financial Benefits From Safety Measures

It might be interesting to cite the experiences of others to show the financial benefits accruing from the adoption of safety measures. In a certain mining district, safety work was started in July, 1924. During the year 1924, the district produced 1,044,554 tons of concentrates and during the year 1925, 1,507,450 tons of concentrates, an increase of 44 per cent. During these same periods the accidents increased only 28 per cent and, furthermore, the "Lost Time Accidents," that is, accidents in which the miner lost more than the day on which the accident occurred, were decreased from 59.2 per cent in 1924, to 38.9 per cent in 1925.

Comparing similar statistics it has been found that whereas during the last six months in 1925, 28 mines produced an average of 1,733 tons per accident, during the first six months in 1926 these same mines produced 2,051 tons per accident. Furthermore, the percentage of "Lost Time Accidents" was decreased from 42.8 per cent for the last six months in 1925 to 37.2 per cent for the first six months in 1926. In addition to this, a study of the costs of insurance showed that whereas during 1923 nine of the cooperating companies were paying \$5.04 to \$8.47 for compensation

insurance, on a \$4.06 base rate per \$100 of payroll, in 1926 these same companies were only paying from \$4.18 to \$6.52 per \$100 of payroll on a \$6.25 base rate.

In other words, had the experience rating of these companies remained the same for 1926 (on a base rate of \$4.06 per \$100 of payroll), their insurance would have cost them from \$7.75 to \$11.04 instead of the present cost of \$4.18 to \$6.52 per \$100 of payroll.

It is stated in connection with a particular mine and smelting company that the question of safety has been given very careful consideration during the past two years and the results of their efforts have been very gratifying. During the year 1925 the actual cost of carrying insurance on their property was \$2.20 per \$100 of payroll, including the cost of adjusting and medical, and figuring their insurance on a basis stipulated by the rating bureau for their classification, they have made a saving of 51 per cent. For the first eight months of 1926 their actual cost per \$100 of payroll has been \$2.10. Including cost of medical, adjusting and miscellaneous their saving below the classification rating will be approximately 60 per cent.

Figures on the Money Cost of Accidents

The financial savings to this company on account of various safety measures and the whole-hearted cooperation they have been able to obtain from their department heads and their foremen in making all working places safer, has been entirely satisfactory and more than was anticipated.

During the first six months in 1924 the lost time on account of injury was 1,678 days. The income of the employees losing this time would have been \$5,104.72. The total compensation benefit they received was \$2,688.64, leaving a net loss to their employees of \$2,416.08, or over \$400 per month.

During the first six months in 1926, or after the various safety measures had been enforced for one year or longer, the total lost days on account of injury were 1,073. The income of the employees losing this time would have been \$3,245.33. The compensation payments on account of lost time were \$2,095.04, leaving a net loss to the employees of only \$1,150.29, less than \$200 per month, or just one-half of the monthly loss two years before when safety measures were not so thoroughly undertaken.

It is said that accidents in the construction industry cost that industry \$120,000,000 annually. Judge Gary of the U. S. Steel Corporation says that "Accident prevention is not only good morals and good ethics, but also good business."

J. W. Robinson, secretary, Construction Section, National Safety Council, cites a number of cases in which financial savings have resulted from the adoption of safety measures. Thus, as a result of "Accident Prevention" efforts James Stewart & Company, Inc., has secured a credit of 64 per cent on its insurance rate, or a saving of \$2,800 on each \$100,000 of payroll. Fred T. Lew & Company, Inc., has reduced its accident rate 76 per cent.

In ten years the U. S. Steel Corporation expended over \$9,000,000 for accident prevention which netted them a return of over \$14,000,000. The Bell Telephone Company of Pennsylvania and associated companies in ten years increased the average number of employees from 3,703 to 7,796, while the days lost due to accidents decreased from 6,883 to 1,396. The American Car and Foundry Company expended in 14 years approximately \$1,000,000 for accident prevention work. After auditing their books they show a saving of \$2,700,000 represented by reductions in liability and compensation payments. These are very definite cases where considerable financial savings have been effected through the adoption of definite safety measures and by the carrying on of well regulated safety campaigns.

One crushed stone producer in the middle west gives his experiences as follows:

One-Half of the Serious Accidents Eliminated

"At the beginning of the 1926 operating season we undertook to work along the lines suggested by the National Safety Council, using their posters and bulletins at the plants and having foremen caution workmen with reference to their own safety and installing additional safety devices wherever possible. The direct result of this effort is shown in the following figures taken from our last year's report up to October 1st, 1925. Accidents from which employees lost one or more days work, 27. Accidents reported for which no time was lost excepting for first aid, 14. Our 1926 records taken up to date show only 14 accidents from which employees were compelled to stop work for one or more days and 12 accidents from which employees lost only time necessary for first aid.

"These figures seem to indicate that our safety program has had practically no result as far as minor scratches and bruises are concerned, but that practically one-half the serious accidents have been eliminated. We are so well satisfied with this program that we are planning to inaugurate organizations among the employees themselves for the promotion of safety at the beginning of next year's operation.

"Aside from the humanitarian viewpoint this reduction of serious accidents will reflect itself in reduced compensation premiums and in more efficient and unbroken operation. Whenever a serious accident occurs the workmen are not fit for duty the rest of the day. Things are wholly disorganized and production greatly reduced for the time being. We are thoroughly convinced that we can afford to spend a considerable amount of time and money to promote safety from both humanitarian and financial viewpoints."

H. G. Jacobsen of the Portland Cement Association has stated that the cement industry has saved several hundred thousand dollars over a period of the last five years due in part to many of the member companies carrying their own insurance and also to obtaining a complete revision in basic rates. In one case a particular company had just completed a new plant about two years ago in a state where there was no other cement

plant and the rating bureau in that particular state applied a most excessive basic rate to this plant. This matter was taken up on the basis of experience records with the result that a reduction in the insurance rate of more than 40 per cent, with a corresponding saving to the member company of more than \$4,000 per year, was brought about.

Is more evidence needed to demonstrate the fact that safety does pay big financial returns? If such huge industries as represented by the United States Steel Corporation have found savings of millions of dollars over a comparatively short term of years, does it seem unlikely that another huge industry, the crushed stone industry, will not have a corresponding experience if a thorough safety campaign is undertaken?

Discussion Following Mr. Goldbeck's Paper

CHAIRMAN EVANS: I am sure we are very greatly indebted to Mr. Goldbeck for coming from Washington, not only to present this paper but to meet with us in session today. His paper would indicate that he is thorough in everything that he undertakes.

I think I made mention in my opening remarks that the Quarry Section had its inception in Toledo. We could not have gone very far in our activities, particularly in the state of Ohio, if it had not been for the hearty cooperation which we have received from the Department of Safety and Hygiene of the Industrial Commission. I want to take the opportunity to introduce to you the superintendent of the Division of Safety and Hygiene of the Industrial Commission of Ohio.

I want to say to you men that notwithstanding the fact that Pennsylvania has been the pioneer state in adopting and carrying out a quarry code, it will not be long before Ohio will have adopted a code and we will not be compelled to pattern in its entirety the code of Pennsylvania. I want to introduce to you Mr. Kearns of Ohio.

THOMAS P. KEARNS: Mr. Chairman and Gentlemen: I don't believe that I ought to take up very much of the time of this Section this morning, because I doubt if there is anything I could say to you now that would be particularly interesting or helpful. I am certainly glad to be with you this morning and to see this large gathering here. It seems to me it is rather an encouraging sign of the times to see so many men getting together to discuss this very serious and important problem of accident prevention in quarries.

As the chairman has intimated to you, we have recently started a drive, as it were, in Ohio against quarry accidents. Just a short time ago we held a safety conference of quarry operators of the state. Through the assistance, support, and cooperation of the operators, particularly your chairman and vice chairman, who have been very active in the Quarry Section, the meeting was a decided success. We discussed all phases and all angles of quarry accidents at that time and also discussed ways and means of preventing these accidents. It also developed at that meeting that the quarrymen of our state were very anxious to have a quarry code, and we expect in the very near future to begin the work of

compiling a complete set of safety regulations covering quarry operations. It might be interesting to you to know about how those quarry codes are handled in our state.

They will be handled through a general advisory committee which will be composed of an equal representation of operators and workers. They will in turn appoint sub-committees who will also be comprised of an equal representation of employers and workers. This plan has been adopted, because we felt it insured a practical code when it was completed.

While I think a code will be decidedly helpful and useful in the matter of preventing accidents, the code itself or the enforcement of code regulations alone will not eliminate quarry accidents. Along with the enforcement or administration of this code, it is going to be necessary for the operators to do educational safety work in their plants. Unless the employer himself is sold on the safety problem, unless he is doing educational safety work, unless he makes a real, whole-hearted effort to reduce the accidents in his quarry, the codes themselves or state laws are not going to prevent accidents. There is a lot of educational work necessary amongst the men themselves. We realize that.

Thorough Survey of the Operations to Be Made

Our department has been organized for the purpose of assisting the quarries of the state in this educational work among the workmen in the different industries and operations. We are going to attempt this amongst the quarries of our state in the very near future, by making thorough surveys of the plants or operations, by arranging if possible for meetings of the workmen and delivering safety talks to men, attempting to point out the hazards of the operation in so far as it is possible for us to do it and to encourage the workmen themselves in following worthwhile practice, in observing the safety rules of the organization, and in other words, to work and think safety at all times.

But, of course, the operators must set the example. It seems to me that the very best way to start that would be to comply with all of the state regulations or all of the requirements of this code, or whatever code or regulations you may have in the different states. It seems to me that that in itself is the best way for the employer to demonstrate to the workers that he himself is interested in their welfare, that he is doing what he can to protect them from accidents and injury. If he will do that, I am sure that he can get the cooperation of the men in his safety work.

CHAIRMAN EVANS: I am going to further digress from the form of the program. Mr. Kearns's brief talk, mentioning as he did something with reference to safety education, has convinced me that it would be proper at this time to have that subject up for consideration. I believe we are convinced in our own minds that we need the education, that our employees need it, and anything that we may acquire that will be along educational lines it is our duty to carry back to the employee, so that

he may receive some benefits in an educational way. Without any further introduction, I am going to call upon Mr. W. F. Smith, of the Safety Department of the Ford Motor Company, located in Detroit, Michigan.

SAFETY EDUCATION

W. F. Smith, Safety Department, Ford Motor Company, Detroit, Mich.

There are two reasons why I am interested in your industry. The first is because it is one of the oldest—no matter how far back we turn the pages of history, even into the most primeval days, we read about men engaged in quarry operations. The second reason is because it is one of the most dangerous. I am convinced that the average man does not even realize what tremendous risks are connected with your work, and he therefore does not appreciate what a wonderful safety record you have established. I therefore feel very happy indeed in being able to discuss with you the subject of Safety Education.

The subject of my address has been divided into three headings, as follows:

- (1) General, as it affects the whole industry.
- (2) The new employee.
- (3) The trained or experienced employee.

A leading professor has stated that education is simply the appreciation of what we study and read in books and gain in experience. For example, we can give a man a complete set of rules on the safe operation of his job. He may be able to repeat every rule word for word, but unless he can fully appreciate the reason and value of each rule, then the education has been a failure.

It has been truthfully said that safety work is 75 per cent education and 25 per cent mechanical. Therefore, our efforts must be concentrated on the training and instruction of the employee. A leading safety engineer was once asked if he would prefer a plant with no guards on the machines and men who had education in safety, or a plant with guards on every available place and men untrained in safe operation. He at once favored the plant where safety education was established.

No matter how much we protect an industry with mechanical devices, they are of very little avail unless the operator is trained, and our training must be thorough.

The question of thoroughness reminds me of the story connected with an old crossing watchman. One dark night when a fast passenger train was rushing along the tracks, an automobile passed the crossing watchman and was hit by the train. Damages were claimed by the relatives of the injured and in the court old John was put on the witness stand and subjected to a cross examination something like this:

"Did you swing a lantern over your head as a warning on the night of the accident?"

"How long before the train arrived at the crossing did you do this?"

"Do you declare on oath that you stood at the crossing with the lantern?"

To all of which John replied in very emphatic terms, "Yes, sir!"

The railroad company won the case, and outside the court the president extended to John his congratulations on the loyal spirit he had shown in standing his ground in the face of a most penetrating examination. John replied, "Yes, sir, but it's a good job the judge didn't ask if I had a light in the lantern."

So, gentlemen, we must be thorough in our safety system and always have the lantern lit.

The new employee is our greatest responsibility. I do not believe we realize just what it means to enroll a new man and put him to work. There are so many handicaps and small details that contribute to his danger:

- (1) The newness of his surroundings.
- (2) The anxiety of making a success of his new job resulting in an over-enthusiasm to rush in with no thought of danger.
- (3) The suspicion that he will be despised if he shows signs of nervousness.
- (4) He may have been out of employment for a considerable time and carry a lot of worry regarding his home and family.

Educational Activities Begin Upon Employment.

To overcome these handicaps the first step is to instruct the man immediately he reaches the employment office, thereby giving him confidence that his new field of activity is going to be among men who believe and practice safety.

Safety bulletins on the wall and a card of welcome containing safety rules are practical samples of making the new surroundings appear welcome.

Next, the employee should be examined as to his fitness to do the work for which he is making application. This test, of course, should be physical as well as from the point of view of experience. There is no question of the hazard of putting a man on a job for which he is mentally and physically unfit.

Providing he meets all the requirements of experience and has received the preliminary instructions in safety, his road is more or less easy and supervision in safety work should do the rest.

The following are a few sample of educational activities which will help in training the new employee:

- (1) Bulletins in employment office.
- (2) Safety cards outlining general safety rules.
- (3) Instructions by foreman.
- (4) Set of safety rules governing his job.
- (5) Safety moving pictures.
- (6) Safety Committee man in his department.
- (7) Personal talk by safety engineer.

Practical demonstration of safety equipment and application of rules are among the most effective methods of convincing the new man. There is no use lecturing and wandering into paths of theory and rhetoric unless we get down to earth and show the man by demonstration that our ideas and equipment will protect him.

In a certain foundry the men left leggings and shoes off, and considerable trouble was experienced in making them wear this particular equipment, because they falsely thought molten metal would simply go through just as if it were tissue paper. The men were collected and two or three pairs of leggings spread on the floor. Molten metal was poured on them and it rolled off into the foundry sand. This experiment proved so successful that no future trouble was experienced. Therefore, we must be leaders and let the man see the safe road. Then there is no question but that, in the majority of cases at least, he will follow the trained or experienced employee.

Some Bad Violators of Safety Rules Are Old Employees

Last is the trained or experienced employee. It is a peculiar and also regrettable fact that some of the worst violators of safety rules are the experienced men. It very often happens that men of 10 years' service are among the offenders. This is probably due to familiarity with their job on the one hand and a false impression of their skill on the other.

Education by discipline is probably the best remedy.

The question of discipline immediately creates a long, drawn-out argument, but there is very little question but that the enforcement of safety standards is essential to accident prevention. Of course, we must be leaders before we are dictators and very often men will admit that they are violators.

One system which has proved most successful is the method of having men who violate safety rules come to the office and study safety posters in their own time. And a very high compliment is paid to the National Safety Council poster service when I say many men after they are told to go home request to look over the remainder. Care is always taken to avoid humiliating the man when he comes to the office. Taken all together, this system has proved fair, popular, and has brought results.

Another incentive in training the experienced man is to promote men who have a good safety record. This encourages the others to realize that a man must be first-class in safety as well as in his particular line of work.

Education is the beacon light on the sea of safety. The more luminous we make that light, the more readily will the dangers be observed.

There is something sacred about safety work when we realize that our efforts are crowned by something other than the cold metallic ring of cash.

To get the true perspective of safety, there is no question that the empty chair carries the real significance. The safety engineer's training should include the operating room and compensation office.

CHAIRMAN EVANS: Mr. Smith, on behalf of the members assembled, I want to thank you for the splendid talk that you have given us this morning.

There is one thing that I had forgotten, and that is the appointment of a Nominating Committee. I think my reasons in hesitating are because of the fact that I had some reluctance in severing my connection with the Quarry Section as its chairman. The compensation received, not in a financial way, has more than reimbursed me for any feeble efforts I may have made, and I want you gentlemen to take this as my swan song, because whomever this Nominating Committee may select, it is my wish and desire that I be not considered as a prospective candidate for chairman of this Section. I think that the honor should pass on to hands more capable than are mine to conduct its activities.

I should like to ask Mr. Jay Thompson to sit in with this committee, because of his familiarity with the duties of the official family of the National Safety Council. Mr. J. R. Davis, I know, will consent to act as chairman of that committee. Assisting him will be Mr. Martin Gross, safety engineer of the Holstein Quarry Company of Strawberry Plains, Tenn, and Mr. Charles A. Briggs, connected with the Woodville Lime Products Company's main office in Toledo. This committee is appointed and will take time and use great care in the selection of the officials for this Section. I think that we can very well excuse them at this time.

C. FRED WOLF (Travelers Insurance Co., Hartford, Conn.): I find objection to wearing leggings and goggles in many foundries. I hear the worn-out excuse that the metal will get in on top of the legging. Personally, I know that isn't so if the legging is a properly fitted one. However, has any trouble arisen from this source?

The Problem of Goggles in the Foundry

I want to ask another question as to the wearing of goggles by the men in pouring. Many foundries will tell you that they consider it more hazardous for the men to wear goggles than not, because the fumes from the metal seem to fog the goggles, and they can't see where they are walking. I don't think that is a good excuse, because I know there are some foundries where they do wear them, and if some of the metal should splash and fall into the man's eyes, he probably would be blind for life. I wonder if you have had any such experience?

MR. SMITH: I certainly appreciate your remark and the two questions you ask me. We have had very decided trouble with the same thing—not only in the foundry, but in the wearing of the safety equipment and other phases of operation.

We have found the question of the goggles becoming befogged with perspiration, to our mind and our experience, is purely a mental attitude. As to whether they are more dangerous than if he didn't have them on, I only wish you gentlemen could come to the Highland plant, to the safety office, to see a large bulletin which has at the top, "1925 goggle record," and then subdivided we have goggles pinned to it showing how

they saved men's eyes. Under the classification "foundry" we have a very, very large number showing the beneficial results of a man wearing goggles.

Many men in the past thought, "Anybody can make that up and stick on a pair of goggles." They considered it artificial. Now we put on the goggle and the man's badge number. We organized the cribmen to bring the goggles which saved an eye into our office, and we treasure them as living examples of observing safety rules and symbols of the effect of wearing them. To offset that mental attitude, we bring the men there and let them see this board and point out the goggles to them and convince them by this method as to their efficacy.

Another method we adopt when a man gets a metal splash and his eyes are saved by goggles: we take a full photograph of the man with the goggles on, and place a little piece of bandage on his face. We put that in the department and let the men see a real safety man who has benefited by wearing goggles. That more or less offsets that biased idea that goggles are uncomfortable and dangerous.

Leggings and Proper Shoes Prevent Accidents

Regarding the leggings: I don't see where they are a hazard. We never yet have had a man injured who wore foundry shoes and foundry leggings. As I tried to bring out in my address, a practical demonstration of pouring molten metal will convince him of the efficiency and practicality of the method. If he is taken before the bulletin board and shown the photograph of a man whom he knows, together with the accident report, his badge number, and every piece of evidence in the world that the human brain needs to make it believe, we find he becomes convinced. But it is a big battle, and that practical demonstration in educating these men, more particularly the foundry workers, will help a great deal in putting the idea across.

H. W. MUNDAY (Editor, Pit and Quarry, Chicago): I should like to ask Mr. Smith to answer a question for me that comes up as the result of two illustrations he used. The first one had to do with the man who wouldn't wear the goggles and used the case of no lens. I imagine there are varying degrees of intelligence in your shop, but the thought that occurred to me was: is there any bad effect from that method? It occurred to me that it could be properly classified as subterfuge and would be humiliating. The question has come up in dealing with safety whether it is practical to humiliate the employee. I thought possibly Mr. Smith had considered this and thought of the matter in connection with the workman and come to some conclusion.

The second point has to do with holding the workmen after working hours on their own time for infraction of the rules. The reaction I got was that the workman was treated like a school boy. I want to know from Mr. Smith whether they have had any bad reaction from that method?

MR. SMITH: That also is a thing we have had a very personal experience with. Gentlemen, you have to be very careful in dealing with the

question of violations and you must use the most complete tact in handling the situation.

The most important thing is to inform the general foreman of the detail surrounding the violation so that he will be willing to cooperate with you regarding bringing the man to the office. Then when the man comes up there we take off the acid taste of humiliation by telling him that it is rather a ludicrous thing for an intelligent man to be brought up and made to look at a poster on the wall. We impress upon him the fact that when he leaves the office he will have learned something worth while.

As a direct contradiction of the idea that he feels humiliated, in 70 per cent of the cases when we turn to the man and say, "We think you have had enough time to study here," the man turns around and says, "I have got about 15 more and I should like to continue until the end, if you don't mind," and he continues to look at them. That certainly pays a very high compliment to the posters of the National Safety Council.

Regarding the case of the goggles, there is no question but that you must meet conditions with similar arguments. It does no good to repair a watch with a sledge hammer or use a rubber dissector on the operating table. When a man adopts the arrogant attitude that the goggles are no good and gets away with it, there is no question but that at lunch hour he will tell the rest of his friends around him, "Just give them a good line and you will get off with it." Then you will have a bad apple in a large barrel of apples which if allowed to continue would be a very, very bad offset to safety.

When the "Safety Business" Is Genuine Stuff

The particular case mentioned resulted in the men around that particular territory remarking among themselves, "Well, this safety business is genuine stuff and you can't kid them." We have had excellent results since.

I think Mr. Munday meant to convey the idea that there is a legal aspect connected with this. We agreed there was. There is also a legal aspect to a man coming to look at the safety pictures after they have completed their eight hours' work. But when we appeal to them—and this is education, too—along the lines of illustrating to them what is done to make them safe in the plant, then they respond in every case.

Here is an example of what we say: "Do you realize that when you state that you are not going to that auditorium to look at the safety moving picture that you are giving a very poor reward for all that is being done for you? Do you realize that you have clean conditions under which to work? There is not a part of the plant that is not swept from hour to hour. Do you realize that the brains of the engineering world have been concentrated on making the machinery safe to operate? Take the lunch you buy at the lunch wagon; we analyze the food, determine the number of calories, and make sure it comes up to health requirements. We analyze the water you drink from the fountain. We had a

man leave who was sorry for it afterwards because he missed the drinking water.

"Do you realize that we have first-class compensation, medical transfer development, where you can go to be transferred to a job more suitable to your condition, first-aid stations dotted throughout the plant, first-aid medical equipment to take care of you, a suction system to take away dust from the air, and a full time safety department struggling day after day with the problem of accident prevention, working out schemes, drawing up blue prints, making up sets of rules, holding meetings for your benefit? We expend thousands of dollars for you. And the very head of the organization has said that production without safety is inefficient. Yet in spite of all we have done for you, you refuse to spend 50 minutes out of 365 days in a year as your small contribution to making this factory safe."

That never once has failed to bring results.

Goggles in Cutting and Welding Operations

MR. HAWK: I should like to ask Mr. Smith a question. We have different types of trouble with different employees. I should say that probably the greatest difficulty is with the eye. Have you any set rule as to what glasses to use for cutting and welding? We don't seem to be able to satisfy our employees with the different colored glasses used in cutting and welding. Is there any way we can overcome that? I know that is the greatest problem with all the quarries I have talked to. Some say the glasses are too dark, and others say they are too light. That is a matter I would like to have discussed.

MR. SMITH: The first attempt to solve that problem was to investigate thoroughly the most efficient type of goggle for the operation that the man is going to work on. We need only to take a walk around the wonderful exhibit of the National Safety Council to see the articles that science has developed to bring into reality the type of goggles most suitable to that job.

After a thorough investigation, and after taking the opinion of all kinds of men—more particularly the man who wears the goggle—we finally adopted certain standards for chipping goggles, for welding goggles, for the lens that would be used in the foundry, and for the lens that would be used in all the other operations. We made a standard box with a lock on it, and that box is locked. No one is allowed to go in there except certain people who have the authority. As goggles come into the plant they are examined to see that they are perfect. We have a level gauge on the lens to make sure there are no waves in the lens, no sand pits. If you don't inspect the goggles thoroughly, the men will be wearing lenses that are just a mass of specks from the grinding wheel and will be using inefficient lenses. Adopt a standard box and make sure by inspection that every goggle is up to specifications.

We have had very little trouble except in contending with the idea that they are uncomfortable to wear when they wear the standard lenses.

If you would care to come to our plant, we will willingly show you this box of standard goggles, used throughout the whole organization. They have proved very efficient, indeed. So that I would think the answer to your question would be to adopt as standard the best quality that is in the market today—and that is the best you can get—and apply it on the job. Then by education you can eliminate many of the misunderstandings that are created among the men.

MR. LABAR (Star Accident Insurance Co.): How do you provide for wearing goggles with regular lens?

MR. SMITH: Last week I had a man who came to the safety department, and said the safety inspector had found him wearing his own glasses on a production line where we nail up the parts of the automobile for shipment. We have the thick lens for that job, plus all the specifications that go with it. He said the safety man told him to report to the safety department because it is unsafe. It undisputably is, because it is more dangerous to have a man wearing his own glasses on nailing and spiking than if he didn't wear them. If the glass would become shattered and enter the cornea, it would produce a complicated case for the medical department.

An Illustration of the Value of Goggles

We illustrated that by a sample test for the goggle lens. We took a 22-inch tube with a five-eighth steel ball and put it on the lens and dropped the steel ball down. It hit the lens and is supposed to remain intact, that is, the cracks are not supposed to splinter. If it breaks at all, it is merely supposed to crack it. That shows the practical necessity of having protection of glasses from the impact of the nail. Then we told him if he dropped his own glasses and broke them, he would have to get a new pair. If the man is unfit to wear these glasses on that job, we consider that there lies a hazard; and we transfer him from the nailing job to a job where he can work free, without any glasses at all.

It is just the same idea, gentlemen, of the greatest hazard from an eye point of view: a man with one eye operating on a job where there is a danger is a very great hazard, because then you have the hazard of complete blindness, which is ranked by the Bureau of Statistics as a fatality, a total disability. We don't subject a man with one eye to any eye hazard.

The answer to your question would be if he is incapable of wearing safety goggles, then he needs to be transferred to a job where the hazard does not exist.

C. S. HURTER (E. I. du Pont, de Nemours & Co., Wilmington, Del.): I understand the goggle people put the man's original lenses back. Do you use such a feature?

MR. SMITH: Yes, there is a type of goggle that some of the manufacturers make by which the safety goggle slips on to the rim of the man's own glasses. Sometimes that has resulted in the excess weight breaking the nose piece of the man's own glasses. Sometimes the bow is snapped

because of the excess weight, and some men consider it very comfortable to use it. I would say that where it is practical, the men may do it. A lot of men find they can't, so that it is a matter of classifying them again. The man who can wear those safety goggles over his own finds them comfortable and he can work with safety.

MR. HUETER: I just wanted to say that I am under the impression that we have an arrangement with a goggle company whereby you can send the prescription for the men's glasses to them and they will make up special goggles that will fit the eyes.

MR. SMITH: That is getting safety down to the finest point. There is no question about it, if that system could be made practical we would have a 100 per cent safety protection for eyes. But, gentlemen, circumstances alter cases. In the case of a small shop, where you know every man as Jack, Bill, and Jim, it is very easy to apply that method. If you take 70,000 in one plant, 40,000 in another, and so on, it would be a tremendous problem to take every man and examine him as to the fine points of his vision and then adjust the goggles through an optician to fit him. It is far more practical to transfer a man from a job and replace him by a man who can wear the standard equipment.

Difficult to Prevent Steaming of the Goggle

MR. UMBRETT (Standard Accident Insurance Co.): Will Mr. Smith kindly go into the detail of the construction of the goggles worn in foundries in the case of men pouring metal? Can he tell us what is done to prevent their steaming?

MR. SMITH: I could do this more easily if I had our standard specifications with me. We have a standard box of goggles. We have a blue print, if you will, of the specifications, which must be met in regard to the foundry and chipping goggle and welding goggle. We have an amber lens of a certain thickness and color which we use in the foundry.

I do not know of anything that we have adopted to prevent steam or perspiration coming over the lens, except to have a man take off his goggles occasionally and wipe them, plus the fact that we increase the ventilation as much as possible on a leather piece that comes from the eye to the bow, and we get the maximum ventilation to go through. Then we have the man adjust the goggles by making sure that the bridge doesn't come close to the eyebrows and thereby press against the face too much and permit a sealed joint between the space and the goggle. You have to be very careful in adopting that method because we used to have some men who bent the bow and bent the front, so that there was enough slack so they could have the goggles down until an inspector came along. Then they would stick up on their foreheads, and when the inspector came, down came the goggles. When he would ask, "Are you wearing your goggles?" they would reply, "Yes, sir." So when you come to adjust that goggle, be very careful you don't get them up on their head so they can slip them down.

We have men who had to go into the boiler flues, who crawled through

a little manhole inside the job and poked around the flues. The heat was intense. Because of the necessity of turning these engines in the round house, one man adopted a sort of solution which he found to give results. He smeared a solution over the goggle and thereby prevented the perspiration from getting on the glass. I think there is some kind of a substance you rub on windshields that serves the same purpose. It may be that by the application of something like that you could meet the difficulty. So the answer to that question is the possible application of some kind of solution to prevent the steaming of the lens and the adjusting of the goggle by keeping it away from his forehead and making a sealed joint and the increased ventilation of the leather sides.

MR. HAWK: Do you permit using a plain goggle with a cutting torch?

MR. SMITH: We certainly do not, the reason being that any man who is using a cutting torch is having his eyes subjected to something they never were meant to. The human eye was never meant to stand the high illumination which results from the glare of an open furnace door. You will get an extreme case of high flashpoint and high illumination that will cause serious injury to the eyes.

Training the Employee in First Aid

There is one practical angle to that; and that is that many men on the bonding jobs, just as they begin heating up the metal, before they cut keep up until they get a line on the job, then drop, and go right along. From a practical angle, we more or less consider that all right, because there are many times when it is difficult to see a line with the dark lens, and hence the man may not cut the job. But the answer there is that we do not permit or recommend a clear lens for bonding. From a practical point of view, we sometimes let him go ahead until he gets the line of pouring and the torch heated up, and then he puts the goggle on.

F. S. SPEHAR (First aid instructor, Western Electric, Chicago): Through Major Shields we have taken up first aid work through the American Telephone and Telegraph organization.

A short while ago a gentleman asked a question of Mr. Smith about the 50-minute period taken. In this district alone I have trained something like 300 men, and not one of those men took time except after supper. In other words, he took his own time to obtain the Red Cross 15-hour instruction course. All these men we instructed for 15 hours of their own time, which was once a week for a two-hour period. All obtained certificates. Out of something like 300 men we instructed almost 90 per cent. There were a few who objected to not getting paid for that instruction period, but the majority of them were so enthusiastic that they are trying to get instructor's cards.

In most instances I found they were perfectly willing to allow that time for their self-education. I think that the gentleman can get records from our department installation branch and also get records from the Michigan Bell Telephone Company, which is at the present time running classes of 60 men at a time, with one instructor for every 10 men. They don't seem to have any difficulty with the men objecting to the amount

of time they spend. That has been our experience with the first aid work.

MR. SMITH: There is a distinct difference between dealing with 300 men and dealing with 70,000. That system is a very commendable one, and we adopt it from year to year. Through the Detroit Safety Council we have sent men to specify courses in safety, to attend after supper on their own time and ultimately get a certificate from the Council certifying they had attended a safety course, and then have had men volunteer after supper to come down and use the auditorium of the plant for a full-fledged safety meeting with their families. We take advantage of the opportunity to have expert people get on the platform and give them instructions in safety. That is a form of school which is excellent, in which the man has his wife and children beside him. We run moving pictures and comedies and get them there.

But when it comes to getting every man to attend—and that is the object—there is no question that if you touch only certain men by the volunteer method, you are only going to touch the men who have the safety spirit, and the man who needs to attend the meeting isn't there. The man who needs to attend the safety meeting and look at a safety moving picture is the man who can't understand English and who can't read English but who can see safety on a film. That is the only method left to instruct him. So I would say in the application of the method of education, where it is practical to adopt an after-supper arrangement, do so.

A Course of Instruction Through the Winter

Where you have a large body of men, then it is necessary to adopt the other method, because we start our meetings in the auditorium about October and run every night in the week except Saturday and the night previous to a holiday. It takes us until the middle of May to have every man go through that course of instruction. We also go to great pains to relieve a man from attending who has home troubles and who has complicated matters to attend to outside. Then we wait a month, two months, or three months, until such time as he can attend. We keep a tag on him until we finally get him to the meeting.

MR. SPENAR: I think most of the men understand the size of the A. T. & T. In our part of the Western Electric Manufacturing plant at Chicago we train something over half the men in the Hawthorne plant. That doesn't take effect only in the small groups of men. On installations alone there are something like 20,000 men in the United States. We have a doctor in some town where we congregate to take over the work to give first-aid instruction, so that these men can obtain an instructor's certificate. Then these instructors from the laymen are transferred into the various towns to do the work. While they are on this job, doing the work, they make up the first-aid classes.

JAY THOMPSON (Toledo Safety Council): In the Ohio Bell Telephone system they do this first aid work on the time of the company. I should like to present this thought: It doesn't make any material difference

which way you go at it. It is a sales proposition. If you want to get together on your own time, do it. If you want to do it the other way, do it. It is really a question of getting the job done in the most practical way for your set-up. Particularly in quarries with a small organization, it is easy to find out which is going to be the most acceptable way to put it over. You will compensate them in some way for taking their own time. It adds to the wealth of the organization, makes higher wages possible if they do it on their own time. The other way around it is just as effective. The only idea is to have these meetings and get the job over.

MR. SMITH: In this system you speak of, how many men can be concentrated at one point?

MR. SPEHAR: We have in Michigan at the present time close to 500 men. They are scattered throughout the areas.

MR. SMITH: You see, gentlemen, it comes back to the question of numbers. If you have 500 men split up or 200 men in one locality, it is simple to adopt one method. If you have about 40,000, 50,000, 60,000, or 70,000 men in one spot, then it seems the other method must be adopted. As Mr. Thompson has illustrated, whatever method you use will balance itself.

CHAIRMAN EVANS: There is one individual here whom I am going to call on next, who has had much to do with safety as applied to quarry operation. He is connected with a stone industry that has approximately 17 plants, and is in charge of the explosives exclusively in the operation of these many plants. During the 10 or 12 years that he has been connected with this institution, I have yet to learn of any fatality in connection with their blasting operations. I am going to call on Mr. McLaughlin, explosives engineer, France Stone Company, Toledo, Ohio.

HANDLING EXPLOSIVES

F. F. McLaughlin, France Stone Company, Toledo, Ohio

No smooth, level, even-working commercial industry of today found its way to such a state by "happen-so" methods or simply of its own accord, without direction. Ever since commercial and humanitarian statistics have proven the value of human safety in industrial programs, we find that by leaps and bounds safety measures have entered among the major policies of industrial management throughout the business world.

Faith in the rightness of a thing has often been the only foundation on which great results were finally built. Many of our great industrial organizations had for their beginnings only men with faith in an idea. The growth and success of such enterprises have rested upon the perseverance, patience and toil required to justify that original faith. Human mental attitudes can build nations or tear them down.

"Safety First" was just such a faith-provoking idea in its beginning. It has not reached its present status in the world of industry by any haphazard course best designated by the words, "chance" and "luck." We

here today, meeting as a part of the Fifteenth Annual Congress of the allied safety interests of our country, are but beneficiaries of all the faith, patience, perseverance, and toil it has taken to make such an expression of the spirit of "Safety First" possible.

Faith, after all is said and done, may be simply described as an attitude of certainty regarding a cherished object. In this sense, industrial safety must, first of all, become a personal attitude with us on our jobs before the practical operation of its meaning and value can follow.

In many industries safety can be provided for workmen by mechanical means, but not so in this work of handling and using explosives. This is one of the many occasions in which the attitude of safety must first predominate before safety can become a fact.

It is possible that some of you are under the impression that to actually associate the idea of safety in connection with the handling of explosives is sufficient cause for a gentle snicker of derision. Perhaps you do not quite realize that today explosives are as indispensable as capital and labor in the development of the original sources of all our industrial processes. Quite a number of the pages of this paper could be devoted to statistics showing you the diversified use, every year, of many million pounds of this concentrated energy, and those statistics would also show a surprisingly small toll of human wreckage compared to the supposed and real hazard its use creates.

The Psychology in the Thought of Explosives

It is not so much the total number of accidents, however, that makes us think of explosives as one of the necessary "bad actors" in the industrial world, as it is the totality of devastation and horror created when its power is unsafely loosed.

The ordinary commercial explosive such as we buy and use today, will do no more of its own accord than will a pile of sand. It doesn't go into unexplainable tantrums and produce an effect without a controllable cause. It can be generally said that all results, both good and bad, from the use of explosives are directly due either to human direction or misdirection of its true function. Knowing the terrific power explosives develop, yet the logical conclusion is this: a careful, informed man is far safer while using explosives than he is crossing a street heavy with traffic in one of our large cities; but an uninformed, careless man might just as well be playing on a railroad track ahead of a fast train, as with a case of dynamite, so far as his personal safety is concerned.

It is not chemical explosive deficiency, but a human mental deficiency that is almost totally responsible for blasting accidents. True it is that an uncontrollable caprice of the elements will at times enter and destroy our well laid plans for safety in the use of explosives but even such things as stray ground currents, storms, hot sparks and lightning can be anticipated by the foresighted blaster, and guarded against.

The greatest cause of blasting accidents is composed of careless, ignorant men—ignorant, I mean, about the proper and safe use of explosives. This seems as simple as saying twice two is four; but if saying it t.n

thousand times, right here and now, would help to seat this fact firmer in your minds and by its guidance give you future relief from blasting accidents, it would be worth our time and interest to repeat it that many times together.

In handling and using explosives the sensible way is the right way and the right way is the safe way. To be free from blasting accidents requires no miracle. It is only necessary to be sensible—and being sensible with explosives is simply knowing what to do and doing it.

Truths are facts and facts are details, not generalities. Safety with explosives is a matter of knowing the actual details of its nature. The first step in learning how to prevent blasting accidents is to learn how they occur—and this step must deal with the explosive itself as well as the human factor involved in its use.

Details in the Manufacture of Explosives

Nitrated chemicals form the explosive base of most of the explosives in use today. Ordinary starch, ammonia and glycerine are treated with acids in such a manner that the resulting chemical will produce a large volume of gas in an infinitesimal space of time when given an initial detonating impulse. It is by confining for a short time the rapidly expanding gas from a detonated explosive that we make it do its intended work of fracturing or rupturing some material in which we have located it. These acid-treated chemicals are mixed with and are carried in a non-explosive base material to make them much safer to handle and use. Combustion, explosion, or detonation of an explosive can only occur from certain specific causes and under specific conditions.

High explosives will detonate of their own accord when heated to 200 degrees centigrade. They will begin decomposition at a temperature as low as 60 degrees centigrade. For this reason they should not be stored in a place excessively warm nor located for blasting purposes in a hot bore hole. Neither should they be stored or used in a place excessively cold, unless made specifically low-freezing, because some explosives become rigid, congealed, or "frozen" under such conditions and are much more susceptible to explosion by friction when in such condition. As a rule, when a paper cartridge wrapper shows a brown, oily, stain, or when the cartridge is hard and rigid, or when it is wet and soggy, do not use it. Call in the manufacturer's representative and let him advise you.

Most explosives start burning easily and burn rapidly, partly due to the paraffined paper wrapper in which it is packed, and partly to the inflammable nature of the chemical itself. A small spark will set it afire, and if the gases of such combustion can not readily diffuse with free air the increased temperature will lead to its explosion. Avoid sparks or any kind of fire from all sources during any part of your blasting operations. The steam shovel, locomotive, crane, hot carbon of gas engine exhaust pipes, matches from the men's pockets and dottle from their smokes, metal, or imbedded rock on the tamping pole can all produce a fire hazard to the explosive. Take steps to prevent these from occurring.

High explosive, under some conditions, will explode or detonate from

the friction of rough handling in or out of the box or bore hole. Mark this word "rough." High explosive will stand a lot of abuse when it is in a normal condition, but this fact offers no excuse for forming habits in using it that become potential accident makers when the condition of the explosive is not normal.

Lightning will detonate explosives or any of the commercial detonators for explosives. If you have located explosives on a shot, in or out of the bore holes, and lightning approaches, avoid possible trouble by removing all your men to a good safe distance until the disturbance is well gone. Do not poke, or jar, or hammer an explosive roughly or heavily with any kind of a tool, wooden or otherwise, and do not tamp the explosive if you wish to be thoroughly safe. Tamp the stemming above the explosive if you will, but keep the tamping rod well away from the detonator or its connections. The detonator caps are even far more "sensitive" than the explosive, and their nature must be respected and treated in this light.

Avoid the Hazard When Many Men Are Exposed

Avoid having any more men working on or about a shot than is absolutely necessary. The safety of all can be endangered by one man; the more men the greater the chances for trouble and the more affected when trouble does hit. A foresighted manager can usually keep his blasting operations sufficiently ahead to make rush jobs unnecessary.

I wish to repeat to you a suggestion made in our meeting in the convention of last year, that you give earnest consideration to the quite reasonable amount of safety provided in blasting operations by the use of a wooden peg and rope with which to lower explosive cartridges in bore holes. Four things this practice assures—it prevents "hung" or lodged cartridges in the bore hole, and the subsequent possibility of trouble involved in dislodging them; it prevents rough treatment of the detonator and its connections; it prevents excessive friction on the explosive; it gives the blaster exact information regarding the location of every cartridge in the bore hole.

This practice may seem to involve a considerable amount of extra work; but we have developed, with the cooperation of the explosive makers, the use of 25 pound cartridges of five-inch diameter, in both the pulp type and gelatin. Either of these will handle easily on a peg, and when you can thus load a case of explosives in two movements the labor argument against "pegging" is largely dissolved.

Several explosive makers have indicated their willingness to cease packing explosives so snugly in the box as to make it necessary to knock off the lid, turn the case upside down, and dump the entire contents in order to loosen the explosive from the case. It is a better way to have the explosive case of sufficiently greater length than the enclosed cartridges to make it easy for the men to open the lid and lift the cartridges from the case, leaving the packing and the box to be removed entirely from the shot. Loose paper and sawdust are not good companions for the explosive around the bore hole.

The task of connecting the detonators or "hooking up" a shot requires.

quite specific knowledge and should be committed to a very few good men who know what they are doing and how to do it, and for their ability to think before they act. This part of your blasting is more safely accomplished after all other workmen have left the shot. Electricity, invisible, and therefore dangerous to human life, when used with electric blasting caps to detonate explosives, should be used with the exercise of every available precaution to prevent a premature blast.

Power lines adjacent to a blast should be well insulated and located off the ground. Power lines with frayed insulation resting on wet ground can cause stray currents to enter detonator wires with the comparatively small amount of current it takes to fire one. Be sure that your mechanical methods of connecting current to the blast are in such a location, of such a type, and are used in such a manner that a premature blast is impossible; that the shot firer can not be reached by flying fragments from the blast, or that anyone can open or close the switch save one to whom is delegated that responsibility. Any of you men who have had to pay compensation costs because this was *not* done know wherein the sense of it lies.

Making Use of the Blasting Machine or Battery

A blasting machine or "battery" often spends much of its time exposed to elements injurious to its health. Knowing this, many older blasters, preparatory to its use in firing a shot, will push the rack bar down three or four times to "pep" up the magneto in the generator. It is totally unnecessary to connect the leading wires from the shot to the blasting machine until the moment before firing the blast. Observe this precaution and avoid premature blasts that may occur if the blaster unconsciously "peps" the blasting machine with the lead wire tied to it. Misfired or unfired explosive charges in the midst of the mass of a made shot form one of the extremely hazardous results that can occur. After it is done there is no safe cure for it.

Prevention is the sensible course. Misfires are ordinarily caused by detonator failure or improper connections or improper use of current. The two last causes you can control. As for the first cause, I regret to say that there has not yet been made and sold a continuously 100 per cent efficient detonator. So long as this is a fact we can not have perfect freedom from misfired holes. There still remains this mark of attainment for detonator manufacturers to strive for. So long as there is an unfired cap located in an explosive charge, with the chance of anything hard striking the cap with force, there is a chance for a serious accident to occur. Explosives will sometimes detonate when loose in blasted material and struck with a shovel dipper. They will almost always detonate if an imbedded cap is discharged. Even explosives that have lain unexploded in a shot for some years do not always have their power dissipated to a point of safety.

When cordeau is used as detonator, misfired charges can be caused by broken lines, wet or poorly made connections, the cordeau curved in too

short an arc, and by ignoring the proper detonating sequence of rows in connecting multiple row shots. In laying out the ground or connecting line of cordeau distance should be so considered that multiple row shots will fire from the face back. Countered cordeau only should be used in the holes because of its greater strain strength and resistance to the friction of loading explosives and stemming in the bore hole. Cordeau only should be used on top to connect the cordeau in the holes. It is a safer, simpler manner of detonating the holes than the practice of detonating the cordeau in each hole with a cap. It is unwise to depend on one cap to a hole. If the single cap happens to be faulty, a misfired hole will be the usual result. Do not bend a short right angle in that short part of the cordeau that arises above the hole. Let it stand straight up and at right angles with the connecting line. Protect all cordeau connections from possible dampness.

Where electric blasting caps are used, misfired charges can be caused by the detonator wires having been broken or bared and shorted, due either to the method of loading the explosives or tamping the hole. By testing each electric cap with a galvanometer before using it, and rejecting those that indicate an exceptionally high resistance, you can control a part of the trouble caused by faulty caps. There is, however, no way for you to determine the condition of the detonating chemicals inside the cap. Use at least two No. 8 electric blasting caps in each separate explosive charge in a bore hole.

A Blasting Machine Gives Variable Results

Be sure that a sufficient amperage and voltage is available to care for an electric blast. Most of the explosive makers have prepared, and will send you for the asking, a table for figuring current needs for different conditions. I personally think it is wise to use not only the same make caps in all the holes of a shot, but also to use the same length exploder wires on all the caps in a shot, equalizing, as nearly as possible, the action of the electric current on all the caps. Avoid multiple connections as much as possible, especially when using alternating current, for this is a prolific source of misfires. It is better to arrange your transformer to have sufficient current to be safely able to connect every cap direct to the lead line on the shot.

A blasting machine will give variable results. Do away with its use if possible, but if you must use one don't forget that with a two post machine all the caps must be connected in one series or circuit. In general, when using electric blasting caps do not abuse the insulation on the wires; make all splices or connections good and tight, and keep all bare wires off the ground. Scrape to brightness all wires to be spliced. When you encounter trouble in the electric blasting process don't go on and trust to luck. Get some one on your job to find and tell you what is wrong.

Fuse and ordinary blasting caps, used mainly for block-hole work in secondary blasting, can cause an extraordinary amount of trouble if not stored and handled properly. An immense amount of energy is stored in the business end of a blasting cap and can cause some costly damage if

it lets go at the wrong time and in the wrong place. They are very sensitive to sharp blows and should not be mashed in the blacksmith shop between the anvil and a hammer. It may seem just a little foolish for me to use your time telling you that a pants or shirt pocket, or an open box, is not a fit place to carry or store blasting caps, and that they ought never be stored or carried adjacent to explosives. In an Ohio State Safety meeting last month we were advised from a creditable source that last year over 900 accidents were caused by the improper use of blasting caps.

It pays to buy and use well made 40-second fuse—but don't kink it or unroll it when it is cold and brittle, and don't expect it to function when allowed to draw dampness. A good "pop-shooter" is a valuable man. He gets the big pieces down to small ones for you, and he doesn't leave any unexploded charges in the rock to go through the dipper into the cars, and down to the crusher to finally let go with a shower of hard rock in your crusher-feeder's anatomy. But don't skimp his good work with poor, cheap fuse; and don't growl about the extra six inches he cuts on the length to make himself and the rest of the boys 20 seconds safer.

Be Positive Everything is Ready for the Blast

Is it necessary to say that when making any kind of a blast the responsibility rests with us to be positive that everything is ready for the blast before we fire it? Highways should be guarded by men with red flags, respect should be given to possible approaching electric or steam trains, your men should be all well in the clear. Insist on the elimination of the chance takers. We may as well get into the habit now of being responsible for human safety adjacent to a blast, because it won't be long until we will have to consider even the traveler in the air. Place a good sensible man, who has the time to actually be on the blast himself, in charge of your blasting, and you will have gone a long way toward the prevention of accidents due to the use of explosives.

Let me say in conclusion that the writer of this paper realizes its incompleteness—that it is not possible, in the time given for this purpose, to deal in sufficient detail to satisfactorily answer your individual needs—but you can, by your participation in the following discussion, bring to bear upon the subject your own individual experiences and questions. Because of all the knowledge about explosives and blasting represented in this meeting it will be absurd for us to leave the subject without each of us having gained a new hold on our determination to conduct our blasting sanely and safely.

CHAIRMAN EVANS: Mr. McLaughlin, your excellent paper has been graciously received by the men who are here.

MR. HURTER: As I represent one of the explosives companies, I can probably give you one or two highlights. One feature that has come under my personal observation in a number of cases of accidents has been where the fuse started to burn, the coils were around, and the man pointed them around, and the charge spit and nearly caught the man. Fortunately, he wasn't killed.

In regard to the use of alternating current in firing spots, our recommendation is that the 25-cycle current be not used in the series connection. The closest measurements we can make show that the electric blasing cap explodes in the minimum time of .014 of a second after application of current. With the alternating current, you must be absolutely sure the crest of your alternating current will pass through the bridge wire of the cap. The half cycle of the 25-cycle current is .02, which is longer than .014. There is the chance that you may catch that on the cycle so that between the two crests some of your holes are likely to miss and that is more likely to occur with the fuel hole than the large hole.

In regard to straight currents, there is one very good precaution that has been developed in the last speaker's paper. That is to keep your lead wires short circuited at the point near where you connect. Keep those short circuited up to the time when you are ready to connect the blast. Then after the current leaks on the point of circuit, instead of having only a pair through the explosives, you have a short circuit of least resistance, a current going out and possibly causing an accident.

MR. SHAY (Atlas Portland Cement Co.): In speaking of explosives, we look at the extreme cases and try to safeguard them. I remember that when we were children we used to run across a carpet, turn out the gas jet and hold our fingers up to it and light it with the tips of our fingers. Could we on a cold, clear day in any way get a static charge in our body so that we could touch lead wires to the exploder and explode it?

Making Speed in Loading the Holes

MR. HURTER: I doubt whether that could ever happen. The amount of electricity necessary to heat the bridge wire to redness is about half an ampere at half a volt. While the voltage for the static electricity is high, I doubt if you would get the amperage necessary to heat the bridge to redness.

MORTON GROSS (Holston Quarry Co., Strawberry Plains, Tenn.): I should like to ask about loading holes down the line. What speed do you make in a case like that, going over 35 or 40 holes with 12,000 or 15,000 pounds of power?

MR. McLAUGHLIN: That is a good question! The method I have advocated and used and will continue to use is one I have made use of during the handling of several million pounds of explosives. With my own two hands I know I have put at least five million pounds of explosives in bore holes. I do it quickly, because I have an enormous amount of that stuff to control. I do it with the use of a peg.

Lately we have had an advantage I have mentioned in the book. I don't want to indicate anything that is going to carry your men to any erroneous conclusion, but my personal conviction is that without any undue haste the sooner you get the blasting operation accomplished, the less will be your hazard. To do it rightly and do it speedily with safety is a creditable accomplishment.

When I first started to work with explosives, the large stick we had was of five-inch diameter, and a 12-inch length. In the gelatine form it came four to a box, and each stick weighed 12½ pounds. To peg that size stick takes an enormous amount of labor. I have loaded many a ton of it, and it is a back-breaking job. We then rose to the status of a 5 by 16-inch stick, weighing 16 2-3 pounds. For the last three years in the gelatine type we have been using the 5 by 24-inch stick, which is 25 pounds to the cartridge, two cartridges to the case. You can see how that increase of length enables you rapidly to put an enormous amount of explosives in a bore hole.

I did not tackle the N. G. pulp powder or ammonium pulp powder, because I am a little more cautious with those two types of powder because of their increased sensitivity and consequent hazard over the gelatine type. Yet, as far as blasing is concerned, it is not possible to use any one type of explosive under all the conditions we encounter in our blasting efficiently. For that reason we have had to develop the efficient and safe use of the type of explosives indicated for the work.

Splitting the Wrapper Not Necessary for Efficiency

We recently have received and used a few tons of our first attempt to introduce the 5 by 32-inch long N. G. pulp carton. I want to tell you it works the prettiest of anything I have ever used. I am just a little bit enthusiastic about the details of my job. I like to shoot stone. I have some banks in which it is necessary to load and shoot as high as 10 tons in eight hours. We prepare ourselves to make that blast. We make sure our holes are clean, measure out the powder, lay it out, and then one-two-three, things click. But we take our time. We find it easier to do that within the reasonable time limit set for making a blast by the use of the larger sticks.

MR. ROBERTSON: Is it ever necessary to split the wrapper of one of these cartridges?

MR. McLAUGHLIN: Your own blaster will tell you, "Yes." If your own blaster has been giving you good results, I have no desire to get you into an argument by telling you something different. I will make this reservation. It is not necessary from a standpoint of efficiency. When you have your drilling and blasting properly correlated and the proper explosive, it is not ever necessary to split the cartridges.

MR. ROBERTSON: I suppose it wouldn't do for me to ask what sort of knife you use. We are trying to get something suitable.

MR. HURTER: We use a clasp knife, a straight knife like a paring knife, made of steel.

MR. ROBERTSON: We have been trying to fix up a copper knife but have not been successful.

MR. McLAUGHLIN: I don't believe there is any use in quibbling over the type of metal you use. If you are going to use metal, you are using metal. Explosives in the normal condition will stand exactly the thing you are talking about with comparative safety, but again I repeat that

you must not by that process form a habit that might lead you into trouble when the explosives are not in the right condition.

MR. ROBERTSON: The reason I asked that question was because we are trying to get our men out of that habit.

MR. McLAUGHLIN: You are dealing with the problem of the efficient use of explosives when you say it is not necessary for a man to split the cartridge and drop it in the bore hole and fill it full of explosives. That is a practical matter and not one within the province of this Section to determine.

A. C. HEWITT (Engineer, American Lime & Stone Co., Bellefonte, Pa.): My question may sound like a very stupid one to those of you who have more experience in the quarry than I. My experience has been mostly with crushing and some in the cement plant. You made a statement about dropping the cartridge into the hole. I should like to know some of the details of how that is handled, how you attach it to the stick, and how the stick is removed?

Details on Dropping the Cartridge Into the Hole

MR. McLAUGHLIN: We have done it in our Bluffton, Indiana, plant. We just used it Monday. It is nothing more nor less than an ordinary hickory stick. Usually I go to the stockroom and get a good-sized hammer handle and take the draw knife in the shop and draw it down to a point on one end and tap it. I use that hickory because the sharpened end usually stands up better than any other wood. Then I bore a hole near the end, run a loop through of a size not too large and yet not too small. It should not be too large, because part of the value of the peg and rope is helping him in determining just where that cartridge is located in the hole, especially when the walls of the hole are rough and have different angles. If the rope is too heavy, it isn't sensitive enough to give him the information he wants. It is likely to cramp his fingers if it is too small, on the other hand.

After all is said and done, the operation is taking the dynamite cartridge and lifting up the flap of the end if the point won't penetrate, pushing it down in the cartridge and then lifting it down. The wooden peg is short. Then the rope is lifted to see if it is pushed sufficiently far to get the friction, and then it is lowered down.

You can see that when you have that cartridge tied on to the end of that rope it can not get away from you. It is not anything like an approach to the condition that occurs when you stand at the top of the bore hole and look over and drop a cartridge down there. Then what are you going to do? It has got to be larger. There is no telling how many feet there are between where the cartridge lodged and the top of the charge you previously made. You have got to get it down and go after it with a pole, most of the time a wooden pole. But a wooden pole is no protection if you hammer away at it sometimes. You get explosive mixed up with the cuttings that have occurred from the drilling still sticking on the sides of the wall. If you get that mixed up with the end of the pole and start a grinding motion, you might get friction or

even a spark under such a condition which will ignite the cartridge. There isn't any need for that.

NATHAN C. ROCKWOOD (Rock Products, Chicago): Don't the cartridges ever jump off? What is your factor of safety in the hold of your peg on the cartridge?

MR. HURTER: Don't you find it necessary to put in a few notches? A great many do that.

MR. McLAUGHLIN: I will say this, speaking from my experience with dynamite, you have got to give the explosives manufacturer credit for putting out a better packed product than ever before, and you can depend on that to some extent.

MR. GROSS: You say that you lay down the dynamite ready to shoot before you start loading?

MR. McLAUGHLIN: No. I didn't. It brings out a point in detail that you may want to know. Some of you quarrymen whose books are always in red may be so financially involved as to find it a heart-breaking proposition to put an extra man out; but to all of you who are outside, it is just as easy to station a man adjacent to the loading of a hole, whose duty it is to open the boxes and lay the cartridges as used by the hole, and then remove the boxes. It is just as easy and takes no more labor, with no more dynamite exposed out of the case than reasonable usage at a time.

CHAIRMAN EVANS: Gentlemen, I want to say to you that we will be here but a very short time longer, and during the few minutes that remain we are going to have a demonstration, if I might term it such, that will put into practice everything you have heard in the last two or three hours. Mr. Thompson will make a practical demonstration of first-aid. I am sure that it will be of material benefit to you, because it can be adopted and practiced at home as well as in the quarry.

By way of introduction I might say to you that this gentleman is largely responsible for the formation of a Quarry Section in the National Safety Council, and he is not connected with the crushed stone industry.

Mr. Jay Thompson, the man who will next talk to you, is manager and secretary, and several other titles, of the Toledo Safety Council. He is big enough and broad enough—at least, tall enough—not to confine himself to the safety movement in the city of Toledo, but he is big enough to embrace all lines of endeavor.

FIRST AID AT QUARRIES

Jay Thompson, Manager, Toledo Safety Council, Toledo, O.

On this question of taking care of minor injuries, there is one point which I would like to have you consider, and that is, as we are scratched and barked from injuries in industry, we develop an anti-toxin, which protects us from blood poisoning as long as we have that particular set of germs around us. We are absolutely immune, apparently, to blood poison. We go along and bark our fingers day after day and nothing hap-

pens. But I want you to bear in mind that as in smallpox vaccination, you can scratch and scratch on a man and not have it take, and all of a sudden, for no apparent reason, it does take. He passes out of that period of being immune and becomes subject to the disease.

President Coolidge's son died from that little scratch on the heel. A great many farmer boys might have had a similar accident day after day and had nothing develop from it. The fact that you can scratch your hand and not get blood poisoning proves little. You have got to consider that at that particular time you may have run out of anti-toxin for the germs which that particular cut has picked up.

On the way here I had to use a little first aid on myself, and I will show you just what it was. I got a cinder in my eye. I looked at my eye like this (pulling the lid of the eye out with my finger) and saw it in the mirror. I might have put my finger in my eye and pulled the cinder out, but I did not. I used a little stunt which should be used only in emergency. It is, as a rule, only told to railroad men, because they are the only ones supposed to be far enough from a doctor to make it safe to tell them. Take two matches, light them, blow them out and then sharpen one with the other down to a little needle point. Then you have an antiseptic needle that is free from slivers, and with reasonable care you can remove an ordinary particle with safety.

Infection the Big Danger in Eye Accidents

In addition to that I went into a drug store and bought some boracic acid and a little eye cup and washed the eye out.

Don't forget that your big cause of danger in eye accidents is infection. You can cut an eye quite seriously and the doctor can repair it as long as infection is kept out. In fact, the eye is one of the most quickly healing parts of the body.

This is all I will say concerning minor injuries. They are largely in your plant a matter of discipline as to whether you have your rules followed out or not.

Now I am going to get into pure safety work, which is selling the safety idea. In that you will use visualization, sales letters, campaigns, contests, and with every sales proposition you will find some failures. It does not follow that the contest has been a failure if there are some accidents. You have got to keep the subject alive. Try a half a dozen different things.

In an individual case in a plant up at Elyria, a safety man had had a hard time to get a workman to clean up with his crane before going home at night; he tried all kinds of schemes, all kinds of appeals. One day he went to him finally and said, "Jack, I want you to tell me something. There are three or four ties down here along the side of the track. I have talked to you about cleaning up and you have not done it except while I was talking to you. Now, if a railroad man fell over one of those ties tonight and lost his leg, or lost his life, left a family, would that be absolutely his fault? Or would there be some part of the accident that would be your fault?"

The workman admitted he had never looked at it in that way. And this safety man, after about eight months, told me that never again had he found anything left in the way of a railroad trainman who would have to work in that plant after dark. There are millions of ways to teach safety, if you will get the right psychology for putting over your sales proposition.

Take a certain case in California, where the manager called in every man. I did not look at this as a case where the men were bawled out for getting into trouble. I considered it a case where the sales manager had found a customer who was not buying goods, and called him over and talked the matter over with him, man to man. That kind of psychology, calling a spade a spade, and the manager of the plant himself getting in on the matter, is the all important element in putting over safety. If the managers will go that far, they will get results.

Bleeding to Death is a Very Rapid Process

To demonstrate safety, I have a sort of a ritual for first aid. It takes only from three to seven minutes for a person to bleed to death. You have two hours to take care of most infections, but you can bleed to death very quickly from a serious cut. To emphasize the value of safety work and to emphasize the value of medical attention, I want to go through this little ritual, which you must pass on to other people if it is going to amount to anything. You have to be in this safety game just like these little danglers along the railroad where there is a bridge. Each of you must be a rope that is going to knock somebody on the head. I do not mean knock them down, but tickle them up and tell them something is going to happen.

For a cut in the palm of the hand, fold the meaty portion of the hand down, close the fist, squeeze it tightly, and walk to the doctor. Have the injured person hold it higher than his heart. He won't bleed to death.

For a cut in the wrist, which might happen anywhere—and don't forget you have got to put this over in the home; you have got to have it with you all the time—for a cut in the wrist place one finger above the cut and one below. A steady pressure—you have got it. He won't bleed to death. You don't have to get a rope and a crowbar and put a tourniquet on. Your patient won't bleed to death with this grip.

For a cut in the forearm, just imagine this upper arm of mine is a broomstick, with a rubber hose running under it through which a valuable liquid is flowing. Imagine a cut in that rubber hose, and now press your fingers up here on the upper arm as if it were a broomstick. You don't have to take his coat off. You rest the arm up over a chair and the hand goes to sleep because you have stopped the pulse. Just a little pressure with your fingers does the trick.

Take this wrist shut-off and apply it to the throat, one thumb above and the other below the cut. With this grip you can walk your patient to the hospital. I know a doctor who walked a man to the hospital with two of those big veins cut, two blocks, and didn't get the patient's collar bloody.

Here is another shut-off, a little V is here in the shoulder blade. Put your finger down in this V and press good and hard. By this you have shut the blood all off, just like turning a tap.

A little girl on the Boston L had her arm cut off near the shoulder. In three minutes she was dead because no one knew enough to put his finger in that little V and press down there good and hard.

You have the same shut-off in the leg. It is half way down in the groin. Use the heel of your hand. Shove it in good and hard, because that part has some meat around it on most people and requires more pressure than the shoulder.

Another way to perform this shut-off is to use something similar to a bath towel or a jumper; tie a knot in it, put the knot in the groin, one end through the belt, tie it in back with a square knot, and then give it a little twist with your hand. It will produce the pressure on this groin shut-off and the person's life is saved.

If a foot is cut off, if you should shoot it off while out hunting, the shut-off is made with the fingers here in the hollow of the knee with the thumbs on top. You can use something the size of a billiard ball in the hollow of the knee and tie the leg back to add to the pressure. In cases where you use a tourniquet, you have got to loosen it up every ten minutes to keep the blood from coagulating where the pressure comes. If it does, your victim is just about as good as dead. When you have a blood clot form in a large vessel, it is quite apt to float back to the heart. You must let it wash itself out.

Using the Tourniquet to Stop Bleeding

If you were out motoring and a man had a cut in his forearm, a bad one, and you wanted to drive your car and get him to a doctor, you couldn't hold him and drive the car. You should take your tie, pass it around the upper arm, get a little piece of wood, tighten it up and fasten it, so that it wouldn't unwind, then drive for ten minutes—stop—open the tourniquet up, let a little blood out to wash itself and then fasten it up again. Drive another ten minutes. Repeat.

When you have once put a tourniquet on a man, it is your obligation to him to see that it is taken off. In other words, stay with him. There have been cases where a tourniquet has been on under the coat of a patient and it was not removed in time.

When you are putting a tourniquet on, use a broad strap like a belt or a tie. Never use a piece of wire or a small piece of rope, because these may injure the blood vessels permanently and the doctor may not realize it. If he does, he can go in and cut them open and patch them together again and take care of the distorted nerves and so forth. But that is an awful chance to take. Use a wide tourniquet.

For puncture wounds, you have your ten fingers. In gun shot wounds, falling screw drivers, or any kind of a puncture wound, put a finger in the opening. It is better to take a chance on blood poisoning than it is to wait that three or four minutes and be as fussy about it as you might; you may not get anything that is cleaner than your finger when you do.

For simple cuts (say a man had a cut across the top of the forehead), put one finger on one side and the other finger on the other side, and close the opening. Don't apply a big wet rag and expect the cold water to make the blood coagulate. It won't. Water will keep the cut open. Close the opening, and in 40 seconds it will start to coagulate. Then if you have any first aid material, put a little strip of adhesive across the center of the cut and take the patient to a doctor.

If you have multiple cuts on the scalp caused, perhaps, by being thrown through a windshield or hurt in a quarry, just shut all those blood valves off with a little pressure applied by means of a belt or tie passed around the head at the forehead. There will be no loss of blood with this shut-off, absolutely none.

In cases of broken bones, a leg broken in a quarry, perhaps, take any cloth, make a pad, shove it between the knees and then tie the legs together. Put your first tie just above the break and tie four places in all; one above and one below the knee, one at thigh and one at the ankles. And one other thing, remember to fasten the toes together, so that the leg won't wobble. Your main idea is to relieve the patient from shock and pain and keep him from getting in any worse condition than he is when you find him.

A Compound Fracture May Result from Carelessness

Arms are taken care of by just fastening them to the torso. For a broken shoulder, fasten the arm to the torso. A doctor told me of a case in Pittsburgh where a man had both legs broken. They just bundled him into a taxicab, and they had two compound fractures when they got to the hospital; the bones had punctured through. It took the doctor four months to keep that man from losing both legs, whereas if they had fastened the two legs together, with a piece of board down the middle of their pad, they would not have had such a serious case.

All this information is, we believe, so elementary that we are teaching it in the elementary schools in Toledo. We taught it to children last summer on the playgrounds and they learned it. They had to be members of the playground safety club. You fellows ought to get it in one demonstration and you ought to pass it on to others.

After you have stopped the flow of blood and looked for broken bones, your next move is to return your patient to consciousness. If one of you men had fainted while I was talking about puncture wounds, and occasionally that does happen, I would have walked over to where you sat. I would have put your head down between your knees and held it there for a minute, you would have come up by yourself with a nice red face. When you faint the blood goes down to your stomach and the face gets white. If a man falls down in a faint, pick up his heels and push his knees in on his chest.

A sunstroke is just the opposite. Your face is red from blood rushing to the head; also with a fractured skull your face is red and your breath is short and sharp. Your remedy is to elevate the head. The blood is

up there; you want to get it out of the head. Lift the head and put your cold compresses on the back of the head. Then you have done all a layman can possibly do to bring that fellow through.

Treat a sunstroke and fractured skull just the same. When the face is white, lift the heels, and when the face is red, lift the head, just like you would a bottle if you wanted its contents to go one way or the other.

For drowning or electric shock you have to apply what is popularly known as the Schaefer method of resuscitation. We will call it artificial breathing. Any one of you can squeeze the breath out of any girl you ever had. That is resuscitation. That is elementary resuscitation. If you do that at the intervals at which you breath, you will bring her back to life.

If they are out from electric shock or any other form of suffocation, it is not the best way to do, but it fills the bill.

I have here a little bottle that will show you the operation of your lungs. The sides of the bottle are the walls of the chest. The little balloons inside the bottle are the lungs. A rubber at the bottom represents your diaphragm. It is what you exercise when you laugh.

Press on the diaphragm and the balloons collapse. Remove this pressure and the atmospheric pressure rushes air in and fills the lungs again. In the case of this bottle they collapse completely, but in the case of the human being, they do not collapse completely. There is 25 to 40 per cent residual air left in your lungs in order to keep the walls separated from each other.

The Danger in Some Pump Breathing Machines

The danger of some pump breathing machines, which are still used in a number of places, although they have been abandoned in large industry, is the collapsing of the lungs. The mask which is put over the face, particularly after it is a little old, loses a little of the air which the pump pushes in; then when the pull of the pump draws the air out of the lungs, more comes out than goes in. Eventually you have pulled that 25 per cent out and the lungs collapse. If you do not know what has happened, (and the chances are you won't know) your victim is soon beyond any help that can be given him.

In electric shock you have got to remember that the cause of suffocation is the paralyzing of the nerves that are right around the mouths of the little balloons in your lungs. They are paralyzed. They are contracted. And a countershock tends to make them vibrate and open up so that you can get air in and out. You can countershock in several different ways. One is to just slap the victim on the cheek. The old way of applying resuscitation was to pick up the victim's heels while he was lying on his back and let them drop to give him a countershock on the heels. But that has been passed up for the slap on the cheek. That does the work just as well. After starting resuscitation in electric shock, get someone with a stick to give your victim a "hot-foot" about every five minutes as a counter shock.

Your patient's position is flat on his stomach with one arm out in front

of his head, for the purpose of keeping the tongue from going back into the roof of the mouth. The cheek is laid on the other hand in order to keep the mouth up out of the sand or dirt and to make sure that you have a free inlet and outlet for air.

In getting a man in this position, you do not do it all at one time, but you keep giving him a bump on his breathing apparatus. You want to get that circulation of air. In fact, as you carry him in out of the water, or pull him out of a room that is filled with gas, or from some other awkward place where you can not work on him, try and give him a few squeezes in some way. The linemen in Cleveland, as they come down the pole with a man who has been electrocuted, have one arm around him, and they keep giving him a jolt, trying to get the air circulating through him. The quicker you get it going, the more confident you may be of results. If your victim has gone so far that he is completely out, you do not need to worry about hurting him. Do one thing at a time, and between times give him a little circulation of air.

Practical Instruction in Prone Pressure Method

Now, to get the position of your hands, you kneel astride of one knee of your patient, put both palms on his back and pull them back sharply till they come to a natural resting place, at the hollow of the back. Turn them to an angle of 45 degrees and you are on the floating ribs. Keep hand away from the spine, with about the width of your hand between the heels of your two hands. Keep your fingers parallel with each other and do the work entirely with your back. You can not help but make air circulate in that position.

Now, if you want to change operators, if you have knelt over one knee, then another man can kneel over the other knee, and as you are applying pressure he can give you an elbow, throw you away entirely, and then drop into place with his hands.

The ritual for this is, "Out goes the water, in comes the air"; and that will time you fairly well. "Out goes the water, in comes the air." When you say "Out goes the water," you are pressing down; "In comes the air," you are sitting back on your heels getting a breath of air yourself. If you hear any noise which might indicate an obstruction in the air passages, it is probably something lodged in the patient's throat; maybe a cud of tobacco or his false teeth. Set yourself back a little, give him a little harder thrust and remove pressure slowly, and you will find whatever is in his mouth is right where you can get hold of it with your fingers and remove it.

One life saver told me of an amusing case where he brought a man back from drowning and the man got mad because they had lost his false teeth in the shuffle. That really happened out east of Cleveland.

Occasionally you will hear of infants choking to death from croup. I know of a case where the fire department of Shaker Heights was called out and when it got there the woman met them on the porch and said, "My baby is suffocating with croup." Those firemen walked in and revived that child, a two year old boy, by the Schaefer method of resusci-

tation. She happened to use the word "suffocation." The child had suffocated from croup. They knew what to do for suffocation and they went ahead and did it, and they got a big return.

In case a child should get an apple core or something of that kind in his throat, slapping him on the back may help, as it knocks some of the wind out. If it don't, place your hand right over the floating rib, grip his heels with your knees, then give him a thrust and come back slowly, so the gust of wind coming in does not pick up the object and force it back.

You can all use this first aid. You don't know how soon you may need it. I hope not soon, but all ought to know how to save life by these methods.

I hope you will go out and begin selling this idea of first aid. It will pay you in your plant to know how to use these finger shut-offs. You are going to use them every once in a while.

A man bled to death from a little cut in the cheek, where a man held it open and poured water in it. If he had worked the other way and held the cut shut the man would not have lost any blood at all.

CHAIRMAN EVANS: Jay, I want to thank you in behalf of the members here and also the victim for the practical demonstration. If you will be patient for a minute, we will listen to the report of the Nominating Committee. Unfortunately, the Chairman was compelled to leave on the one-thirty train. Therefore, the duty of advising us as to who your officers will be has been delegated to Mr. Thompson.

MR. THOMPSON: The recommendations are as follows:

Chairman: L. R. Cartwright, Mid-West Crushed Stone Co., Indianapolis.

Vice Chairman: D. C. Souder, France Stone Co., Toledo, Ohio.

Secretary: A. C. Hewitt, American Lime & Stone Co., Bellefonte, Pa.

CHAIRMAN EVANS: If there is no objection on the part of the members here, the report of the Nominating Committee will be accepted as final and considered an election of the officers that have been designated. I want to thank the Nominating Committee and also congratulate you members on having secured the services of men who will be competent to carry on the work of the Quarry Section of the National Safety Council.

ADJOURNMENT

Rubber Section

New Officers of the Section

CHAIRMAN: W. L. SCHNEIDER
The B. F. Goodrich Rubber Co., Akron, Ohio.
VICE-CHAIRMAN: M. A. QUIRK
United States Rubber Company, Detroit, Mich.
SECRETARY: R. C. SALISBURY
Fisk Rubber Company, Federal Division, Cudahy, Wis.

Committees

POSTER: C. L. HUNGERFORD, Chairman
The Firestone Tire & Rubber Co., Akron, Ohio.
PROGRAM: E. R. LAWLER, Chairman
Hartford Rubber Works Company, Hartford, Conn.
STATISTICAL: S. MANSFIELD, Chairman
The Goodyear Tire & Rubber Co., Akron, Ohio.
SAFE PRACTICES: HOWARD W. LOW, Chairman
The Miller Rubber Co., Akron, Ohio.
HEALTH HAZARDS: DR. J. NEWTON SHIRLEY, Chairman
Hood Rubber Co., Watertown, Mass.
MEMBERSHIP: R. H. COCHRAN, Chairman
Kelly-Springfield Tire Co., Cumberland, Md.
ENGINEERING: J. E. CONGDON, Chairman
United States Rubber Co., New Haven, Conn.
ADVISORY COMMITTEE: H. H. GRAEF
The Goodyear Tire & Rubber Co., Akron, Ohio.
E. W. BECK
United States Rubber Co., New York City
E. A. HOENER
The Firestone Tire & Rubber Co., Akron, Ohio.
A. L. VILES
The Rubber Association of America, Inc., New York City.

October 26, 1926

H. H. GRAEF, Chairman
Manager, Employees' Service Division, The Goodyear Tire & Rubber Co.,
Akron, Ohio.

THE Rubber Section of the National Safety Council, convened at the Hotel Statler, Detroit, Michigan, at 10:00 o'clock, Mr. H. H. Graef, chairman, presiding.

CHAIRMAN GRAEF: The first thing on the program is the reports of the various committees. I will call on Mr. Salisbury, vice-chairman, to make his report covering his activities for the past year.

R. C. SALISBURY (Manager, Health and Safety Department, The Fisk Rubber Company, Cudahy, Wis.): The activities of the vice-chairman were confined somewhat to just the getting out of a monthly news letter. Some of the outstanding features of the work were getting the smaller companies to assist us or to participate in the news letter itself.

We heard from Van Cleef Brothers in Chicago. They had submitted an idea to prevent rolls of stock standing on end from falling over. R. B. Harkness of the Cupples Company of St. Louis volunteered some information concerning fires from sulphur.

Altogether, we produced during the year but seven news letters. If I made a report without stating that the editor of the news letter should have more active cooperation, I would be failing to say something very necessary, because as most of you know the news letters can not originate from one man, nor be kept up by one man; and I would like to solicit your cooperation, your much better cooperation, for him than was given during the past year.

CHAIRMAN GRAEF: I might say that our original plan was to get out one news letter each month for the Rubber Section, and we did not necessarily intend to confine that news letter to the rubber companies that are members of the National Safety Council; in fact, we felt that it might be a medium for having companies which had previously shown very little interest in our work become actively associated with us.

Our chief idea was to have this news letter not only serve as a medium for the exchange of our ideas and experiences, but also to have it serve as a medium for making inquiries and getting replies from various companies, using that as a channel.

We hope that in the year to come, now that we have got it started and the rubber companies know what we are trying to do, they will cooperate a little more closely and give us enough material to get out the letters according to schedule.

Next I will call upon Mr. Schneider, the secretary, to give us his report.

REPORT OF W. L. SCHNEIDER, SECRETARY, RUBBER SECTION, NATIONAL SAFETY COUNCIL

Your secretary has attended the meetings of the Rubber Section Executive Committee, which were held on November 20, 1925, at Akron; March 5, 1926, at New York, and June 16, 1926, at Chicago.

He has furnished the members of the Rubber Section with the minutes of these meetings, following up the detailed correspondence in connection with the same, and carrying on the routine correspondence.

In addition he has assisted the various committee chairmen in every way possible in connection with their activities.

He has also corresponded with the Rubber Section members in regard to criticisms and hearing of the proposed Mill and Calender Safety Code of which the Rubber Section and the International Association of Industrial Accident Boards and Commissions are joint sponsors.

The chairmen of the various committees will render separate reports.

CHAIRMAN GRAEF: Mr. Schneider has certainly fulfilled his obligations to the Rubber Section in a very conscientious way during the past year. There has been an unusually large amount of correspondence due to the fact that the question of the Code for Rubber Machinery has been, I might say, paramount in our activities, and Mr. Schneider had all of the inter-committee correspondence on that subject.

The next report I would like to have is from the chairman of our Membership Committee, Mr. Lawler.

REPORT OF EDWARD R. LAWLER, CHAIRMAN, MEMBERSHIP COMMITTEE

Number of members in Rubber Section September 25, 1925.....	43
New memberships during the year.....	4
Memberships cancelled during the year.....	4
Total number of members in the Rubber Section to date.....	43

During May, 1926, with the assistance of W. L. Wheeler, Service Extension Department, National Safety Council, we sent out over 100 letters to rubber concerns. These names were secured through the kindness of the Rubber Association of America who are members of the Rubber Section. Evidently our sales letter didn't get across, as I believe only about two of these new members are due to our letter. Very few even acknowledged our letter and total replies were only about 15.

In addition, we wrote several other concerns who made inquiries and supplied them with detailed information plus bulletins, copy of the *National Safety News*, etc. Some of the replies read like this: 'We are members of a local safety council, making available to us a vast amount of literature, posters, etc., and we feel we are engaged in this work to a sufficient degree.'

"We feel that our safety program is sufficiently well organized and posted to serve our purpose."

"Our insurance company handles our safety work in a satisfactory manner."

In the replies of several, reading between the lines, it seems to be a question of finance for not becoming members. Although interested, it was impossible to overcome this condition in spite of our stressing a greater saving in an earnest effort to firmly establish safety in their plant.

Personal contact is the principal factor in selling our membership and possibly the new chairman will be in a locality where there are opportunities for visiting prospects, as letters in many instances receive scant attention.

Present members are the greatest assets we have to assist in this work and we trust during the year to come they have the time to assist us in increasing our membership.

EDW. R. LAWLER: Just one other thing more. It was impossible for me to go and visit rubber companies located outside of my state and for that reason we had to depend upon correspondence. Mr. Schneider, the secretary, did a lot of personal work there. He wrote to friends that formerly worked with him, and also gave me one or two other leads, and while we were not successful, in time we may be able to grab them off.

Our membership remains the same, but I think if any of the members know of concerns that are not members at the present time and have any one there they can get in touch with, in that way we can gain members. I think we can do far more that way than we can by writing just to strangers, you might say. So if during the year any of the members will assist the new membership chairman by submitting names and assisting in that way, it will help considerably.

The Small Manufacturers Need the Council

E. W. BECK (Supervisor of Safety, United States Rubber Company, New York City): Adding a few words to Mr. Lawler's report, some of you might be interested in knowing that the National Safety Council has taken this question of the small factory into serious consideration, trying to see what they can do to get the small manufacturers into the National Safety Council. It has been quite a difficult task. They have hired a field secretary, a field man to go out and make personal contacts with these smaller concerns.

They have run up against the same thing that Mr. Lawler reports, that is, they feel that they are getting all they can from the insurance company, and that their work or their experience does not justify any expense. Now I think the problem is to sell them safety rather than to sell them a membership. The problem is to sell them safety because if they are sold on safety I think they naturally will join the National Safety Council.

It is a personal job, you can not do it very well by correspondence. It is a case of all of us pitching in and doing what we can with the industries in our territory that we can get to join.

CHAIRMAN GRAEF: I intended mentioning the experience the national organization has had with these small factories, which included any plant where there were from 200 to 300 employees. They had a man out who made on an average four calls a day for over a month. I know in our Section we have always felt that personal solicitation is the best method, and I think there is no question that it is far easier to explain what you are trying to do in a few minutes in personal conversation than it is to try to do the same thing by correspondence. Our committee has always been handicapped in this respect due to the fact that the man who was in charge of our membership work was

located in a certain city and had his regular job to do for his company. He had no way of getting traveling expenses or the time to make a trip around the country interviewing people in these smaller plants that were not members. For that reason we had to confine ourselves almost entirely to correspondence, except where we could call on some member of the executive committee who was not necessarily on the membership end but was located near a plant that we wanted to get in contact with, and ask him to go out and make the contact for us.

I think that is what you are going to have to continue to do.

What the Rubber Section is really fundamentally interested in is having the various rubber companies know what activities we are engaged in and what benefit that work would be to them if they actively participated in it. I feel sure if we get a point of contact with some of these companies who are not now associated with us, and can get them to see just what we are doing, they will come in with us; not just because they are going to join the National Safety Council, but because they realize that the work we are trying to do is valuable and beneficial work and they can derive equal benefit in participating in it.

Now next I would like to call on Mr. Quirck, chairman of our Poster Committee.

REPORT OF M. A. QUIRCK, CHAIRMAN, POSTER COMMITTEE

Last year when I took over the chairmanship of the Poster Committee, it was a pleasure to find that Mr. Sanders, my predecessor, had very capably and successfully carried on his work. He turned over to me or the council sufficient posters to carry us through at least the first three or four months of the period I served. Naturally that gave me some good ground to work with. In April, when our posters got to the point where we needed more, I sent out an appeal to all members of the Section. I was rather discouraged in the results from this first batch, because we received only three replies. Fortunately in the replies we did get, we got 33 cartoons and photographs. I think it is only fair to mention those people, the Fisk Rubber Company, the Hartford Rubber Company, and Mr. Sanders, of the Kelly Springfield Company.

Realizing that we had to get some material for the future if I was to leave the Poster Committee in the same condition as I found it when I took over the chairmanship, I immediately started to send out individual appeals to people whom I knew and who would come through; and I must thank three members again, Mr. Lawler, Mr. Partridge and Mr. Sanders, and myself,—I think I owe myself thanks too.

It was my thought when the new chairman took over the work he really would have some material to work with, and in the communication that I just received from Mr. Keefer—and Mr. Gardiner, they inform me that the Council is well prepared right now to go into next year and carry us over nicely through the Congress.

I think we take the wrong attitude. I don't think we cooperate enough. At one time every poster I saw was a Goodyear Tire and Rubber Company poster. I do not think it is fair to let one firm or one man do it all. I think if we would all resolve right now to go out and make just one poster next year, just imagine what we would accumulate! I think if the next chairman would assign to each member some particular hazard he wanted to work up into a good poster, have us work it up and send it in, we would accomplish something, rather than go away from this meeting and have the chairman start in anew when he does not have anything to work with. If the new chairman does that and if we all resolve to leave the meeting with that one thought, that each one come through with one poster next year, we would have enough to go through two years. I would like to make that as a suggestion and put it up to the new chairman.

The condition of the Poster Committee now is pretty well taken care of, and I think when I turn over the material I have to the new chairman he will be pretty well fixed for the new year.

CHAIRMAN GRAEF: I think Mr. Quirck is right, along with the other gentlemen that he mentioned. He really has a great deal of credit coming to him personally. He has done a lot of work and he has done it all practically single-handed.

I am going to omit the report of the Special Reports Committee this morning, and I would like to appoint next the Nominating Committee, and ask them to be prepared to make their report at our meeting tomorrow morning.

The Nominating Committee is Mr. Hoener, of the Firestone Co., chairman; Mr. Lawler, of the U. S. Rubber Co.; and Mr. Mansfield, of the Goodyear Tire and Rubber Co.

I feel personally that we have been very fortunate in having Mr. Weston, the president of the Ajax Rubber Company, come here and talk to us this morning, and I know he is going to have something very interesting and instructive for us.

ADDRESS

J. C. Weston, President, Ajax Rubber Company, Trenton, N. J.

I am quite certain you will agree with me that anyone should experience a feeling of gratification for an opportunity to say a few words to a group of men who are taking such a necessary and constructive part in present day spiritual, educational and industrial progress; and I have already begun to feel a degree of inspiration in the realization that I am participating, in a slight degree at least, in a meeting of men whose statements and a report of whose activities are awaited by the whole industrial world with a considerable degree of eagerness.

Also, I am experiencing a certain measure of fear or awe at standing in your presence and realizing that I am not as familiar with the detail of your work as I should be; and perhaps in my official capacity as head

of a manufacturing company I have not devoted sufficient time to the development of safety measures; so here I am in a decidedly mixed frame of mind, gratified on the one hand and a little frightened on the other, and, believe me, it is rather a paradoxical thing to sit in a National Safety Congress and be afraid.

I doubt if the average business man fully appreciates the constructive effort that is constantly being made by the men who constitute this great national organization. Perhaps one of the reasons for this lack of appreciation is the commonly accepted belief that safety work is absolutely necessary—it must go on because of the constant daily need—therefore it is easy to assume that it is being carried on. Also, we read in trade papers, the daily press, and magazines, articles written for the purpose of indicating the great advance that has been made respecting safety devices and the adoption of methods that direct and coordinate movements of men and women in their daily tasks.

Statistics Say We Are Getting Better

Statistics are turned out by the ton which prove that we are getting better "every day in every way." However, it would seem that a greater measure of appreciation respecting this important phase of our daily lives might be developed if we were to engage in a little deeper thought regarding the meaning of safety work, and apply for the time being a different yardstick to measure its purpose and progress.

First, it would seem essential to consider safety in the broadest manner possible. In other words, eliminate from our thoughts with respect to safety that it means only prevention of accidents in factories, on railways and on our highways. At least we might set aside these common, every day, safety difficulties which most often come into our thinking whenever the word "safety" is heard and turn back the book of time to the early association of men in an endeavor to accomplish all the tasks of life.

We should not think of safety as something new, something that has been discovered by the great industrial minds of recent years, something that is dependent wholly on "good business," but rather we are concerned with the progress of one of the oldest phases of our lives and that is the protection of the body and mind against all of the elements of destruction.

Let us take the development of our own country. In the beginning, it is quite natural to assume that men worked at the tasks of that day, clearing land, planting, harvesting and other similar activities in small groups, undoubtedly in a cooperative way in order that the small communities might exist; and because of the stress of primitive conditions we surely would have found efforts being made to provide safety. In other words, spiritual safety, moral safety, safety with respect to such hardships as hunger, disease, and many other things. In fact, the acceptance and application of the Golden Rule which is nothing more or less than the practice of safety.

Undoubtedly the United States of America enjoys a unique reputation

throughout the world for the development of machinery for use in the production of nearly every article necessary to human existence and comfort. It can not be said in truth that our machinery supplants or replaces hand labor but rather it is a cooperative element in aid of such labor; which, considered in a broad sense, improves the quality and usefulness of all articles produced and, of course, permits of production in such great quantities that costs are lessened to a marked degree. Hence as a commercial nation we are able to hold our place among the nations of the world even though labor and living costs are lower in most other countries.

It seems fair to assume that the development of machinery in our country proceeded more rapidly than our understanding of its operation by groups of men; or, to express the thought in another way, the development of machinery quickly brought about the building of large factories and the consequent grouping together of large numbers of men and women and, in this rapid development, perhaps little thought was given to the confusion and the lack of coordination between the human being and the machine. Hence a long period of time may have elapsed before there came the realization that educational and supervisory organizations must be built to prevent the machine working even a slight degree of injury on the mind or body of the workers, and undoubtedly with this recognition of the needed readjustment with respect to man and machine we gave birth to the present day safety idea.

Safety Work is Not Inspired by Fear of Laws

Too many people think of safety organizations in factories, or safety work with respect to railways and highways, as something which is inspired by fear of regulatory laws or that it has been organized and is conducted by industry because "it pays" in dividends or in reduced compensational losses or lessening of legal battles with respect to responsibility for accidents; whereas if one will give the matter a sufficient degree of thought, it should not be difficult to see the true meaning of safety work—that it is a very important part of the progress of civilization. In fact it stands out as a symbol of the development of our national life in the same degree as the work of leaders in medicine, law, engineering and other major agencies for progress.

As industry is organized at the present time, we are trying in every way to produce more and better goods with machinery, to work shorter hours in an effort to increase our earning capacity at the same time, in order that we may live more complete lives and participate in all of the known and accepted comforts and pleasures of life.

Undoubtedly our eagerness to participate in all these things, produce all these things, makes for a degree of carelessness which requires that we shall be watched over more than ever. Therefore, the future for safety work undoubtedly holds greater opportunities than have ever been presented. This situation is rather paradoxical as one would naturally conclude that a greater development and refinement of the "human critter" would make each individual think for himself. However, that does not

seem to be true and here we find ourselves working in the mass, so to speak. Mass production of manufactured goods, mass enjoyment of sports, mass living in cities and community efforts taking the place of individual social activities—hence the greater need for organized safety; and inasmuch as the rubber manufacturing industry is the specific concern you gentlemen are interested in, I might say that what applies to all industry and all civilization is equally true of the rubber industry—in fact, a little more so, as it is one of the outstanding industries rendering service to mankind in every phase of life.

I am satisfied that we are going to make greater progress in this industry with respect to the establishment of safety organizations, in appreciation of what it means, and that we will all “put our shoulder to the wheel” to help in this great work, not because it means minimizing the losses of respective companies with respect to accidents in the factory, not because we fear municipal, state or federal legislation governing the use of machinery, not because we fear the antagonism of our workers, but because of the big, broad conception I have tried to convey to you as to what safety means in the whole progress of civilization.

We must teach safety by individual example, promote its practice and try to realize each day that organized protective effort, as represented by the National Safety Council, is one of the great world movements built up on the foundation of the good old Golden Rule—“Do Unto Others as You Would Have Them Do Unto You.”

Cooperation With the Rubber Association Expected

CHAIRMAN GRAEF: Mr. Weston has hit the nail right on the head when he says our chief activity and our chief source of trouble is failing to have the workman educated up to the point so that he takes care of himself, in spite of what we may or may not do in making the machinery at which he has to work as fool proof as possible.

As to Mr. Weston's suggestion with regard to the rubber association and the help which he feels they can give us, I feel safe in saying that he will undoubtedly hear officially from us. We will be very glad to accept his suggestion and we hope that it will turn out as favorably as he thinks it will. That is one of the things that the executive committee has hoped for and wanted for a number of years, but we never have quite reached the point of doing what Mr. Weston suggests this morning.

I appreciate, and I am sure we all do, Mr. Weston making this trip here to give us this talk, and I personally got a lot of good out of it. I want to thank him in behalf of the Section.

MR. WESTON: It is a great pleasure, indeed, gentlemen, for me to be here.

MR. BECK: It has been a great pleasure to us. I want to assure Mr. Weston that those present this morning represent a very large majority of those employed in the rubber industry. No doubt you realized that.

When I analyzed the statistics which you mentioned, I went right

to my own figures of the United States Rubber Company, with its 23 factories, and I found, just as you anticipated, that those companies that are organized in safety do not have the high rates that are mentioned in that report of the Labor Department, and there is no question but what the smaller rubber industries have had a great deal to do with running up that rate. Those are the fellows that we can help and we can help them best through the rubber association. In other words, the rubber association can help us and we can help them. I feel that we should have their close cooperation.

MR. LAWLER: Talking for Mr. Weston's information and your information I know we took up with the rubber association the question of getting a list of names. I think there are approximately 175 members of the Rubber Association of America. We only have 43, and so you see there is a great deal of difference; there are 125 to work on. I second the motion on that being a wonderful suggestion.

CHAIRMAN GRAEF: In connection with the next item on our program, the idea we had in mind was that in spite of the fact that one of our plants may make boots and shoes, another tires and another hose, (and there are a thousand and one things that are made in our different plants), still there are many conditions in all those factories that are similar where the same hazards exist and we all have the same fundamental problems.

Perhaps in one plant you have attacked this problem in one manner and in another plant you have tried to solve the same question in another way.

Not getting together any more frequently than we do, not having any way of visiting back and forth and seeing at first hand the things which we are doing in our factories, we thought perhaps we could get together a group of pictures showing these hazards and how they have been protected and taken care of in different factories. If we saw three or four ways or a half a dozen ways of taking care of the same thing, and had a little explanation from the man who had furnished us with this information, we thought it might help us to improve conditions materially in our plants.

Planning the Presentation of Safety Kinks

With that idea in mind we asked Mr. Sanders, of the Kelly-Springfield Company, to get this material together for us and have it put in the form of lantern slides so we could project them on the screen this morning and get a little explanation of just what the hazard was and what had been done to eliminate it.

Mr. Sanders recently left the Kelly Springfield Company, and took a position entirely outside of the rubber industry, and Mr. R. H. Cochran, who is now connected with the Kelly Springfield Company, very kindly consented to complete this part of the program for us. He had no conception that the job was going to be shoved on him until the last

minute, and I want to assure him personally that I appreciate very much his undertaking to handle it.

I think perhaps the way for us to get the most good out of these pictures is to ask the man who has furnished us with this material to give a brief explanation of just what the picture covers, and in that way we will get the information correctly and first hand. Every one may feel perfectly free to ask any questions.

SAFETY KINKS

R. H. COCHRAN, Kelly-Springfield Tire Company, Cumberland, Md.

(Slide.) MR. COCHRAN: That is a bead flipping machine. We had several accidents with the rolls. You can see them there just under the guard. We put that guard on. Since that time, about eight months ago, we have not had an accident. I would like to ask of any firms that use that kind of flipping machine, if you have got a better guard, any better type of guard? That is one of the first types they made; the "Utility."

(Slide.) MR. COCHRAN: That was a shower we placed close to our dipping tanks. In case the workman should catch on fire, all he has to do is to step under the shower and pull the lever out.

R. B. HARKNESS (Cupples Co., St. Louis, Mo.): Mr. Chairman, doesn't water have a bad effect on certain burns?

MR. BECK: I know of one plant in particular where they have an oil bath, a large boiler with linseed oil in it. In case a man catches his hand on fire, he can dip his hands right into that oil bath, which serves the purpose very well. I do feel, however, in the case of clothing being on fire, that this is much better than dipping in oil.

MR. COCHRAN: Some of the workmen are in the habit of wearing overalls so long that they become full of cement, gasoline and benzole and readily catch fire.

W. L. SCHNEIDER: I might mention in that connection—Mr. Cochran mentioned overalls getting full of cement and I suppose he means solvent—we have a quick removable apron, which the workman can take off at the slightest pull. The material is made of treated fabric to repel the cement solvent. The material itself is made by the Cleveland Liner and Manufacturing Company in Cleveland, Ohio. It is a very easy matter to make the aprons out of it, just the application of a strap and clips.

(Slide.) MR. COCHRAN: This picture shows a Cameron bias cutter. Once or twice we had that cable break, and when it does it flies around and might hit the operator. So we put those guards on, to guard the entire cable both below and around the wheel.

(Slide.) A. M. PARTRIDGE (Fisk Rubber Company): The guard is at the lower end of the knife carriage. The carriage comes down through the

slide there. That is exposed and we put on a metal guard. One fellow caught his finger in there as he was adjusting the knife and somebody started the machine. We put that guard on to keep them out.

(Slide.) This little box on the upper section is used to put broken blades in. They had a habit of throwing them around the floor or laying them on the edge of the machine. In one instance, somebody cut his finger. So we put all the broken blades in that box, and that box is going to last a long time.

(Slide.) That is the top of the knife sharpener which we developed in Fisk. The fellows use a large knife in the compound room and cut their hands quite often sharpening knives on an ordinary stone, so we put on that metal shield near the handle of the knife, which prevents the knife from cutting the hand. It works out very successfully.

M. A. QUIRK: In that connection we have made a rubber handle guard, so we can take off the guard and put it on a new knife. We found that it saves us considerable. It is just an ordinary rubber handle that we put right over the knife. We are using it in all departments now and it is working very effectively.

Another Guard for a Small Knife

MR. BECK: Speaking of a guard for a small knife, I came across a good scheme to keep the hand from sliding over on to the blade and cutting. Right where the index finger comes there was a small piece of metal with a slight curve to it which would keep the hand from sliding off on to the blade. It is a piece of metal only about five-eighths wide, the width of the stock of the handle, about two inches long. There was just enough curve there so it would serve to give a better grip, and it had the same contour as the index finger.

(Slide.) MR. PARTRIDGE: Here is a type of wheel that is used on friction. We had a lot of trouble when they turned those wheels by hand; the fingers of the operator would strike on the metal guard and abrade the skin. Of course, it was not a serious accident, but there is always the danger of infection. The man on the machine suggested that the spokes be built in a bowed position, so that the rim of the wheel should extend out quite a distance from the guard itself. Since the wheels have been made that way, we don't have any trouble at all.

(Slide.) MR. PARTRIDGE: This is a type of tube heater. In one instance, we had the head of one of those heaters shift a bit, and they have devised two safety pins, one on either side, that fit into a hole that is drilled right into the metal. Those pins are hung by chains so they will always be in position.

MR. BECK: May I ask if you depend upon the human factor, upon the man to put that pin in there?

MR. PARTRIDGE: Yes, we have to, of course; they won't go in themselves.

MR. BECK: We had a problem where we had a head blow off and kill

a fellow. We have designed, although we have not put it into practice yet, a device whereby automatically we lock that head. So long as there is any pressure within the press, there is an internal pin that keeps the head locked, so you can not turn it. I think that is the only safe way. While there is considerable expense in working up a device to lock automatically, it may be well worth while.

MR. SCHNEIDER: I would like to ask Mr. Beck how he controls the minimum pressure on that? Your gauge won't measure less than a pound per square inch. We have had several instances where a door has blown open with as much as that pressure on.

MR. BECK: If I remember correctly, there is a diaphragm arrangement back on the line that is very sensitive. A half pound will readily keep that pin in place.

Problem of the Pipe Wearing Through

MR. PARTRIDGE: I wonder if any of the boys ever had any trouble with this pipe wearing through? It wears a hole through there and the steam comes out. We almost burned a fellow's leg there, so now they have put metal boxes over all those locations so in case the pipe does break or the steam blows out, it won't go out sufficiently to burn anybody. There will be enough warning there to prevent them from getting hurt.

MR. SCHNEIDER: Is that an extra heavy fitting, Mr. Partridge?

MR. PARTRIDGE: Yes, it is.

E. A. HOENER: The cause of that fitting eating out is due to the fact it is on the drain end and the water, if analyzed, will have a certain sulphur content which eats out the iron. We found it economical on our tube heaters to get a drawn iron fitting on that particular place. By doing that we have eliminated all our trouble. We have found it is corrosion that causes that fitting to weaken, rather than any pressure or action of the steam.

As to the matter of the pins, we have tried out two similar devices as mentioned by Mr. Beck. Our trouble has been corrosion. We have developed a pin, an interlock, which would act upon one pound pressure. Our trouble has been that after a period of time this device became inoperative, due to corrosion. I feel there is some excellent work that can be done on this particular phase of safety work. We do not use a safety pin, but we do use a system of painting with a special heat resisting paint, so that when the door is not properly closed on the tube heaters, it leaves a gap in a circle. That has been our most successful method of determining that, because the inspector at a glance can see that possibly they have not got the door completely closed. But up to the present time I do not know of any absolutely fool proof device that has been either put on the market or developed by any one along those lines. That is a very great hazard in the rubber industry. I think a lot of work should be done on it.

(Slide.) MR. PARTRIDGE: Here is a type of guard to go in between

the rolls on the calender. That is one that was developed after a lot of study. You notice there are three or four slots at the upper edge; it has a large strip of metal going across there. Those slots were cut so that the operator on one side of the calender could look through and see the fellow on the other side.

MR. QUACK: The minute I received that picture, Mr. Partridge, I noticed that particular guard. We had the same experience. One night two new operators were on a calender and they took off the guard and one of them went in and lost his hand. So I appreciated very much the photograph. I have almost the same kind of guard you have. It shows how helpful it is if you only all shoot the stuff over.

MR. BECK: Did you ever notice, even in lower rolls on calenders, where they are spread, that quite often they could be spread more than they are? If they are spread more, if a fellow gets caught they may prevent him from receiving a serious injury. I know we had a fellow get caught where the rolls were only about three quarters of an inch apart; if they had dropped them further, say an inch and a half or two inches apart, the injury would not have been anywhere near as serious. My point is, when they spread the rolls it does not make any difference how far they spread.

A Guard for a Tube Skiver

(Slide.) MR. COCHRAN: This is a guard for a tube skiver, simply a gate which protects the cutting knife, going down on two guides. That raises and lowers as you shove the tube forward or backward. It runs down covering the sharp knife which does the skiving at the time the tube is inserted, keeping the knife fully covered except when the tube is in position to be skived. It does not slow up the operation at all.

(Slide.) This other picture shows a cement churn or mixer, simply showing the application of a fan and exhaust. It is a known fact that fumes are dense and naturally go down nearer the floor level. We have found it clears the atmosphere very readily. That is a slotted opening in the front which takes the air in and the fumes in and out through the exhaust.

(Slide.) MR. COCHRAN: This is simply the application of guard features, some of which you can not read because of the size. It simply features guarding the calender as completely as possible, the overhead chain with wind-up, and all the worm gears are fully enclosed, the pulley gear is fully guarded, the mesh wire and steel band over the face, and the pipe roll around the feed, the toe guard at the base.

MR. HOENER: One question: we seem to have more or less difficulty on the matter of safety rope or cable and a bell rope for signalling the calender. We have tried out in a number of cases an electric bell, that is, by using a push button, but due to the vibration of the machine and so forth, we have not been very successful and they had a good deal of maintenance. We finally got some cable and started a red sash cord for the safety rope and then an ordinary sash cord for the bell rope;

they use an ordinary car bell for signaling purposes. I wonder if anybody has a suggestion that might overcome the possibility of the man grabbing hold of the wrong rope when he wanted the safety rope.

Mr. COCHRAN: I think your location would have a great deal to do with that. For instance, if you simply had an ordinary trip bell with a rope on it, you could make it a short rope with a knot on the end and mount it in such a position that there would not be any question about it. The bell is visible at least on one side. If you want to go further than that, you could have a bell on each side of the calender. The rope leads to the bell. There is no question about getting the right rope.

Mr. BECK: There should be only one rope and that the emergency rope, because any man when he is caught is not sane, he is going to grab, he is liable to do all kinds of things. I feel we ought to be very careful and not have more than one rope and that rope should be hanging so if he strikes it it does not go away from him. I think it should be either a permanent bar or a cable that is fastened at both ends; but by no means have two ropes, one a bell rope and the other a safety.

Mr. HOENER: Regardless of Mr. Beck's statement that those cables are desirable and very easy to put on, at the time that first photograph was issued by the U. S. Rubber Company a number of years ago, showing that cable and bar and also bars between the rolls, I immediately equipped a calender with that particular device. Due to our operations and arrangement of the calender and auxiliary operations, it was absolutely impossible for us to keep the cable on the inside of the housing; nor did we have any success with fastening a steel cable at the bottom of the housing or putting a bar across the front. That is on account of certain other operations in the way of preheater pipes and things of that sort that interfered with that installation.

The Operator Wants the Bell Rope Handy

There is a possibility of locating those ropes in such a manner that we can do that, but it has been more or less difficult because as the man gets the stuff started, he wants to have the bell rope handy, so that he can give the signal to proceed at fast speed, instead of possibly having to walk around the side of the calender some place to get at it. There is quite a problem there. What I am primarily interested in, is to work out some system whereby we can have the two near each other, at the same time fixing them in such a manner that there won't be any question about which is which. As far as the man himself tripping the safety device, we have yet to have our first accident either in the mill or calender room. A great many of these safety devices are very good from a purely mechanical safety set-up, but we must not lose sight of the fact that in order to sell safety to the management and also to the operating department and get their cooperation, we must try to have safety devices so they will not interfere with operating methods and also either cut down speed or increase labor costs in handling equipment.

MR. LAWLER: We tried out bells and we found that they were not very satisfactory; in fact, the head calender man had to do a lot of running around. So we substituted a traffic cop's whistle, signals of one, two, three. They have worked out very satisfactorily. He has the whistle around his neck, and it is always available.

MR. QUIRCK: I was rather surprised at Mr. Hoener's remark when he said that in his case he never found where a man caught in the bite tripped the mill or calender. We just finished a survey covering about three years, and we found that in 50 per cent of the cases in our plant, the men tripped it themselves. Some three or four years ago Mr. Beck instituted a special form. The minute a man is caught in a calender we make out that special form, which tells the distance from the floor to the roll, and so forth, and the kind of trip that we have, whether the man tripped the bar himself, or whether it was some other man. We found that to be of much value in our work afterwards.

MR. BECK: In our 23 factories we had about that same proportion.

A Circular Cutting Knife Guard

(Slide.) MR. COCHRAN: Here is a circular cutting knife guard. I am not sure whether very many factories use that or not, but this is a guard device for protecting the knife. It is the only way we knew of because that knife is adjustable to cut gaskets. It simply consists of a sheet steel band around the face of the chuck. It is simply to keep them away from the knife. The rotating arm raises and lowers as the stock is put underneath on the table.

(Slide.) That is a section of a mill with guard features shown in a diagram. Cradle switch and conduit mounted on each individual mill in connection with the trip bars.

(Slide.) We clean molds that way. It consists of an exhaust system, in which the mold is put into a chamber and cleaned through an aperture. In some instances, soapstone is used; in other instances very fine sand. Of course, the exhaust is strong enough so that it does not get into the room. The workman does not have to breathe in the fine dust.

(Slide.) That is the same as the other mill shown in the previous picture with the exception that these are all hood mills; the exhaust is over the top.

MR. BECK: Have you any baffle plates in there?

MR. COCHRAN: No baffle plates whatever. There is an air washer, the suction just being strong enough to retain the compounds inside and not take them out to the atmosphere.

MR. BECK: Speaking of an air washer, in one of our locations we have quite a serious problem regarding the exhaust from one of our operations; in fact, we have exhausted every means of taking care of the fumes, even tried to wash the fumes. We are stumped practically on the problem of getting the odor out of the factory. Does anybody know how to get rid of the odor?

MR. COCHRAN: You might put in water.

MR. BECK: We did that. We put in a very expensive system.

MR. COCHRAN: I do not mean a spray. I mean a direct bath.

MR. BECK: That is what we are doing.

MR. SCHNEIDER: The Philadelphia Rubber Company has the same problem, and they have been unable to solve it. You might write Mr. Day, chief engineer of the Philadelphia Rubber Company. Probably they have got something up by now.

(Slide.) MR. BECK: When we were asked to send suggestions down to the chairman of the committee, I thought right away that one of the best safety things that we had accomplished was to establish a little competition among the factories along the lines that Mr. Weston spoke of this morning. I think our big job from now on is not so much mechanical, although we must never lose sight of that, but it is educational. I am doing a little thinking now about carrying our educational work even further than the factory itself. In some of our locations where we have one or two factories, and where we are practically the only industry in town, we are thinking of negotiating with a local moving picture house and putting on some safety educational films, not only for our employees but for the members of our employees' families.

I will say that this contest, which we have been running for several years, has assisted us materially in reducing not only our loss of life and limb but also our costs, and we have a very complete system of measuring costs, which I think is very necessary, because there are people that you can not put some things over on, unless you talk dollars and cents. I feel that the safety man should always be fortified with some cost figures. Our contest has brought about that very thing.

Guards to Protect the Bite of the Rolls

(Slide.) Here is a collection of guards we have been using to protect the bite of the rolls. There are just three rows of the calender shown, three not being necessary in this case.

We have come to the conclusion that one particular type of safety guard will not always do, especially on a calender.

We are doing now what I think Mr. Hoener is doing, putting the calenders in series, and there you have quite a different problem.

(Slide.) Some of our suggestions came from our neighbors across the border, from Canada, others from the states. The one which we are using more than any other is a stationary guard, and is made of two bars going across the bite of the roll. When we first put them on, they were stationary, and we thought it was to our advantage to fasten them to a plate on each side of the housing and allow a little play, so that if a fellow should get caught he would have time enough to pull his hand out due to the play in the rod. If the rods give a little you could tie them in the middle but we have not found that necessary. We have a standard blue print showing the spacings of these distances in accordance with the diameter of the calender roll. There you see the man's hand, it will allow him to put his fingers through to fit the fabric, yet he can not reach the bite of the roll. We have found that particular guard on our calenders most successful for general purposes.

(*Slide.*) This guard here is probably one of the first that we used in our tire factories. It is a G. & J. at Indianapolis. About seven years ago we had no guards on our calenders and one of our fellows got his fingers caught. The factory manager said that they were going to devise a guard, and they put a guard on there, but the men took it off; they said it was in the way. But the factory manager was just a big enough man to say the guard was going to stay there, whether the men did or not. That was seven years ago; the guards have been there for seven years and the men stayed, and we have not had any fingers caught in a calender where they had this device, which is composed of four bars stationary right in front of the rolls.

(*Slide.*) Take this device here, just one bar; here in Detroit we have a wooden bar going all the way across that, with a collar on the end, allows it to revolve on the roll, the collar giving it clearance. That has been recently put in.

The Roll on a Pivot Releases a Man's Hand

MR. QUIROK: That is very successful and also a little slot on the end of the collar so that can rise.

MR. BECK: In case the fellow does get caught in there, that roll is on a pivot so that it just lifts say three-quarters of an inch or a half, enough so that a fellow can pull his hand out.

This upper right-hand roller is similar to the one I just mentioned. You see there the roller is traveling on the lower roll. You can see the slot so if a fellow gets caught in there it raises up. This is wood, which makes it light, the timber is of pretty good size, large proportion; you see its ratio to the roll itself.

MR. SCHNEIDER: I would like to ask Mr. Beck if there is not a tendency, if stock is coming from a higher level, to draw that up, pull that guard up; consequently that would leave you a pretty good sized opening there between the bottom roll and your guard.

MR. BECK: That is true. If it can be changed to be fed from a low level it should be done, but there again you have a condition which you can not change. In that event you have to design a different guard.

In every case we recommend as standard practice a rod or bar going full length of the roll, which may be tripped or moved in either direction. At one stroke it will automatically stop the rolls. In some cases we have cables coming down on the side of the frame fastened to the floor, so that a man can swing either way and grab that cable. In other words, you see how our experience is differentiated from, say, Mr. Hoener. He said he has not had a case where the man has tripped the rod himself. We made a very complete survey, we have accurate records, and in 50 per cent of our cases our men have tripped the rolls themselves. In other words, we have given him that opportunity. He may be alone. Wherever you have the man tripping the roll himself, you usually have a less serious accident, because you have that time factor.

R. C. SALISBURY: How many accidents did you have, Mr. Beck, to investigate with reference to the men pulling the rods themselves?

MR. BECK: We probably average eight or 10 a year. Now remember that is where a man has got caught in the bite of the roll.

MR. HOENER: What is the percentage of those on calenders as compared to mills?

MR. BECK: I would say there were a few more on the calender, where people have been feeding them in. For that reason we have gone to this extreme, we have guarded everything. I think Mr. Hoener's experience is that his men are probably not as near the bite of the roll as our men.

Another thing, Mr. Hoener is probably not operating small factories that are 40 or 60 years old, where you have inadequate equipment and make products that he does not make, like in our footwear division.

MR. SALISBURY: Did your survey include the severity rate on those accidents?

MR. BECK: Yes, although I do not recall the figure exactly. We use the scale of lost time in accordance with the standard method of, say, 300 days per finger, or whatever it might be. It would not show the actual days lost, but it would show the severity of the accident, regardless of the permanent disability.

MR. SALISBURY: I think that would be very interesting information, before we decide to put guards on rolls similar to these you have. In other words, I should consider the separated roll more dangerous than rolls that come together.

The Mental Caliber of the Operator a Factor

MR. BECK: Well, as a matter of severity, that is correct; that is, the degree of separation often determines the amount of feed that a man is giving in there, but all our rolls are separated to some extent, and the mental caliber of the operators of the calenders, I think, does not bring about any quick, alert action. They are not of that type. Now, you take the piece workers on tires, you know the type of man there, he is a speed artist, but we do not get that particular mental capacity on our mills and calenders. You are liable to have colored fellows, and they do not react always as quickly as some other folks do. But we are sold on the proposition of guarding the bite of the calender.

E. A. OSWALD (General Industries, Elyria, Ohio): I would like to ask you, Mr. Beck, about guarding rolls in the manufacture of shellac composition. Have you had any experience in that?

MR. BECK: I am sorry I can not answer that. What is the operation?

MR. OSWALD: It mixes the shellac composition for shellacing molded parts and solid parts. We have some rolls where we mix this shellac and since I have been looking this over I don't believe they are guarded. Of course, it is different, it is more like dough.

MR. BECK: Does it go into the hopper on rolls or horizontal?

MR. OSWALD: It is thrown in by the operator, and he works it in there and rolls it out there; they keep doing that until it is thoroughly mixed up.

MR. BECK: It is overhead, vertical?

MR. OSWALD: No, horizontal.

MR. BECK: It is a mixing mill?

MR. OSWALD: Yes.

MR. BECK: And you throw it into a hopper?

MR. OSWALD: No, he has to force it in there.

MR. BECK: We have in one location a hydraulic plunger that forces stock between rolls.

MR. HOENER: My suggestion on similar operations is to use a small Banbury mixer, and then put it on a sheeting mill. That would eliminate one accident hazard.

(Slide.) CHAIRMAN GRAEF: I guess that one looks like one of my pictures. It shows a pneumatic truck tire building machine. We had some difficulty with our operators on large size tires, because, being on a piece work basis, they didn't want to take the time to walk around the machine from one side to the other to throw the power on and off.

They wanted to reach over the machine to operate the control and when the machine started up, many of them were injured. So we put an auxiliary control on, just a hand wheel, with a long arm, so that the man could operate the machine from either side, without having to reach over the tire.

MR. QUIRCK: Are your switches in that case operated by power or hand?

CHAIRMAN GRAEF: Mechanically by power. You probably all have in your curing rooms or other departments on the first floor of your building, manhole covers leading down into the basement, where you have piping and all that sort of thing; it has been our experience that when mechanics go down there to do work, they quite frequently leave the manhole cover off, which entails quite a hazard.

A Frame for Protecting the Manhole

(Slide.) This other picture is simply a frame made out of pipe, it is in collapsible form, and fits inside the manhole opening, so when men go down to work, they can leave the cover off and get some light and ventilation and at the same time protect the opening. When they are not using the guard, it folds up and occupies very little space.

(Slide.) I had this picture made because there has been a lot of comment and talk in different meetings about the safety pop-off valve on the lid of heaters. That valve right on top of our bead heaters is for releasing the pressure. That valve has to be opened and the steam allowed to blow out until nothing more comes, before they are permitted to unlock the heater.

MR. QUIRCK: It is not interlocked mechanically?

CHAIRMAN GRAEF: No, it is operated by hand.

(Slide.) This picture does not show very clearly what I wanted illustrated. You probably have all had ply pickers on bias cutters when they are reaching up here and get their fingers caught. So we had a sheet metal guard made that runs right underneath there, that is firm enough for the fabric to run through but not enough roof for

the fingers to get in. That runs the entire length of the machine. Since we had that we have not had any of the ply pickers get their hands pinched in the clamping bars.

(Slide.) CHAIRMAN GRAEF: This shows an ordinary grinding wheel. We all know we have a lot of trouble in our plants in buffing, in polishing, or holding tires in different positions. This shows the protection on the shaft and over the buffing wheels where we had to leave them exposed due to buffing different parts of the tire. We can not just leave a little space open in the front, we had to leave quite a bit, and I just took a picture of the guard over the end of the shaft and the buffer.

(Slide.) This is a picture of a carton labelling machine that girls operate, and shows the guards that were put on to keep the girls from getting their clothes caught in the mechanism of the machine.

Guards for the Cement Mixer in Each Department

(Slide.) That is a rotary cement mixer. We used to handle all our cement in a central cement house; but we found in distributing it out to the departments they were not in just exactly the proper condition, so they put these cement mixers out in the department, and they keep them constantly in motion to keep the cement agitated and in proper shape. We put these guards over the cement mixer while they are in the departments, so the men won't walk into them.

MR. BECK: Are they taken out every night?

CHAIRMAN GRAEF: They are all taken over to the cement house at night and brought back in the morning.

MR. PARTRIDGE: Does that increase your fire insurance rates any?

CHAIRMAN GRAEF: No.

MR. SCHNEIDER: What type of plugs do you use there?

CHAIRMAN GRAEF: I don't know the make of it. It is just one of those big rubber plugs. There is no spark in the type of motor used there. I believe they call them squirrel cage motors. That is gear driven.

(Slide.) This is a grinding wheel. You will notice the guard is in the up-position. We found with a number of our big grinding wheels, they were quite carefully balanced, and when the man was through using them and shut the power off, the wheels sometimes would coast as long as 20 minutes at a high rate of speed. It was practically silent and by just giving it a casual glance you could not even tell whether it was running. We had a lot of men bump into it, so we made this guard. When the wheel is in use that guard is up. When the man is finished with it and wants to throw the switch off, he pushes that guard out and it falls down and covers the entire wheel. So when your wheel is not actually in operation it is completely enclosed.

MR. QUIRK: Does anybody here use the Perks washer?

CHAIRMAN GRAEF: Yes, we are using it. We have 145 all equipped with a Perks washer. That is a vulcanized rubber washer on a steel base made by a patented process by the B. F. Goodrich Company, sold through a safety equipment concern here in Chicago. It holds the parts

of the grinding wheel together due to the suction created between the rubber disc and the grinding wheel.

(Slide.) We had a great many men caught in our debearing machine with the loss sometimes of a few fingers or a hand. We were at a loss to know what to do about it. So they finally changed the machine. This machine is in operation now but it is in very crude form and they are all being rebuilt. In order to operate the machine the man places his tire up here and it is carried; there is an automatic feed on the other side that rotates it and keeps it in position. Then he has to come over here and put one foot on this pedal and the other hand on this switch over here, so that he can not get up where the knife is while he is actually cutting the bead off the tire. The point is that the man can not get where the knife is when he is running the machine. He has to be over here with one foot on the pedal and the other on the switch.

MR. HOENER: The secret of that is to get a proper guiding device. That safety feature on the machine is due to the odd shape of the guard.

MR. QUIRK: Is that a commercial machine or did you make it up yourselves?

CHAIRMAN GRAEF: It is one we made ourselves. That is another picture of the truck tire building machine. It shows the hand wheel control that extends through to both sides of the machine.

MR. QUIRK: In connection with that, may I ask you what kind of stitch your people use?

CHAIRMAN GRAEF: We use a ball bearing steel disc. We do not have any fiber or wood.

The Location of a Bad Accident

(Slide.) This picture I took to show you where we had a bad accident. These two rolls are connected on an air hoist on the chain calendars and they regulate the tension in the fabric before it goes into the main calendar rolls and at the same time serve as an ironing device and take out the wrinkles in the fabric.

When the machine is started the fabric has to be threaded through these rolls. The fabric has to come down over this roller and between these two rolls and then over to the calendar. We had a man get his hand in between these two rolls which operate under hydraulic pressure, and it ground his hand off.

(Slide.) This thing here is a piece of sheet metal shaped like a trough. It comes down and fits right into the bite of the rolls, so that all a man has to do now is just drop the end of the fabric into the top of that little chute and it goes through itself. He does not have to reach in there with his hand at all.

MR. COCHRAN: Are those rolls rubber covered?

CHAIRMAN GRAEF: Yes. That is the installation on the tread cutter. All it was taken for is to simply show the method of guarding up there where the stock comes through.

MR. HOENER: The tread cutter?

CHAIRMAN GRAEF: Yes. We just put guards across where the knife is. You see them over the wheels on the other side.

(Slide.) We use quite a lot of oxy-acetylene in the plant for cleaning the molds. Mr. Schneider showed you a picture of cleaning molds by sand blasting. We also use the method of burning them out. They use a large number of these cylinders of gas and they were continually standing them on end. Every once in a while somebody would run a truck into them and it meant they would upset. They were rather heavy and we did have some accidents. Now wherever we use them, we have an I-beam that runs along between building columns or a building wall and column with a chain. The chain goes around each bottle and then fastens to a place in the beam and it keeps the bottles from upsetting.

CHAIRMAN GRAEF: That concludes today's program. This last item we have had is something entirely new, and I would be very glad if you gentlemen at some time would express your opinion as to whether or not this sort of thing is constructive and worth while. When we try something new we like to know whether or not we are getting something that is worth your time to look at, and we would appreciate your opinion on it.

MR. BECK: I make a motion that we have the same thing next year.

MR. QUIRCK: I second that motion.

CHAIRMAN GRAEF: I am glad to know you liked it. I know there has been quite a little work put in on it by the various members of the Section. I feel sure that now we have had a sample of what we want to do next year, knowing what you have in mind, you men will be able to give us more pictures and better illustrations of conditions in your plants.

P. W. DEMPSEY (Westinghouse Air Brake Company, Wilmerding, Pa.): The last picture you showed there about your tanks, we handle that in an entirely different manner. We have two-wheel trucks, and we fasten our tanks on there; we have our hose and everything connected to the tank, and we push them right to the benches and burn out the molds. Do you take your molds to a separate room to do that?

CHAIRMAN GRAEF: We have separate rooms. We use those two-wheel trucks with two tanks on a truck for the ordinary welding and burning such as the mechanics do around the plant on repair work; but in this burning operation we have anywhere from 150 to 200 bottles in a room at a time, so we can not use trucks.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The Section convened at 10:00 o'clock, Mr. H. H. Graef, chairman, presiding.

CHAIRMAN GRAEF: I am going to have to make one or two apologies. The chairman of our Statistics Committee sent in a telegram stating he would be unable to get here, as did also the chairman of the Health Hazards Committee, Mr. Horan. There will be no reports naturally since the men are not here, but I know they have their material all ready and the reports were ready to present. I will have these reports mimeographed and see that each man that registers here this morning gets a copy.

Now one other committee report that we have this morning is the report from the chairman of our Engineering Committee, Mr. Hoener of the Firestone. I think our Engineering Committee has probably done more work in the past year than any other committee in this Section. I will allow Mr. Hoener to present his report and he will undoubtedly give you a more complete description of their activities.

REPORT OF E. H. HOENER, CHAIRMAN OF THE ENGINEERING COMMITTEE

It is very difficult to put down in writing the exact work which has been done by the Engineering Committee and the various checks and things that have been developed due to these tests.

Personally, I feel that I have been amply repaid for any work I have done on the Engineering Committee, because I have learned things in making these tests on our own equipment in Akron which were certainly an awakening to myself and also to the company.

We have been able to develop, in cooperation with the manufacturers of electrical equipment, for instance, on calendars, stops which we had never even dreamt of on such equipment and with a minimum cost. For example, by installing a certain contactor on a D.C. control board at an expense of about \$45, I think we improved our stops on calendars between 30 and 40 per cent.

That never would have come to pass if we had not taken the time and effort to check into it in detail just what could be done under various conditions of loading and various speeds of the equipment.

On mills and calendars, mills, wash lines and items of that kind, by proper alignment and watching the alignment of your clutches and your brakes—it is surprising what can be obtained without going to the great expense of new equipment. It is an easy thing to say, "Well, I

can not stop this old equipment. I've got to have new equipment; "but I often feel from our own experience that we do not go into it deep enough to find what could be done with existing equipment, which is really the thing that the management is interested in. If you go to the management and tell them you have to have \$4,000 for new clutch installation or new motor installation, your chances of getting it are fairly slim, whereas if you go to them and say for \$150 or \$200, by making certain small changes, I can improve the stops a certain percentage, why, you will most likely get it.

Now that is the field that the Engineering Committee has been trying to work on. My only regret is that it is a little difficult to bring all those points out in detail, because conditions vary so much. But the Engineering Committee of the Rubber Section is willing to go into specific cases of any company where we can be of benefit, and tell you how to improve your stopping distances, without going to a great deal of expense. We can not say that we have got a cure-all or anything of that sort, but we do feel from our own tests and experiments that we can be helpful in showing you what to look for. There are a lot of kinks to it that the ordinary master mechanic in a rubber mill will overlook.

Attacking the Problem From an Economic Standpoint

We have also had made up a testing device which really grew out of the outfit which was originally made by the Cutler-Hammer Company. We put a coil in there so that the same testing outfit can be used for both clutch circuits and D.C. circuits. In other words, we put a coil in there with a tumbler switch, so that you can stop your calendar, your stopping distance on your calendar or mill stop with the same device, without going to a great deal of added expense and combinations of equipment.

We found that by having the tests made it has put the mechanical division of the various factories where these tests have been conducted, much more up on their toes, knowing that if a line showed up bad on stopping distances that they would be criticised for it. The result is there has been a great deal more pains taken in the proper alignment of clutches and the proper tension on brake bands and things of that sort.

We have tried to attack the problem from an economic standpoint, knowing that it is necessary to do this work at a minimum expense, and that is the thing that really sells itself to the management side.

Now, with the permission of the chairman, I will deviate from the strict report and cite just a few concrete instances of accident hazards which I have personally become familiar with during the past year, due to the fact that we have had a number of unusual accidents, the circumstances surrounding which were rather peculiar.

It seems that it is not the every day, common, visible accident hazard which gets you into most of your serious trouble. We find from experience that it is usually a group of unusual circumstances. We may have had each one of those operations performed just like it was performed

at the time of the accident, but never were they all grouped together at the same moment.

I will cite as a concrete case the matter of curing tires in a heater without having the heater full of tires, in other words, what we call a split heat; for instance, having four or five molds in a heater when they rammed up into the vulcanizer. That has reference to the hydraulic vertical curing press. We had done that a great many times before and never had any particular trouble, but it so happened that the man in cooling those heats would use extra precautions. Well, this particular time the molds were cured the same way, and the man on the heater tender did not take the extra precaution in cooling the heat. The result was there was a lot of boiling water and so forth on the inside of the ram, which, when the heater was opened and the last mold taken up, boiled suddenly over the top of the heater and caused quite a serious accident in our plant.

A Combination of Circumstances Caused the Accident

We had a check-up and found we had cured thousands and thousands of tires that same way, but that thing had never happened. Why? Because there were certain other circumstances which had not been present.

We put safety equipment on our mills. We can put safety equipment on our calendars, stops, and have the delicate mechanism. At the best, as far as we can develop a safety device on a mill line or calendar, it usually only succeeds in cutting down the severity of the accident; it does not prevent the accident usually. There are some cases possibly where it does, but you will find in the majority of cases safety equipment on mill or calendar tends to reduce the severity of accident rather than prevent the accident.

We look into why these accidents happen. It is not the normal operation of the man when he gets hurt. It is straightening out a wrinkle, trying to pick a thread off the calendar, the fabric, or reach into the mill after a knife, or his glove gets caught in the rolls or he cuts up too far on the roll.

Now the ideal thing, of course, is to keep a man away from the hazard and not try to stop the machine after the man is caught. I think the biggest step which has been taken toward safety on mills is the raising of the mill height. We have a program in our factory whereby we can raise our mills with a minimum expense. What we have done is to develop a new set of gears, and in every case where we had a gear to replace we replaced both the gear and the pinion and put some filler blocks under the mill; the result is that we got all our mills eventually raised up to the new height with practically no cost whatsoever outside of the filler blocks, because your gears have to be renewed anyhow and the slight additional cost of the gear you will never mind. That has helped a whole lot, and we find that the men are happier working

lower down on the mill than they would be if they were leaning right over the top of it.

Another thing we did recently was to put a bar across the front of the mill slightly above a man's knee. We tried it first on one mill and tried some experiments with it, and the man after it had been on there for a while refused to work on the mill if that bar was taken off. Now the whole object of that bar is to give a man a brace so that in case he ever gets snagged in the rubber, he has a chance to brace himself and pull himself loose. From our past experience that has been very desirable.

We also have developed a great deal of work on some of our other equipment such as calendars, in the way of keeping the man away from the hazards and trying to educate the workman. The thing which the safety inspector or foreman should do, and which a great many of them do not, is to place himself in the workman's position and study the job from the possible hazards. It is not always the in-running roll alone that causes the accident hazard. We had a case not so long ago where a man was caught in the wind-up. Usually a wind-up accident results in a broken arm, sometimes a compound fracture necessitating the amputation of the arm. In this particular case it swung the man around in such a way that his head struck an iron beam, and the result was a fatal accident. Those are some of the things that will happen. This man had been on that job for six years, had been doing that job day in and day out, and he had certain instructions on where he should work, and he took a chance with fatal results. He reached in after straightening out a wrinkle with the calendar running at high speed.

Proper Lay-out of Equipment is Important

Now the matter of the engineering department providing safeguards, that is a good thought, but I do feel that the engineering department can do an awful lot towards having the accident hazards removed when the machine is originally designed, when the processes are figured out. I happen to have charge of the engineering department, the lay-out division, and so forth. It makes a lot of difference how you lay out equipment in a shop as to whether it has got a great accident hazard or a small one. How close do you make the man work to an in-running roll? Keep him away from it, then you won't have to have such delicate stopping equipment as is necessary after the man is caught, because our experience has been that a safety device on a mill and calendar, as mentioned before, does not prevent the accident, it usually reduces the severity of the accident only.

We have had a number of cases in our organization where if proper thought had been given by the foreman or supervisor of the department in looking ahead for these accident hazards, we would have prevented some of them. But the safety inspector at best can not possibly cover each and every individual case and can not put brains into a workman who is persistently careless. We have had a great many experiences

where the result has been more or less disastrous; but if we can keep the workmen away from it, that is the thing we have got to do.

Take, for instance, a tire building machine. A tire building machine looks like a minimum hazard. We had a case not long ago where a workman in putting a core on the tire building machine did not properly fasten it, did not see to it that the chuck was properly fastened. The result was that the core, chuck and all came off the machine while it was revolving. Fortunately nobody was seriously hurt, but it might have been quite a serious accident.

So I feel there is in every machine a potential accident hazard, and it is up to the engineering department, safety inspectors and the operating department to observe those particular machines from that view point; it is easy enough to lock the barn door after the horse is stolen, after a specific accident happens. It is not very often that the unusual accident will occur twice, because usually after an accident happens you take the necessary precautionary steps to prevent repetition. It is too bad that in many cases it is necessary for a man to sacrifice a hand or an arm before proper safeguards can be provided or necessary arrangements can be made; but often the safeguard is not provided until after the accident has happened.

Everybody knows if you have in-running gears you are supposed to guard them. State compensation departments and safety inspectors will all be looking out for those particular types of hazards, everybody pays attention to those; but the thing that the safety man has got to do and the engineering department is to look for unusual conditions or circumstances which never occurred before. There are a lot of them at the best. No matter how careful you are, you won't get them all. But that is the point I want to make; you have simply got to watch for those particular items in the engineering department.

Use of the Engineering Committee is Urged

I do feel that the members of the Rubber Section have not availed themselves of the facilities at hand. The experiments that have been conducted by the engineering department are available; but, as I say, it is very difficult for us to put them down in writing, as there would be a lot of sketches, drawings and photographs necessary, and the conditions in the various factories vary. So I want every one to keep in touch with the Engineering Committee of the Rubber Section and avail themselves of the opportunity for bettering their equipment and cutting down accidents from that viewpoint.

CHAIRMAN GRAEF: I knew that we would all enjoy Mr. Hoener's report.

There was one point I noticed in his talk that will be of particular interest to the production department rather than the engineering, although both are interested in it. This bar that he spoke of that the Firestone Company placed across the front of the mill between the housings in front of the front roll and slightly above the knees of the

workman, in addition to helping the workman by giving him a brace in case he gets caught in the rubber, is also of material value on mills where rubber is being broken down, crude rubber. As you know, that very often breaks loose from the mill roll and flies up with considerable force. Occasionally it hits the workman but a great many times where we have a safety located as they usually are, it stops the mill and the mill line. This bar greatly reduces the number of times that the mill line will be stopped, because the rubber will hit the bar first.

That concludes the reports of our committee chairmen. I am going to go from there down to our program. Mr. C. F. Horan was to have given us a talk this morning, but I received a telegram from him yesterday stating that he would be unable to come here.

The other speaker that we have on the program this morning is going to give us a talk on occupational diseases in the rubber industry. As you know, a great many of the states have passed amendments to their workmen's compensation laws including occupational diseases as an industrial hazard for which compensation must be paid.

Dr. Millard, who is the head physician of our plant hospital, and who has had a great deal of experience with these various occupational diseases and is held in very high regard by the Industrial Commission of Ohio on this particular point, is going to give us a talk on that subject.

OCCUPATIONAL AFFECTIONS OF THE SKIN IN THE RUBBER INDUSTRY

Dr. J. S. Millard, The Goodyear Tire & Rubber Company, Akron, O.

In the rubber industry the vast majority of our occupational disease claims are brought about by one of the various skin eruptions caused by ingredients in rubber compounds.

Therefore, I will confine my paper to the discussion of occupational dermatitis in the rubber industry. To cover all occupational diseases in the Rubber Industry would be exhausting to my audience as well as to the essayist.

According to Pusey, the health of the skin may be affected by:

A—Causes which act directly upon the cells of the skin.

B—Causes which affect the supply or composition of the blood and lymph.

C—Causes which influence the cutaneous nerve elements.

In the majority of instances it is impossible to draw a sharp line of demarcation between the symptomatic disorders of the skin, conditions in which the cutaneous lesions are but secondary manifestations of some derangement of the internal economy, and the idiopathic dermatoses, diseases which originate in the skin itself and confine their action to this organ alone.

The factors which lower the resistance of the skin or increase its susceptibility to attack are: age, sex, race, nationality, seasons, occupation, general health, habits and environment. Organic and constitutional

disease may coexist with or be a forerunner of a cutaneous disorder, such as acute and chronic nephritis, rheumatism, gout and tuberculosis.

Diabetes mellitus is often associated with certain types of eczema, pruritis, furunculosis and carbunculosis. Focal infections may cause various cutaneous maladies.

The exciting causes in diseases of the skin may be internal (constitutional) external (local) or both.

The internal causes may be toxic or nervous. Unfortunately in many instances it is difficult or impossible to define accurately or locate the exact causative factor.

The causes of skin affections are numerous and varied. The skin is exposed to an endless variety of irritants and harmful agents, acting on it from without, and to numerous influences acting on it from within.

Each irritant sets up a type of reaction which manifests itself in some form of clinical lesion or eruption.

A large number of local irritants of animal, vegetable or mineral origin are capable of causing a dermatitis. Some produce an inflammation on any skin, others only do so if the individual has an idiosyncrasy towards them. This susceptibility may be a natural peculiarity, or it may be an acquired condition owing to a diminished resistance of the skin from ill health, or from some pre-existing skin affection.

When a dermatitis has been produced by the action of some local irritant, the individual affected becomes extraordinarily sensitive to that irritant, and likely to suffer from dermatitis from a far slighter exposure to it than was necessary to produce the original attack.

This hypersensitiveness, or anaphylaxis, is supposed to be due to the action of protective substances called forth in the blood, when the first attack took place.

An important group of occupational diseases are caused by the action of local irritants, such as: itch from handling flour and sugar, and so-called "rubber poisoning" from handling hexamethylenetetramine by rubber workers.

Immunity and Anaphylaxis

Natural or acquired immunity in relation to diseases of the skin has recently attracted much attention—closely connected with it is the condition known as "Anaphylaxis." A state of hypersensitiveness which occurs when the organism has reacted to some toxin or irritant, and then reacts more intensely to a second dose of the same toxin.

Natural immunity is frequently met with in connection with skin diseases; certain individuals are naturally less susceptible to some skin affections than others. In local infections this may be due to differences in the texture of the skin, greater protective capacity, or absence of greasiness which might form a suitable soil for the growth of micro-organisms, while if the infection is a general one, it may be the result of the presence of certain anti-bodies or protective substances in the blood itself.

Acquired immunity is the result of the production of protective bodies in the blood, which are called forth by some local or general infection, and which render the individual for a longer or shorter time, proof against a further attack.

Inflammations of the skin produced by external contact with irritating agencies, whether solid, liquid or gaseous, are classed under the term "dermatitis venenata."

Occupational affections of the skin are in the above class. As there are no positively distinguishing symptoms or appearances associated with this class of inflammations, diseases and affections of the skin seen in the industries give no little concern to physicians handling industrial cases, as well as to compensation boards of state industrial commissions.

Workmen who lose time from their work on account of skin pathology due to the nature of their work, may receive compensation for lost time; but as it is often impossible to determine positively whether or not the skin lesion in question is occupational, several factors should be brought to bear on each case before making a decision, as follows:

Pertinent Questions on the Problem.

Are the substances used or handled by the workman capable, in the concentration and manner used, to produce the lesions in question?

Has the workman had a similar skin affection not traceable to occupation?

Are his fellow workmen affected in the same manner?

The rapidity of onset and decline;

The characteristics of the primary lesions—their situation, color, changes, etc.;

Does the skin condition improve when not exposed to the suspected irritant?

Is the skin pathology general or confined to the parts exposed?

Difficult as a true diagnosis may be in some cases, the situation must be met, and a just decision made, based on all the factors at hand.

Not only must the physician, the employer, and the compensation board be satisfied with the diagnosis, but the patient as well; for if the skin lesions of an employee are not occupational, he must be convinced of it, otherwise you have a dissatisfied, suspicious and therefore uncontrollable patient to deal with.

This is most easily accomplished by showing the patient a picture of his skin disease and letting him read the description of it in some book on dermatology.

In the rubber industry the parts of the body usually affected by occupational dermatitis are the face, neck, shoulders, forearms and hands.

The causative factors may be classed under two headings—mechanical and chemical—as follows:

1. Mechanical irritants are inert substances such as soapstone and zinc oxide, which in the dry state in which they are used have a drying effect upon the natural moisture of the skin, and cause the skin to

become dry and thickened, attended often by intense itching. Because of the itching the patient scratches his skin and the areas excoriated from scratching become infected. Because of the infection the glands become enlarged and painful, and the workman is obliged to quit work.

All this may be prevented in most individuals by protecting the skin in the early stages with a soothing protective ointment, applied just before going to work each day, and again at night for a period of two weeks or until his skin gradually adjusts itself to his occupation, after which the ointment is seldom needed.

2. The second class of irritants are chemical in the nature of their action. Examples of these are sulphur chloride and hexamethylen tetramine. The action of sulphur chloride is similar to that of an acid irritation; inflammation and destruction of tissue.

The skin first shows signs of acute inflammation and later thickening and scaling of the skin of parts affected (the arms and hands) and fissures appear around the finger nails which are very painful.

As in the previous class of irritants, the treatment is protection and to avoid contact with the irritant so far as possible.

The arms may be protected with a protecting ointment, and the ends of the fingers dipped in a solution of celluloid dissolved in amyl acetate which protects the fingers and prevents cracking of the skin.

Hexamethylen tetramine is fast being eliminated as an accelerator in the rubber industry, because of its irritant properties to workmen, and will soon cease being a factor in that industry.

A Protecting Ointment is Available

For those factories still using hexamethylen tetramine, a protecting ointment containing an alkali has been found very helpful in preventing dermatitis, due to the fact that the skin irritation is caused by the liberation of formaldehyde, as a result of the reaction of acid sweat on the accelerator. Keep the skin alkaline and your trouble is eliminated.

For occupations which cause skin irritation, dark, oily skinned individuals with black hair and eyes, are preferable, as they are more resistant to skin irritation than blonds; negroes are nearly immune.

Sensitiveness of the skin to irritants varies with the individual, therefore by eliminating from any particular job those whose skins react unfavorably to the work an immune crew can usually be obtained.

The accompanying prescriptions for lotion and ointment are useful in occupational dermatoses.

Considering the fact that processes of manufacturing are constantly changing, where one may be having occupational dermatitis today it is somewhere else or gone tomorrow. Therefore there is no value in naming the processes where dermatitis is found today.

In summing up I have the following rules to give:

1. Study a new process well before starting manufacturing by it, that the workmen may be safeguarded against poisoning or injury.
2. Workmen engaged in hazardous occupations should be frequently

examined to safeguard their health. The nature and extent of the examination to depend on the nature of the work.

3. By a process of selection, weed out the highly susceptible workers.

4. In occupations where dermatitis is prevalent, protecting rather than medicated ointments should be available to the workers in their workrooms, where they may use them freely while at work. Medicated ointments to be prescribed by a physician to suit the individual case.

5. Where occupational dermatitis exists, eliminate as soon as possible the exciting cause, by a change in the process of manufacture, or changing the offending chemicals or substances used.

In closing let me sound a warning note regarding anti-oxidants which are being put into rubber to prevent aging.

Those which are best known on the market now seem to be harmless, but the chemists tell me that as new ones are developed, they should be carefully tried out before putting them into mass production, as they are likely to produce a dermatitis similar to that experienced by photographers, and caused by similar chemicals.

Skin Lotion

R

Acidi carbolic	3ss
Zinci Oxidi	3ss
Glycerini	3ss
Liq. Calcis Q s Ad	3viii

Sig—Sop on skin freely for itching.

Note—If skin is too dry leave out the zinc oxide.

A Soothing and Protecting Ointment

R

Para wax	6 lbs.
White wax	10 lbs.
Cotton Seed Oil	16 lbs.
Sodium Borate	6 oz.
Distilled water	7 lbs. 10 oz.

Sig—Apply freely to parts affected three times a day or oftener as required for skin irritation.

CHAIRMAN GRAEF: The only other item on our program this morning is the report from the chairman of our Nominating Committee, Mr. Hoener.

E. H. HOENER: (Chairman, Nominating Committee): We have drawn up a proposed list of officers for the ensuing year to place before the committee or the group here today. These are suggestions based upon the best judgment of all concerned. We would like to bring up for your consideration for the ensuing year the names of Mr. Walter Schneider, of the Goodrich Company, as chairman; Mr. M. A. Quirck, of Morgan and Wright, as vice-chairman; and Mr. R. C. Salisbury, of the Federal Division, Fisk Rubber Company, as secretary.

CHAIRMAN GRAEF: Gentlemen, you have heard the report of the nominating committee. As Mr. Hoener says, I know that that report was given careful consideration and the men mentioned are men who have been associated with this Section for some time and who have all given us valuable and conscientious service. I would be glad to entertain a mo-

tion that the report of the Nominating Committee be accepted and approved.

MR. BECK: I move it be accepted as read.

(The motion was supported. There being no further discussion, the motion was put to a vote and prevailed.)

CHAIRMAN GRAEF: On concluding the meeting I would like to say that there has been considerable work done by the Rubber Section in the past year. For that I claim no personal merit at all. The work was done almost entirely by the various committees, and I want to take occasion to thank the chairman of those committees and the men who so kindly worked with them.

I would now like to turn the meeting over to the new chairman, Mr. Schneider of the Goodrich Company.

CHAIRMAN SCHNEIDER: It gives me great pleasure to serve you in this capacity. About all I can say is if I can serve half as well as Mr. Graef, I believe I will feel as though I had done something worth while. I know that he has worked hard personally, and despite the fact that the committee has also worked well, I believe he has done a great deal to elevate the Rubber Section to the place it occupies today.

We have a little time left, and it might be well to turn the meeting into a general discussion and perhaps someone has some particular subject which they would like to enter into a discussion on. I would like to suggest that some particular subject be brought up for discussion for the short time which we have up until the close of the meeting.

Age of the Worker Influences Skin Affections

R. B. HARKNESS (Cupples Co., St. Louis, Mo.): Two years ago in Louisville a gentleman from the Eastman Kodak Company remarked that they had discovered that men over 40 years of age working in their chemicals were less susceptible to skin infections than younger men. I believe the gentleman from Morgan and Wright, if I remember correctly, corroborated this statement. So I went back and in the last two years we have tried hiring men over 35 years anyway for the compound and mill rooms. It seems as though these men are less subject to eruptions and the effect of the compound and also more steady than men under 35. I was wondering if anyone else had the same experience, or whether our doctor friend could tell us whether there was really anything authentic about men being so susceptible to this eruption.

CHAIRMAN SCHNEIDER: If I get your question correctly, your point is whether there is a median there, either over or under 40 years, where the susceptibility is greatest?

MR. HARKNESS: It is awfully hard to keep men in the compound room. They generally quit more than in the tire room or inner tube department. We have found they will stay better if they are over 40, but it may only be a chance.

DR. J. S. MILLARD: Well, I think it has a good deal of truth in it. You take young fellows with delicate, tender skin; they can not stand the irritating substances half as well as a man of mature age, 35 or 40.

something like that; but then you go a little bit further, about 60, and then they do not stand certain irritants at all. As we get older, our skin gets drier and drier. You put an old man into a compound room where he handles a lot of zinc compound, and he just dries up. They have a terrible time. But I think your point is well taken. Women do not stand it well on account of that tender skin. You take men from Norway and Sweden, light hair and blue eyes, thin skin, they do not stand irritants at all. The darker the skin the better—like negroes, they can stand anything.

MR. HARKNESS: You say negroes will stand it?

DR. MILLARD: Oh, yes, a negro will stand a tremendous amount of skin punishment.

MR. HARKNESS: May I ask one more question? The gentleman over here said that he put a bar in front of a mill for the man to put his knees against. It seems to me, if I recall correctly, you put the rubber into the top at the bite of the rolls; in breaking it down it goes down through and you reach down underneath and get it and pull it out.

MR. HOENER: Yes.

Further Discussion About the Mill Bar

MR. HARKNESS: If you pull that between the bar, you are going to have the man break his arm. I think that would be a worse accident hazard. In fact, we had a bar in front of the mill and a man broke his arm.

MR. HOENER: There is a possibility, if you get your bar in between the two housings too close, that will happen; but you should put that bar all the way out by the adjusting screws, not up near the rolls. You have to have ample space for the man to get in there. If you get that bar too close, it is a failure. It must be out to the front of the housing in order to be at all effective. It is absolutely no interference with cutting, because we tried them on all mills, on all processes; we have the warming up, cutting off rubber, mixing. Certain mills we have do not have aprons. Where we have aprons, the apron itself when it is down acts more or less as a knee brace on our mills. On mills where we do not have aprons, we have tried it on both mixing and batching off, warming up. We have had absolutely no trouble with it. But be sure and have it out far enough, because I agree with you it is a great accident hazard if you put it too close.

MR. HARKNESS: If you get it out too far, you can not reach the mill.

MR. HOENER: Oh, yes, you can, unless you have an unusual mill. If you send us a sketch or cross section of your mill, I will be glad to sketch on there how it should be put on.

CHAIRMAN SCHNEIDER: I would like to reiterate what Mr. Hoener has said about the members availing themselves of the opportunity of getting information through the Rubber Section. It is your Section. That is what our job is, to give you the benefit of our experience, and work out your problems for you. We are waiting to help you and we want your suggestions. We are very glad to give you anything we can in

the way of guidance, and we solicit your suggestions in any way, so that we can work them out for you. Do not hesitate to write in to the secretary or any of the members and we will endeavor to work out your problems for you, if you can give us the information.

P. B. MARTIN (Industrial Commission of Ohio): Referring back to Mr. Hoener's remark on split cures, I think Mr. Hoener omitted an important part there with reference to the elimination of that hazard with reference to the center plate.

MR. HOENER: There is one point I did not bring out because I felt it might be an isolated instance. I am not familiar with how many other people in the industry are using what they call either the Dill or Schrader internal tree, on cord tires.

Originally the vulcanizer was equipped with a top platen, as we call it, on top of the ram, and that platen has an opening about 10 inches in diameter, and the process requires a base to support the tree, and the base is set on top of this platen and the tree is built up on the inside of the molds.

An Outside Tree Where the Hazard Does Not Exist

Now in most of our plants we are using an outside tree where that hazard does not exist, but by covering up this internal hole with this plate, there is an accident hazard available, and we have found out from actual checking and experiment that at least 32 square inches of area are essential in the ram opening to prevent pressure being built up during a cure on the matter of a split heat. That is just another case where we had cured thousands and thousands of tires by that particular method, but we had never had the group of circumstances, as mentioned before, of two or three things coming at the same time.

We had done considerable work on a similar item of equipment on the matter of having a ram valve stick. I don't know whether anybody has had any experience with that or not, but we do once in a while find that a ram will go up with a heat of molds; that is, when you raise the ram to hook your lid on, the ram will keep on going with a stack of molds on top. We have worked out a safety device whereby the minute that goes up it automatically opens a valve on your hydraulic and prevents it from going up. We have had a stack of molds go up and tip over. Nobody was particularly hurt because everybody ran, but it certainly disorganizes your whole outfit and does a lot of damage.

CHAIRMAN SCHNEIDER: Does any one here use the the Dill connection?

G. E. RUEFNER (Ajax Rubber Company, Racine, Wis.): We use the Dill connection. We have not experienced any trouble yet. Of course, we have not had them very long. We are just going into it. I am glad to know these points, however.

CHAIRMAN SCHNEIDER: Is there any one else that has anything on that subject? Have you, Mr. Beck?

MR. BECK: Not on that subject, but I was interested in knowing the present status of the pressed steel metal book. Has any one had the

opportunity to try that out? At the last meeting of the executive committee we had a sample of it.

MR. PARTRIDGE: We had a little experience with the metal book. I think we had 12 of them put into service and they lasted us about three weeks, bent all out of shape, the edges got rough and torn, and they were not a success. The manufacturer has taken them back and he is trying to develop a new type.

MR. BACK: That is the one that was shown at Chicago?

MR. PARTRIDGE: Yes.

MR. QUIRCK: We had the same experience. We had 15 of these steel books and they did not last at all. They warped, the edges got ragged, and we took them out of service and sent them back.

CHAIRMAN SCHNEIDER: For the benefit of those not familiar with that subject, this matter was brought up at the Chicago meeting of the executive committee of the Rubber Section. A salesman of a certain concern brought in a steel tread book which was to supplant the wooden type which was used heretofore in various plants, which according to claims caused a great many small injuries. He furnished each member with information and blue prints, and we were to carry back the message to our own plants, but it seems it did not act favorably. Has anybody else had any experience with the new books? Have you, Mr. Graef?

The Metal Book Has Not Been Developed Satisfactorily

MR. GRAEF: We had a dozen of the books in the plant and had the same experience that these other men did. They are not satisfactory in their present form.

MR. QUIRCK: I would like to ask some one who is curing tires on water bags, whether he has a system of inspection. We had a great deal of trouble in our plant with bags bursting just prior to the time they come out of the molds, as lamp black (or whatever it is) accumulates around the valve stem and it builds up an internal pressure in the bag and it explodes. We had some very serious burns. I was wondering if anybody had any special system of inspection of their bags, or what they are doing to prevent those bags from bursting?

CHAIRMAN SCHNEIDER: I assume you mean, Mr. Quirck, the scrapings and corrosion that takes place inside of the bag. We had some trouble some years ago, and we worked out a specially constructed valve for that purpose. It is not 100 per cent fool proof but it does eliminate a large portion of the trouble which we had before, in allowing a free passage of water that it does not plug.

MR. QUIRCK: Is it a larger hole?

CHAIRMAN SCHNEIDER: We have a series of holes and its position to the valve with relation to the inside is that it extends down through, not flush, with the upper section.

MR. QUIRCK: We tried the same thing and it was a failure with us.

CHAIRMAN SCHNEIDER: The first valve we made had a series of holes bored at various angles but it did not work out as well as the one

we are using now. I would be very glad to see if I can get you the information.

MR. QUIRK: We have made some stems with larger holes. We feel we are going to contrive to cut it down a little bit.

CHAIRMAN SCHNEIDER: Of course, there are some conditions that arise there, such as a weakness in the bag itself; some of the conditions are internal, for which no visual inspection can be made. The best plan is to figure out what you consider the life of your bag is, and when you get to that point throw it away. Keep track of the number of heats it is used on and throw it away. We find it is cheaper in the long run to do that.

E. A. OSWALD (General Industries, Elyria, O.): I would like to ask the doctor the proper way to dress a small burn on the arm caused by steam?

Dressing a Small Burn on the Arm

DR. MILLARD: I do not know as one way is much better than any other. We are rather partial to boric acid for burn dressings; picric acid ointment and anesthizing them, which is supposed to relieve the pain somewhat. We have not tried it out long enough to come to a conclusion that it justifies the increased cost over boric acid. If the burn is extensive you have got to give the patient morphine. Anything you put on the outside is not going to be sufficient to relieve the pain. There is an extensive absorption and picric acid is somewhat poisonous. Of course, the small burn would not require morphine. The smaller steam burn is not so painful that it is unbearable. If you put on boric acid, cover it up, and the pain does not last long.

MR. OSWALD: We have generally bandaged new burns in our first aid room, and lots of times that causes infections. We have even heard fellows say, my burn will heal up quicker if I leave the rag off, but the first aid room requires them to keep the rag on.

DR. MILLARD: Anybody who has burned himself knows how painful it is to leave the burn open and exposed to the air. The minute you cover it up with ointment it is soothed and the pain is much diminished. See that the skin is clean around the burn and then put boric acid on, which, of course, is only slightly antiseptic, still it is sufficient to protect the small burn. Most deep burns become infected anyway, because there is so much necrosis of the tissue caused by the burn that it is impossible to prevent it.

MR. HARKNESS: Doctor, do you think it is just to refuse to take on a man when he is found to have a hernia when he is examined?

DR. MILLARD: No; personally I think that a man who has a small hernia which may be held up by a truss should be given employment but the Goodyear Tire and Rubber Company, I presume because the labor market is plentiful enough so that they do not have to take men with hernia, have recently made a rule that no man shall be accepted for employment who has a hernia and wears a truss; but any man who before this rule went into effect was in the employ of the Goodyear

and who had a hernia, is not turned out. We keep all those that we have but we do not take on any new men who have hernia, even though they have a small hernia with a properly fitting truss. I do not think it is right myself, but they had some trouble.

I suppose what brought it up was two or three men came in with a hernia and finally came around and said their hernia had enlarged and had increased their disability. Under the law of Ohio if you have a pre-existing disability and you are accepted for employment by any plant, the plant that accepts you last for employment assumes the responsibility. So if he can prove his hernia has become larger, or he can not wear a truss and has to have an operation, then they are stuck for the operation.

MR. BECK: I am quite pleased that this question of hernia has come up, because it has cost our company enormous sums of money. I am also pleased that there is a state representative here to hear what we have to say. In certain states, I know in Ohio and I know it is so in Connecticut: in one small factory we had as many as 17 hernias in one year. These men come to us and we employ them and we are responsible for the aggravation of any pre-existing condition and the men go before the commissioner, and there is no question but what we are stuck.

The Problem of the Man With a Hernia

Now it is working a hardship on labor. There is no doubt about it. Suppose we had a hernia and we were going around to these different factories looking for a job and they turned us down. We ought to go right to the commissioner, that is where we should be sent. I believe it would be good policy for all of us in the industry to tell our labor department to send the men down to the commission to find a job for the fellow with a hernia, and let them see what we are up against. We do not like to turn those fellows down. They should have some labor, but if we are going to have to pay bills for their condition, which may be a disease, not an industrial injury, I feel we are justified in trying to do something.

I believe if we can get together and bring about a better understanding so that we are not going to turn these people down but we are going to give them a square show, that we have accomplished something that is really constructive.

I know in certain states the tendency is to tighten up rather than to be a little more liberal. After once these laws are on the books it is almost impossible to have them changed. If New York, Connecticut and Ohio say industry is responsible for all hernia cases, the first thing you know Vermont, New Hampshire and Maine will adopt the same attitude. I feel that this is a very important subject, and I would like to hear from the state representative.

MR. MARTIN: Mr. Beck, I am sorry to advise you that I am not with the division of claims. I am with the division of safety and hygiene. Therefore, I am not able to answer that.

MR. BECK: You must have an opinion.

MR. MARTIN: I do happen to know of one case that happened in one of our Ohio cities not long ago where a man went to work who claimed a hernia and his doctor friend decided it was an emergency case and rushed out to operate on him immediately, and then the industrial commission refused to pay the bill, because he had not consulted them previous to the operation; and I know that both the doctor and the hospital were stuck for their bills and did not get their pay.

I am not trying to make any excuses for the laws that have been passed in the state of Ohio; but as to the question of the law on hernias, I can not answer you.

CHAIRMAN SCHNEIDER: I doubt if anybody can settle that controversy. I know in Ohio it is one of the things we have to contend with and always will, I presume; but I think your suggestion is meritorious and perhaps the spreading of that word around would do some good.

Development of the Hernia Rulings in Wisconsin

MR. MARTIN: I might say that there is a law existing now, or rather a ruling of the industrial commission of Ohio, that no hernia can be operated on, except it be an emergency, unless they have permission from the industrial commission to do so.

DR. A. C. SEIDLER (Fisk Rubber Co., Cudahy, Wis.): In Wisconsin they adopted the industrial commission in 1913, and from the time of its adoption until three years ago we did not recognize occupational hernia. During those 10 or 12 years we recognized only hernias caused by an immediate accident. Surgeons of Milwaukee contended that all men had a congenital hernia. During this period Wisconsin had a rule that if a man contended he had acquired a hernia in industry he had to specify how and when he acquired it.

The leading case that was the rule in Wisconsin for some years was this: a man was loading a truck with barrels, 20 barrels, and while loading the barrels he felt a pain in his groin. He discontinued work and filed claim for the hernia. The industrial commission ruled against him because he did not specify what barrel caused the hernia. This ruling was sustained by the Wayne County Circuit Court and later by the Supreme Court of the state.

During the past three or four years, however, we have necessarily recognized the industrial hernia. We watch those. When we see a man with a potential hernia we keep our eyes on him, and if it develops at all we might advise a truss without admitting liability and continue to watch the development. In these inguinal hernia cases, if there is no acute enlarging of the ring and acute tenderness there, we do not recognize it as a liability case.

DR. MILLARD: Personally I am very sure that the size of the rings has little or nothing to do with the development of a hernia. We find just as many men with hernia, or beginning hernia, who have small rings as those who have large rings. We examined men two or three years ago where we could put two or three fingers up in the ring, where

they did not develop hernia; other men where you could not get the small finger through developed a hernia. I do not think it is the size of the ring but length of the mesentery which has the potentiality to cause a hernia.

CHAIRMAN SCHNEIDER: That is very interesting to know, from my limited knowledge of that subject. I was always under the impression that enlarged rings were most dangerous and that small rings were more or less minor.

MR. QUIBCK: I would like to ask Dr. Millard if he thinks it advisable to examine men working in the compound department?

DR. MILLARD: We go through the department about once a month, looking, of course, for lead poisoning more than anything else, but we pick up other things as well. All the men are examined more carefully every two months, but once a month we try to send a doctor through, and they talk to each man just a word or two. If there are any suspicious signs we examine the man, then next month we look him over more carefully. Of course, that does not mean to strip them off, but to ask them some questions: Have you any abdominal pains? Indigestion? Look at the gums. Then if the doctor finds anything in going through the plant, he sends the man up to the hospital for a more careful examination.

CHAIRMAN SCHNEIDER: I would like to hear from Dr. Seidler on that.

DR. SEIDLER: We do not make it a fixed rule to examine the men. Due to some labor conditions in our town we do not like to get down into the mill room to excite them. However, we meet up with them without any fixed time, and if we see any indication of lowered vitality or lessened resistance in an individual, we like to take him out of any department where he would be susceptible to the absorption of any poisons.

MR. HARKNESS: Would it be in order to make a suggestion that might be of interest to the members on general safety, not specifically in the rubber industry?

CHAIRMAN SCHNEIDER: I think there are a number of us that are interested in general safety.

The Careful Children's Club in St. Louis

MR. HARKNESS: There is a movement started in St. Louis which appeals to me very greatly, and I think it is one of the best educational plans that has been devised for quite a while. Mr. Girard C. Varnum, manager of the St. Louis Safety Council, I believe is the originator of this idea. It is called the Careful Children's Club, and they broadcast on KMOX every night except Thursday. He has a great many catchy songs. Then the children will send in their names to this St. Louis Safety Council asking to be members of the Careful Children's Club, and then he sends them a big list of all these songs and they sing them at home and they broadcast them.

Now at Cupples we cooperated with Mr. Varneman on this and

organized the Cupples Division of the Careful Children's Club. We put this in the plant magazine, and on the first returns out of a possible 600 we got about 400 answers from children who wanted to join the Careful Children's Club who wrote in saying their father worked at the Cupples Company, and they wanted this information. We got these children all together and got their pictures taken and will run it in the plant magazine and also in the *St. Louis Globe Democrat*.

My idea is that we talk about the education of the employees aside from mechanical safety guards. All our fundamental reactions I believe are the results of our original innovations and concepts taught to us in school. We still believe in Santa Claus with a big beard and several other fictions we had that we got in Sunday School and other places.

It might be of interest to the members here to organize similar clubs. The mothers brought their youngsters down and we got a chance to talk to the mothers. The fellows that were on the night shifts brought their youngsters down to have this picture taken, and we got a chance to talk to them. The youngsters were interested in it, and you are getting it into the home and incidentally into the children and it will last.

CHAIRMAN SCHNEIDER: I think you have touched upon a very interesting phase of accident prevention there—education. That point was brought up at one of the other meetings, just how far the various plants ought to go in trying to educate the children, the workers' children. I think a good many plants today have community houses and various other features to carry on work of that sort. I think it is largely a matter of the policy of the various plants, how they handle that.

ADJOURNMENT

Steam Railroad Section

New Officers of the Section

CHAIRMAN: J. D. WHITE
Illinois Central System, Chicago, Ill.
VICE-CHAIRMAN: E. R. COTT
The Hocking Valley Railway Company, Columbus, Ohio.
SECRETARY: J. E. LONG
The Delaware & Hudson Company, Albany, N. Y.

Committees

PROGRAM: C. F. LARSON, Chairman
Missouri Pacific Railroad Co., St. Louis, Mo.
MEMBERSHIP: FRED W. MITCHELL, Chairman
New York, New Haven & Hartford Railroad, New Haven, Conn.
POSTER: HARRY GUILBERT, Chairman
The Pullman Company, Pullman, Chicago, Ill.
ACCIDENT CAUSES AND REMEDIES: THOMAS H. CARROW, Chairman
The Pennsylvania Railroad Co., Philadelphia, Pa.
PUBLICITY: D. G. PHILLIPS, Chairman
Wabash Railway Co., St. Louis, Mo.
PREVENTION OF HIGHWAY CROSSING ACCIDENTS: C. E. HILL,
Chairman
New York Central Lines, New York City.
PUBLIC RELATIONS (U. S.): E. R. SCOVILLE, Chairman
The Baltimore & Ohio Railroad Co., Baltimore, Md.
PUBLIC RELATIONS (CANADA): W. A. BOOTH, Chairman
Canadian National Railways, Montreal, P. Q., Canada.
TRAIN SERVICE ACCIDENT: C. T. BAILEY, Chairman
Oregon Short Line Railroad Co., Salt Lake City, Utah.
ENGINEERING REPRESENTATIVE: F. HARTENSTEIN
Lehigh Valley Railroad Co., Bethlehem, Pa.
EXECUTIVE COMMITTEE (The Officers and)
L. G. BENTLEY
Chesapeake & Ohio Railroad Co., Richmond, Va.
ISAIAH HALE
The Atchison, Topeka & Santa Fe Railway System, Topeka, Kan.
H. A. ROWE
The Delaware, Lackawanna & Western R. R. Co., New York City.

A. V. ROHWEDER

Duluth, Missabe & Northern R. R. Co., Duluth, Minn.

ROBERT SCOTT

Atlantic Coast Line R. R., Wilmington, N. C.

October 26, 1926

A. V. ROHWEDER, Chairman

Superintendent of Safety, Duluth & Iron Range Railroad, and Duluth, Missabe & Northern Railway Co., Duluth, Minn.

THE opening session of the Steam Railroad Section of the National Safety Council, held in the Ball Room of the Statler Hotel, Detroit, Michigan, convened at 2:15 o'clock, Mr. A. V. Rohweder, of the Duluth & Iron Range Railroad and Duluth, Missabe & Northern Railway Company, of Duluth, Minn., presiding.

CHAIRMAN ROHWEDER: Gentlemen, the Steam Railroad Section of the National Safety Council will come to order.

Mr. L. F. Shedd will give the invocation.

L. F. SHEDD (Rock Island Lines, Chicago): Almighty and everliving God, God of mighty love, we are not unmindful that we are again privileged to gather here in convocation to discuss the ways and means that will redound with credit to Thy creatures, and we pray that all we do, every word that is uttered and every action likewise, may be acceptable to Thee. May we be guided in our deliberations by the thought of Thy Son, Jesus' advice when He said that He came to earth that men might have light and have it abundantly. Be with us; we ask it for the sake of Thy Son, Jesus, our Lord.

(The members joined in singing "America.")

OPENING ADDRESS OF CHAIRMAN A. V. ROHWEDER

For some reason or other I never got into the habit of making an address; but I have a few ideas and a few things that I want to comment on in opening this session of the Steam Railroad Section of the National Safety Council.

Your chairman has performed the regular duties as chairman of your Section in as capable a manner as he knew how. Working with a committee such as I have had during the past year, with a secretary like Cott, and a chairman of the Program Committee like Shedd, and a chairman of the Membership Committee like Long, and the rest of the fellows on the committees, it was a comparatively easy job to act as chairman of your Section. The results of the activities during the past year, of course, speak for themselves.

I want to mention two or three things with which probably some of you are not familiar. One was recognition by the Steam Railroad Section, and, in fact, the National Safety Council, as a whole, of one of

our past chairmen who died a little over a year ago, and whose memory and life's work we honored at the Northwestern Passenger Terminal in Chicago on April 5, 1926. We have here today the wax replica of the tablet, made of bronze, that is placed on one of the pillars in the Northwestern Passenger Terminal of Chicago as an everlasting memory to the origin of the safety work on American railroads. The presentation of that plaque was made by Mr. Robert W. Campbell, who was one of the first presidents of the National Safety Council, a life long friend of Mr. Richards; and it was accepted on behalf of the Northwestern Railroad by Mr. Fred W. Sargent, president of that railroad.

In outlining a program for this congress, we had in mind two or three things. In the first place, it has always been my idea that we have started more or less from the wrong end of the line in our National Safety Council Congresses—bearing in mind, of course, that we have an employee problem and that we must interest the employee and the organization that represents the employees and so forth. But I have also felt there is a decided need that something be done by the Steam Railroad Section of the National Safety Council, and by any other agency devoting its time to spreading the gospel of safety, toward bringing the executives, supervisors, and other officers of American railroads to the point where they will realize their personal responsibility and where they will actually get in and work and put over a definite safety program, just the same as they are putting over a definite operating, maintenance or mechanical program in their respective departments.

Program Planned Along New Lines

A lot of people will say, "My president, or my general manager, or my medical department is just as much interested in safety as those on the other railroads." But in looking around, I have often wondered how much real constructive safety work those men are actually doing? In order to get the idea of educating our officers, we decided in making this program, to ask representatives from departments and organizations relating to the Steam Railroads to come in here at what we termed "Executives' day," which will be tomorrow, October 27, and tell us just what is wrong with the safety departments on the American railroads and what their respective organizations would like to see done to bring about a reduction in accidents in their respective lines of work.

We may not get this year, at least not at this congress, the results that we expect. We may not get the ideas advanced from those particular groups that we hope to get, but we are at least recognizing that an association, for example, like the American Railway Engineering Association, has it absolutely in its own hands to either bring about an increase or a decrease in the number of accidents in the maintenance of way department on our railroads.

We are getting a start and with that start, imbedding the idea in the organizations that they will be represented in this convention from year to year, they will in turn devote a part of the time of their annual congresses to the discussion of safety, so that their delegates may come

here with a very definite message to each and every one as to just what they can do to assist us.

We also have changed the usual manner of handling our program. About a year ago we tried out in St. Paul at a regional meeting the proposition of assigning a man to handle specific subjects for one hour each during the day, so that this man might inject into the meeting some new ideas that probably would not have been thought of by a single chairman. So we have designated five men to act as chairmen of the various sessions of this congress. They are men who have been going to these conventions for many years and have very definite ideas of what should be done in handling a meeting, and we are going to give them a chance to show what they can do.

Close Contact with Safety Organizations Valuable

There is a rather peculiar situation which has developed in the minds of some of the railroad people of this country in connection with the relationship of the American railroads to the National Safety Council. I am not going to say a great deal about it, but I simply want you to carry back one thought to the management of your property, and that is, that the contact you are having here this year with the safety officers from the iron and steel business, from the Paper and Pulp Section and all the various other sections, some 20 or more in number, certainly is well worth any outlay of money that your company may have put forth. There is also the public relations touch that you get through a membership in the National Safety Council, and I want to suggest to you that if you have never been in the offices of the National Council in Chicago, you make it your business to go through that institution the next time you are in Chicago, and find out what they have and begin to use some of the service that they have available. There is no organization in the United States that has as much real, live, up-to-date service as the National Safety Council on the subject of safety; nor is there any organization that can give you any better engineering or mechanical advice in connection with the subject of safety than through the Engineering Section and through the staff officers of the National Safety Council.

In conclusion, I want to express my appreciation for the privilege of having served during the past year and up until the time of this congress as your chairman. I have enjoyed the many contacts I have had with each and every one of you gentlemen, and I hope that through the years to come I can continue to be of service to you in any way you may see fit.

We have a few changes in our program that we want to make. The first is to change the order of the reports from committees and call on Mr. C. W. Frey, Superintendent of Car Shops, Michigan Central Railway, West Detroit, Michigan. That change is made so as to give Mr. Hill, General Safety Agent of the New York Central Railroad, an opportunity of hearing Mr. Frey, and Mr. Hill's absence later on is due to the fact that he is to speak before another meeting in a few minutes.

HOW SAFETY CAN SUCCESSFULLY BE HANDLED IN A RAILROAD SHOP

**C. W. Frey, Superintendent, Car Shops, Michigan Central Railway,
West Detroit, Mich.**

Teamwork

In order to promote safety in any railroad organization and make a continued success, it is first necessary to be a firm believer in all of the principles, and then embody these principles in the minds of everyone under your jurisdiction.

Teamwork is an essential factor if you ever expect to obtain results, and unless you receive the cooperation of every individual under your management, you will never accomplish your purpose.

In the first place, a supervisor must be a salesman of the highest degree and sell his ideas on safety to each and every employee under him; to do this he must have plenty of patience, the same as a school teacher has with children, for you know that to become a successful salesman, patience is the essential factor.

To build up a successful safety organization requires plenty of time, but each step that you take should lessen your future burdens; although safety demands constant attention at all times and you should never expect it to take care of itself.

Teamwork must not only be confined to your own supervisors and the workmen under their guidance, but must also extend to your safety agents, claim department officials as well as every higher supervisor above your own position.

The shop managers and their foremen must work at all times and give the safety agent their best cooperation, for without this teamwork the safety agent will have a difficult time in getting the best results.

The safety agent must be a diplomat and know how to approach each and every type of person, as there are no two individuals with the same personality; the safety agent, in my mind, is the person responsible for a successful safety organization and his position must be recognized by those under his guidance.

Factors Necessary in Building Up a Safety Organization

The first requirement is to study your accidents in a railroad shop and devise schemes to eliminate chances of re-occurrence in the future; the head of every department should be furnished with a copy of every accident report, along with a bulletin explaining causes of accidents.

Watch each individual injury and if the injured party loses any time, be sure that you trace his movements; for I have had numerous cases where men could have returned to work at their regular duties, but we were charged with a lost time accident through the fact that the foreman did not follow up the man.

Don't overlook the fact that your employees may be carrying accident

insurance in one or more companies and that their revenues from this source may exceed their regular wages during the interval of time that they claimed to be injured.

Often we have had cases where an employee reported to his foreman that he had been injured while on duty, after failing to report for work, and upon investigation, it developed that the injury occurred away from duty. These cases must bear careful watching, or else your company is going to be charged with an injury, with possible payment of compensation, depending on extent of time lost.

During the first three months of the year 1924, we had 24 lost time accidents of more than three days at our West Detroit Car Shops on the Michigan Central, and being in charge of this place, I came to the conclusion that something must be done. A special meeting was called among all the supervisors and every form of suggestion was made by them. At this meeting we developed the idea of following up each injury by sending foremen to the homes of our employees with a possible view of getting them back to work at their regular duties before the three day limit had expired, to avoid being charged with a lost time injury.

This practice proved successful as we only had nine lost time injuries for the second quarter of 1924; and by continuing this idea, along with many other schemes, we only had 11 lost time injuries for the last six months of 1924. This was further reduced to six for the first six months of 1925 and for the last six months of 1925 we only had one injury of more than three days lost time in the entire shop, comprising 720 men.

Safety slogans are valuable and the continued use of bulletin boards proves beneficial; but don't forget that the best advertising feature for safety in any organization is the workmen themselves. When you can get these men to sell safety ideas among themselves, you have accomplished an aim which is greater than any other form of advertising.

Any person that will watch another work in an unsafe manner, is not a fit employee to have in the service, and with careful training you can get employees to warn one another on unsafe practices.

If you saw children playing on the street, the first thing you would do, in case you noticed an approaching automobile, would be to warn them of their danger; and in all probability if any of these children were your own, you would scold them for their carelessness. Is there any reason why workmen in a railroad shop can not adopt this same method and warn others of their failure to work with safety? In connection with this feature if you are responsible for a body of workmen, don't forget to practice what you preach, as the worst handicap to safety is to have a supervisor violate safety rules in the eyes of his own employees.

It is only natural for employees to get careless if the supervisor fails to comply with safety rules.

Inspection of Facilities, Tools and Machinery

This is one of the most important features of safety work in a railroad shop and this inspection should never be made by a foreman or

supervisor, for the reason that too many other responsibilities are placed on these men and the best results are never accomplished.

Appoint some first class mechanic who is a safety convert to handle this inspection and give him full authority to condemn tools which are unsafe to work with; also see that such tools are taken away from the workmen and not returned until proper repairs are made or new tools furnished.

Give your men to understand that the party making this inspection has full power and see that a report of his inspection is made to the highest authority in charge of the shop; also do not let any discussion arise between the foreman and this man over this inspection. The supervisor should be notified that results obtained are for the benefit of all concerned.

If you will study your accidents monthly, you will find that quite a few of them can be attributed to the use of defective tools or machines improperly guarded; if the departments are large enough, one man from each shop should be assigned for this inspection.

Tool room attendants should have a certain time whereby all tools furnished workmen should be recalled to tool room and given a thorough inspection periodically, and these attendants should also be invested with full power to condemn tools that are not safe for the workmen.

These safety inspectors, whom you appoint, should also report all unsafe conditions which they find existing in buildings or appliances in or around same.

Applying Discipline to Unsafe Workmen

None of us in a supervisory capacity likes to apply discipline to a workman who persists in performing operations contrary to safety rules; but I am sorry to say that often this is the best policy and gives best results.

After you have spent all of your available time in teaching safety to a workman and he fails to follow out your instructions, the only feasible plan is to apply discipline of some sort to this man. It is for his own good that such action has to be taken; also, it has a moral effect on the rest of the employees in that department and conveys to them that the supervisor intends to have a safe organization, even if necessary to employ new men to get the desired results.

From my experiences, I can readily see that the safety movement has been to the advantage of the workmen, as they derive all of the benefit when supervisors are continually guarding their interests; and for this reason they should cooperate at all times with their foremen and not oppose any method which the latter may adopt, when applying discipline.

The worst trouble we had in this respect was with employees failing to wear goggles. Continually warning the men did not produce any effect. Conditions became so bad and we had so many eye injuries that a set of rules had to be adopted. After several employees were disciplined and one or two men discharged from the service, the men saw that rules were for their own good, with the result that very little trouble

is now experienced, although this is a matter which has to be watched daily.

Applying discipline to employees in a railroad shop is no different from methods employed by judges in courts, and while no one may have been hurt, it is always for somebody's good that fines or punishments are imposed.

Laws are made to be observed, and with safety organizations punishment in certain cases is the only remedy for correction.

CHAIRMAN ROHWEDER: I will ask Mr. Guilbert of the Pullman Company to discuss Mr. Frey's paper.

HARRY GUILBERT (Pullman Company, Chicago): Mr. Chairman, Ladies and Gentlemen: I read this paper twice four weeks ago. It appealed to me as a very intelligent paper, and proved conclusively in my mind that the speaker had studied his subject very carefully. I feel that when the car shop got Mr. Frey, the safety department lost a good representative.

CHAIRMAN ROHWEDER: We will now go back to the first part of our program. I will ask Mr. Cott, our able secretary for the last four years, to make his usual annual report.

REPORT OF E. R. COTT, SECRETARY OF THE SECTION

The report of the secretary must of necessity be brief. First, because there is little to report. Your secretary is busy more or less, depending upon his inclinations to work throughout the year, and his work, as the work of your chairman, speaks for itself. If you like the job, you don't need necessarily say anything about it. If you don't like it, you will have an opportunity sooner or later to get a new secretary.

I have enjoyed the association of four years as secretary with such gentlemen as Mr. Rohweder, Mr. Hill, Mr. Bentley and others with whom I have been privileged to work. It has been pleasant, and in some measure I shall hate to give up, but we can't be selfish.

I want to read a telegram from our good friend, W. S. Wollner:

"Regret inability to be present at Steam Railroad Section meeting. Am sure it will be a great success and much will be accomplished. Northwestern Pacific making remarkable safety record. Thirty-seven months without employee fatality; injuries reduced 30 per cent."

Here is a telegram from a good old friend, Mr. John T. Broderick, whose road is ably represented here today. It is addressed to Mr. Rohweder:

"Cordial greetings and best wishes to you and other members of the Steam Railroad Section. Congratulate you on your good work as chairman."

Mr. Carrow's former right hand, Mr. Chapin, sends regards to all the boys. I know it comes from his heart, because he always liked to be with us.

I have here a group of letters from the different presidents of the railroads which some time later, if we have an opportunity, we will read to you, because you will enjoy some of the good things that have been said about us and about you and about your good work.

I want to make a suggestion. I have been secretary of this Section for four years and as I tell you, I am resigning that office at the adjournment of the session today, and now I can speak my piece.

The duties of a secretary are somewhat difficult, provided he does his job right, something I have never taken credit for doing. The news letter ought to go out monthly to the membership and I can't claim any such record. It is not a very difficult thing for you to write a news letter yourself, but it is quite a difficult job to put out a monthly letter and turn your office upside down in turning out a stencil of five, six, or maybe 10 or 12 pages.

I don't know who will be secretary this year, but I hope he will do a better job than I have done. It may be out of order, I haven't consulted with anyone about it, but it seems to me that we ought to pass the hat around for the secretary and not let him have a penny of it. Let him put on a clerk, make it worth somebody's while to get out these news letters regularly to the membership. That doesn't go in your dues.

I have a boy in this audience who has done a good deal of work. We aren't going to pass the hat for him at all. It seems to me you put a burden on the secretary and those who help him in his office. It is not just. I am ready to kick in for the incoming secretary. You can talk about that on Thursday, but I wanted to get it off my chest. I told you last year the only substitute for complaint was silence.

CHAIRMAN ROHWEDER: The life of any organization very largely depends on the kind of Membership Committee you have. We were fortunate this year in having Mr. J. E. Long, of the Delaware & Hudson, as chairman of that committee. Mr. Long did a remarkable piece of work, as you will observe from his report.

REPORT OF J. E. LONG, CHAIRMAN OF THE COMMITTEE ON MEMBERSHIP

We started the fiscal year in September, 1925, with 95 members of the Steam Railroad Section. During the year we lost four of our members, two of them by cancellation and two of the smaller lines by consolidation with larger companies. The Yazoo & Mississippi Valley Railroad consolidated with the Illinois Central and the Ann Arbor with the Wabash, so I don't think we need to worry especially about the safety activities on those particular properties.

The new members during the year were Mr. E. J. Goodsell, of the American Railway Express Company, the Buffalo, Rochester & Pittsburgh Railroad Company, the East Erie Commercial Railway, the Nevada Northern Railway Company, the Oklahoma Union Railway Company, the Brotherhood of Locomotive Firemen & Enginemen's Magazine, the

Pittsburgh, Shawmut & Northern Railroad Company, the Cumberland & Pennsylvania Railroad Company, and the Mississippi Central Railroad Company, a total of nine.

To summarize, we started with 95, we lost four, added nine, and we have closed the year with an even hundred.

CHAIRMAN ROHWEDER: Mr. LaFountaine had charge of the bulletins. You see them displayed on the rack today.

Due to a new scheme that they are trying out on the Great Northern Railroad, combining the safety work with some sort of an operating examination, Mr. LaFountaine was unable to come down to attend our congress at Detroit. However, he has sent in a written report and we will ask Mr. Cott to read it at this time.

REPORT OF C. L. LaFOUNTAIN, CHAIRMAN OF THE COMMITTEE ON POSTERS

As chairman of your poster committee during the past year, I beg leave to report that during my term of office we prepared the material and published:

5 posters 17x23 inches.

34 posters 9x12 inches.

1 large public poster.

On Sept. 23 and 24, Messrs. Galaty, Metcalfe, Gardiner and myself met in Chicago and were able to secure material suitable for posters sufficient to care for the next three months' supply.

While I wish to acknowledge with gratitude the assistance given me in preparing posters by different members, especially Messrs. Rohweder, Metcalfe, Johnson, and Bailey, I too feel that I should call to the attention of the entire membership the need of greater cooperation on their part in assisting the Poster Committee.

It is a much more difficult problem to handle efficiently than one would ordinarily think, and if they are to get out posters desired by the membership, they must at least have suggestions from the members from time to time, indicating the kind of posters desired, subjects they wish covered, etc.

This is not said in a spirit of criticism, but with the hope that the entire membership will more fully appreciate the needs of the Poster Committee and give them 100 per cent cooperation.

CHAIRMAN ROHWEDER: I will ask Mr. Galaty to present his report in connection with the Publicity Committee.

S. M. GALATY (C. & N. W. Ry., Chicago, Ill.):

There isn't a great deal to report. Your committee cooperated with the National Safety Council in publicity. We handled the publicity for the Richards' Memorial.

I do want to say just one word. Each one of you members can help your Publicity Committee by sending the committee your magazine and also sending them some information of what is doing on your road, so that they will have some material to work with. I sincerely trust that

the members will bear that in mind and help the chairman of the incoming committee so he can do a better job than I did in publicity.

CHAIRMAN ROHWEDER: We have a committee in the Steam Railroad Section entitled "Prevention of Highway Accidents." That committee is dovetailed with the committee of the American Railway Association.

The chairman of that committee is D. G. Phillips, of the Wabash Railway, who is not only chairman of the Steam Railroad Section committee but is a member of the American Railway Association committee as well. I will ask Mr. Phillips to give us his report at this time.

REPORT OF D. G. PHILLIPS, CHAIRMAN, COMMITTEE ON PREVENTION OF HIGHWAY ACCIDENTS

If there is anything that tends to take the joy out of the first meeting, it is the reports of these committees, and there is a disposition to avoid first meetings on that account.

As your chairman stated, the highway crossing question is very close to every railroad, very close to every railroad man and is being handled by a committee in the A. R. A. Section proper, and for that reason our work is so interwoven it is hard to tell what we as individuals do, whether we are doing it as members of this Section or the other section, and for that reason I am not going to refer to what we are doing, but rather just a word as to what the National Safety Council itself has done during the last year to help us in this great and as yet unsolved problem.

The National Safety Council distributed for us 100,000 of our "Careful Crossing" bulletin. They ran a great many articles in the NATIONAL SAFETY NEWS, supporting the movement to the very best of their ability, and as you know, all over the country they have organized local councils. These local councils have a regular course of instruction and all of them that I have heard of yet have a general plan of meetings, sometimes once a week, sometimes every two weeks and sometimes once a month. At least once each year one of those lessons of their careful drivers' club is on the matter of highway crossings. They take up the time of one whole meeting discussing highway crossing accidents.

In the city of St. Louis they have two safe drivers' clubs. The ladies have one, and I had the pleasure, the honor of talking to that convention of 300 women. I also went before the safe drivers' club, as they call it, some 3,000 or 4,000 members, and talked to them about the problem we have; and we have had wonderful cooperation all over this country from the National Safety Council and their lesser organizations. I want to say that in the city of St. Louis the assistance the Wabash Railway alone has received in this careful crossing campaign has been of more monetary value to the Wabash than every cent that all the railroads in the United States have contributed to the National Safety Council.

I am a crank on this crossing situation, because, listening to the kindly advice of Mr. Walsh of the M. K. & T., I became convinced that the railroads were not doing what they could themselves to prevent crossing

accidents, that we had things we could do. For instance, the one idea that seemed to possess a good many of us was that this matter of whistling needed attention. Our engines were whistling back at the whistling post where nobody could hear it; that was not a good idea. Then the old crossing rule, two long and two short blasts of a whistle, was not a proper whistle.

As most of you know, the engineers at Montreal made a recommendation that the whistling rule be changed from two long and two short blasts of the whistle to two long, a short and a long blast of the whistle. All of you know this, but I want to recount this anyway. That rule was submitted to the General American Railway Association Rules Committee, and Mr. Carrow, Mr. Rowe and I had the honor of appearing before that committee in support of that rule. I don't know just what we are going to get, but I am going to tell you that is the best whistling rule. I happened to see the address of the superintendent who is going to speak here tomorrow and he says the same thing.

Accidents Fewer Under New Whistle Regulation

Here is the solution of the matter. We have found the whistling proposition can best be handled to reduce automobile accidents at railroad crossings by two long, a short and a long blast of the whistle. The idea of the last blast of the whistle being long is so that the whistle can be held until the crossing is reached, that is, at a place where the driver of the automobile can hear that whistle.

A number of railroads, without waiting for the action of the A. R. A. committee, have changed that rule already and here is what it has done on the Wabash Railroad. I am just going to refer to the last two months. In September and October of last year, under the old rule which we enforced, like all other railroads, we had about 60 crossing accidents, and we killed 18 people in 14 different accidents. In the month of September and first 23 days of October, the same period as last year, we had 20 crossing accidents in which we killed three people, and it is the opinion of every operating official on the Wabash Railroad, many of whom were bitterly opposed to that rule until it was put into effect, that almost the sole cause of that reduction is whistling at a place where the whistle can be heard.

FRED HARTENSTIEN (Lehigh Valley Railroad, Bethlehem, Pa.): I want to tell you about another railroad. Shortly after I received a letter from Mr. Carrow, the Lehigh Valley Railroad adopted the same method of sounding the whistle as described by Mr. Phillips. We laid aside the old rule calling for two long and two short blasts of the whistle at railroad crossings, and verbally we have instructed our engineers on the railroad to sound the whistle two long, one short and one long, and carry the sound of the last whistle to the crossing and over it, if they consider necessary, leaving it entirely to the judgment of the engineer.

CHAIRMAN ROHWEDER: We have a gentleman from Canada with us who has been a member of our Executive Committee, W. A. Booth, of

the Canadian National Lines, and he is chairman of the Committee on Public Relations. Mr. Booth, may we hear from you at this time?

REPORT OF W. A. BOOTH, CHAIRMAN, COMMITTEE ON PUBLIC RELATIONS

When our chairman asked me to say a few words about the Public Relations Committee, I must confess that I nearly had a heart attack, for the reason that public relations are so hard to define.

There is a story of a Scotchman going from Glasgow to Edinburgh, a place I visited last year. The trip takes about 45 minutes. They have local trains taking a somewhat greater length of time. This Scotchman took the local train and at each station he got off, went into the station and bought a ticket to the next station, and so on.

After doing this half a dozen times, his friend said, "What in the world is the matter with you? You have me all unnerved jumping in and out."

He said, "I will tell you why I have been doing that. I was to see a doctor the other day and he told me that I had heart disease and that I might die very suddenly so you don't think for one moment I was going to buy a through ticket, do you?"

There is not much to say in connection with the Public Relations Committee except that I have had the cooperation of our friend, Harry Guilbert, and our work has been a sort of assisting provincial safety leagues. Our country is divided in provinces, as no doubt most of you know. There are 10 or 12 provinces and each one is fitted with the proverbial safety leagues. We assist them all we can in their safety parades and similar things. We have also assisted some of the cities of the United States along that line. For instance, we had one in Battle Creek.

I hardly like to make mention of this, but some time ago there was bulletins and posters distributed to the various members. May I say, I was requested to get out either the November or December? I have been led to believe by the chairman of that committee that perhaps there are more of those being ordered than any other, which news I was very glad to receive.

The last time I was on the floor, I believe in St. Louis, I made mention of the fact that we had prepared a book of safety rules and instructions and at that time I promised to send every representative a copy. You will find these on your return home.

I have emphasized the fact that our railroad, perhaps the only railroad on the continent, has a series of radio stations. We have 10 radio stations in all and we make use of those by broadcasting safety news, which I also think may come under the head of public relations.

You all give your best, I am sure; to the different school commissioners' work, speaking before children, all that sort of thing, and in that case we not only try to give the word of safety there to the children, the

teacher, or head master, but we also deliver a little of the literature that is received from the National Safety Council.

CHAIRMAN ROHWEDER: We now come to the fifth item of our program and that is the report of the Nominating Committee. Mr. Bentley of the Chesapeake & Ohio is chairman of that committee. We will ask for his report.

REPORT OF THE NOMINATING COMMITTEE

Your Nominating Committee regarded this assignment this year as one of very serious import. For that reason we met in New York City on September 25 for the purpose of naming the nominees for the Steam Railroad Section for the coming year; and from among the wealth of material at hand we named for each office two candidates, and as I read the names of those candidates, you will recognize that you have the choice of selecting for each position one of two good men.

For chairman we nominated Mr. J. D. White and Mr. W. S. Wollner; for vice-chairman, Mr. E. R. Cott and Mr. W. A. Booth; for secretary Mr. J. E. Long and Mr. C. L. LaFontaine

CHAIRMAN ROHWEDER: We will appoint as tellers Mr. D. G. Phillips, of the Wabash, Mr. Galaty, of the Northwestern, and Mr. Satterfield, of the C. & O. We will declare a recess and have the ballots passed around. These envelopes may have the name of the company, the name of the safety officers and in the left hand corner the number of votes that railroad is entitled to. Only the gentlemen who receive one of these envelopes with the name of his company can vote. Every member of the Steam Railroad Section is represented in that package of envelopes.

While we are waiting for the votes to be counted, we will proceed with the program. The next speaker is W. H. Jones, Assistant Director of Safety and First Aid, Canadian National Railways, Montreal, Canada.

My first experience with Jones was when we sneaked out of one of the sessions at the convention in St. Louis and went to see St. Louis and Cleveland play a game of ball. I think the score was 11 to 2 and he came to the conclusion he would rather see a game of English cricket. As a result of some of the discussion we had at the ball game, we decided Jones would be a good man to talk on welfare as applied to safety. Canadian railroads are particularly prominent in this work and have worked out a particular program of welfare among their employees.

WELFARE AS APPLIED TO SAFETY

W. H. Jones, M. A., Assistant Director, Safety and First Aid, Canadian National Railways, Montreal

The terms "Welfare and Safety" are sometimes used synonymously and are often regarded as being joined together in the formation of a worthy human destiny. But technically speaking "Welfare" is simply a condition, whilst "Safety First" is action. "Safety in Action" is one of the flowing rivers that enter the vast ocean of human welfare.

This quest for betterment is one of the earliest cries heard in our development and long before the scientist formed his theory of the "survival of the fittest" the human race marched onward along the lines of the "survival of the best." The milestones of its evolution were those periods when society respected and responded to this universal yearning of mankind for the "best that is yet to be."

It is obvious that within our social unity lies our individual protection against the intruding forces of destruction, and that within society are to be erected those floodgates, that can stop the onrushing currents of dangerous influence. Primitive society was effectively taught to feel affection for its individual members as well as to realize the possible danger of offending its associates. Naturally enough, this approved policy was safeguarded by the adoption of two dominating practices that were then in vogue; that the man who caused destruction to a fellow member of his group could expect the wrath of his associates; and that the man who was injured by a stranger could count on the aid of all his own associates in pursuing and avenging. It is not for me to decide whether our modern social groups have advanced beyond even these crude stages of protection but suffice to say that these were the principles upon which all social units were organized.

Three Important Truths About Welfare

But I am tempted to say that modern industry in its approval of even these rudimentary principles must, in order to prove its value, regard them simply as seed for a larger and better accomplishment: larger to the extent of knowing no limitations of kin or race and better to the degree of eliminating vengeance and wrath. The industrial welfare must welcome a policy that is larger than the safety merely of its own group. It must expand its inheritance to include all mankind and exclude none. So that all uplifting and noble achievements can be practised irrespective of color or clan. Accident prevention is an agent of universal welfare and must not be confined, cribbed or cabined by sects or groups. It is a policy larger than all railways and bigger than all corporations. It is as large as the world and as big as humanity.

Giddings, in that attractive textbook known as "Elements of Sociology," gives a thought which I shall paraphrase to read:—

"A society is a number of safety individuals who know and enjoy their safety and are, therefore, able to work together for common ends."

We have, then, three important truths which are worthy of our further attention:—

1. That welfare is based upon the safety of the individual—"a number of safety individuals."
2. That welfare in its nature is social consciousness—"who know and enjoy their safety."
3. That welfare in its scope is cooperation of all concerned—"working together for common ends."

"Individuality is everywhere to be guarded and honored as the root of all good."—Titan.

It is absurd to expect to build an industrial state of safety or welfare in its entirety apart from specialization on the value of the individual who constitutes that aggregate. The larger the group of employees the harder it is to recognize the value of the individual. In a world with its supply of man service larger than its industrial demand it is an easy matter to lose our admiration for the single life.

It was in this respect that Tennyson even lost his affection for nature, for he said of her: "So careful of the type she seems; so reckless of the single life." And undoubtedly his conception coincides with his statement of nature's brutality as being "red in tooth and claw."

Welfare Built on Value of the Individual

During the late war men were grouped into regiments, battalions and brigades and these were known by numbers. It was never expected that any military general could recognize the individual soldier of these vast units. John or William was lost in the vastness of the groups. Individual identity became a non-entity. Perhaps this explains the old saying that—"War is a biological necessity."

But what is true in times of emergency can not be true during our industrial tranquility. A successful welfare must be built upon the value which is attached to the individual. I do not mean that the foreman should know only the members in his gang but that even the general superintendent may inherit a goodly portion of this gift of personal acquaintanceship with those who form the working unit of all departmental groups.

In my first experience in a railroad career, I had the privilege of reporting to a vice-president and general manager who, in my estimation, was a genius in this art of knowing personally his individual employees. I often witnessed his arrival at different terminals and invariably I would see him go up to the engineer and say "Good work Jim;" or after a noon hour address at the shops he would descend from the platform and mingle with the men, addressing them by their own names, with such an effect that one could see them swelling with personal pride. And I do not hesitate in saying that the secret of that vice-president's railroad career is not so much detailed railroad knowledge as his particular gift of being a student of human nature.

When you touch men as individuals and not as mechanical units you have produced mutual relationships, and these are the basic principles in any industrial safety or welfare. When industry has lost that qualification it has suffered an irreparable loss of its soul.

In 1922 Babson's report contained this statement: "Relation between employer and employee is fundamentally a business relation and anything which injects into this relationship a flavor of charity is misplaced." Mr. Babson is speaking about welfare in industry. I heartily agree with him that "business" is the fundamental policy in industry but would also

suggest that this business, in its relationship to man, must be maintained by dynamic influences and not left entirely to mechanical processes.

Before you get the best out of man's strength you must enter his heart and soul. This is not charity but conformity to human justice. To say that a business concern has no sentiment is more of a callous "foolosophy" than a practical "philosophy." I think there is more concerned than mere dollars and cents in the matter of industrial accident prevention.

At any rate an approach to our employees must be along humanitarian principles. For one of the deep seated instincts that sways normal men is not so much loss in material production as a repulsion from personal pain and suffering. This is the key that opens the door to the heart and head, sentiment and consciousness of our employees. And when you have successfully entered a man's heart you will soon be able to govern his conduct. Welfare deals with human values and saves them from being subordinated or foolishly slaughtered. The greatest capital entrusted to industry is its man-power and everything must be measured by a standard of human values. The message of welfare applied to safety is, therefore, "That not one of these should perish."

Welfare in Its Nature Is Social Consciousness

"A sound mind in a sound body is a short but full description of a happy state in this world."—Locke.

Two important words in the definition submitted are "knowledge and happiness" or "consciousness and emotion." While the basic principle in welfare is individualistic, the nature of it is entirely social. The individual now removes the shackles of self-aggrandisement and launches out to aspire for the welfare of the whole group.

In other words he now begins to live for others. He "loses himself," so has to find himself in others. The self-conscious attitude is replaced by a social consciousness. The fault finding tendency of his past selfish and small world has now been replaced by happiness and contentment of his larger world and sphere.

The bane of human life today, you say, is discontent and I agree with you. But 99 per cent of that discontent in society, whether industrial or national, has been due to some individual culprit who has tried to squeeze the interests of the whole group into his own selfish desires and thereby the vision of true welfare has been lost by the glare of limited safety. For, after all, safety is but a physical protection while welfare assumes a psychic adjustment. It is generally conceded that a large majority of our accidents today can be traced to these psychic causes.

Recently while investigating a number of accidents which occurred in one of our shops, I was amazed to find that certain conditions not in the shops but in the home were the real causes of these accidents. The men never should have been admitted to work, if their state of mind and personal attitude could have been previously detected.

Our railroads today have made rapid advancement in the erection of proper guards and the installation of safe working conditions, but all those modern devices are inadequate without a further advancement in caring for the mental and the emotional forces which are uppermost in the human construction of man. You may say that industry has no business to interfere in such psychical realms; true, but when such factors do influence the physical, then I say it is to the advantage of the employer to assist in making the employee realize the importance of a clean mind and contented heart.—“A conscience void of offense.”

Let me illustrate. In the training of the medical man today he is compelled to study many sciences which (speaking from my own experience) he may justly have complained during his student days were unnecessary to produce a real doctor. For his conception of a doctor's vocation then was simply to give away pills indiscriminately, to use the knife freely and to charge exorbitantly. But medicine has been relieved of the tortures of such embryonic quacks and it is now acknowledged to be one of our most important sciences, with the result that the successful physician can make use of all those bothersome sciences of his collegiate days to assist him in his work. The quack treats symptoms but the scientist goes after the causes.

Safety is also a science. It must be approached as such and especially by those engaged in its application. You can not prove its truth by reading arguments or concocting committee reports. For it is not a matter of truth and falsehood only; it is a matter of life and death. Hence we must acquaint ourselves with causes and not mere effects only in applied safety. Its mission is to construct a bridge from the past, with its cripples and sightless, to the future, with its perfect men, strong of body and resourceful in mind.

Welfare Demands Trained Effort—Organized Knowledge

To do this is a gigantic task which will tax the very best of human knowledge. The subject of the care and protection of men in all its varied forms of welfare and safety is gradually restored from illiterate hands and placed in charge of intelligent and competent leaders. I am not speaking disparagingly of the progress made by energetic workers of the past. For they have done well and contributed splendidly to the achievements of the present. But on the other hand I do fearlessly insist that the future must depend upon more than energy alone. It must have trained efforts—organized knowledge. The day is past when any company will entrust the care of this important work to certain members of their personnel because they have nothing else to offer them.

This branch of a railway enterprise, I say, is too important to be managed by those who are inadequately trained. Perhaps the tendency of our various railways in the past has been to look rather suspiciously upon the college trained man and become rather prejudiced against education. But the railroads of tomorrow, as far as this subject is concerned, must demand the best that training and education can supply.

Prophecy is no argument. But I can see the day coming when the mat-

ter of human welfare as applied in industry will be given as much prominence in the college curriculum as that of engineering or agriculture. For the man in charge of industrial welfare must be thoroughly qualified. He is called upon not only to inspect and install guards against the visible dangers of machinery but also to erect barriers against invisible and destructive influences that attack both heart and mind. So that if welfare and safety are to attain their true objective, then, the man in charge must be a psychologist as well as an engineer.

It is a gigantic task and we have done well with the physical phase of it, but I am not sure whether as yet we have launched intelligently into the psychical aspect of it. But to abandon the stage at this time of our splendid progress is to retreat all along the line. I admit that there are limitations to our success in this respect, especially in formulating adequate solutions to our psychic problems, but to leave the battle because of past failures is a confession of ineptitude. The struggle of the future will be centralized upon this problem of safeguarding successfully the minds and hearts of our employees. For these, after all, are the causal factors in destructive accidents.

The Safety Platform Is an Important Ally

Therefore, our safety platform is an important ally of welfare to bring about not only safe conditions during working hours in the shops but also contentment and happiness that can reach even to the home and community. There is nothing so satisfying as the production of a happy workman: a man whose countenance gleams with the joy of contentment. It matters not how greasy his overalls or oily his hands, there is beneath all a pulsating heart for service and a mind cleansed from all evil intentions. Such is the man who best serves his employer, for he knows that his employer respects his best. Such a man has no sympathy for restlessness that breeds contempt and dissatisfaction.

Welfare and safety, both hand in hand, can change not only the environment of man but help even to change the man himself. So that the hope of the world for better men today depends very largely upon organized industry or, may I say, upon that industrial welfare which can be humanitarian enough to benefit the working man at his place of work as well as at his home.

And I know of nothing more beneficial to the business relationship between employers and employees than this state of contentment or happiness in the workman himself. Welfare and safety help to eliminate the social restlessness so characteristic of our age. Fault finding which breeds antagonistic relationship between employers and employees has not even a dog's chance. Of course there will always remain with us a few individual fault finders—they are like some religious enthusiasts that think they are bigger saints because they call Satan a Devil, or some enthused officials who think they are bigger railroaders because they make fun of other railroads. These culprits are like the poor; they will always remain with us.

But the need of the hour is for an enlarged vision. A vision of safety that can foster not only accident prevention of human bodies but also accident prevention of human minds. The task is big but not too big to be accomplished.

Welfare in Its Scope Is Cooperation of All Concerned

"Whatever may be the issue we shall share our common danger, one safety."—Virgil.

I trust that you have noticed the threefold angles of these scattering thoughts; as outlined by the definition, they are:—

1. TO BE. 2. TO KNOW. 3. TO DO.

So the very essence of welfare as applied to safety is action—"To Do" Cooperation of all the various agencies for one common end of welfare. There are many branches now growing on this handsome tree of welfare. Some of them are indeed bearing luscious fruit. I shall enumerate only a few.

1. *First Aid.* This is one of the most important corner stones in the architecture of welfare. In the railroad company to which I have the honor to belong the safety department is inseparably attached to our first aid. They both work together, as they should, and to my mind it is impossible to perpetuate a 100 per cent safety policy if it is separated from this ally.

2. *Dental Clinic.* If it is true—according to the contention of medical science—that most ills and diseases originate in the teeth, then the establishment of such a clinic would prove beneficial to any industrial concern. How elaborate should be the scale on which we shall adopt this is not for me to say. It is simply mentioned as one of those social agencies that formulate a real welfare in industry.

3. *The Visiting Nurse.* Such an appointment can be very beneficial one to any company. A nurse who knows when and how to enter the homes of our employees could be productive of much good and bring about a great deal of comfort and assistance to many a sorrowful and helpless home. But such a nurse must be tactful. For a flippant visiting nurse can do much harm.

4. *Athletic and Social Activities.* These are worthy activities when operated efficiently, for they help to promote an "esprit de corps" amongst employees. Physical training builds health and strength while social events produce good fellowship. And both these factors are of inestimable value to any industrial company. I know of nothing so valuable in building up the morale of men as social or "get together" meetings. And I know of nothing so productive of increased business to a railroad company as a properly conducted "get together" meeting. After years of experience in charge of such activities I could enumerate many instances, especially in competitive towns and cities, where the company increased 100 per cent its former patronage and business.

But these various agencies, after all, must depend upon the cooperation of all concerned. It is absurd to expect the company to shoulder all the

responsibility. There must be a realization that each employee is a spoke in the wheel of the successful company. The one-man-safety and the single-life-welfare ideas carry but little weight. But each railroad with its safety unit must realize that it is a unit in the whole fabric of universal welfare. Just as the individual man is helpless apart from the cooperation of his fellow beings so is a railroad in this respect. It matters not how keen the competition may be in business activities; in safety and welfare there must exist all possible cooperation. The railways of today are now linked together in the expansion of this work of protection and care of mankind.

Professor Guyot, of Princeton, says that progress in the world is like the development of plant life. It has three periods of growth. The first is that in the soil—growth by the root. The second is more accelerated—growth by the stem. The third is the most rapid of all—growth by the blossom and fruit.

The welfare of humanity has been growing by the root—obscurely, lingeringly and slowly. It is now, after ages of acquired root, growing by the stem; I believe it is now ready to break into blossom and its fruit bearing will be surprisingly rich and wholesome.

Welfare properly applied to safety, therefore, is not only humane and social but it also increases dividends on capital invested. Show me two railroads both giving transportation service of equal efficiency, and I will tell you that the public, every time, will support the one which maintains the highest order of organized protection and care of its patrons. So the "value of man" makes our work a sacred trust and the prosperity of our company makes it a valuable asset. Safety work is our contribution to bring about the realization of that human destiny—Welfare. May the day hasten when all shall cooperate to the fullest in making man as he should be—Happy and Safe; Happy in his heart and Safe in his Home, to his Employer and to his Community.

CHAIRMAN ROHWEDER: We have assigned to the discussion of Mr. Jones' wonderful paper the chairman of the Safety Section of the American Railway Association from the Sesquicentennial town of Philadelphia, Mr. Thomas H. Carrow.

DISCUSSION OF MR. W. H. JONES' PAPER

T. H. Carrow, Pennsylvania Railroad System, Philadelphia, Pa.

I have listened with much pleasure to the illuminating address just presented by our good friend Jones. He has evidently been studying histology, biology, and all the other "ologies" in the dictionaries for a suggestion for a study on the ills peculiar to mankind.

I thought the address related to first aid and then I happened to look at the program and it said "welfare." Then I woke up to the very important reference that he made, something that I think we will all be able to ponder over with much benefit after we have gone home.

I am going to refer to certain aspects of his paper a little later on, but in order to avoid being too conspicuous, I have asked the chairman if he wouldn't let me combine my report as the chairman of the Committee on Statistics with my response to this address, so I shall give you very briefly the result of the accident situation in the United States in the first six months of this year, then I will return to Mr. Jones' paper.

There were 3,145 people killed on American railroads in the first six months, which represents an increase of two, a very unsatisfactory showing from the standpoint of fatal injuries. There were 62,484 injured, representing a decrease of 3,090, a net reduction of five per cent, which lends my good friend Bentley, who is so energetic in putting out his monthly bulletins, reason to hope that with the enormous progress that our railroads have made, particularly in the last six months, we will be able to get by the remainder of the year with a little better than five per cent.

I have listened to a great many papers in my life and the paper of my good friend Frey is really the finest thing I have ever heard. If we can get a few people on the railroad to see that people are laying down on the job and calling them accidents, we will make a very good improvement in our railroads. I saw that because we show a reduction of only five per cent in all accidents; but 15 per cent in non-train accidents, and nearly all of that was made up in the shops and the Pennsylvania Railroad contributed about half of it. That was because we hadn't awakened previously.

Getting the Injured Employee Back to Work

One of the important things is getting injured employees back to work. I recommend to you people that you pay a little more attention to that as you go along. It is a most discouraging thing to read the record and find that train accidents increased nine per cent. I had hoped that the time had arrived when we could look forward every six months of every year to a decrease in accidents, but the subject that is confronting the A. R. A. more than any other is the reduction in train accidents. As my friend Scott pointed out, a few mashed toes, a few lacerated fingers and maybe a mutilated hand is infinitesimal compared with a tragedy such as we have had time and again during this present year.

Crossing casualties have shown a very marked increase in number, perhaps not on a ratio basis, but 16 per cent in the total number of casualties. I shall not make any comment on that because I presume that will be covered under another head. I do wish to recommend for your consideration, however, an effort that is being made by the New Haven Railroad, which I discovered in Boston last week. They have in their principal station, which I understand is the biggest passenger station in the world, a reproduction of the crossing flashlight. It is my purpose to present that to our Executive Committees in the different regions of the Pennsylvania Railroad at the very earliest opportunity. I can think of no better way of advertising care at crossings than this

flashlight that Fred Mitchell has stuck in the middle of the train floor at Boston.

By the way, we have in Philadelphia a sample of a little electric train showing this flashlight, and you would be astonished to know, as my inspectors have discovered, the utter ignorance of a vast majority of the people as to what these flashing lights mean. All of us ought to start a campaign to educate the public to know what that light means. We can not overlook the fact, friends, that people do not cross railroad tracks in front of trains carelessly and negligently when we see men who are just as competent as we are doing it. We have to take into consideration that it is our job to apprise them of the approach to the crossing.

Now I am going to return to Mr. Jones. The prevention of accidents may be divided under two heads, and first is the proper construction, education, organization and persuasion. On our railroads, on all of the railroads, we have made wonderful success in that direction. I don't think it is necessary for me to dwell upon that. That is not the purpose of my discussing his paper. The second item is first aid, medical attention and supervision to get the men back on the job. That is what I thought I was to discuss, the first aid proposition and all of its implications.

Thousands of Days of Disability Lost

I don't want to disillusion anybody, but I am of the opinion that many of the accident records made on the railroads of the United States (and from the bottom of my heart I give every man credit for every single part of improvement he has made), the vast majority of these records, in my judgment, have been largely made up not by preventing the accidents, but by getting the men back on the job. I suggest that you consider that very carefully, and if you do that and if you are situated as we are on the Pennsylvania, you will find a very large field for improvement. Thousands of days of disability have been lost by the mere fact that the doctor would say, "Stay off a week," or "Stay off three days," instead of saying, "Go back to work and let your superintendent find you something that you can do that won't imperil your health."

I want to illustrate that. Would it be conceivable that the railroads in the state of Missouri would have an accident rate of, let us say, 250 per thousand, and the railroads in the state of Oklahoma have a rate of four per thousand? Is it conceivable that a plant with 600 colored laborers with feet as big as an acre of ground, handling ties and rails and all the other paraphernalia that go into a steel mill, would go 30 days without an injury?

We determined to cut injuries down and we got these fellows together and put them on their pride; we organized them into safety committees, and, now, almost over night, from a regular slaughter house, we eliminated all of these accidents and we have the perfect record. Just think of the lack of frankness of any representative, of any reputable business in America, putting a thing over like that as accident prevention without

giving us the benefit of their experience; but more particularly think of the stupidity of such people as the present speaker, and some other gentlemen who are listening to me, in not having the intelligence to detect it before the year of our Lord 1926.

I addressed a body of surgeons on Saturday morning. I did it with a certain amount of fear and trepidation. There is one thing that I rather pride myself on and that is I believe I know my own work, but I am thoroughly conscious of what I don't know. I never pretended to know anything about medicine, although I passed through a medical school. I don't pretend to know much about psychology, although I have read a little about it. I leave it to the technical men to know their subjects; but it requires no acumen, no enormous intelligence to recognize the fact that 50 per cent of the doctors do just what your mother and my mother did when we were children. Anybody who can't treat the lacerated finger and some of the simple things we are confronted with in the shop is lacking in ordinary human intelligence. The doctors have formed a clique and they have gone to the legislature and they have passed laws that a first aid man and a nurse can only do so many things; and what is the consequence? We have to employ highly trained medical men to do the things that a man without an education can do if he is properly trained in first aid, and, that, gentlemen, is a mighty important thing in the accident record of the railroads of the United States.

Maimed Men Should Have Best Scientific Care

Talking about serious consequences following first aid attention, putting men back on the job when the first aid attendant has given a man a little Brown's mixture for a cold or a little paregoric for cramps—there isn't anything in it. I told those physicians so.

There is nobody that is more sympathetic than I am. I would contribute a nickel any time to a blind man. I say that men who get their legs broken, men who have their vision impaired, men who are crippled and maimed ought to have the very best scientific care that can be accorded; but don't let us dignify these little scratches and bruises as major injuries and have to drag men away and keep them off the job week after week.

After I finished my talk the other day, one of our company physicians came to me and said, "Carrow, I have been listening to you and when I go back home I am going to experiment. I am going to send the men back when there is a chance for them to work and when there is no chance of injury."

Another fine doctor (you could tell he is intelligent) said to me, "We have cut that out in the American Steel Company. Not long ago an Italian injured his back. He came to me and said he wanted to get off. I told him he didn't need to get off. He did a certain sort of inspection work. I told him I would put him in a chair and let him sit there and do the inspecting, and his wound would heal and he would convalesce just as quickly as he would if he were to sit at home and worry about his trouble. The Italian came in the next day and I put him on the job

in the chair, and before noon he was around just as lively as he had been the previous day.

I want to suggest to you fellows that when you have anything to take up with your executives, cut out the generalities and get right down to brass tacks and give them some information that they can work on. I want to tell you that the amputations on the railroads amount to one per cent, but the sprains and strains, that indefinite thing that is descriptive of something for the most part that never occurs, is 19 per cent. If any individual in the railroad circles or industrial life will develop some means to determine what a sprain and strain is, his name will have a place alongside that of Mr. Richards, the father of the safety movement.

Bruises are 40 per cent of all the injuries, and what is a bruise? Nineteen per cent are lacerations, some of them no more than a scratch. And fractures, the most important of all, are only six per cent. Fractures and amputations, the most serious of them all, make up a measly seven per cent.

Twenty-Six Per Cent of Accidents Cost Three Days

I will tell you something that is even more convincing, and it will show you how our good friends, the Union Pacific and all these fellows who have led us, have awakened to it long before we did. What percentage of the accidents on a big road would you think cost three days? Twenty-six per cent, a little better than one quarter. The injuries from four to 10 days, 45 per cent; and the injuries from four to 16 days, 46 per cent; or in the first two weeks of disability, 72 per cent. Think of it, friends, what a remarkable field you have for getting men back on the job and not impairing their health. Seventy-two per cent of all the injuries on all the railroads of the United States only result in two weeks' disability, and half the time if you had master mechanics with the acumen of this gentleman who spoke here first this afternoon, half of that 72 per cent would be right back on the job where they belong, and even if it costs a little to put them back on the job, it has a wonderful effect on the morale that Jones mentioned. It makes the men feel they will not break their safety record and it keeps everybody liking to have a good record.

This "keep off the grass" attitude of the supervisory forces is another thing to which we can attribute a very large percentage of our accidents. The laborer is injured and the gang foreman says, "Mr. Relief Doctor, I turn this man over to you forever and a day," and he can stay there until hell freezes over and the supervisor doesn't pay any attention to getting him back. That combined with the kindly attitude of the doctor, places the man in the same category as that described by John Fitzhugh this morning. He told me about a friend of mine who had goat fever. He separated that man from the sheep and goats and this fellow was put in the hands of the doctor. The foreman had washed his hands of it, the general manager, the president, and everybody else in the railroad

had done the same thing, and this fellow was more or less of a derelict until a doctor by his kindly offices put him back on the job.

Now I want to tell you something. You know I am great for confessions. You remember in the prayer books, "Oh, Lord, our Heavenly Father, we have done those things which we ought not to have done and left undone those things we ought to have done." If somebody had come with the same enthusiasm that I have today and told me five years ago all about these details that I am telling you, our record would have been 25 or 30 per cent better. I am anxious not only to improve the record of the Pennsylvania Railroad but the record of all American railroads, and whatever I have you can have, and whatever everyone of you have, you ought to give to me.

One of our shops issued a notice like this, "Any employee who loses time hereafter on account of an accident will be called on at his home by a company physician and a representative of this shop within three days after accident occurs." From May 6 to October 31 the foreman or one of his assistants accompanied by a company physician, when necessary, called at the homes of 62 employees who had received minor injuries and failed to report on the following day of duty or who failed to report the accident at the time it occurred and reported off duty by telephone or through employee. Upon investigation it developed that the injuries of four of these employees were of such a nature that it was necessary for them to remain off duty one or more days. In several cases where sprains were reported, the diagnosis of the company physician proved them to be lumbago. In other instances it was learned they were off duty on account of the illness of one of their family. Where employees had remained from duty unnecessarily on account of a slight injury, they were induced to return to the shop and resume duty at their regular occupation.

While this method is still in force, it is seldom necessary to resort to it. A very important factor in obtaining these results was the hearty cooperation of Dr. J. B. Hillman, Chief Medical Examiner, and his entire staff.

Friends, I want every railroad to get the advantage of what we do on our railroad and I think everyone of us ought to come right across to each other and give the advantage of the other's experience. That will dignify the railroad business and in the end we will all be better off.

Partial Report of the Resolutions Committee

CHAIRMAN ROHWEDER: Tom Carrow never fails to put over a talk that has original ideas but he puts it over in such a way that it seems to leave an everlasting impression.

We have a Resolutions Committee for this Section. Mr. J. E. Long of the Delaware & Hudson is chairman. I will ask for his report at this time.

J. E. LONG (Delaware & Hudson Railroad, Albany, N. Y.): The Resolutions Committee wishes to offer the following for your consideration:

"Whereas, There is no uniformity in the manner in which financial

assistance is rendered to local safety councils by steam railroads; therefore be it

"RESOLVED, That the chairman of the Steam Railroad Section, National Safety Council, be directed to appoint a committee of three to confer with the officers of the National Safety Council with a view to arranging a meeting with the committee of local safety council managers to determine a policy in this respect."

(The resolution was regularly adopted.)

CHAIRMAN ROHWEDER: We will now have the report of the tellers on the election.

Announcement of Election of Section Officers

MR. PHILLIPS: Before this election, your chairman stated that six of the best men in the Steam Railroad Section of the National Safety Council had been nominated for these offices, and I want to assure you the result of that ballot verified that statement. There wasn't a single "has been" and also there isn't a single "also ran" in that bunch of six. They all ran good races.

We found, as a result of your ballot, for chairman for the coming year you chose Mr. White; for vice-chairman, Mr. Cott; and for secretary, Mr. Long. (*Applause.*)

CHAIRMAN ROHWEDER: I am going to have Mr. Cott make announcements in connection with the meetings tomorrow and other matters he has here.

SECRETARY COTT: I have been looking over our membership list and I want to tell you something about which perhaps you are not aware. There are seven roads not represented here today. That is not unreasonable; it is not really reasonable to expect them to be represented here. I wonder if the members know that we have one member in South America, one in the Hawaiian Islands, three in Canada and two in Australia that have been members of the Section for a number of years, pay their dues regularly without complaint; and I have had the pleasure a few times since I have been secretary of having a letter from several of the overseas members. It certainly should be a point in favor of them when that far away they continue to belong.

I want to call to your attention that you will have on tomorrow's program the representatives of various associations who will come here to present the views of their association to us. There may be some time for general discussion tomorrow, but out of courtesy to these representatives, there is to be no discussion of the papers presented tomorrow. There is time left in Thursday morning's program to discuss such subjects among ourselves as may be brought up in the papers presented by the gentlemen I refer to in tomorrow's program.

CHAIRMAN ROHWEDER: We have completed our afternoon's program. We are going to take one or two minutes to ask the incoming chairman to say a word to you, and then the meeting will stand adjourned.

CHAIRMAN-ELECT WHITE: Gentlemen, I appreciate very much the honor that has been conferred upon me today, not only upon myself but upon the railroad that I represent.

I am going to put forward my best efforts to make this Section a grand success the coming year, and I ask the cooperation of all of you to help me make it the best year we have ever had.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27

J. D. WHITE, Chairman

Superintendent of Safety, Illinois Central Railroad Co., Chicago, Ill.

The second session of the Steam Railroad Section was called to order at 9:45 o'clock by Mr. A. V. Rohweder, chairman.

CHAIRMAN ROHWEDER: As you have observed by the program, we have quite a bit ahead of us and we are going to get right down to the set program.

Mr. Carrow, of the Pennsylvania Railroad, would like about one minute in which to present a resolution.

MR. CARROW: Mr. Chairman and Friends: It has been my observation of these meetings that some of the best thoughts frequently die after we leave, and in order that we may accomplish something of a definite nature on a subject that is bothering us more than any other, I would like to suggest that a committee of three persons be appointed to consider immediately a set of propositions for the prevention of train service accidents, and I would like to suggest that the chairman appoint Mr. C. T. Bailey, of the Oregon Short Line, Mr. McCampbell, of the New York Central, and one of our men, Mr. Mikusinski, who has made some very definite studies along that line, with a view of bringing back to this meeting, not later than tomorrow morning, a set of propositions which will assume the nature of a recommendation for action with respect to the prevention of train service accidents.

I want to report that during the first six months of this year there were 339 train and enginemen killed and 14,841 injured, representing a decrease of eight killed and an increase of 1,185 injured.

I have information that leads me to believe that some of the railroads, particularly in certain yards, have made excellent progress in the prevention of train service accidents whereas some of our other yards and some of our other divisions (I am speaking of the railroads as a whole) I have a lamentable record in this direction; and for that reason, Mr. Chairman, I would like to suggest that these gentlemen be appointed.

CHAIRMAN ROHWEDER: Gentlemen, as you have observed on the program, we have asked Mr. J. D. White, of the Illinois Central Railroad Company, to act as chairman of this meeting this morning. He is not only acting chairman but chairman in reality. We will now ask you, Mr. White, to take charge of the meeting.

(Mr. White took the chair.)

CHAIRMAN WHITE: I first wish to express my thanks to our dis-

tinguished chairman for his courtesy in designating me to preside at this morning's session. I am going to have the pleasure of introducing a program that is, I know, both interesting and important, and we are all going to enjoy it because our Program Committee has selected some eminent representatives of railroads to be here.

I have the honor to introduce to you this morning a speaker who has achieved distinction in railroad circles and I know that you are all very anxious to hear him; without any further remarks, I present to you, Colonel J. T. Loree, Vice-President of the Delaware & Hudson Railway, Albany, New York.

ADDRESS

J. T. Loree, Vice-President, Delaware & Hudson Railway, Albany, N. Y.

It is not so difficult a matter to address a gathering whose ideas of value and necessity as to your subject are so similar. Not for one moment can the slightest difference of opinion exist between us as to the vital need of an active and unceasing elimination of hazards in employment.

Nor is it much more difficult to state the reasons for this agreement: Self-protection—Increased efficiency—Financial need—Love of our fellow men—reasons good and sufficient, to each of us undeniably insistent, easy of comprehension.

When the subject was suggested it seemed to me that the reasons were so clear and self-expressive that I could only re-echo your thoughts, but as I reviewed the matter it occurred to me that the so-called "Safety First" activities and results might find different values to the occupants of different positions in our profession.

That this not only might be so, but of necessity must be so, became more and more apparent, the reasons being the difference in the point of view, perhaps best illustrated, if you will call to mind a series of photographs of a city. First, you have separate pictures of each house from each of its faces; then perhaps you have groups of houses, fronts and backs in blocks. Then whole streets of houses, and finally those bird's-eye views taken from an aeroplane hundreds of feet above the city, showing not only the city proper but its environs.

In the first picture, we plainly see the most minute detail of each separate building but not its relationship to anything else, and as our pictures take in more ground so the details vanish and the relationship becomes more apparent.

This picture series illustrates the changing points of view of the different grades in our business structure and as the responsible area of control of an employee increases, the detail becomes merged and the relationship becomes accentuated.

The vice-president, charged with operations, may be said to view safety first with the railroad displayed in an aero-photograph, having in the past examined the other pictures.

The history of a profession sometimes sheds great light upon its problems and their solution and it is particularly true of ours in a time when, through indefinite language and the efforts of many, the true reasons for a composition of rail transportation systems are befogged.

From the earliest historic time, the necessity has existed of bringing the thing produced to the point of consumption, and almost exclusively it was this transportation which gave value to the commodity. As the needs of the people grew through education and their gregarious instincts the sources of supply became more distant and ever the need of quicker and cheaper transportation increased. This need prompted the efforts of Stephenson, Bevin, Watt, Jarvis and Horatio Allen. How pressing the need is most aptly illustrated when the whole progress of steam rail transportation is comprehended within the single life of at least one employee upon our own line.

But this great transportation machine, produced to satisfy this need, is a most complex thing dividing into three distinct components: capital, management, and labor.

The first may be described as the portion of earnings one man saves and invests, and which some other man may spend.

Management is the co-ordinating and directing force producing the product by the employment of capital and labor. Labor may be defined as those who work under direct or indirect supervision of management.

The combination is a system organized for gain, to be had by the transportation of persons and property.

Losses to Capital, Management and Labor

Now, in this system lies a certain risk to each component. To capital it is loss through mismanagement, changed condition or desire, competition, hampering or confiscatory action of public regulation.

To management, it is risk of lack of capital or labor, and unknown conditions arising from the same causes as constitute the risks to capital.

To labor, it is those risks capital and management run in a lessened degree and, added thereto, the risk of bodily harm.

Our profession is a hazardous one as all occupations must be those which have to do with movement. This we call the inherent risk. There are two other risks, those arising from conditions and those from practices.

You may recall that upon September 15, 1830, the opening day of the Manchester and Liverpool line, there occurred the first railroad fatality—Mr. Huskisson, a passenger, being fatally injured, crushed from the thigh down by the "Rocket."

Lamentable as this accident was, when you read the words of the *Edinburgh Review* that "it was wholly attributable to his own carelessness," you are much more depressed by the fact that it began the long list of dead and incapacitated which has resulted of the same cause.

From that first day the work began of guarding against accidents

arising from this new danger, for the general movement for safety is as old as the human race.

Do we not state, "Self-preservation is the first law of nature"?

Every cave occupied in the early days and every fortification in the trenches of the late war, were safety first constructions.

Every weapon of either offense or defense, from the pointed stick which served as a spear to the latest gas bomb, constituted efforts at safety first.

Every vine and log bridge of the aborigines to the great Tunnels under lakes and rivers are but illustrations of man's unceasing efforts at safety first.

The movement is not new. It is very, very old; sometimes more active than at others, sometimes quite obscure in its direction, sometimes even defeating its own purpose, it has, however, ever been progressing; and this brings us down to a most modern time and to a modern problem in the present state of the movement and the topic which I have been asked to discuss—"Safety From a Vice-President's Point of View."

Loyalty and Discipline May Offset the Risks

As he views the property under his direction, as in an aeroplane photograph, he sees the components of the system—capital and labor—each in its relationship to the other. He sees in the suburbs, as it were, the history surrounding the development of rail transportation. He sees the risks run by capital, labor and management, with the failures of the past and the efforts to offset a repetition.

His is the responsibility and to him has been given the necessary authority.

To offset the risks he has two weapons—loyalty and discipline.

Against the risks to capital he must interpose the knowledge of the profession possessed by himself and every other employee, an alertness, a willingness for personal sacrifice, an untiring devotion, and cooperation. He must, with the aid of all, anticipate changing conditions and precede them, not meet them. He must insist that the service be so good that successful competition is impossible. He must, by public education, prevent adverse and destructive legislative action. This is safety first to capital, from his point of view.

For management, he must so conduct the business that investment therein will be attractive and safe and that conditions of wages and working conditions will attract the best elements of labor.

He must by study, observation and research, reduce unforeseen emergencies to a minimum. This is safety first for management.

For labor, he must by care and skill produce capital and earnings to enable them to be employed, and he must minimize their bodily risk; it is this last effort that too often we regard as the one and only "Safety First" movement.

To a vice-president, the safety first movement is one of good business, not maudlin sentiment.

Railway workers, to produce results, must be able-bodied and efficient,

and to maintain and produce either, the safest possible conditions and practice must be established and maintained.

A timid man is most apt either to get hurt, hurt others or, in his terror, do poor work. Therefore, for efficiency, men must know that the conditions are as safe as possible; that unsafe practices are stopped and that their fellow workers are likewise careful.

In every employee, from the engineer to the youngest laborer, the company has an investment varying from some \$5,000 down. This investment must not unnecessarily be rendered useless or less efficient by death or disability.

Each man has a place in the organization, and if you introduce a substitute the whole team slows up and you lose part of your momentum.

Railroads are great tax payers and every family made destitute by the loss of the earner's ability, in whole or in part, is supported partly through these taxes.

This may sound cold-blooded and material—is it not—simply sane? No one can see a fellow human being injured without a surge of pity, but if this is all you feel the condition or practice will remain to trap the next one. Be as sympathetic for the individual as you can. That is natural; but only by viewing safety first for all the components of the system as but a part of one's personal duties will best results and those of a really lasting quality be obtained.

Mr. Guilbert Responds to Colonel Loree's Address

CHAIRMAN WHITE: Brother Loree has favored us with an exceedingly fine address. I am going to call on Mr. Guilbert to tell him how much we enjoyed his address.

HARRY GUILBERT (Pullman Company, Chicago): There is one thing that Brother Loree neglected to mention in giving credit to the safety department for the record of the Delaware & Hudson, that is the fact that he set the example, because without that, the safety department, could not assist in making a record.

Colonel Loree has been trying to hide his light beneath the bushes, but I don't intend to permit him to do that. I have made exhaustive inquiries about this gentleman and the road which he represents, and boiled down here it is:

Colonel Loree is strictly a business proposition and a fine gentleman. His undivided attention is given to the task before him, and he is familiar with and keeps in touch with every branch of the Delaware & Hudson system.

He is deeply interested in the welfare of his men. He is a leader in all railroad activities, including safety, athletics, etc., and incidentally he has a war record, having served with General O'Brien overseas.

In a few words Colonel Loree is the illustrious son of an illustrious father, judged on all the information I have received from authentic sources, and I want to congratulate Colonel Loree and the Delaware & Hudson system for having an executive of that type.

There is another thing I want to mention. This is my fifteenth convention and I have been a safety man for 21 years, and I don't know of many railroad executives that have appeared at those 15 conventions. That is why I feel very strongly about it and we should be deeply thankful to this gentleman for appearing here today.

I have also noticed at this convention Mr. W. A. McGonagle, President of the Duluth, Missabe & Northern Railway. I do believe, boys, that our work will be made much easier and we will have a better record if we can get executives of this type at these conventions.

CHAIRMAN WHITE: Mr. Carrow made a motion here this morning which you all heard. May I hear a second to that motion?

(The motion was seconded and carried.)

MR. CARROW: Did that include the appointment of Messrs. Bailey, McCampbell and Mikusinski?

CHAIRMAN WHITE: Yes.

I want to announce that the committee named in Mr. Carrow's resolution will get together and arrange to carry out that resolution and report at tomorrow's meeting.

Our next speaker is a veteran of the transportation department, having come up through the ranks as operator, agent, dispatcher, chief dispatcher, train master and superintendent, and he holds one of the key positions of safety work. I now take pleasure in introducing Mr. Victor Parvin, superintendent, the Ann Arbor Railway and also representing the American Association of Railway Superintendents.

WHAT THE SUPERINTENDENT CAN DO TO PROMOTE SAFETY WORK

**Victor Parvin, Superintendent Ann Arbor Railroad, Owosso, Michigan,
Representing the American Association of Railroad Superintendents**

In the first place I wish to extend to you greetings from the American Association of Railroad Superintendents, which organization I have the honor of representing.

Our association is composed principally of chief dispatchers, train-masters, superintendents and general superintendents, but we have numbered among our membership, vice-presidents, general managers and others, and I am proud to say that the gentleman who preceded me on the program is a member of our association.

The members of our association, in line with the duties of the superintendent, deal with all phases of operation. The superintendent is one man who can not specialize.

While for several years our association in convention has dealt with the grade crossing problem, this year in convention was the first time that it has devoted any time to strictly safety first matters. Some of you are aware that we had with us at Montreal, in June, Mr. Carrow, who put across his message in his usual able manner, and I can assure you that his presence was greatly appreciated. I believe that it is going to do

a great deal of good to have members of one association appear before other associations and present their individual problems. And right here I might state that it was greatly due to Mr. Carrow's presence and influence that the superintendents' association in convention unanimously approved the two long, one short and one long as a standard highway crossing whistle, to be adopted by all railroads in the country, provided the suggestion may meet with the approval of the American Railroad Association.

The duties of a superintendent of the present are entirely different from what they were 20 or 25 years ago. At that time, as I recall it, the principal function of the superintendent was to see that his passenger trains ran as nearly on time as possible, or at least that today's train arrived before midnight tomorrow; and that when an engine left the yard, it carried as many cars as there was room between the locomotive and caboose; which method of handling tonnage kept the superintendent pretty well occupied.

Procedure of a General Staff Meeting

A superintendent's duties of today are entirely changed. This can probably be best illustrated by giving you an insight into a general staff meeting, which might be held on any railroad, and no doubt many of you superintendents of safety and safety agents have attended such a staff meeting. I believe the procedure is about as follows:

The freight traffic manager has entered a complaint on account of symbol or time freight trains running late; next comes the passenger traffic manager with his story about certain important passenger trains not making the time; the general superintendent has considerable to say regarding the matter of transportation ratio and failure to handle as much tonnage per train as he thinks should be handled; we next have the superintendent of freight claim prevention telling about the great amount of damage due to rough handling; the chief special agent speaks of superintendents being rather lenient at times when men get caught with their fingers too far into the door of a box car; the chief engineer informs the superintendents that they have not been watching their maintenance expense as closely as they should; and then the superintendent of safety proceeds to tell the superintendents that their divisions should be more safely operated.

You might suppose that after spending a day at such a meeting the superintendent would be about ready to throw up his hands and say, "What's the use," but if he is a man of this caliber he would not last long as a superintendent. The average superintendent can leave such a meeting, go out and get as many laughs out of a show as anyone else, or play as good a game of poker, but when the superintendent returns home he begins to feel around and find out where the rain drops are coming through, or in other words, he begins looking for the leaks. He takes up each matter in the order of its importance and endeavors to bring about a correction or improvement in each, including his safety first

record, and that is what we are going to deal with in the balance of my talk.

I have heard the statement made that a division is only as safe as the superintendent wants it to be. I believe this statement should be changed and we should now say, that a division is only as safe as the superintendent of safety helps the division superintendent to make it. It is the superintendent of safety and the safety agent who have made the division superintendents safety men, although there may have been many cases where it was necessary for this to be accomplished through the general manager; but regardless of methods, the average division superintendent of today is a *safety man*.

The superintendent of safety is the man that should sell the idea to the rank and file and lay down the foundation for safety work on all operating divisions. And after listening for six years to such capable speakers as Mr. Carrow, Mr. Hale, Mr. Bently, the late Mr. Harry Adams, our own Duff Phillips and numerous others, I am satisfied that you can not only sell safety to the men down the line but you can do it far better than any superintendent, because it takes a certain amount of oratory to do the job and this is one thing that you fellows have that the superintendent has not.

Responsibility Rests in Hands of Division Superintendent

After the superintendent of safety, or safety agent, has laid the foundation, then the responsibility for safe operation of a division rests absolutely in the hands of the division superintendent, and from then on he should not offer any alibis for failure to have his division as safe as any other division on his railroad. Whether or not a superintendent has a safe division, in my humble opinion, is wholly dependent upon discipline properly administered; in fact, I feel that the entire railroad structure, as far as it has to do with operation, is thus dependent and there is no exception with relation to safety.

When I speak of discipline properly administered I have in mind fair but positive discipline, and superintendents should require the same compliance with rules or special instructions which deal with matters of safety, as they would any other rule in the Book of Rules. You can rest assured that when the superintendent "winks" at the violation of any rule or regulation, whether a safety rule or any other important rule, that particular rule is going to be habitually violated, not only by one individual but in time by all of the men on the division. On the other hand, if the superintendent can instill into the minds of his men that observance of rules and regulations means safe operation, and anyone failing to observe such rules and regulations will be promptly disciplined, it will go farther toward making the division safe than any other one thing that he can do. And this is his responsibility and no one's else.

You have often heard the saying, "You can not teach an old dog new tricks." There are many employees on the railroads who have been there for years and they have formed certain habits in doing their work that we all admit are hard to change. In the case of the older men, it is going

to require a great amount of educational work and considerable patience, but the educational feature can best be taken care of through the medium of the safety first committees. I believe that one of the most certain methods of lining up an old employee in the interest of safety is to make him an active member of the safety committee. With the younger element the problem should be a much simpler one.

It has always been my habit in employing men to explain to them that the forming of habits is a simple matter, that it always seems to be easier to form bad habits than good, but they should bear in mind that it is much harder to break themselves of a habit than it is to form one and for that reason they should start into the game of railroading with the resolve that they would form, as far as possible, only good habits. With this same motive in mind I believe I have a positive recommendation to offer that will in years to come simplify the safety work on the part of division superintendents.

We all understand that brakemen, switchmen and firemen are employed principally by trainmasters and road foremen of engines, and I realized one day that new brakemen, switchmen and firemen would be on the railroad several weeks, possibly months, before I would even become well enough acquainted with them to know them when we would meet on the street. So I put into effect the plan of having each new man come to the office for a personal interview after he had been in the service a few weeks; and I always close this interview with a lecture on the hazards of the work and the importance of practicing safety and of forming safe habits. I am satisfied that this scheme is going to have a great effect, not only on the mental attitude of the new man toward the company as a whole, but particularly his view-point on the matter of safety, and it is safety that is mostly stressed and the last thing mentioned in my talk with these men.

Problem of Boulevard Stop at Railroad Crossings

In one other important matter I believe the superintendent can do as much, or more, than anyone else, and this is in connection with establishing the boulevard stop at railroad crossings in cities where the city itself establishes the boulevard stop for its through or important streets. Railroads have gone a considerable length in protecting the public at the various highways, both inside and outside of city limits; in fact, they have gone farther to protect the public than the public has ever gone to protect itself; and if city officials see fit to establish boulevard stops within their corporate limits at street crossings, it is certainly only reasonable that they should do so at railroad crossings not otherwise protected.

The argument that I have been using with city officials is that they see fit to cause automobiles to stop at numerous street crossings to avoid possible collision with a body of about equal weight, where fatalities seldom result; but they will permit, as far as they are concerned, an automobile to drive without hesitation on a railroad crossing in front

of a locomotive which may weigh half a million pounds. This attitude on the part of city officials is certainly not consistent, and while some superintendents have already succeeded in getting for their railroads boulevard stops at railroad crossings, I do not believe that the surface has been scratched and there is yet a great deal of good work to be done by the superintendent.

In conclusion, and on behalf of President Harmon and the American Association of Railroad Superintendents, I want to thank you sincerely for extending an invitation to have present at your convention a representative of our association. I can assure you that the association I have the privilege of representing will at all times gladly cooperate with you in the interest of safety, and will appoint members to serve on joint committees for the purpose of dealing with any special problems; in fact, I believe there has already been one such committee appointed.

Mr. Phillips Responds to Mr. Parvin's Address

CHAIRMAN WHITE: I am sure that we have all derived much benefit from Mr. Parvin's address. I could say many nice things about it myself, but I am going to call on Mr. D. G. Phillips, of the Wabash, to tell how much we have all enjoyed it.

MR. PHILLIPS: I know that you were all very much interested in Mr. Parvin's remarks about the ability of division superintendents to play poker and to shoot "craps," and you are right, gentlemen, when you presume the remarks he made were a challenge to meet him in his own room later.

It certainly does the safety superintendent a lot of good to have supervisory officials, superintendents, if you please, come here today, as this superintendent has, and assure us that the superintendents' association, that is the superintendents themselves, are now going into this safety movement and are going to do the very best they can to let us help them put the movement over.

We have gone along here for years listening to the eloquence of Isaiah Hale and the pleadings of Shedd and the cold mathematical facts presented by Tom Carrow, but we haven't reached anywhere near the point that we wanted to reach. Now as Mr. Parvin comes to us and tells us the superintendents are on the ground and that they are going to supervise this matter after these other fellows have done their part, I feel like just saying this one thing—Sheridan was 20 miles away, but Sheridan is now here on the firing line, and that 35 per cent reduction Tom Carrow mentioned is just as good as won.

CHAIRMAN WHITE: Of course, our first duty is to prevent accidents among our employees. However, we are not always successful in doing that, and the next best thing is to have competent physicians to look after these men and get them back on their jobs with us with as little delay as possible.

We are going to have the pleasure of listening to an address this

morning in which we are all very much interested, and I am sure that Dr. W. Louis Hartman, chief surgeon, Michigan Central Railroad, representing the medical section of the American Railway Association, will be able to tell us just what we want to know. I take great pleasure in introducing to you Dr. Hartman.

THE SURGEON'S VIEWPOINT ON RETURNING MEN TO SERVICE

W. Louis Hartman, Chief Surgeon, Michigan Central Railroad, Detroit, Mich., Representing the Medical Section, American Railway Association

In my short experience of 25 years in dealing with accidents I have found that practically 80 per cent of all accidents happen in the first two hours of the first half of the working day and the last two hours of the last half. Those accidents that occur in the first two working hours are due, in a large majority of cases, to the employee, having his mind concentrated on some subject other than his work. This is often due to the home environment or to something which has happened just prior to his leaving for work. He may be in financial distress, have illness in his family or have had a quarrel with some member of his home, and his mind is concentrated on that subject rather than on his work. Therefore, his mind is running single track and it takes from one to two hours to divert it from that siding and bring it out on the main track where he will concentrate on the work that is before him; the result is that, in the meantime, an accident is liable to occur.

To my mind, a great many of these accidents could be prevented if we could get closer to our employee's home environment and the problems that go to make up his mental attitude. Just how this could be brought about is a matter well worth considering.

The accidents that occur in the last two hours of the working period are largely due to over-fatigue, resulting from some physical or mental defect, and for this condition the remedy is at hand. The avenue that leads to the correction of these defects lies in seeing that the employee is not only physically and mentally fit, but that he is kept physically and mentally fit; and this is obtained through periodical physical examinations, whereby we discover any disabilities and through proper treatment and observation see that they are overcome. Merely making a periodical physical examination gets us nowhere unless we follow up the defects that are found and see that they are corrected. Of course, due to human equations, however cautious we may be, we will probably always have a certain amount of accidents, but there is no doubt that the majority of these can be avoided.

We will now deal with the man who has had an accident and is about to be returned to work. In my opinion, these men should often be given some light service until they are able to resume their regular duties, thus reducing the chance of an accident. In the case of an employee who has been injured and has had a long-drawn-out convalescence, my

experience has been in these cases that if his duties could be changed to those of a lighter capacity, his recovery would be more rapid than if he were allowed to wait around until such time as he is able to take up his regular duties. In the case of the man who is performing some light duties which will keep his mind occupied and away from his physical defects, the psychology is that he will be thinking of what he is doing instead of his defects, and therefore his recovery is more rapid.

It also shows him that his employer is trying to do something for him and is treating him as a human being, and this diverts his mental attitude to the channel where he is anxious to recover sufficiently to be able to resume his old occupation. While during this period he is perhaps not earning what his employer pays him, in the end he is an economic asset to his employer.

My experience has been that at times too little attention is paid to what the surgeon might have to say regarding returning the injured to duty. Due consideration should be given to what the surgeon has to say about the physical condition of the injured. There have been cases where men who knew nothing about surgery have put their opinions above those of the surgeon. These cases are few and far between, being perhaps brought about through lack of confidence in the surgeon. If, however, this is the case, my advice would be to change and obtain men to do this work in whom confidence would be placed.

Time of Disability Is Sometimes Underestimated

I am not going to leave the surgeon out of this matter, either; I am going to talk about him also. The surgeon sometimes underestimates the time of disability. This is often done through the surgeon's idea that he is helping his employers; but this is certainly a mistake, as it is more economical in the long run to over-estimate a disability than to under-estimate it. This you can readily see, for the reason that often if the estimated disability is made too short, an early and equitable adjustment is not made and later on becomes a more expensive proposition than if the proper estimate were made at the outset. I thoroughly believe in an early adjustment, as my experience has been that it matters not how honest the employee may be (and most of them are honest), his recovery is more rapid where an early adjustment is made than where the time is allowed to drag on without settlement.

One of the points that I wish to stress and which is all-important, is cooperation from the higher officials down to the man directly in charge of the injured employee. My experience has been that this has not been practised as thoroughly as it should be. Of course, we all realize that large corporations are considered by employees and by the public in general as cold-hearted and indifferent, and the belief is that all they are interested in is what they can get out of the employee; that they are blind to human kindness and the welfare of their fellow-man.

We who are more closely connected know that this is not true; therefore it is our duty to dispel this distorted idea in the minds of our

employees and the public and show them that large corporations have a heart and are not just looking to squeeze the last bit of service out of the employee in order to increase the exchequer of the company. By eliminating this fallacy from the mind of the injured, he will not feel that he is obliged to go outside and employ an ambulance-chaser in order to protect his interests and obtain what he thinks is right for his injury.

Whenever a man is sufficiently recovered that he can do light work, this should be provided for him, as I have said before, in order to keep his mind from dwelling on his physical condition.

On the New York Central Lines, this method is practiced and we find that it is an economic procedure. I can do no better than to quote the instructions recently issued by the vice-president of the New York Central Lines:

A Railroad Vice-President's Recent Instructions

"It is very desirable that the supervisory forces, especially foremen, retain an active interest in the return of an injured employee to his work as soon as he is able to perform satisfactory service, irrespective of the period of disability.

"It is an advantage to injured employees as well as the company, that the economic loss resulting from injuries be minimized as much as possible. In all injury cases, it shall be the duty of the employing officer, when the employee does not return to work on the day following the injury, to ascertain whether his injuries are of such a nature as to warrant further loss of time.

"No injured employee should be permitted to work when, in the opinion of the attending surgeon, the injuries are of such a nature that the recovery therefrom will be retarded in any way. This question is wholly one for the attending surgeon to answer.

"While the question as to whether an injured employee can perform satisfactory service is largely one for the department in which he is employed, due consideration must be given to the company's interest in connection therewith. Where satisfactory service can be rendered by an injured employee in a capacity other than that in which he is regularly employed, it is highly desirable to so employ him where possible."

It has been shown, since this practice has been followed, that the employee is more satisfied, and that it goes a long way toward convincing him as well as the general public that large corporations have consideration for the protection of their fellowman.

CHAIRMAN WHITE: We are greatly indebted to Dr. Hartman for taking us in hand for the medical department and telling us how that department can contribute to the success of our work.

I am going to call on Mr. W. A. Booth of the Canadian National Railways to express to Dr. Hartman our thanks for his very fine address.

MR. BOOTH: I am sure we all appreciate very much what our friend said to us this morning. I remember his saying something about the first two or three hours in the morning being perhaps the most hazardous for the men because they may have something on their minds that happened at home before coming to work. I believe my friend Jones touched on that a little yesterday.

I am sure it is very pleasing to this Council to have one of our medical friends come along, as also the superintendent that preceded him. It goes to show, I think, that the Council is bettering its programs each year. You know that, after all, these medical fellows are about the best in the land. I have a good deal to do with them. I know we all appreciate very much what Dr. Hartman has said to us, and I should very much like to move a vote of thanks.

CHAIRMAN WHITE: That completes our program for this morning. We still have some time yet, and I am going to open what might be called a round table discussion. I have been requested to ask Colonel Loree if he will say something more in connection with Dr. Hartman's address.

Colonel Loree Responds to Dr. Hartman's Address

COLONEL LOREE: Mr. Chairman, I don't know why I should be presumed to know much about the medical profession. I have been called doctor frequently but I think that is because I wear glasses. Nevertheless, I do think, in all seriousness, that we have paid much too little attention to the physical condition of the officers and employees of the railroads and that a very large number of what may be termed preventable accidents have been directly caused by the failure on the part of the management to be cognizant of that fact.

Dr. Hartman said this morning that within the first two-hour period and the last two-hour period of the working day occurred the majority of accidents, and I don't think that he will have to take any water on the assumption that that is the experience of all of us. The reasons advanced by Dr. Hartman as to the prevalence of accidents in those periods we must likewise concede. It is no kindness to the man, if you know that financial or domestic worries are occupying too much of his attention, to allow that man to continue in the service unless those matters can be properly adjusted.

I remember a case which was recalled by Dr. Hartman's paper, an experience of my own after I had been connected with the railroad. I now have the honor to be with, only a few weeks. We had an engineer of long experience and exemplary record, who, had to be summoned to the office for violation of the rules. They weren't serious derelictions and if they had come over an extended period, there would have been very little thought of it; but for a man who had gone on for years without any violation of rules, and then three coming to the attention of the assistant trainmaster, it seemed to be a matter of some moment.

Investigation was first made outside and then from questioning the

man, it developed that his wife was extremely ill. He had gone to a very large expense for doctor bills and he was trying, in order to save some money, to do the night nurse work, and the result was that when he went on duty in the yard during the day, he was totally unfit for the service.

When he had finished the third day, I said, "You can't work any more until your wife has been to the hospital and is well on the way to recovery," and I shall not ever forget the despairing look that appeared on that man's countenance. First of all, 30 days' pay is a serious matter, and that seemed to be about the last straw in that man's bundle, and it was quite a long while before he could listen comprehensively to what else had to be said.

But there was no use in letting him go on because he would either have killed somebody or else he would have been killed himself, and I think very often if we took the trouble to go thoroughly into the home life and the conditions surrounding the home life of the employee, we would more intelligently approach the problem, not only of the prevention of accidents, but violated rules.

As I said before, the two things that the vice-president has to conduct his work are loyalty and discipline, and I want to clarify exactly what was meant by that.

The Employee Must Have Pride in His Organization

By loyalty I had in mind first of all the individual's pride in himself. Any man who hasn't pride in himself starts very poorly. Then he must have pride in his ability to perform the work for which he is employed. He must have pride in the organization which employs him. One of the truest things ever said was written by Elbert Hubbard: "Don't continually kick about the organization that employs you. If it is as bad as it is, how can you afford to work for it?"

Loyalty embraces the sacrifice that the individual is willing to make his own predilections for the benefit of the organization of which he is a member. It is the trust and confidence that all employees must have in those who have been placed over them for supervisory purposes.

What is discipline? I know to the operating superintendent, and perhaps to most of the safety superintendents and agents, and I know to a great many general managers and others, the word discipline has meant suspension, adverse criticism, dismissal, and yet nothing is further from the meaning of the word itself. Discipline is exactly what is meant in the Greek—it means to teach.

There is practically no place on a railroad for punitive discipline. It is very seldom that you can afford either to lay a man off in suspension or sever his connection with the company. When you think that in every engineer that works on the American railroads the company has at least \$5,000 invested, it should be a long time before the superintendent or trainmaster would sever that man's connection. No superintendent that I know, if you handed him \$5,000 in bills, would throw

it out the window, and he has no more right unthinkingly to put an engineer out of the service. There are five per cent, roughly, of the employees of the railroads that are no good, that are unfit for railroad service. They may be very competent elsewhere, but for our service they are totally incompetent.

Discipline means to teach, not only teach the details and the technique of the profession, but it means to teach how to perform the service that is to be performed in a safe manner, and it is in exactly that connotation that the two words which I used to express the tools of the vice-president were used this morning.

DR. HARTMAN: You will pardon me for taking the floor again. There was one part of this that I really did not stress, that is, the last two hours of the working day. My experience has been by close observation that the majority of our accidents which happen during the last two working hours of the day, are due to over-fatigue resulting from mental and physical unfitness.

I have a case in mind (this is only one of many) where a man had been working for a long time and the last half of the day he was slowing up. His economic value was only about 20 per cent of what it should have been. After censuring the man and going down into his record more, we found he had not only been going down in his efforts, but he had been ruining material. We examined his eyes and found his trouble. We had his eyes thoroughly examined, glasses put on, and he gave us a day's work. That is only one case of many that I could cite. Therefore, it is important that we know that in our shops where we have a great many accidents, the eyes of our employees are normal. If they are not normal, they should be brought up to normal with glasses.

Round Table Discussion on "Train Service Accidents"

CHAIRMAN WHITE: Colonel Loree, I was especially requested to call on you to say something in connection with Dr. Hartman's address, and I am very glad I did, because we enjoyed very much your further remarks.

This is one session that I am going to propose we finish in accordance with the program and adjourn on time.

I am now going to open a round table discussion for about 30 minutes on "Train Service Accidents." I am going to limit each man to three minutes, and at 11:45 I am going to adjourn this meeting.

ROBERT SCOTT (Atlantic Coast Line, Wilmington, N. C.): May I accept your gracious offer just for a moment and put a question before this meeting that I have been asked? Something was said yesterday afternoon by Mr. Phillips, I believe, in connection with the wonderful reduction that his railroad has made in grade crossing accidents. The matter was brought out by the representative of the superintendents' association this morning, and it seems to me, as some of our fellow members have said this morning, it is a matter of much importance that

we find out how many railroads in our group have changed the grade crossing whistle signal. I propose, Mr. Chairman, that you ask every man representing every railroad here to give the name of his road if it has changed the whistle signal so that it can be recorded in the proceedings.

CHAIRMAN WHITE: You have all heard what Mr. Scott has said, and I will be glad if each representative of the railroads here represented will signify whether his road has changed the grade crossing signal whistle, and I am going to start off with my own.

Railroads Using the New Whistle Regulation

(The following roads have changed the grade crossing signal whistle:)

Illinois Central Railroad
Wabash Railway
Hocking Valley Railway
Lehigh Valley Railroad
Great Western Railroad
C. B. & Q. Railroad
M. K. & T. Railroad
D. T. & I. Railroad
A. C. & Y. Railroad
Ann Arbor Railroad

CHAS. E. HILL (New York Central Lines, New York City): The New York Central Lines have not changed the rule excepting through special instructions which will have the same effect. It will require the sounding of the last whistle to be prolonged until the crossing is reached.

S. M. GALATY (Chicago & North Western Railway, Chicago, Ill.): The Chicago and North Western have the same procedure.

J. J. HEAVEY (Erie Railroad, Huntington, Ind.): The Erie Railroad has followed the same principle on the western division.

MR. HILL: Mr. Chairman, I am not going to discuss the question at issue at this time, but may I just ask those who are here representing the various units of the New York Central Lines to stand so we may know how many are present?

(There were thirty-five.)

ISAIAH HALE (Atchison, Topeka & Santa Fe Railroad, Topeka, Kansas): It has truly been said that he who tooteth not his horn, his horn shall not be tooted.

CHAIRMAN WHITE: I want to say that I am not going to do any tooting this morning. I was requested early in the game to leave the great Illinois Central in Illinois and it is still out there.

Does anyone else want to say anything about train service accidents? We have a little more time and should benefit by some discussion here.

C. T. BAILEY (Oregon Short Line Railroad, Salt Lake City): It appears to me that in view of the fact that a committee has been appointed

to investigate the subject, any discussion should be postponed until the committee has reported.

CHAIRMAN WHITE: This is another case where the acting chairman has been misled in opening that kind of a discussion. Next year I think I will stay in my room out of sight until the time for the meeting.

MR. CARROW: A thought occurred to me this morning after the very able address of the surgeon of the Michigan Central, which I think is so important that it should not go into thin air, as most of our thoughts do. While I was formulating a tentative resolution, I heard someone mention adjournment, and I will therefore have to present the resolution I have in mind extemporaneously.

"Whereas, The diagnosis of treatments of injuries and disease by railroad doctors enables them to detect the physical and mental condition of employees that might be antecedent to accidents.

"RESOLVED, That it is the sense of this meeting that safety officers develop a relation with their respective company surgeons and doctors that will enable them to obtain from the doctors any information that might bear on the prevention of injuries to railroad employees."

I move the adoption of that resolution.

(The resolution was seconded and carried.)

ADJOURNMENT

WEDNESDAY NOON LUNCHEON

October 27, 1926

E. R. COTT, Toastmaster
Safety Agent, Hocking Valley Railway Co., Columbus, Ohio

ADDRESS

**W. A. McGonagle, President, Duluth, Missabe & Northern Railway
Company, Duluth, Minn.**

No Congress of safety officials would be worthy of the name, without paying tribute to the life work and the public service of Ralph C. Richards, of Chicago, Illinois, the Father of the Safety First idea. It occurred to Mr. Richards that there was a needless number of fatalities and a far greater needless number of accidents in the railway service, many of which could be entirely prevented by a persistent and consistent system of education; and so he started a campaign of "Safety First" that has spread like wildfire among the railways of the United States and among our manufacturing industries, until the present results are so startling as to cause us to wonder why we did not adopt this method many years ago.

Mr. Richards, notwithstanding opposition at first, carried on, and today, when our reports show the many thousands of lives that have been saved and the greater number of accidents that have been prevented, we have cause to remember with gratitude this splendid man who was with us for a time to assist in doing God's work on Earth, and has now been called to receive the final approbation of the Master—"Well done thou good and faithful servant."

Suitable tribute should also be paid to Judge Elbert H. Gary, Chairman of the Board of the United States Steel Corporation, for working out a definite plan of safety, sanitation and welfare among the constituent companies of the corporation, which plan has produced marvelous results in saving the lives and limbs of many of its hundreds of thousands of employees and has at the same time brought into effect the closest cooperation of officials and men, due to the friendly interest taken by the officers in the welfare of these employees.

It is a very great pleasure for me to be present at this, the Fifteenth Annual Congress of the National Safety Council, Steam Railroad Section. I have been in the railroad service for a period of 45 years and during that time have witnessed the tremendous growth of the great railroad industry; but so rapid has been the development of the railroads of the United States, that we have neglected to look around us to see the increasing danger to life and limb caused by the mad haste that we have all been guilty of and the indifference that has existed among our employees for the safety of their fellow employees and the public. We have rather assumed that it was up to the employee to look out for his own safety, if he cared to, and have not impressed him sufficiently with

his responsibility for conserving the lives and limbs of his fellow men.

Fortunately, due to the activity of Ralph C. Richards and the many others who adopted and practiced his suggestions, we are at last emerging into a period when it is a disgrace to any railroad executive to permit carelessness among his employees; and each and all of them, to a greater or lesser degree, are taking into serious account as a business proposition, as well as a humanitarian obligation, the conservation of human life and limb.

The need of the National Safety Council, as a clearing house for safety ideas and methods of accomplishing them, is becoming more and more apparent, not only to the railroads of our country, but to all industries, and to our national, state, city and even our rural governments. The total membership of the National Safety Council, now consisting of about 4300 railroads, industries and municipalities, is appealing and shows conclusively that the people of this country are alive to their responsibilities in regard to the conservation of human life, and are anxious to become associated with specialists along this line and follow those recommended practices that will give us the desired results.

National Safety Council Congresses Lauded

The National Safety Council is doing a noble service in bringing together in congresses like this, men from all walks in life, each giving the best that is in him for the welfare of all, with the single thought of eliminating the needless accidents that have sapped the life of our Nation and have to a degree disgraced our modern civilization. Let us therefore be up and doing to make our country, already the brightest and best country in the world, also the safest Nation for each of us to labor in, and so give confidence to all that each one of us is looking out to an unusual degree for the welfare of all the others.

In my opinion, each railroad in the United States and each and every industry should be active members in such national organizations as this one, and preferably this particular organization, in order to secure maximum benefit at the lowest consistent cost, of the safety work being fostered by the master workmen who compose the official roster of this organization. There is not and never can be any politics in this National Safety Council, nor can it ever be controlled by any particular religious denomination; on the contrary interest for the personal safety of all the people is the first consideration of the officers and employees. Its meetings are held in different centers in our country, so as to make it reasonably convenient for the greatest number to attend and thus get at first hand full information regarding recommended practices and take this knowledge back to our homes to assist in adding further safeguards to our employees and to the public at large.

The accident prevention problem on American railroads, from the standpoint of the railroad executive, is the particular subject assigned to me today. To you who are charged directly with the responsibility of organizing and directing safety departments, I wish to say that outside

of the credit you will receive for carrying out humanitarian ideas there also comes the assurance that it pays in hard dollars to save the lives and limbs of our employees. Too many of us in the past have hesitated as we comprehended the cost of organizing and maintaining safety departments, but my own experience has fully satisfied me that all the expenditures we have made in this department of the Duluth, Missabe and Northern Railway were warranted. The investment made has been a paying one, even measured commercially, and we are in position to recommend to all other executives the organization and permanent maintenance of a strong and effective safety department, which, from our own experience, we know will tend to unite in a bond of fellowship all the officers and working men of your companies.

Ten years ago we created a safety department on the Duluth, Missabe and Northern Railway, with Mr. A. V. Rohweder, who is now the chairman of your Steam Railroad Section, in charge, reporting directly to the president. His presence here today indicates that he made good in his department and that the National Safety Council recognized his special ability.

He attends all officers' meetings, is familiar with all subordinate departments, cultivates the friendship of all officers, foremen and employees and the men look upon him as one of the most important officials on the railroad. He has succeeded in cultivating a spirit of cooperation and friendship among the employees that has resulted in very great benefit to the company, and we have as a result of this cooperation a record that is very satisfactory from every point of view.

Various Safety Committees Are Active

We organized safety committees in every department and required our men to serve upon them according to their seniority, beginning with the General Committee, upon which the officers serve and of which the president is the chairman. We follow with the Shop Safety Committee, the Operating Safety Committee, the Engineering Safety Committee, the Ore Dock Safety Committee, the Coal Dock Safety Committee, composed of employees and officers in each department. Written recommendations are made by the men in every department, tending to eliminate dangerous practices, increase efficiency and improve appliances used. These committees meet regularly once a month and have made thousands of recommendations, the majority of which have been adopted by the General Committee. Only a small number have been rejected, (about three per cent), and the employees who make the recommendations are always fully advised as to the reasons for rejecting any suggestion. Those whose suggestions have been adopted are also advised and complimented for their assistance in promoting safer and more efficient operation.

Attendance of the president and other general officers at department safety meetings now and then, gives inspiration to the men to do their best. It is the same old story of "like master, like servant" and the

men are glad to know that their officers really mean what they say in urging them on in making new suggestions.

Safety dinners and picnics are given now and then, at which our own officers and some good speaker from the outside, are present to spur the men on to renewed effort. The successful work of the employees is given full credit at these meetings and the men always return to their occupations fully resolved that it was worth while to give their time and their thought in eliminating as far as possible the accidents that cause sorrow in their homes and loss of earnings possibly for a long time.

The accident record of the Duluth, Missabe and Northern Railway Company, based on the number of accidents involving the loss of one day's time or more for the years 1917 to 1925, inclusive, is as follows:

Safety Record Covering Nine Years

Year	1917	1918	1919	1920	1921	1922	1923	1924	1925
Number of Accidents.....	607	413	494	298	179	68	71	45	76

The tonnage moved for the year 1925 was 21,373,044 tons; our maximum number of employees was 3,349; our average number 2,701. In addition to the above, our records show that the severity of injuries has been greatly reduced.

The Missabe Road has operated from December, 1923, to date, a period of nearly three years, without a single death and without the loss of an arm, hand, eye, leg or foot to any employee or passenger.

In our Car Repair Shops at Proctor, where we employ 216 men on the average and repair an average of 1,898 B. O. cars per month, we have a record of operating over eight years without a single lost time accident where one day's time or more has been lost.

These records mean only one thing, namely, that it pays to work out an intelligent plan of cooperation in reducing accidents and it pays for railroad executives to lend a hand in helping employees to help themselves to the end that sorrow may be banished in so far as is possible and that employees may leave their homes for their work on our railways and in our shops with a reasonable assurance that they will not be maimed.

In conclusion I desire to state that our company has been repaid many times over for the cost of organizing and developing the safety work on our railroad; it has paid me in peace of mind to assist in working out an effective system for preventing accidents to our employees; and I am much prouder of our record in saving human lives and limbs than I am of the splendid low operating cost we have attained, much of which is the result of loyal and faithful cooperation of our officers and men.

It is my hope that all our railways, industries and municipalities may see the light of the new day and realize that we are indeed "Our Brother's Keeper."

WEDNESDAY AFTERNOON SESSION

October 27, 1926

L. F. SHEDD, Acting Chairman
Superintendent of Safety, Chicago, Rock Island & Pacific Railway Co.,
Chicago, Ill.

The meeting was called to order at 2:30 oclock by Chairman Rohweder.

CHAIRMAN ROHWEDER: On the third lap of cur program, the chairman of the Program Committee will preside. I want to say that Mr. Shedd, who worked out last year's program and this year's program, has done a real job. I never realized until this year the amount of work that is involved in the job of chairman of a program. Visualize for yourself the amount of correspondence it takes to get together the speakers on the program and then work that out with the National Safety Council to get it down in brief form and into your hands when you register here at the convention. That is a real job. And then to work it out so your time comes along about as you anticipated is a bigger job.

I want to pass one more idea along to you and that is that we have three very excellent papers this afternoon. These gentlemen have come here representing three associations, three national railroad associations, and they have given considerable time and thought to their papers, and I hope that you will make any notes that you might want to make so you can discuss them tomorrow at the round table discussion.

I am going to ask Mr. Shedd to adjourn this meeting when the regular program is over.

(Mr. L. F. Shedd, of the Chicago, Rock Island & Pacific Railway Company, Chicago, Illinois, took the chair.)

CHAIRMAN SHEDD: I am very happy, of course, like most fellows, to be permitted to sit in the active chair up here, but the real good that I get out of this is through the magnanimity of the fellow who has just stepped off the platform. This isn't a love feast but Art has again displayed his executive ability, his real leadership, by distributing some of the honors, as it were, among some of the older heads of the Section. I am speaking now of Jim White and myself; and then it was splendid of him to let Cott be the toastmaster today, for if there is anything in the world that Cott likes to do, it is to talk.

I am very glad to preside; but the thing that I am really glad about is that we have had such a wonderful session this morning, climaxed by that wonderful speech by Mr. McGonagle, that Godfearing gentleman who has the courage of his convictions and the courage to come here

and tell them. The further we go, the better it gets, and I am anticipating something fine this afternoon from this wonderful array of talented men whose names appear on the program.

ROBERT SCOTT (Atlantic Coast Line, Wilmington, N. C.): Mr. Chairman, before you proceed with the program, I wish to offer a motion to the effect that the Steam Railroad Section go on record as making a specific request of the *Railway Age* and the NATIONAL SAFETY NEWS to reproduce in full every word that Mr. McGonagle offered at our luncheon today. I so move you, Mr. Chairman.

(The motion was seconded and carried.)

CHAIRMAN SHEDD: We are privileged to have with us today a man who has done a great deal outside of the Section to make streets and highways over the railroads, as well as remote from them, safer in one of the great states. He comes from a city in the northwest that bears a decidedly splendid name. I am very glad to introduce to you Mr. F. W. Matson, Commissioner of the Minnesota Railway & Warehouse Commission, and also Chairman of the Committee on Safety of Railroad Operation.

THE MINNESOTA STOP LAW

F. W. Matson, Commissioner, Minnesota Railway & Warehouse Commission, St. Paul, Minn.

On April 24, 1925, the Minnesota Grade Crossing law was approved and went into effect. Without quoting the entire Act I will present some of the sections:

SECTION 2:

"The commission is hereby authorized and required to adopt and prescribe uniform warning signs for use at grade crossings in this state which will furnish adequate warning of the existence and nature of such grade crossings and to make regulations as to the place of installation. There shall be at least three distinct types of such warning signs, to-wit: a home crossing sign, for use in the immediate vicinity of the crossing, an approach crossing sign, to indicate the approach to a grade crossing, and a stop sign, which shall have the word "stop" plainly appearing thereon, to indicate the necessity to persons on the highway approaching the crossing whether in vehicles or otherwise, to come to a stop before proceeding over the grade crossing, according to the provisions of this act.

SECTION 3:

"At each grade crossing in this state hereafter established and at each grade crossing where and when the existing crossing signs are replaced the railway company operating the railroad thereat shall erect and maintain on the highway on each side of the railroad track or tracks and within a distance of 75 feet from the nearest rail, one or more of such uniform home crossing signs.

SECTION 4:

"At each grade crossing where, because of the conditions surrounding the same, the reasonable protection to life and property makes it

necessary for additional warning signs to be placed on the highway at a greater distance from the crossing than the home signs, such approach warning signs shall be installed. The commission is hereby authorized to designate any such grade crossings requiring such additional signs on either or both sides of said crossing. When any such crossing is designated by the commission as requiring such additional protection, it shall notify the railway company operating the railroad thereat and the public authorities having the care of the highway. Such railway company shall, within 30 days after such notification, furnish such uniform signs to such public authorities, and such public authorities shall erect said signs in conspicuous places on said highway on either or both sides of such grade crossing, as the case may be, not less than 200 feet from said crossing and shall thereafter maintain the same.

SECTION 5:

"At each grade crossing where because of the dangers attendant upon its use a reasonable protection of life and property makes it necessary for all persons approaching the same to stop before crossing the railroad tracks thereat, such stop signs shall be installed. The commission is hereby authorized to designate any such crossing requiring such additional protection as a stop crossing and shall notify the railroad company operating the railroad thereat of such designation. Within 30 days after such notification it shall be the duty of such railroad company to erect such uniform stop crossing signs in conspicuous places on each side of said crossing.

SECTION 6:

"Whenever any vehicle carrying school children, explosive or inflammable liquids, or passengers for hire, or any trucks or any vehicle having in tow any other vehicle or equipment, or any vehicle of the tractor or caterpillar type, approaches any grade crossing it shall be the duty of the driver thereof to bring the same to a complete stop before reaching the railroad track and before crossing said track to ascertain when such crossing can be made in safety.

SECTION 7:

"Before proceeding across the railroad track at any crossing marked with such stop sign, it shall be the duty of all persons controlling the movement of vehicles to bring such vehicles to a full stop and to ascertain whether or not trains are approaching such crossing."

The Commission appointed an advisory committee composed of experts on signs, crossing protection and road marking. This committee met several times and worked out specifications for signs to be used and suggested the following general rules for the selection of stop crossings:

"Crossings Outside of Municipalities"

1. Where the view of an approaching train within a distance of 500 feet in either direction from the crossing is obstructed from an observer at any point on the highway within a distance of 200 feet in either direction from the crossing:
2. Where the view of approaching trains within a distance of 1,320 feet in either direction from the crossing is obstructed from an observer at any point on the highway within a distance of 50 feet in either direction from the crossing:

3. Where a public highway adjacent or parallel to the right of way turns and crosses the right of way:
4. Where the smaller angle of the highway crossing is less than 60 degrees:
5. Where the highway crosses the tracks of more than one railroad company on right of ways which are parallel, the distance between the tracks, as well as obstructions, should be controlling features.

"Crossings Within Municipalities"

At crossings in municipalities, no rules as to distance and clearances can be suggested. The usual speed of trains passing through the towns, density of traffic, the location of buildings, their distance from the main lines and the practice of spotting cars adjacent to crossings must be given consideration in scheduling such "stop" crossings.

Each railroad operating in the state was requested to submit a list of the most dangerous crossings on their lines and ones which should be designated as "Stop Crossings." The Commission had printed a pamphlet containing the law, the specifications for the different signs to be used and the suggestions outlined above.

In June, 1925, the Commission started out inspecting these crossings and has now almost completed the work. There are about 13,000 crossings in the state and we have selected about 1,300, or approximately 10 per cent, as stop crossings.

Great care has been exercised in the selection of these crossings and many of the crossings suggested by the railroad companies have not been marked. In many cases a sign has been placed on only one side of the track, that is in cases where the view was obstructed from one side only. These trips have been made in a special train consisting of an engine and business car, stopping at each crossing and walking over the road from both sides. In some cases we have improved the condition of the crossing by re-locating the signs, ordering brush cut out or small buildings re-located so as to give a better view.

In municipalities we have met with local authorities, and with them have gone over each crossing, securing their full cooperation in the location of the stop signs and their promise of enforcement.

On trunk highways we have been particularly careful about designating any stop signs unless conditions were so thoroughly bad as to make it necessary for the protection of life and property. We have had a representative of the state highway commission with us on most of the trips and he has been of great help in locating and re-locating crossing signs and advance warning signs. We have also taken into account the amount of automobile travel over the road as compared with train movement and our general policy has been not to put up any sign we would have to defend. That is, we want conditions to show for themselves that the crossing is one that should be a stop crossing.

It is very possible that in picking out so many crossings we may have made mistakes, in fact we have taken down a few stop signs that

were ordered up, because we found conditions were not exactly as represented to us at the time we designated the crossing. Every one of these stop signs has been ordered in after a personal inspection of the crossing by a member of the Commission, together with the engineer or assistant engineer of the Commission, assisted by advice of the railroad officials and municipal authorities.

I do not know how it would have been possible to have exercised more care in the selection of these crossings. Where there was any doubt about the advisability of making a stop crossing we have not designated it, feeling it would be better to have fewer crossings designated until the vehicle drivers of the state become familiar with this law. We have had several requests for installation of additional stop crossings. I believe that as the drivers come to know what this law means in the way of safety for themselves, their families and property, that the observance of it will become general and requests will come in for the designation of more crossings to be marked.

Certainly we have not made the mistake that other states have in putting up these signs promiscuously at every crossing in the state.

The Commission is not charged with the enforcement of the law. That is in the hands of the local authorities. The results vary with the activities of the authorities in the different towns.

In some towns the law is strictly enforced, in others little if any attention is paid to it. The Commission receives daily reports from various sources of the license numbers of automobiles ignoring these stop signs. We keep two employees busy looking up the name and address of the owner and writing a courteous letter calling attention to the law and violation of it and asking the driver's cooperation in enforcing it. We get some very nice letters in reply and I believe this work is doing some good. Of course, the best way to judge any safety measure is by the results obtained.

The Interstate Commerce Commission's accident bulletin shows that in spite of the greatly increased number of motor vehicles in use in the state, the casualties at grade crossings are becoming less. For instance, records of accidents at grade crossings involving automobiles in 1924 in Minnesota, show that 39 persons were killed and 112 injured; in 1925, 34 were killed and 113 injured.

Casualties at Grade Crossings in Minnesota

The casualties at grade crossings in Minnesota where automobiles are involved show the percentage ratio per 10,000 automobiles as follows:

1924—Killed	.77	1925—Killed	.60
Injured	2.22	Injured	1.98

The adoption by all states of a uniform law empowering state commissions to designate dangerous grade crossings at which drivers of automobiles and other vehicles must stop, as recommended by the

National Conference on State and Highway Safety, judged by the results obtained in Minnesota, is highly desirable and should have the active support of this Congress.

In Minnesota the State Highway Commission, in connection with its road building program, is very active in re-routing trunk highways in such a way as to eliminate all grade crossings possible. In such work, they are meeting with fine cooperation from the railroads, and where crossings are necessary the Railroad and the Commission are eliminating the grade crossing by construction of overhead or underground crossings and sharing in the expense of such improvement.

When the State Highway Commission took over the trunk highway system in Minnesota in November, 1920, there were approximately 932 grade crossings in connection with the 7,000-mile trunk highway project. The highway department by the end of 1926, expects to have eliminated 557 of this number, 44 being replaced by overhead structures, 80 by under passes and 233 by re-location of the highways. Further crossings will be eliminated by these methods as the trunk highway projects are further extended. The policy of the State Highway Commission is to be commended and their good work has no doubt saved the lives of many of our own citizens and citizens of other states.

In connection with the operation of the new Minnesota Grade Crossing Stop Law, the city of Minneapolis and many of the small towns have passed ordinances requiring all vehicles to come to a full stop at each designated crossing within their limits. These ordinances can and will do doubt be rigidly enforced and the effect will be far-reaching in commanding obedience to the stop crossing law.

We expect to make Minnesota nationally known for its minimum number of highway grade crossing accidents. The splendid cooperation between all state departments and the railroads and the educational campaign directed to the drivers of all motor vehicles is beginning to bear fruit. It will take further time to accomplish full results, but our program has been continuous and our efforts in this direction are being rewarded.

Mr. Bentley Responds to Mr. Matson's Address

CHAIRMAN SHEDD: Mr. Matson, that was a very splendid paper and I thank you in behalf of the Section.

Sometime ago it was my privilege to introduce a gentleman who sat at my right, and I did so through a reference that had been written in an article in one of the leading magazines in the country. It spoke of him as a man who had attained more or less success financially, and it stated he was the fellow who shook the tree and caused the plums to fall. Now get that. It did not state he gathered up the plums that the other fellow had caused to fall from the tree, but he shook the tree.

The gentleman I shall give the privilege of responding to that very good paper, is the fellow who is shaking the educational tree from which

those splendid plums are falling which you and I are enjoying each month as they come from the A. R. A. Safety Section. I will be glad to have our good friend, Bentley, from way down south, tell Mr. Matson what we think about his paper.

L. G. BENTLEY (Chesapeake & Ohio Railway, Richmond, Va.): I am sure you must be wondering, even as I am, what words I could possibly select to convey to Mr. Matson our appreciation of this splendid paper so forcefully presented. I hope that what I shall say briefly will be taken on the strength of its sincerity and that I do correctly interpret your feelings toward Mr. Matson in telling him that I think he has brought to us one of the most encouraging evidences that we could possibly get of this expanding spirit of cooperation on the part of national organizations in this great work of saving lives.

Cooperation in Safety Work a Solemn Obligation

Aside from the saving of lives and the preventing of injuries to our own employees, the railroads of the country feel, and rightly, that there is no more solemn obligation, no more sacred work that they may perform, than that of cooperating in this work of preventing highway crossing accidents, those accidents through which not only the guilty suffer, but innocent children and women, who are in no sense chargeable with the action which caused the disaster. It is through the work of such men as Mr. Matson and the organization he represents, that the railroads are looking for the upholding of their hands in this splendid, all-absorbing work; and as an educational feature of this work, the thoroughness, if you please, of the method whereby this law was written and is being executed, the care to see that nothing was written that might have to be unwritten, that nothing was done but that which had received the most careful consideration, is worthy of any attention that this Section may see fit to give. Gentlemen, I know that I do correctly represent you when I say that we do sincerely appreciate your presence here today, Mr. Matson, and the wonderful message you have brought us.

CHAIRMAN SHEDD: Digressing just a little bit from this Section over to the A. R. A. Safety Section; I think we safety fellows don't care which horse we straddle as long as we keep on. We were pleased to know that the purchases and stores department has added its assistance and prestige as well to the A. R. A. Safety Section, and I understand that Mr. H. R. Duncan, of the Burlington, who has been requested to represent the A. R. A. Division of Purchases and Stores, is here, and unless he is extremely modest and doesn't care to do so, I would like to see how big and how good looking he is.

H. R. DUNCAN (Burlington Railroad, Chicago, Ill.): I am very glad to be here. Our section up to the present time has never taken up the safety movement, but it has now appointed a committee and I am a member of that committee. We are going to give our attention to the

safety movement. I am here to get as much information as I possibly can.

CHAIRMAN SHEDD: There is another man in the audience whom I would like every fellow to know. Over in the central west there is a state which I will characterize with the words, "What it purposes, it performs." We have a man here representing that splendid state from which the grasshoppers tried to drive the inhabitants. They were unsuccessful. Famine has overtaken it. They withstood drought and everything, but today, in my opinion, excluding my own state of Illinois, I think it is the greatest state in the Union, and I think Jesse Greenleaf ought to stand up and let the boys say "hello" to him.

(Mr. Greenleaf arose and the audience applauded.)

CHAIRMAN SHEDD: Mr. L. K. Sillcox, General Superintendent of Motive Power of the Chicago, Milwaukee & St. Paul Railway, representing the Mechanical Section of the A. R. A., has kindly consented to appear on our program and add his measure to its success. I take great pleasure at this time in introducing Mr. Sillcox.

THE MECHANICAL DEPARTMENT AND ITS RELATION TO SAFETY

L. K. Sillcox, General Superintendent of Motive Power, Chicago, Milwaukee & St. Paul Railway, Chicago, Ill.

The meaning of human life is experience. Responsibility alone brings experience. Individuality is developed by responsibility. Methods may change; the individuality persists. In law a person who is not responsible for his behavior loses his individuality, for responsibility is the functioning of an individual—a conscience—who promises, who stands sponsor for the acts of the person. The real individualist devises ways to encourage the individuality of those he employs and holds himself responsible for the results. This is the first charge on his enterprise; material prosperity comes second.

When safety is made a matter of serious study, two fundamental relationships come into view that are in themselves sufficient to cause the movement to be indispensable. These are, first, that safety is only one of the manifestations of a deep, thoroughgoing efficiency; and second, that safety is primarily a matter of the head rather than the hand and hence pre-eminently educational.

In mentioning the subject of sustaining interest in safety, the mind naturally turns to safety committees or to employees who have lost interest or who need to have their interest improved. It may be, however, that the loss of enthusiasm on the part of the employee can be traced to lack of interest on the part of the employer. Unless the latter has consistently and conscientiously kept up to date in the matter of safety, he can not lay the entire blame for lack of interest in safety on the employee.

One of the ways in which an employer can certainly indicate his sus-

tained interest in safety is by devising new avenues of approach, as well as by adopting devices and processes that are developed from time to time, and while this is not meant to indicate that all schemes brought to his attention should be made standard, it does emphasize the need for, at all times, being ready to listen to suggestions, the application of which will make for improved safety in the handling of the work. Such a procedure does, at times, represent the expenditure of considerable sums of money for new and improved equipment or new devices. Such a situation is inescapable in view of the contribution of the engineering profession to safety, which has been very marked, and the application of electricity and other sciences in the way of advanced forms of machinery and processes have aided safety very materially.

An employer who takes advantage of all these developments to add to the safety of his plant, is making a substantial investment toward maintaining the interest of his employees in this important subject.

It is interesting to observe figures shown in the 1925 report of the Director of the Bureau of Safety in the Interstate Commerce Commission, indicating the number of freight and passenger cars and locomotives inspected, the number found to be defective, and the percentage defective each year for the past ten years and from them see that the 1925 showing is better than in any previous year:

TABLE No. 1

Year	Inspected	Defective	Per Cent Defective
1925.....	1,214,170	41,426	3.41
1924.....	1,172,900	51,387	4.38
1923.....	1,162,629	96,024	8.25
1922.....	1,096,670	46,370	4.22
1921.....	907,293	47,040	5.18
1920.....	911,537	40,416	4.40
1919.....	1,078,361	38,551	3.57
1918.....	1,119,451	42,448	3.79
1917.....	1,166,759	41,378	3.54
1916.....	967,507	35,372	3.65

In addition, Table 2, a tabulation, for the period June 30, 1921, to 1925, inclusive, covering freight cars inspected and percentage found defective, passenger cars inspected and percentage found defective, locomotives inspected and percentage found defective, and the number of defects per 1,000 inspected, indicates substantial improvement in 1925 over previous years with respect to freight cars and locomotives; and as regards passenger cars the showing is better than that which obtained in either 1923 or 1924.

Furthermore, a study of the 14th Annual Report of the Chief Inspector of the Bureau of Locomotive Inspection to the Interstate Commerce Commission for the fiscal year ended June 30, 1925, as shown in Table No. 3, shows a 69.7 per cent decrease in number of persons killed as compared

to the previous year, as well as a decrease of 33.9 per cent of the number of persons injured.

In addition to the train service accidents already mentioned, it is well to take account of the fact that in the maintenance of equipment department, there were, in 1924, 540,000 employees, of whom in that year 221

TABLE No. 2

	1921	1922	1923	1924	1925
Freight cars inspected.....	865,858	1,046,964	1,117,355	1,123,258	1,167,980
Per cent defective.....	5.34	4.35	8.49	4.47	3.48
Passenger cars inspected	20,082	26,116	22,038	21,359	22,526
Per cent defective.....	0.87	0.97	1.27	1.54	1.19
Locomotives inspected....	21,353	23,590	23,236	23,283	26,664
Per cent defective.....	2.80	2.40	3.64	2.89	2.10
Number of defects per 1000 inspected.....	62.36	50.54	100.31	52.73	42.46

TABLE No. 3

Number of accidents, number killed, and number injured caused by the failure of some part or appurtenance of the locomotive or tender, including the boiler, by comparison, year ended June 30.

	1925	1924	1923	1922	1921
Number of accidents.....	690	1,005	1,348	622	735
Per cent increase or decrease from previous year	31.3	25.5	117*	15.4	12.8
Number of persons killed.....	20	66	72	33	64
Per cent increase or decrease from previous year	69.7	8.3	118*	48.4	3
Number of persons injured.....	764	1,157	1,560	709	800
Per cent increase or decrease from previous year	33.9	25	120*	11.3	12.6

(*Increase.)

were killed and 53,311 injured, representing 15 per cent of all fatalities and 43 per cent of all injuries to employees on duty.

The officers of the mechanical departments of American railroads are fully alive to the importance of overcoming these accidents. On every railroad there is a complete safety organization providing, through the general foremen, foremen, assistant foremen, gang leaders and other supervisory forces, full and complete safety supervision and training of maintenance of equipment employees, particularly new and inexperienced men, to the end that maximum safety may be assured and a 35 per cent reduction in casualties by 1930, which is the safety goal of the railroads, may be achieved.

The result can and will be accomplished. The following methods are being used to awaken and sustain interest in safety:

Methods of Persuasion:

- Inspiration
- Education
- Information
- Group Rivalry
- Prizes
- Lessons from actual accidents
- Recognition of meritorious acts.
- The personal touch.

Methods of Compulsion:

- Rules and Regulations
- Discipline
- Physical safeguard
- Safe Maintenance
- Improved design or method

Each railroad has a safety organization working through committees, staff meetings, etc., to develop to the utmost the features listed under "Methods of Persuasion," and to impress the value of rules, discipline, etc., listed under "Methods of Compulsion."

It is well to recall the extent to which these results are attributable to the elaborate character of the equipment and the careful attention paid to rules and regulations by the railroad managements and employees. It is true that occasionally an accident happens, though its results may be quite out of proportion to the seriousness of the accident in itself. Indeed, some of our most serious accidents have been, so far as cause and circumstances are concerned, of a relatively minor character, while others, more alarming in their nature, have been attended with few or no serious casualties. Results are, indeed, somewhat a matter of chance, in that they are governed by circumstances as much as by cause.

An important point to be remembered is that every accident which occurs induces careful study of each factor involved; and this in itself, both in road practice, shop practice, and from the standpoint of design or rolling stock and locomotives, as well as the specifications and inspections covering materials entering into the same, by reason of standardized procedure and exchange in views made possible by the American Railway Association, has resulted in a very real and fundamental way to make possible the advance in practice which is evidenced by government statistics, as well as from daily experience on each railway system.

CHAIRMAN SHEDD: Mr. Sillcox, we are surely indebted to you for that paper, giving us so much new and interesting data, and which you so ably presented. That is all I am going to say about it. However, there is going to be more said about it by one of the best looking young fellows in the Section. I say young because he is considerably younger than some of us, and who by the way, comes from a very splendid railroad, the name of which is reflected in two of America's beautiful streams—the Delaware and the Hudson.

I am glad to give Mr. J. E. Long an opportunity of replying to your very splendid paper.

J. E. LONG (Delaware & Hudson Railroad, Albany, N. Y.): Mr. Chairman, that introduction was even better than we arranged for this noon.

On behalf of the members of the Steam Railroad Section of the National Safety Council, I want to express our appreciation to the Mechanical Section of the American Railway Association for sending so distinguished a representative to our meeting today, and our thanks to Mr. Silcox for his most interesting and instructive address. There is considerable food for thought in his paper and I know that each one of us here will want to take a copy of it home to give it the careful study it deserves, for, as you know, the food we take into our bodies is of little value unless properly digested, and by the same token the mental food we receive is valueless unless mentally digested.

We know that accidents are only a small portion of the mechanical officer's many duties and responsibilities. Mr. Silcox has told us how important a part it is, and we know how vitally necessary it is for every railroad officer to get squarely behind the safety work if it is to be a success.

I wish again to express to Mr. Silcox our grateful appreciation for his intensely interesting and important contribution to our meeting today.

CHAIRMAN SHEDD: You know it has been said in certain writings that they builded better than they knew. I say this with all respect to the engineering department. Some of these fellows had the impression that the engineering profession were not much in sympathy with us; but they were susceptible and came across, and we are very glad, I assure you, to know that the engineering societies have taken such a deep interest in safety because "well planned and well begun is half done." We are very glad to have Mr. E. R. Lewis, Principal Assistant Engineer of the Michigan Central Railway, of this grand and glorious city, and who, by the way, is representing the American Railway Engineering Association, with us here. He will add another strong link in this chain of successful things that we have forged here today. I am very glad to introduce Mr. E. R. Lewis.

STARTING POINTS

E. R. Lewis, Principal Assistant Engineer, Michigan Central Railway, Detroit, Mich.

The American Railway Engineering Association, which I have the honor of representing, consists largely of chief engineers and other officers of the principal steam railroads of North America. We pioneered in the field of safety for many years before any specific safety organization was effected. It has ever been the duty of the civil engineering

profession to protect their men, their structures, their equipment, their machines and tools with all possible safeguards.

We are strong for organized safety. We know the difficulties, we are familiar with the inertia to be overcome. We deeply appreciate the great strides made to this end by the National Safety Council, and we desire to afford every means within our power to further the objects for which this Council stands. Our "Manual of Recommended Practice" includes safety rules which are the results of the labors of our committee on rules and organization extending over a series of years, during which the best thoughts of supervisory officers, railroad executives, and writers of railroad rules for employees were collected, reviewed, reconciled, revised, combined, and finally adopted as standard.

General Notice Prefacing the Rules

The rules are prefaced by a general notice. Our general notice to maintenance of way employees reads as follows:

"To enter or remain in the service is an assurance of willingness to obey the rules.

"Obedience to the rules is essential to the safety of passengers and employees, and to the protection of property.

"The service demands the faithful, intelligent and courteous discharge of duty.

"To obtain promotion, capacity must be shown for greater responsibility.

"Employees, in accepting employment, assume its risks."

To this list of precepts, the Michigan Central Railroad Company, with which I am employed, adds this specific warning by way of emphasis:

"When in doubt, employees must take the safe side and run no risk."

Many years ago I learned to respect that last extraordinary warning—written so forcefully by Colonel Webb, then chief engineer, that no employee could mistake its meaning nor doubt its intent. It leaves the heedless no excuse.

The 1925 Transactions of the Steam Railroad Section, presented at the National Safety Council Convention in Cleveland last autumn, are so replete with valuable matter relating to safety that the ground seems admirably and exhaustively covered. Improvement and standardization of safety devices are attracting the necessary attention. I judge that in-so-far as the human element is concerned—and it seems responsible for some 90 per cent of our accidents—the chief problem now confronting this Council consists of ways and means of impressing on all the people, the precepts of the gospel of self preservation. Since self preservation is the first law of nature, the assignment sounds perfectly easy. As a matter of fact, it is quite the opposite. We have progressed greatly, yet we may well adopt the motto of that great British empire builder, Cecil Rhodes, "So Little Done, So Much To Do."

As a member of the American Railway Engineering Association I would like to present two thoughts, born of our experience in and out of committee work closely related to safety:

First, we are handicapped in Steam Railroad educational circles by two conditions, the foremost affecting the present personnel; the other affecting the prospective employee.

Railroad employees are busy men and women. They have many exacting duties with the ultimate object of selling transportation. They must work fast and think fast. Most of them must at the same time fight the clock and the weather, for schedules are schedules. They must see and hear and remember and remedy many things, under many conditions. They must protect the company's interests and deal with the public. You who drive automobiles (and who does not in this automotive age) well know that no driver is a safe or a good driver who does not keep his eyes on the road and his mind on his job. No good driver is a safe driver who drives when he is impatient, or nervous, or overtired, or in any but a calm yet alert and normal condition of mind and body. If you really and properly drive a car you will see and think meanwhile of little or nothing outside the driving limits.

Safety Lies in the Least Dangerous Course

Many railroad accidents are due, I believe, to lack of concentration on safety; due to the employee considering other duties and problems while in charge of a hand or motor car or other moving vehicle or machine. There are many other accidents attributable to the employee's lack of power of mental concentration. No person is safe who can not, or will not pursue always the least dangerous course with his whole mentality focused on the danger to be avoided. The individual must be awakened to the absolute necessity of exerting his will to concentrate before he can be educated. The first requirement of salesmanship is to get the attention of the prospect. Our problem is then, to impress safety, preferably in some attractive manner, on the attention of the people.

The other handicap, affecting both the employer and the prospective employee, is lax method or absence of adequate means of employee selection. It is becoming harder every year to "hire and fire" employees. This probably is as it should be. An impersonal attitude on the part of the employer is likely to be interpreted as an affront by the employee, and is to be avoided if possible. The trend toward the co-partnership viewpoint comes nearer that Justice on which this world was founded and endures. Because men can not now and should not be indiscriminately discharged with or without cause, we should be very particular as to whom we hire and how we hire them. Employers preferably should have special means for the examination of applicants for all positions and such means should be used to select employees only after a strict measuring up to standard requirements, physical, mental and moral.

Once on the payroll, the employee should not be lost sight of by the employing examiner. He should be made to feel, without any inference of espionage, that having entered the service with a clean bill of health, it is up to him individually to retain that state of being, for the em-

ployer's benefit as well as his own and that of his fellow workers. By example and precept he should in like manner educate his family in safety. Selection then is our most efficient safeguard, with education of employees made easier because the selected worker is more readily impressed with safety teaching, having the intelligence to understand its importance.

Most of the technical societies have recognized the value of instituting student chapters and of seeking in various ways the cooperation of college and university authorities to interest the youth of the land in the technical activities of their elders with a view to applying for student membership. This trend suggests the second thought I would leave with you, namely: educate the young people to practise safety.

I would go farther back than the university, farther than the college, the high school or the common school. I believe that the way to get the best results from teaching safety is to reach the infant class. By the time a child is old enough to go to kindergarten alone, he or she should have the precepts of the safety primer by heart and should be drilled in the practical rudiments of resisting danger. A child so schooled will make the safest and best railroad employee.

There are various organizations through which a great deal has been and is being done along these lines for boys and girls, notably the Boy Scouts and the Campfire Girls, which can not be too highly commended. The self sacrifice of the scoutmasters and other volunteer officers of these training corps is most commendable; for they sacrifice not only time but their personal funds in many cases, for transportation of troops, and many other incidentals. Boys are eligible as scouts at the age of twelve. The training is, of course, moral, mental and physical. It is of inestimable benefit to the youth of the land, our future men of affairs.

Children May Be Trained to Become Safe Citizens

But the Boy Scouts and the Campfire Girls are of an intermediate grade. An applicant must have had certain preliminary teaching to be or to want to be a scout. It is this early training of children that you and I through the mothers and fathers and teachers of America must direct to obtain the greatest safety results. We forget less of what we learn in childhood than thereafter. Details fade, but principles inculcated in early youth endure through life. The extent of good in this project is illimitable—children trained to be safe citizens, observing, careful, methodical, efficient, honest, physically, mentally, and morally alert and upstanding. It would indeed be a pleasure to select railroad employees from such promising material.

What a glorious objective and how sure of attainment, if you, the members of this section and of other sections and kindred organizations, will only put this thought across to the entire people and keep it before them! This assignment means diligence and perseverance, unremitting toil in the face of apathy and obstacles; but it is sure

to meet with less opposition than most great movements and just as certain to be among the greatest, because no one can doubt that it will be of greatest good to mankind. This, gentlemen, is our opportunity. What are you, what are we, going to do about it? Let us plan well our campaign and carry on, for the future safety of transportation and of the millions of patrons who depend on its services.

CHAIRMAN SHEDD: Mr. Lewis, on behalf of the Section and personally, I want to thank you for your very able paper and the way you have presented it; and I am going to call on a gentleman to say a little more about it. In this gentleman you will immediately recognize both oratorical ability and a desire, as well as further ability, to say good things to folks who deserve them. Mr. Cott will say something more about Mr. Lewis' paper.

SECRETARY COTT: I have been honored, Mr. Lewis, with the privilege to respond to your address. I presume, first, because I came from the maintenance and construction department of a railroad. There is a happy relation (perhaps you don't know of it) between our association and the association which you represent because we have a good old friend in the person of Mr. Arthur Ridgeway, now chief engineer of the Denver and Rio Grande, who formerly was in charge of safety and has left us to go into your ranks and into your association. Mr. Ridgeway was well loved by all of the older members of the Section and is remembered by them.

You remarked early in your address that an engineer very seldom talks, it is the silent profession. I presume, however, that you are an engineer, and in spite of that, you did a very good job of talking. I can't say anything about your ability as an engineer, but I am sure that your association had every confidence in you when they selected you, and they took the safe course when they made that selection.

It has been said that an engineer is trained to look at all sides of a proposition and sometimes he doesn't see the heart of it. Your paper is a splendid presentation of the subject and got down to the heart of the matter at hand; we thank you, sir, for being privileged to listen to you and being able to take home a paper in which there is food for thought.

DISCUSSION OF MR. LEWIS' PAPER, "STARTING POINTS"

F. W. Mitchell, Director of Personnel, New York, New Haven & Hartford Railroad Company, New Haven, Conn.

I find a deep sense of satisfaction and pleasure in making the response in this safety conference to the representative of the American Railway Engineering Association because it is to the engineering departments that we are indebted for much that has made our accident prevention work more potent and our machinery more effective.

We recognize, therefore, an obligation and acknowledge with apprecia-

tion the help that our safety work has received by the contribution of improved standards and design, and more careful scrutiny of conditions of maintenance, training the human element, and all other features of accident prevention to which the engineering departments have given strength and stability by their substantial support and constructive effort.

These are features that are so fundamental in their relation and so far reaching in their moral effect that I feel like saying without qualification, that too much emphasis cannot be placed on their importance.

A limitation that is short of the best that these departments can provide or maintain has a very distinct and active tendency to promote a like limitation in the character of the personal effort of the employees who are brought into contact with such conditions and examples.

An interesting phase of safety has been referred to by Mr. Lewis in connection with the effort to instill the principles of safety into the minds of the children, even down to the earliest years of their comprehension of its importance and value.

What will develop from this instruction yet remains to be demonstrated, for our industries have not as yet begun to enlist in large numbers the products of this comprehensive effort.

Accidents from Carelessness May Become Rare

With this as a background, however, and with better machinery and standards for protection, we may certainly hope for a day when accidents from carelessness of employees and many other forms of human failure may be a very rare occurrence in the course of our experience.

I am reminded of an incident that happened in one of our safety meetings when a supervisor of many years' experience, in contemplating the present spirit of safety and contrasting the conditions of former years, due to the lack of the organized effort, said with evident conviction of the truth of his statement. "Why, if we had been taught safety years ago as we now are, we wouldn't be having accidents at all today."

Let us hope his estimate of the present effort and his vision into the future prove true. It is not an unreasonable expectation, and faith is a very necessary element in bringing it about. "From Faith to Light" is a most practical sentiment, as witness the telephone, the radio, and the heavier than air flying machine.

Let us then continue the spirit of cordial cooperation, not only in our engineering departments, but in all departments, and let us confidently expect progression in safety in no less measure than we have expected and experienced other achievements. To this end, too, we must heartily endorse the suggestion presented by Mr. Lewis that careful attention should be given by all our railroads to adequate and well organized methods for employee selection.

Because it has been my experience to be closely associated for some time not only with accident prevention work but also with the examinations, revision and development of rules, and investigation of previous records of applicants for employment, re-employment or re-instatement, I

feel that I can speak with a most intimate knowledge of the actual conditions that obtain and the dangers that are invited when there is inadequate provision for safeguarding this feature, or when any laxity creeps into the effort to carry out the requirements of such provision in an efficient manner.

These also are features that are fundamental in their relation and far reaching in their effects. They are important factors affecting every department of our operation. In closing this response to the thoughts presented by Mr. Lewis I can find no more fitting words than those he used himself, and I therefore join with him in sentiment and program:

"Let us plan well our campaign and carry on for the future safety of transportation and of the millions of patrons who depend on its service."

CHAIRMAN SHEDD: I hope I made no mistake in my introduction. They say it is proper for the chairman to exercise certain prerogatives not appearing on the program. I am not going to make a speech.

I understand that we have had sitting through all of these sessions a gentleman who started his railroad career as a fire boy. He handled the scoop for many years. He was promoted to fireman, then to a freight, then to a passenger engineer. He was afterward promoted to road foreman, and today he is superintendent of automotive power of a very splendid railroad, the Michigan Central. I would like to have Mr. J. F. Jennings stand up and let us have a look at him.

Many Safety Devices Are Employed on Railroads

J. F. JENNINGS (Michigan Central Railroad, Detroit, Mich.): You know I have a great deal of confidence in your chairman, and I thought he was a man of his word. Every expression that he made was handled in suitable English, but if my recollection is correct, he told me he was going to adjourn the meeting at the close of the papers.

I never laid any stress on being a public speaker; in fact it rather embarrasses me to get up in front of a bunch of men and try to say something pertinent to the discussions that are carried on; but from what the boys tell me when they come in and see me alone, I surely have a command of the English language.

The safety first movement is one of the finest movements that has been introduced in many years and the mechanical men can appreciate it from the numerous safety devices which have been applied to railroads. The locomotives of today are made as safe as it is possible for human intelligence at this period to do. We try to preach safety in our shops, and I must confess that the safety agent is a frequent caller at my office and he is one of the fellows in addition to the vice-president who finds a lot of fault with me. You know, the only thing he ever gave me aside from criticism, was a cigarette at the luncheon table today.

In all seriousness I appreciate the safety movement and I believe that any safety agent on the Michigan Central will tell you that I am back of him 100 per cent.

CHAIRMAN SHEDD: Mr. Long, who is chairman of the Resolutions Committee, has two resolutions that he would like to present, I will ask him to do this in deference to the wishes of your regular chairman, so I am not taking any prerogatives not mine.

Mr. Long: "BE IT RESOLVED, That the Steam Railroad Section, National Safety Council, in convention assembled, hereby extends to Mr. W. A. McGonagle, President of the Duluth, Missabe and Northern Railway, grateful appreciation for the inspiration of his presence and participation in the program."

"BE IT RESOLVED, That the Steam Railroad Section, National Safety Council, in convention assembled, hereby extends to Colonel J. T. Loree, Vice-President and General Manager of the Delaware & Hudson Railway, appreciation for his attendance at the Fifteenth Annual Safety Congress and his valuable contribution to the program."

I move these resolutions be adopted.

CHAIRMAN SHEDD: May I suggest that we have these adopted by a rising vote?

(The motion to adopt the resolutions was seconded and carried by a rising vote.)

ADJOURNMENT

THURSDAY MORNING SESSION**October 28, 1926****D. G. PHILLIPS, Acting Chairman
Wabash Railway, St. Louis, Mo.**

The meeting was called to order at 9:40 o'clock by Mr. A. V. Rohweder, Chairman.

CHAIRMAN ROHWEDER: You will observe on the program that we have reached the point where we can discuss some of the things that have been told to us in the last few days. The acting chairman of this morning's program is Mr. D. G. Phillips, of the Wabash, and he will give you the detailed arrangement of the program.

(Mr. D. G. Phillips, Wabash Railway, St. Louis, Mo., took the chair.)

CHAIRMAN PHILLIPS: You will note the program this morning is divided into two parts. The first hour is the hour when the safety inspectors and the safety agents talk. That means that Bentley, Scott and Hill are to keep still the first hour and give their boys a chance.

I don't know of any meeting that I could preside over that would give me more pleasure than a meeting of safety agents and inspectors, because, to be honest, they are the fellows who do the work.

We are going to let you talk about anything you want to this morning, but there is one subject that I know you would like to talk about the most. I know you would like to talk about the safety superintendent. You would like to tell how he blames you for all bad records and takes credit himself for all good records, and how whenever he has a hard job on hand, he sends you out to do it, and all that sort of thing. I know that is what you would like to get up and talk about, but we are sensitive fellows and in order that we may go away from here having a good taste in our mouths, don't abuse us too much.

I am going to tell a story that indicates how much any person can do in safety. It is a story that every inspector and every superintendent can find good occasion to use.

About a month ago in St. Louis the local safety council, of which I have the honor to be an officer, started broadcasting 15 minutes every night in the week except two, on safety. He have a man there known as "Safety Sam." He broadcasts over the radio somewhat after the fashion of the Chicago man who tells bedtime stories.

We are organizing a safety club in St. Louis, of children who listen to Safety Sam in Safety Town, and we are asking them over the radio to write letters to Safety Sam, asking the children to become members of Safety Sam's club, and we send them a button and a pledge. The pledge is about crossing streets and railroad tracks.

This has been going on about one month. Thousands and thousands have already written letters asking to become members of that club and some of those letters are wonderful.

We received a letter from a little boy which read about like this:

"I am a little boy 11 years old. I am very much interested in safety. I want to become a member of your safety club. Won't you send me one of those buttons and one of those pledges? I listen to you over the radio every night. Safety Sam, I like to hear you talk.

"I am an invalid. I have been in bed for five years. I can't even sit up. About the only company I have is the radio. People like you don't like to talk much with a sick boy."

That letter appealed to us. We thought of that poor little boy lying there on his bed for five years, who wanted to do so much for safety; the last person on earth you would expect to be interested in safety. He never will get out of that bed, fellows. The letter appealed to us so much that Safety Sam and his wife and another member of the Council went out to see this boy. They paid him a visit and they found conditions just as he described. He was an invalid in bed. He was so interested in safety, and we all felt what a shame it was that that little boy who couldn't do a thing in safety should be so interested in it when others were not. But how mistaken we were.

Influence of a Little Invalid Boy for Safety

Safety Sam went back there again the other day, and here is what that little boy has done, the boy can't raise his head from the pillow. He has organized a safety club out there. He now has 515 members of that safety club. His sick room is the headquarters, and he has the best boys' and girls' safety club in the city of St. Louis.

We fellows really ought to be ashamed of ourselves when we say we can't do anything. It brings to mind the old saying, "Where there is a will, there is a way."

But this is a meeting for safety inspectors. We are going to have to limit your time of talking to three minutes. You heard those speeches yesterday. Who will be the first safety inspector to get up, the men who do the real work in safety departments?

C. W. HAMMOND (New York Central Lines, New York City): For the last two or three years it has come to my notice that the New York Central Lines have been sort of clogging the docket, as it were, so for the last year or so we have kept rather quiet. However, I would have you know that the New York Central is still making progress. I believe it was a D. & H. magazine that I saw the other day which said, "Progress is a good deal like riding a bicycle, because when you stop you have to get off."

There is only one thing in my mind this morning with reference to equipment that I would like to speak about. Many of you were present, I believe, two years ago when I had the pleasure of discussing a paper written by a United States inspector. His subject was "Proper Maintenance of Equipment." I told at that time that I thought our inspection of our equipment was nearly 100 per cent, but we should have proper equipment to inspect.

I would not have you believe that we do not have proper equipment on the New York Central Lines because we haven't a car in freight service today that is not either all steel or steel underframe, but we do find today that many of our railroads are equipping their brakes with dish brake wheels which causes a very dangerous condition because of the fact that you can not get 100 per cent braking power.

We have eliminated the dish brake wheel on the New York Central Lines, and the only ones I know of that are being installed are those put on by some foreign railroads.

Those of you who have been in the game realize what I am talking about. When you elevate your brake over 45 degrees, you are not getting proper braking power and that is one of the causes of a great many of our complaints among the switchmen, more especially those who have to ride the cars over a gravity hump.

Trouble Through Wheel Being Mounted Wrong

E. D. SWIER (Belt Railway of Chicago, Chicago, Ill.): We experience a good deal of trouble with brake wheels of that kind on our clearing yard common. We have had that subject up a good many times and we have been told by the Master Car Builders' Association, which I believe is a section of the A. R. E. A., that the dish wheel was never intended to be mounted that way, that is with the dish up. The dish is supposed to be down, and where cars are made and equipped with the dish up, it is contrary to the standard plans of the car builders association.

When the wheel is mounted with the dish down instead of up, it is just as good and probably a better braking proposition for the use of clubs on gravity yards, as the ordinary flatter wheel.

W. L. BOSLOOPER (Michigan Central Railroad, Detroit, Mich.): Were I to talk about the dish brake wheel, I would merely have to reiterate what Mr. Hammond said, because I have been working around humps and on humps for the last 24 years.

There is something else I want to call to your attention, that is the matter of the continuous operating lever.

We have had a great many papers read at meetings of the Safety Section of the A. R. A. and Steam Railroad Section of the National Safety Council regarding the number of employees struck and run over by engines and cars.

In the operation of a hump, you are going to run across a great many operating levers that are not what you term defective; however, the knuckle locks stick in such a manner that it is necessary for the man doing the cutting to go between the cars to do it, with the result that he sometimes stumbles and is run over. I believe that should be taken up for consideration by the mechanical section of the A. R. A.

CHAIRMAN PHILLIPS: I would like to say that is one proposition that I am thoroughly sold on.

A. C. HARTLEY (Michigan Central Railroad, Detroit, Mich.): Mr. Boslooper has spoken of the continuous operating lever which could be used in case the lock sticks. I have had a lot of experience with locks sticking and it is my candid opinion, based on quite some investigation, that if our car department would drop a little oil on the knuckle locks, it would last from two to three months, and particularly when cars go to the repair track. If the knuckle lock were oiled, it would save a lot of running in between cars. I believe this should be given consideration. We have given it some consideration, but we haven't perfected it up to this time.

J. R. McCAMPBELL (New York Central Lines, Indianapolis, Ind.): I want to approve what Mr. Hammond and Mr. Boslooper have said about the brake wheels.

We have another feature about brakes that has caused a lot of accidents on our railroad. I refer particularly to the stirrup at the bottom of the brake staff. We find our hump riders report that a chain will not go around the staff.

This is a matter that has been given a good deal of consideration but the problem is not yet solved and we are having quite a bit of trouble from that source.

Practical Discussion of the Crossing Whistle

C. D. SHEFF (New York Central Lines, New York City): The question was brought up yesterday among some of the officials in regard to the crossing whistle. I would like to hear something from some of the practical men assembled here today as to how they feel about the change in the crossing whistle. Personally, I have had considerable experience as a locomotive engineer and I have always been a great stickler for the rule. The standard rule requires two long and two short whistles approaching a crossing, and I believe that signal, if properly given, is the best yet. I would like to see the thing discussed fully today.

We have tried out on our line, and pretty generally so, 13 second whistles. If we are running 60 miles an hour approaching a crossing (the whistling post is supposed to be located 80 rods from the crossing); we are making 88 feet a second, and that would bring us down within 176 feet of the crossing, and I believe if that was carried out, the engineer would be giving a pretty reasonable crossing whistle.

CHAIRMAN PHILLIPS: I would like to ask you one question. How does that rule work on 10 miles an hour?

MR. SHEFF: We have to take into consideration the speed of the train, of course, but we try to get them to use two long and two short. The idea is to get the whistle up close to the crossing, not to it or over it, but near the crossing. We can't afford to blow a whistle over the crossing because there are still a few horse drawn vehicles and if we should frighten the horse, we would have to pay.

H. M. WILLIAMS (Missouri Pacific Railroad, St. Louis, Mo.): I have been running an engine 44 years. I have struck 10 automobiles in which

seven people were killed. Some years ago we started on the Missouri Pacific to instruct the engineers to begin whistling back 80 rods from the crossing and finish up the whistle, no matter what rate of speed we were running, when we got to the crossing, and we have cut down a number of accidents due to that manner of whistling.

From my experience as an engineer, it is my opinion that if you keep your whistle blowing up to the crossing, you are going to attract the attention of the car driver.

The grade crossing for the last hundred years has been nobody's business. The railroad company built it. They said to the people who drove over it, "Look out for the cars while the bell rings or the whistle blows." That was when we had the ox-cart and the horse and buggy. We haven't done a thing in the world in the way of changing that thing. Every single county superintendent of highways, county judges that I have talked to, I have asked to put up a sign 300 feet from the crossing on the highway.

Adequate Warning to the Man Approaching the Crossing

Everything in the world should be done to warn the man who is approaching the crossing that the crossing is there, and I say frankly that the collision of a locomotive and automobile is a very foolish accident and the most easily avoided accident that could happen. Therefore it behooves us all to get in touch with the road departments, the highway departments all over the country in the different counties and cities and do something to make the crossing considered a dangerous place.

Another thing, the different roads are trying out different whistles and locating the whistles in different places. I believe the Wabash is trying out something of that sort. Some roads have changed the whistle to a short and a long and something else, but I really believe if we stick right with the old road crossing whistle that the people have known for so many years and continue it right up to the crossing, it is going to do a whole lot toward cutting down collisions at grade crossings.

Another thing we want to take into consideration is the fact that we must get in touch with the people. The crossing is as much their business as it is ours; therefore let's get together and do everything, so when we come back next year to this convention, wherever it meets, we will be able to show that we have done something towards avoiding these terrible road crossing accidents.

CHAIRMAN PHILLIPS: Remember this meeting is open to every man. If there is any engineer, fireman, brakeman or conductor present, even though you are not an official safety agent or inspector, for this morning I want you to consider yourself in that category because we would like to hear from enginemen right now.

B. G. CHAMBERLAIN (Big Four Railroad, Indianapolis, Ind.): There has been a great deal said about the whistling and I agree with Mr. Shéff because I have had several years' experience myself; but there is one thing that I want to ask. It is a question that we have not solved

and which has caused one death and two or three personal injuries due to the men going back over the tank to measure water.

You don't have that trouble on some of the railroads where you have the water pan, but we haven't any. We have long runs and we have to figure the water.

I understand some railroads have effective devices to tell how much water we have in the tank without going back. We have tried several of those on the Big Four but they proved unsatisfactory, and I would like to hear from someone as to what they are doing on the railroads in that connection.

CHAIRMAN PHILLIPS: Will someone answer the gentleman's question?

RICHARD EDLESTON (Michigan Central Railroad, Detroit, Mich.): We have been working along that line on the Michigan Central and I might say our plant foreman at Jackson has a very good idea that can be applied on all roads, that is, two long rods reaching up above the tank, down to the base of the tank, with a float similar to those used in toilets. This float comes up with little brass plates fastened to the brass chain and as the water rises, it indicates per foot what you have in the tank. This is set inside of a superheater float and registers practically every inch of water in the tank without the fireman or engineer leaving his seat box.

Measuring the Water in the Tank

LOUIS H. COLLETT (Santa Fe Railroad, San Bernardino, Cal.): On the Santa Fe they have a system of measuring the water in the tanks with a quarter inch or half inch hose fastened with a straddle on the side of the tank, the width of the tank.

Some master mechanics have placed it on the inside of the tank and as it is fastened up to the top of the tank, they pull it up or down; without going back it gives you the water right in the front of your injector hose where it is located.

J. A. CLANCY (N. Y., N. H. & H. Railroad, Boston, Mass.): I thought it might interest you to know the impressions of a safety inspector and the developments which he believes are under way, at least at these sessions.

As I see it, we are going to replace all the safety inspectors with psychologists, scientists and members of the medical profession. Of course that is only my idea.

In 1922 we were all up against the same proposition with our labor trouble, and at one of our places we had a psychologist hiring men. We had three or four engines waiting to have the valves run over, with trains being held up. The machine shop foreman was nearly crazy trying to get these engines away, and the psychologist telephoned down to him and said, "We have a fellow down here who can do anything on an engine. Come right up."

When the foreman came in the psychologist was asking questions— if he was married, if he had a family, if he lived with his family, if he went to church, if the children went to Sunday school. The foreman

couldn't stand it any longer and he said, "For God's sake, ask him if he can run over a set of valves?"

We wouldn't do that today. We have a personnel department on the New Haven.

We are starting something that might interest you. We have 29 shops and engine houses and we are going to put a flag up at the first of each month and leave it up there until we have an I. C. C. accident and then we are going to take it down. We believe it will stimulate a lot of interest and add to our safety work.

By the way, we have one engine house that has a meeting every Saturday morning. We have gone to this particular house over 1,000,000 hours and we are still going. We started in November, 1919.

This flag that I referred to reads, "No accidents this month," and of course we pull it down when we have an accident and put it up the first of the following month.

Problem of the Brake Step on Box Cars

MR. BOSLOOPER: I have another matter that was also called to the attention of a safety inspector meeting some years ago and as I understand, went to the Committee of Direction of the A. R. A., and I have heard nothing of it. That is the abolition of the brake step on box cars. That is one of the most dangerous things that we have to contend with, especially in yards where there is gravity, not only on the humps, but as I say, in these yards of gravity where you have field men, car jumpers as you call them, to spike the first eight or 10 cars that go in under the clear track. In cold weather when the brake step is covered with snow and ice, there is where you find a great many falling from cars and being run over.

CHAIRMAN PHILLIPS: Are there any conductors and brakemen here? I would like to hear about the end step business.

L. L. GALBRAITH (Santa Fe Railway, Richmond, Cal.): That is something which the men in the yard in train service have been trying to put over for a long time. They have taken it up at different times in their organizations and I think it is a very live subject. When you do something along those lines, it will be the means of reducing the number of accidents in train and yard service.

J. J. HEAVEY (Erie Railroad, Huntington, Ind.): I want to concur in what is being set forth by the Michigan Central man and the other gentleman. I want to illustrate that. We have had on my territory two serious accidents due to the brake staff within the last 90 days.

One of those men was an old, experienced switchman of 27 years' experience; the other was a young man just entering the service. I think it is of vital importance, especially for the Committee of Direction to try to make a standard which will be adopted by the Bureau of Standards to do away entirely with that brake staff.

Another thing I would like to hear about from some of the men present is pusher and helper service. We have had serious accidents on our

railroad due to pusher service. I think we ought to consider that from an unsafe operating standpoint. If there is anybody who has anything to offer whereby their railroad has minimized or eliminated the pusher service and helper service by the double heading process, I should like to hear it.

CHAIRMAN PHILLIPS: We have time for three more speakers only and we want three new men to talk.

A. R. TILMAN (Santa Fe Railway, Albuquerque, N. M.): Before we get off the question of the end platform blocks, let us remember that we do not necessarily have to raise the brake staff any higher than at present.

From my practical experience I find it is better to have the present height above the cars and your brake pole on top of the car rather than on the end of the car on a platform. That will not necessarily mean that you will have to raise your brake staff any higher than at present, which I understand was the objection raised some time ago.

MR. ROWLAND (M. K. & T. Ry.): I would like to ask that gentleman just how the pusher accidents occur?

MR. HEAVEY: By the train parting while in motion.

MR. ROWLAND: How do they part when they have a man pushing?

MR. HEAVEY: An air push. I am a living example of the accident. My right leg is off due to that operation. The train parted with 85 cars and the pusher engine walked right into the caboose, a wooden frame caboose.

Methods Employed in Pushing Trains

MR. SHEFF: We are at the present time pushing trains up to 50 miles with a pusher behind the caboose and we have done that for the last five or six years successfully. We do, however, couple the air through on pushers and we have never found that it was an unsafe practice. We consider that a steel underframe caboose is able to stand as much as a steel underframe car, and we are doing that successfully every day in the year; we haven't to my certain knowledge had an accident in more than two years. Of course, we don't cut the engine off from the caboose while running.

F. TINMAN (New York, Ontario & Western Railroad, Childs, Pa.): Speaking of the pusher service in relation to handling heavy freights, we operate pushers of the Santa Fe type and we make the practice of coupling the air through the entire train. Sometimes we use two pushers, sometimes more, but the air is coming up entirely through the train, engine, caboose and all. I can say we have had no accidents due to the pusher coupling onto the trains. We handle trains of 100 cars, empty trains, and up to 75 loads, and we are operating pusher service in safety due to the fact that the entire train pushers know our coupling throughout the land. We stop at the top of the hill to cut off the pusher; wherever they cut off, the trains stop.

I. R. McCLARREN (New York Central Lines): I just want to tell a story. It will be very fitting here.

There was an old bachelor who once gave a dinner and he bought a lot of watermelons to serve to his party and he told his chef to fill them with good whiskey, and he did. He served the watermelon. He noticed that everybody ate up all their watermelon and no one said anything, but the particular thing he did notice was that they put the seeds in their pockets.

Let's put the seeds in our pockets of what we have heard here today.

H. R. COLE (Erie Railroad, Jersey City, New Jersey): The pusher operation that my predecessor has outlined as prevailing on the Erie does not prevail in its entire territory. In our New York region in the anthracite territory and heavy pusher on the main line, we operate the caboose behind the pusher, and some of the pusher units consist of two to five engines, stopping at the top of the grade and attaching the caboose at the rear of the train at that point.

The Safety Special on the New York Central Lines

J. R. McCAMPBELL (New York Central Lines, Indianapolis, Ind.): I want to state briefly that the New York Central has recently run a safety special over the entire line, consisting of locomotive and three cars. Our General Safety Agent, Mr. Hill, had the officials bring all the employees in groups to a proper meeting place to address them on the subject of safety, and I want to tell you that nothing in this whole work is creating the interest in safety as much as the trip. We have meetings of 200,000 to 300,000 employees on the company's time. Every agent on the New York Central Railroad is requested to apply safety in his work every day.

CHAIRMAN PHILLIPS: The time is now closed for the first hour's session. The next hour's session, you will notice, is labeled "Round Table Discussion." This lets all these fellows in who have been talking as well as the safety superintendents themselves. This round table discussion just adds the bosses, as I called them a while ago, to the list of talkers and it doesn't mean you other fellows are to keep still at all.

I am going to make a three minute speech to start with to tell you about something we are doing on the Wabash which I think is a fine thing. Perhaps some of you are doing the same thing.

On the fourth or fifth of the month I know in my office every injury that occurred during the previous month, and the time lost.

It is done solely for the purpose of having a record to send out to the men while it is fresh and while they are most interested in it, because those are the records you are interested in. If you get the record sent out the fifth of October for the month of September, you are very much concerned in it and you receive it in time to stimulate you for your October record.

We have this rule. In every mechanical department and in all the operating and maintenance of way departments the day a man is injured

a telegram is sent to the division superintendent or master mechanic and that will cover all the employees. A telegram is sent stating that this man was injured on this date. Within three days this man must be visited by his foreman and at the end of three days another telegram must be sent whether the man has returned to work or not. You can go into any superintendent's office or any master mechanic's office on the Wabash (and I know there are other roads doing this) and he can tell you the lost time accidents up to that date.

Here is the principal reason we have for doing that. We believe that supervision is the one thing that we need. There can't be good supervision unless the head of the department knows exactly what is going on in his division, and when he gets these reports showing a man injured today and another report on the day he comes back, he has before him the information that will enable him to supervise.

One of the speakers a while ago told one other thing that we are doing in connection with our accidents. At the first safety meeting after an accident has occurred (of course an investigation is held right at the time), the master mechanic at the mechanical meetings and the superintendent at the other meetings has that man's foreman in that safety meeting. He asks him two questions and he wants to be prepared to answer them. The first one is, "What had you done prior to this accident to prevent it, to keep it from occurring?" After that is answered he asks this one—"What have you done to prevent the recurrence of that accident?" Every foreman on those divisions where that rule is now in effect knows that he must answer those two questions and he must be prepared to answer them satisfactorily or else be reprimanded.

We have an hour meeting now and we want to hear from just as many as possible. We will use the three minute rule again. Let's start on the subject I mentioned; I would like to hear some further talk about platform, and also about the loose covers on the bunkers of refrigerator cars, which are causing a number of serious accidents.

The Psychologist Has a Valuable Place in Industry

JOHN BURNS (New York Central Railroad, Collinwood, Ohio): I think it is a very poor man who will not say a word in defense of his own dog when somebody criticizes him. Regardless of whether the dog is good or not, he is my dog.

I have heard some ridicule of the psychologist. A great many of our boys can't remember my name and they call me the psychologist. That is my dog. I would like to give you my impressions of the value of the science of the human mind practically. If you know the reaction on the human mind when you are talking to a supervisor whose job is at stake, you know something of value, you have a club you can use. If you know the reaction of the employee when his job is at stake and he is possibly sacrificing it by careless practices, you have a weapon.

You know some men are susceptible to flattery. I will not quote this literally but practically. Shakespeare said, "Flattery is the food of fools but most wise men will take a bit." If you know that, you will use flattery, and you can get a good result with some people. If you will study the science of the human mind and its reaction in our daily life, that is psychology.

The most wonderful story that I have heard since I came here is the psychology of the helpless little child and what he did for safety. Hundreds and thousands may be influenced by the psychology of a child. Don't laugh, joke or ridicule psychology; there is something in it.

CHAIRMAN PHILLIPS: I would like to say one word. I don't believe any man can be a successful safety agent, a successful master mechanic, a successful superintendent, unless he is a real psychologist. With all our laughing about this matter of psychology, when we get right down to it, fellows, we must know our fellow men before we are able to do anything with them. We all agree with that. We didn't mean to ridicule at all, because we all know that we must be psychologists if we want to reach the other fellow.

Discussion of the Length of Brake Chains

F. A. HOBBLE (A. T. & S. Fe Railway, Topeka, Kansas): My brother brought up the question of the stirrups at the bottom of brake staffs. I think he only told half the story. The balance is the excessive length of brake chains and if a movement could be put into effect whereby brake chains, particularly on line cars, could be shortened, the handling of cars in switching could be made much safer.

With regard to the cut levers, with due apologies to those whom it may touch, it seems to me the abomination of all cut levers is the rocking tie and we in one instance had a train broken in two three times at one station, with people climbing through the cars, and we have had injuries on account of it.

WM. LENDERKING (B. & O. Railroad, Baltimore, Md.): It seems to me this matter of chains being too long on a brake staff can easily be corrected by having proper inspection in the yards as trains come in. We find that occasionally, but through inspection we correct it.

J. A. McNALLY (Wabash Railroad, St. Louis): Two weeks ago yesterday at a point about 90 miles west of here we had a fireman killed on account of a hatch cover from an E. X. P. L. car coming loose (that is, out of its position on the car), but still fastened to the chain. The chain seemed to be a little longer than the usual chain that is used to hold them up there. In passing a freight train on a double track, this came off, or had been off (the investigation didn't determine), and struck the windshield in front of the window, knocked the brakeman unconscious and struck the fireman on the skull and he died on the way to the hospital. On further investigation we found that cars delivered to the Wabash at Kansas City and other places had the hatch covers lying on top of the roof, some of them with the pin gone which is supposed to

hold them up there, others with the little lug missing that fits at the end of the cover to hold these hatch covers on, and very few cars that were properly covered and secured.

I presume these cars traveling from Kansas City and Omaha to New York pass over some of your railroads and you may have had experience along that line, but I think it is something that we should all take up and see that there is proper overhead inspection; where these cars are iced and re-iced, they should be given the proper inspection and these hatch covers properly fastened. I believe it would be well for all of us to take the subject home and see if we can't eliminate an accident like we had here.

C. T. BAILEY (Oregon Short Line, Salt Lake City, Utah): I would like to ask if that isn't a matter of supervision on the part of your terminal forces? I think that could be largely controlled by proper supervision at interchange points.

E. P. GOLDING (M. K. & T. Railway, Dallas, Texas): Isn't it a rule when cars are emptied that hatch covers are placed down in the bunkers? Isn't it the rule on your railroad?

CHAIRMAN PHILLIPS: We are speaking of the condition in which we find the cars. The rule is there should be a proper hasp on there and it should be fastened. We have gone into the matter and we are not receiving refrigerator cars in proper condition and are not delivering them in the proper condition. We are just as guilty. We couldn't find a train leaving or coming to us that had covers fastened properly on all cars. On lots of them the hasps were broken and gone.

MR. COLE: Is the trouble that is experienced with loaded or empty equipment?

Problem of Swinging Hatch Covers an Old One

CHAIRMAN PHILLIPS: These were loaded and had been re-iced.

All of our progressive railroads, including the Pennsylvania, the Santa Fe, the Union Pacific and others, are beginning to have a lot of double track and this is making the matter of the covers swinging over the sides very important. I might say that I attended a firemen's convention three years ago in this same town and a number of firemen asked me at that time if I wouldn't get after that very proposition, and there were firemen from every road in the United States there.

MR. HEAVEY: I think we handle about as large a set of that class of equipment as most railroads, and it is my experience that the vast majority of those hazards are on empty equipment returning from the eastern points.

CHAIRMAN PHILLIPS: I just referred to that one accident. I agree with you on that.

MR. HEAVEY: We have made an investigation on the Chicago starting point and we have minimized materially by overhead inspection and a follow up. You will find that the trouble exists in the old equipment. It is not the hatch plug that creates the trouble; it is the hatch cover, and we also find on investigation that it isn't all attributable to the

unloading of the car, the re-icing of the car or the terminal inspection. We find in many cases that the condition exists or is made by trespassing on side tracks. We find our own employees are the worst violators in the summer time. Our train service employees at many points will go into those bunkers to get ice and they don't follow up the teachings of this organization as propounded for 15 years that I know of. They don't think about the other fellow. They get the chunk of ice and they throw it on the ground and leave the hatch cover loose. We have had one serious accident at Kenmore, Ohio, from a commercial standpoint as well as the human material standpoint. It was very serious. Too much can not be said; too much interest can not be shown by this organization and the section of the American Railway Association as to promoting the very best terminal inspection that we can get on our empty equipment returning from eastern shores.

CHAIRMAN PHILLIPS: We are going to have to change our program just a moment. We have with us four of the finest singers in the world without any question. Pride causes me to say that one of them is from the Wabash. They will now sing to us.

(The Pullman Porters' Quartet sang several songs amid applause.)

Appreciation of the Pullman Porters' Quartet

SECRETARY COTT: Boys, I don't know that I can voice in words our appreciation of your singing because music touches something deep down in your heart and brings you a little nearer that which you have always wished to be but never reached; every time that is stirred, it makes you just a little bit more like what you want to be.

I am sure when we go away from the inspiration of this meeting with the addresses and talks we have heard, we will carry back with us a memory of something that was stirred by your singing.

As a little evidence and token of our appreciation we have some pieces of paper here that Uncle Sam passes around which our Section wishes to give to you. I am also delegated by our chairman, Mr. Rohweder, to present to you a box of cigars, with the compliments of Mr. McGonagle, president of the Duluth, Missabe & Northern Railway, in whose presence you sang.

CHAIRMAN PHILLIPS: We have just a half hour left and let's use it.

J. E. LONG (Delaware & Hudson Railroad, Albany, N. Y.): Your almost silent partner for 12 years would like to say a little on this ice bunker proposition. I concur in everything that has been said about proper and thorough overhead inspections at interchange points and terminal points, but someone mentioned the question of train crews getting into ice bunkers.

I am going to tell you how we have helped that situation very materially. We put ice boxes alongside of our caboose so that it is a lot handier for our trainmen to get ice from those boxes than out of refrigerator cars. We fill our locomotive ice bunkers before the engines leave the round house.

If you are going to get at the bottom of troubles, you have to go to the bottom, and unless you are giving your train crews facilities for getting ice legally and honestly, they are going to get it the other way. I don't think any of us should blame a trainman for getting ice anywhere if he can't get it where he should get it.

J. H. AMOS (Missouri Pacific Railroad, St. Louis, Mo.): Gentlemen, this is my first attendance at a meeting of the National Safety Council. I feel that you may think I am a trespasser.

It may seem harsh for me to say this, but I have been in the business of dealing in blood and bones for 25 years. This great profession which I represent should stand in close relation to you gentlemen, to your association. There should be no secrets between our departments and the departments over which you preside.

The Leak Stoppers of the Great Railroad Systems

When I was a boy, a young man, I lived on a farm. It used to be my job at threshing time to take the straw away from the old fashioned straw carriers. It often occurred to me that the straw would come from the straw carrier onto the stack. What a tremendous waste it was when the grain was not properly separated by reason of the defective machinery of the threshing machine.

Gentlemen, when you fail to keep your machinery in proper condition, the grain comes through the stacker onto the straw stack and it is an absolute waste. You are the leak stoppers of the great railroad systems of this country. When you fail to stop the leaks in your shops and on your works, we of our departments are the beneficiaries.

I believe that we should keep in close touch with you gentlemen and you should come to us and we should go to you. We should seek your cooperation, not ask it. You should seek our cooperation. We are experts on the causes of accidents and I am sure that you gentlemen can obtain some valuable information from our departments just the same as we can obtain valuable information from yours.

I am going to take some of the seed that has been sown in this convention into my pockets and sow it among our employees and among our departments for future benefit and use.

J. W. BORRIS (Pullman Company, San Francisco, Cal.): Mr. Chairman and members of this wonderful conference: I am very glad to be here to look into your faces and obtain so much information.

I was glad to know that you didn't have time, you were too busy with the different departments, to say a thing about the porter. So I want to ask one question which will bring to your attention the porter's place in the great safety movement. Did any member here present make a safety convert? While you are thinking about that, I want to express our thanks to our director, Mr. Guilbert, and Mr. Carry, our president, for the opportunity to be present at this wonderful conference.

But our problem comes when we leave our homes as porters and come to the Pullman home where there is one porter with a safety message

and 40 passengers who do not know much about safety. We have to spread ourselves over the whole group like a mother bird, and try to get them from one end of the country to the other safely.

During my spare moments I have collected the emblems of as many roads as possible and put them away. I have done that for two or three years. Not long ago there was a little white girl about nine years old who saw those emblems and she became interested, as a child will, and began to question me. I told her, "These are the emblems of the great railroad systems. I am going to a conference and these are to be represented there, and these railroads will talk about the safety problem." The emblems were loose; she went to her aunty and got a pair of scissors, and using my paste, she pasted those emblems on this page. She worked on that two days, and in that time I told her all about swinging out of the door and swinging on the seats and putting her fingers in the door, and all about safety. I found out her father had been connected with a railroad.

A Little Girl Interested in Safety Ideas

I had a greater task for her. I took out the central page of each of these folders, the map which shows the relation of railroads. She cut them out, put them on this sheet and colored them with crayons. I told her that somehow I would get this before our conference. She wrote down her name, age and address, and I am going to ask that she be sent some kind of token, something to show that we have actually made a convert to safety in this little girl.

Among the Pullman porters we have a *Pullman Porter Messenger*. It is to spread the message of safety. I happen to be the editor, and I am in a position to offer you one or two pages, if necessary, if you will send us little safety messages. I ask you to cooperate with us as porters, that you do what you have said, namely, help us to educate the public to safety.

SECRETARY COTT: I move we get the name of the girl and send her safety buttons.

(Mr. Botts furnished the information.)

CHAIRMAN PHILLIPS: I just want to say there is one thing we white fellows can't do. We can't go home and tell our wives, "Don't do this or that!"

C. F. LARSON (Missouri Pacific Railroad, St. Louis, Mo.): I am very glad to follow my former superior, Mr. Amos, under whom I worked a number of years in the claim department of the Missouri Pacific Railroad, and I don't know what the relation is between the safety work and the claim work on other railroads, but I know that on the railroad represented by Mr. Phillips, it is very close. I know that on the Missouri Pacific it has grown very close. The claim department's investigation of accidents is frequently much more thorough, going into the legal phase of it more than the operating department, and I have always been able to get from the claim department of our railroad certain facts that are not brought out by the operating department.

If there are any railroads here that do not have that close relationship between the departments, I would recommend that you get as close as you can to the heart of the claim department.

We had a division or shop on our road that had been making a miserable record with personal injuries for a long time. The management found it necessary to change the master mechanic on that division, not because of the personal injury feature, but because of other reasons, and probably that was one of them.

A very active master mechanic was put in that shop who discovered this situation, and for two or three months instead of getting better it grew worse. He called all of his supervisors in (it is a large division, covering more than 500 miles of jurisdiction), and put the matter before them, and they mutually agreed on April 1, 1926, that every foreman who had a personal injury among the men under his supervision would pay a fine of one dollar. The fund accumulated rapidly for about two months and then suddenly ceased. They had promised me that the month they cleaned their slate and had no more injuries they would give a banquet at a prominent hotel on that division and I should be the honor guest.

An Active Master Mechanic Stopped the Accidents

As I said, in two months the fund ceased to grow because the injuries ceased on that division. On the first of August I went there and we had a glorious feast and that division has not had a reportable injury from that day to this. That master mechanic was changed from that shop to one of the largest shops on the first of October and he has instituted the same program, and I understand that he will have practically a clean slate this month. Other shops have caught the fever and it has followed all over the road.

Some of the railroads are having trouble with their maintenance of way employees. I am happy to say that the largest reduction we have made on our system, which has reduced us from 39 men, a million man-hours, to only 24 at the last quarter, has been primarily among our maintenance of way employees; and if anyone has an idea of ridiculing psychology here, I want that stopped, because we have a maintenance of way engineer on the Missouri Pacific who is a psychologist.

On our Joplin division we have not had a reportable personal injury about the brake and building department for three months. We have one division of our railroad that went through an entire month without a reportable personal injury.

F. W. MITCHELL (New Haven Railroad, New Haven, Conn.): The New Haven Railroad has the high tension current, 7,000 volts, and we don't like to have them swinging the fire hook and hooking onto that because when they come down, they stay down. We had to devise some other means of storing the fire hook than putting it up on top. We have 11 foot, 10 foot and nine foot hooks and we use a superheated flue, five feet in diameter, that is built right into the tank. When they get through, they slide it right back into the tank.

CHAIRMAN PHILLIPS: I am sorry to say that our time is up. I never enjoyed anything as much in my life. All my 29 years of experience I have wanted to preside at some kind of a meeting besides a prayer meeting, and, Mr. Rohweder, I want to thank you for that opportunity.

(Mr. A. V. Rohweder took the chair.)

CHAIRMAN ROHWEDER: We have two or three things that we want to get out of the way before 12:00 o'clock. One is the report of the Committee on Resolutions in connection with train service accidents. Mr. Bailey, of the Oregon Short Line, is chairman of the committee and we will ask for his report at this time.

MR. BAILEY: In conformance with the desire of this Section, after that resolution was passed your committee convened and in the short time we had before us tried to look this situation over; we found it to be a rather large subject for us.

A committee to function properly and to determine remedies that should cover the train service accidents on our American railroads, has a big job on its hands, and as we discussed that among ourselves yesterday, we are recommending to this organization that a permanent committee of that character should be established and that this committee be given the opportunity of making a survey of the records of past experience so that in time it will be in a position to make a real concrete report to you with suggestions or recommendation as to remedies available.

Report on Analysis of Train Service Accidents

Fortunately, through a report that came to the committee's hands yesterday, taken from the Interstate Commerce Commission records in Washington over a spread of years, we were able to look the situation over in a general way, and I am going to give the Section the benefit of that report, indicating the enormity of the proposition.

Train service accidents, as reported to the Interstate Commerce Commission, are subdivided into 10 separate causes and these causes, as the reports come to the Commission, are tabulated. To gain any idea of the necessity for close study, you must have a spread of time and an accumulative period to get that result.

This analysis of train service accidents is subdivided under 10 separate heads. Under the particular heading, "Coupling or uncoupling locomotives or cars," in the past six years there have occurred 10,572 deaths and 11,121 injuries. The sum total of those two items are but 3.95 per cent of the total train service accidents.

Coupling and uncoupling air hose—there were 2,776 deaths and 2,971 injuries. That composed 1.03 per cent of the total number of accidents; and so on down the line through the various headings.

You can see that any attempt on the part of a small committee on snap judgment to make recommendations worthy of consideration, would be futile. We are therefore recommending to this Section that a permanent committee be created to study the question of train service accidents and be prepared to make a report at your next annual session, during the

interim of which the committee might be able to arrive at some satisfactory recommendation. I am making that proposition to you now.

CHAIRMAN ROHWEDER: What is your pleasure in connection with Mr. Bailey's recommendation?

Z. B. CLAYPOOL (St. Louis-San Francisco Ry., St. Louis, Mo.): I move you that this be accepted as a progress report, the present committee to be made permanent, and they report at the next convention.

(The motion was seconded.)

W. L. RICHARDS (Union Pacific Railroad, Omaha, Neb.): I would like to amend that motion so the committee will be enlarged to include at least seven members.

(The motion was seconded, and the amendment carried; the question was then put to a vote and the motion as amended was carried.)

CHAIRMAN ROHWEDER: Has the Resolutions Committee any further report, Mr. Long?

Further Report of the Resolutions Committee

MR. LONG: Your Resolutions Committee wishes to submit the following resolution for your consideration:

"BE IT RESOLVED, That the Steam Railroad Section of the National Safety Council, at their Fifteenth Annual Safety Congress, extends to Mr. Victor Parvin, Superintendent of the Ann Arbor Railway, and a representative of the American Railway Association of Railway Superintendents, Dr. W. Louis Hartman, Chief Surgeon of the Michigan Central Railroad and representing the Medical Section of the American Railway Association, Mr. F. W. Matson, Commissioner of the Minnesota Railway and Warehouse Commission, Mr. L. K. Silcox, General Superintendent of Motive Power, Chicago, Milwaukee & St. Paul Railway, and a representative of the Mechanical Section of the American Railway Association, Mr. E. R. Lewis, Principal Assistant Engineer of the Michigan Central Railway and representing the American Railway Engineering Association, the Pullman Quartet, and all others who in any way contributed to the proceedings, sincere appreciation of their able and effective participation in the success of the program."

MR. BAILEY: I move the adoption of the resolution.

(The motion was seconded and carried.)

CHAIRMAN ROHWEDER: I want to call your attention to one thing in connection with Mr. Matson. On our program we didn't show Mr. Matson's full title. Mr. Matson is not only a railroad and warehouse commissioner of the State of Minnesota, but is also a Chairman of the Safety Committee of the National Association of Public Utilities Commissioners. Many of you gentlemen know you furnished a large amount of material in connection with safety on American railroads that was sent to Mr. Matson and presented in his annual report at Cleveland, at the meeting of the National Association of Public Utilities Commissioners.

We have now arrived at the part in our program which, as Charley

Scott said last night, probably is most pleasant, and that is passing the job over to someone else. I want to ask Mr. Long, who was elected secretary of this Section, to come to the platform, and I will ask Mr. Cott to turn over to him the office of secretary of this Section. Mr. Long has served the Railroad Section as chairman of the Membership Committee and has done a remarkable piece of work.

(Mr. J. E. Long took the secretary's chair.)

CHAIRMAN ROHWEDER: As you know, the man who has been secretary for the past four years has been elevated to the vice-chairmanship. If there is anyone in the Steam Railroad Section of the National Safety Council who understands the ins and outs of the Council's activities and a man who has been responsible for a good part of the work done here and the work done in the past year, it is Emerson Cott, of the Hocking Valley, and I take pleasure in installing him as Vice-Chairman of your Section.

Chairman Rohweder Hands the Gavel to Chairman White

Before passing the gavel over to J. D. White, of the Illinois Central, as your new chairman, I want to express my appreciation to each one of you for the remarkable attendance we have had this year. Mr. McGonagle commented on that yesterday. I think it was probably the highest tribute that could be paid to our Section: the ~~fact~~ ~~that~~ ~~it~~ ~~was~~ ~~the~~ ~~highest~~ ~~tribute~~ that did and going back to your properties is going to have a wholesome effect. It will have on my particular Railroad, ~~because~~ I know as well as you do that a great number of conventions are ~~not~~ attended by the membership as they should be, which has always been the opposite in connection with the Steam Railroad Section and the A. R. A. Safety Section.

I also want to ask for the incoming chairman that you express to him your opinion of the program that we have had here during the last three days. As I told you on Tuesday, it was more or less of an innovation; it was an idea that we were putting the cart before the horse in not getting hold of our supervisory and executive officers and getting them to come in and properly understand what we are trying to do in the Steam Railroad Section. The remarks of the men of the purchasing and stores department of the A. R. A. certainly carried out in a very fine way the idea I have had for a long time, that we have simply been hanging up a sign to the various departments on our railroads, "Keep off the grass—this safety job belongs to the safety men."

I think if we get them in here and have them tell us what they know about it and what we ought to do, which they did yesterday and which they will do even more if they can discuss it at their annual conventions and feel that is part of their job, we are going to get a lot farther than we have in the past, when we go back and report in a hit or miss fashion that "I said so and so," or "some member of this Section said such and such a thing," it doesn't make near the impression on your officers as a statement from the man representing their association.

At this time I take pleasure in passing the office of chairman of the

Steam Railroad Section over to our good friend, J. D. White of the Illinois Central, who served this Section during the past year as vice-chairman:

(Mr. White took the chair.)

L. F. SHEDD (Rock Island Lines, Chicago): May I have just a word? I would like to suggest that we do one thing, either as the first act of the new chairman or as the retiring act of the last one, and that is that we remember that dear, good fellow who was thoughtful enough of us to send us a telegram and regarding whom we should be thoughtful enough to reply. I refer to that dear Christian character, John Broderick of the B. & O. We all remember him at Salt Lake. We remember his enthusiasm, his interest.

Therefore, I move you, Mr. Chairman, that we have our secretary send a telegram to John Broderick expressing our appreciation of his remembrance of us, returning our remembrance for him, and adding further that we wish him Godspeed for an early recovery and the regaining of his health and strength, and that we look forward to having him with us some time in the future.

Officers of the Section Are Present

CHAIRMAN WHITE: I believe it has the approval of everybody here, and I take it upon myself to ask the secretary to send such a telegram.

I am going to call on Robert Scott to tell us what he thinks of the past administration and the way these meetings have been conducted.

MR. SCOTT: Ever since we started this society with our big big job has been to get the other fellow interested. There is a tremendous lot of work. We have been here in Detroit for two or three years now. We have attended these sessions faithfully. We have obtained a wonderful bit of information out of the programs and I want to say that it is one of the most interesting programs that has ever been put on for the Steam Railroad Section of the National Safety Council.

I think the chairman of this Section and the chairman of the Program Committee and the secretary and all of those who have had anything to do with it are entitled to our thanks. We have had representatives of other departments come here and tell us that they are with us in our work and that's what we want to know. Don't you gentlemen wish that your president had been here and sat at the speakers' table yesterday and had said the things about the safety department of your railroad that was said about Arthur Rohweder's railroad safety department, which is being so ably managed under his direction?

You gentlemen have no doubt read Mrs. Shelley's story. It was a story about a young student in physiology who, it seems, set about visiting the graveyards and hospitals, gathering bits of human beings and putting them together. He created a monster that finally set upon him and devoured him because he couldn't put the conscience there.

Gentlemen, we are living in a wonderful age today, this age of fast-moving trains, this age of powerful automobiles that are speeding up

and down our highways and our streets. Let us not create a monster that is going to turn upon us and devour us.

We must go out and bring the average mind up by education and by training so that these people can take care of themselves against this monster that the scientists are creating today in this busy world of ours.

To my mind the chairman who has just left the platform has done his bit in contributing in a large measure to that wonderful work in which we are engaged. I know what it is to be chairman of a busy section like this for 12 long months. I know what it is to undertake to pull off a meeting like this, and my sympathy has been with Mr. Rohweder throughout.

There is only one criticism that I will offer and that is that Mr. Rohweder has been just a little too modest in presenting himself before us at these meetings. Mr. Rohweder, I, personally, thank you and I am going to propose a rising and a rousing vote of thanks to you for the splendid manner in which you have conducted this work during the past year and at this, our Fifteenth Annual Conference.

(Mr. Rohweder was given a rousing vote of thanks.)

CHAIRMAN WHITE: We have another ex-chairman here and I would like to let him say what his opinion of Mr. Rohweder's term of office is.

More Time for Round Table Discussion Suggested

CHAS. E. HILL (New York Central Lines, New York City): Mr. Chairman, as usual, after Mr. Scott has completed his remarks, there is nothing left to be said. I have sat in a great many meetings of this character and at no time have I been any more impressed with the genuine, sincere manner in which this particular meeting has been conducted. To my mind it has been constructive and that is why we come to these meetings.

I don't know of any class of men who know more about putting in long hours, tedious hours and hard work than railroad men. There is no body of men within the entire United States that forms a more composite part of the real citizenship of this great country of ours, and when we gather here together and rub shoulders and exchange ideas and give the benefits of our experiences to our fellowmen and coworkers, we are doing something that is really worth while. I believe that the character of program that was outlined by the chairman of the Program Committee through the aid of the chairman of the Section, is one that has been productive of great results.

The only suggestion I might have to make would be that we have more time for round table discussion. I think it might not be amiss to suggest this for your consideration, inasmuch as you called upon me, that you set apart the second day and give the boys out in the field, the men whom we are depending on to get results for us, a greater opportunity and permit them to talk about the vitals that go to make up the casualty records of our various railroads. Let them tell us of the experience and troubles which they encounter, so through these experiences we may be able to profit.

I wish to express to the outgoing chairman my deep appreciation of the manner in which he has conducted his office. He has done it admirably, and I want to say to the incoming officers that in so far as I possibly can help, you will have the continued support of the railroads that I have the honor of representing to make the next meeting as much of a success as is possible.

CHAIRMAN WHITE: I hope as many nice things will be said about me one year hence as has been said about Arthur Rohweder.

We have about 100 railroad members of this Section. That means, I figure, about 300 men that can and will attend these annual meetings. I want to say again that I very much appreciate the distinction that has been conferred upon me to serve as chairman for the coming year, and I am going to do my level best to make myself worthy of the compliment; but I want you to understand that this is not a one man's job, nor a three men's job, but it is a job of every man in the room or who may attend here or who is in the safety department of the 100 railroads that are members of this Section. I want your cooperation, every one of you. There are no secrets in the safety department. If you have anything to say and can't see me, write me. I want your help and I know I am going to get your help. I want this year to be one of the best years for safety we have ever had, and we will meet some place one year hence even better than this year and have a fine meeting. As I said before, don't forget I want your cooperation.

Committee on Secretarial Expense Is Authorized

D. G. PHILLIPS (Wabash Railway, St. Louis): Mr. Chairman, in order to express our appreciation of the institution of what was known as executives' day, I move you that we recommend that the incoming administration consider again having an executives' day next year. I think we ought to express our appreciation of this executives' day program.

T. H. CARROW: I would like to amend that motion by letting it remain as a suggestion.

CHAIRMAN WHITE: We will take care of that, Mr. Phillips. Thank you very much.

MR. ROHWEDER: Your vice-chairman made a very definite recommendation in connection with the secretary's job. I was secretary of this Section for two years and anyone who has had the privilege, or rather the work, of serving as secretary, knows that to do the job right, it is a real job, and I felt at the time I was secretary that some assistance should probably have been given.

We have a little different situation on the D. M. & N. than they have on the Hocking Valley and a lot of other railroads. We had the money to go ahead and do the things with, but some day you are going to get a secretary who can not do that. It is a question of whether one railroad should be burdened with the expense of doing the work that is required of the secretary for this Section.

Therefore, I move you, Mr. Chairman, that a committee be appointed

to investigate the suggestion made by your retiring secretary, Mr. Cott, looking toward the possibility of taking care of the clerical expense, or other expense, in connection with getting out a monthly news letter, which is an important thing if put out properly.

In addition I want to say this. A great number of the members of this Section from time to time get up into the great Arrowhead country of Northern Minnesota; in fact, some of the executive committees of this Section have met in that country for the past two summers. That invitation is not only open to the executive committee but to any one of the railroad safety officers or any of the railroad subordinate safety officers. We would be glad to have you come up there at any time. We have a fine climate in the summer with all the facilities in the world for fishing and getting away from the heat. I am extending that invitation to you on behalf of Mr. McGonagle, President of the D. M. & N. Railway and myself.

(The motion was seconded and carried.)

CHAIRMAN WHITE: I am now going to call on the Pullman Quartet to sing one song, after which the meeting will come to a close.

(The Pullman Quartet sang "Home, Sweet Home.")

ADJOURNMENT

Taxicab and Fleet-Owners Section

New Officers of the Section

CHAIRMAN: J. T. SMITH
Yellow Cab Co. of Philadelphia, Philadelphia, Pa.
VICE-CHAIRMAN: J. ROBERT CLAIR
Checker Taxi Co., Boston, Mass.
SECRETARY: J. E. DOBBS
General Necessities Corp., Detroit, Mich.

Committees

POSTER: HARVEY D. WOOD, Chairman
Yellow Cab Co., Chicago, Ill.
STATISTICAL: RUSSEL REEL, Chairman
Yellow Cab Co., Des Moines, Iowa
PROGRAM: HENRY J. MINEUR, Chairman
J. M. Horton Ice Cream Co., New York City
ENGINEERING REPRESENTATIVE: F. C. SINGLETON
Standard Oil Co. (Indiana), Chicago, Ill.
EXECUTIVE COMMITTEE (The Officers and)
DALE HARMAN
Yellow Cab Co., Kansas City, Mo.
LEE L. MILES
Louisville Taxi Cab and Transfer Co., Louisville, Ky.

October 26, 1926

DALE HARMAN, Chairman
Manager, Yellow Cab Company, Kansas City, Mo.

THE Taxicab and Fleet-Owners Section of the National Safety Council convened in the Ladies' Parlour of the Hotel Statler, Detroit, Michigan. 10:00 o'clock, Mr. Dale Harman, manager, Yellow Cab Company, Kansas City, Missouri, chairman, presiding.

CHAIRMAN HARMAN: I think for the first few minutes we had better have a little get-together-and-get-acquainted meeting. I would like you to take one of these registration cards and each gentleman stand up and

give his name, residence, and classification of business. In that way we will get started off and know who is here and what to expect.

(Each man then arose and gave his name, business, and city.)

The first order of business this morning is the report of the different committees.

First we should have the report of the secretary, but he is absent and will possibly be here later on. The next is the Poster Committee. Mr. Wood, can you tell us about that?

HARVEY D. WOOD (Safety Director, Yellow Cab Company, Chicago, Ill.): Mr. Kinney asked me to apologize for not having much to report at this time. In fact he has been rather inactive as to that committee, and therefore, has nothing to report.

CHAIRMAN HARMAN: I rather feel that the Poster Committee of our division, gentlemen, will possibly be very much neglected, as fleet-owners and cab operators haven't got very much to post, but you will see a very good display of posters at the different hotels where the various meetings are being held.

Section Should Have Great Variety of Posters

MR. WOOD: Mr. Chairman, I would like to say that as far as posters for the taxicab business are concerned, the field is pretty much destitute. We have a very limited supply of taxicab posters.

I would like to see this Section get out a great number of good taxicab posters. I believe it is a good medium for getting our story over to the drivers, and I have found, after going up to the National Safety Council, that they have probably not more than 15 posters that apply to the taxicab section.

CHAIRMAN HARMAN: Have any of the men present anything to say on this subject? I would be glad to hear from you as to what you may be doing in your respective lines of business on posters for the benefit of your drivers. I will naturally assume that fleet-owners are all interested in drivers the same as the taxicab man. That is, the educational work in the taxicab business is the driver and the safety of his driving.

J. T. SMITH (Asst. Gen. Mgr., Yellow Cab Company, Philadelphia, Pa.): In looking over the posters sent out from month to month by the National Safety Council, it is a pretty hard job to find one that applies to the fleet-owner, and I think the next committee that is appointed has an opportunity of doing considerable good work for our division of the association.

I think this National Safety Council is realizing more and more the importance of the highway end of the Safety Council and if we can emphasize that and work on them, we can get more in the way of posters.

F. E. SHEARER (Standard Auto Accident Co., New York City). I was talking with a broker in New York City. Some of you gentlemen may be familiar with the insurance proposition there. There are fleets knocking around the city, trying to get insurance and can't. This broker had a lot of trouble trying to keep his risk insured. At the present time he is as much interested in the safety work as in the brokerage business.

He had one poster which struck my attention particularly. The poster was a regular blue print. It said, "Yes, a driver can be a gentleman." That poster was a favorite poster with all the drivers where it was displayed.

This man is spending about three per cent of all his premiums on safety work, keeping the risk which he has in New York City insured.

CHAIRMAN HARMAN: I might say for myself we have a garage with about 250 car capacity in Kansas City, and we have framed these posters gotten out by the Safety Council, such of them as pertain to traffic for our garage, and such as pertain to shop accidents to our shop. We have adopted a frame.

You know the size of those posters, two and a half by four feet, and we have made a line of those clear around our entire building between the windows.

Two or three weeks ago, when our schools opened, we took those particular posters down that pertained to slow driving around the schools and put them up on either side of the garage where the cabs go out and come in, in an effort to get before our drivers the message. "Now is the time to drive slow and protect our children around the public school."

Experience in Building Posters on Safety

HENRY J. MINEUR (Safety Director, J. M. Horton Ice Cream Co., New York City): I got into the ice cream business about a year ago. Before that I had been safety director for a plant in Brooklyn. I hadn't been very much interested except by association with the Brooklyn Safety Council.

I found there wasn't much to help the fleet operators in their safety work. A great many had tried to carry a campaign purely with literature. They didn't go further than to post notices or what few bulletins they got, and there was no personal contact, no follow-up.

We made up quite a number of posters affecting the public, and combined in some of the posters the public hazard as well as the hazards to employees, and I dare say we have, during the last year, put out 40 of our own posters, and they are designed for practical fleet-operators.

It is true, in the ice cream business at least, that some of them are having difficulty in placing their insurance. The reason is, as I mentioned, there is no systematic safety work. The posters from the Safety Council dealt mostly with public accidents and very few dealt with injuries to the employee insofar as automobile operators are concerned.

We found some of the posters put out by the Council to be very effective, so much so that some of our fleet-operators have wanted to take them home after they were put on the board. I think that is an indication they were interested.

We don't use a poster the second time if we can help it, unless it is especially good. We keep our posters on the boards for about two weeks and we have four boards on which we put posters dealing with the oper-

ation of automobiles. One of these is located in the drivers' room and other places.

In addition to that we have the pay roll envelope system. We don't run them every week. We run them once every two weeks or we might run one every three weeks or once a month. During the last year, or the first nine months of 1926, we have been very successful in cutting down our outside accidents as well as our inside accidents. Roughly we have averaged about 10 less automobile outside accidents, a little greater number of inside accidents, and about nine lost-time accidents for the month. Those are all monthly figures, and it shows that the posters together with your follow-up work really do some good.

I agree with the previous speaker that the Council ought to get together and devote more time and consideration to the operation of these fleets. I would be glad to send to the Council those posters we have made for our own use.

Methods of the National Safety Council Poster Division

MR. WOOD: I am afraid we don't appreciate the fact that the National Safety Council will give us only as we give to them. In other words, we can only get out of the National Safety Council what we put into it.

The Poster Committee, being as inactive as it was last year, didn't get any posters out and consequently we haven't any posters. If the gentleman over here had been on the Poster Committee last year and contributed to the committee his 40 posters, then we would have 40 posters. But inasmuch as there were no posters contributed, we have no posters. That is the way it goes.

I happen to know some of the members of the Public Utilities Committee, and they have got out some 48 posters during the past year, and as a result the members of the Public Utilities Section were privileged to receive 48 posters during the year.

So you see we must remember that the National Safety Council is merely gathering that data from us fellows and distributing it around to the other members. I was very glad to hear the gentleman say he was going to send them in. I think we should nominate him on the Poster Committee.

S. J. STEINMANN (Indemnity Insurance Co., Philadelphia): I am of the opinion that what is known as the general bulletin should be used just as well as an automobile bulletin. In posting bulletins there is a whole lot in following advertising principles. Too many people post bulletins and they will post them promiscuously and you will never get your message home.

My personal experience has been that no matter how many boards you have you should post the same bulletin on every board, and a bulletin isn't worth the paper it is written on after everybody has seen it.

The gentleman from New York brought out a point—personal contact. If you follow up with pay roll inserts and a little letter to the employee if he is married, addressed "Mr. and Mrs.," you will do a lot of good.

I feel that is the paramount thing in safety work—personal contact. Many an organization has fallen down due to the fact that they have overlooked that little personal contact feature.

F. C. LYNN (Kansas City Public Service, Kansas City): This matter of supply of posters from my observation is rather unlimited.

I had the experience of going down to the public schools and talking safety, two weeks ago, and found down in the second and third grades the children were making safety posters that carried just as good messages as some of our high-priced articles.

I don't think it is necessary to have a poster that applies directly to the work in order to get the message over. Any of the good safety posters put over the message.

The problem, as we all know, is to get the boys to read the poster, not get the poster. Here is a practice we followed out. The board was blank every other day. In other words, the bulletin board had the poster on today. Tomorrow it had nothing on it.

We capitalized on the psychology that every workman is anxious to have the superintendent or general manager or the president speak to him, and also on the fact that every general manager and superintendent is anxious to speak to the employees if he has something in common that he can quickly pass a few words.

When the general manager or any of the other officials walks through the plant, he says, "Jack, what was on the bulletin board yesterday?" Every day, every employee being anxious to impress the management, he was wide awake so he could answer and it put over the safety idea as no other sales argument could possibly do. It struck me as being the best kink in connection with bulletin boards that I have ever heard executed.

One Reason They Have a Good Safety Record

F. B. HENRETTA (Yellow Cab Co., Roanoke, Va.): My former experience was in railroads. My principal duty was safety. I found that secrecy is the greatest impelling force. My present system is a poster that every man carries in his pocket every day, a form of merit and demerit.

Every time one of our men checks in the checker will say, "What is rule so-and-so? Let me see your card." Then he has to dig out the card. If he doesn't answer correctly, he gets a very small demerit.

The record of each of those men is kept secret from the others. I look over these records and come around and say, "John, your record is getting bad." He will say, "How is Tom's record?" I will say, "That is none of your business. Pep up a little. Your record is getting bad."

We haven't had a serious personal injury. Our insurance company told me that it was one of the nicest records in the United States.

CHAIRMAN HARMAN: We only leave the poster up for our school or new man. I don't know whether you men have the labor situation to contend with, but we are always taking on new men. We have a school

of instruction which we have to put these men through. Even if they are expert drivers, for our particular line of business they have to be schooled.

So we have these posters around our garage, almost entirely around the building, and they are all numbered and our instructor has a little talk on each poster, as to why we are trying to put that message over to him. Some may be automobile-wrecking or running down a child on the street. We retain the posters in our garage and keep them bright and clean so the man doesn't know the oldest from the newest, but as they come from the Safety Council they are put up there before they lie around outside.

Furnish Practical Experience for the Posters

J. E. DOBBS (General Necessities Corp., Detroit, Mich.): I am very much in favor of the poster, providing we can get a consistent supply of posters pertaining to the fleet-owners, so that we can run our bulletins with some result, because I do believe that the posters play their part in the safety game; but as Mr. Smith over here stated, it is so hard to find one that relates to the fleet-owner's business.

I think the body here could furnish plenty of hints to the Safety Council as to what kind of posters they want. I know in my line I see a lot of rear-end collisions for instance, and the excuse is, the man in front stopped suddenly. I think we could bring out a suitable poster to cover that.

In another case a truck driver backs his truck without ascertaining if it is safe, and in the meantime a child or another vehicle will come up.

Different things like that could be brought out on these posters, such as making left-hand turns improperly, the picture of a collision, bringing out the result of that collision, and different features like that.

CHAIRMAN HARMAN: We can get those posters through the National Safety Council if we can get a committee here to function in such a way that they will give this information.

MR. MINEUR: Mr. Chairman, I would like to say the special posters we made up, would not be very useful to the National Safety Council. Our poster is on cardboard. I think the size is 15x18 and we have them in different colors. We have all the colors of the rainbow, so wherever a bulletin is changed, it stands out prominently.

MR. WOOD: The National Safety Council takes them and paints up a poster. Ordinarily they just furnish a picture and the artist has to work that picture into a bunch of wording.

MR. MINEUR: We have no picture, just wording.

MR. WOOD: I think Mr. Hemman of Armour & Company, Chicago, has a great deal of experience with fleet-owners. He has been connected with the stores of Chicago for a good many years.

L. D. HEMMAN (Armour & Co., Chicago): I believe my story will be better told tomorrow. I will say I believe in pictures more than slogans. I notice you can always get a crowd around a picture.

CHAIRMAN HARMAN: The next committee that we should get a report from is the Publicity Committee, but Mr. Gibson of the Pittsburgh Transportation Company, is not present. I feel that publicity in a general way comes under the same heading as this poster and bulletin work.

We will pass on to the Statistical Committee, Mr. Reel of Des Moines. He is unable to be here. I don't feel that the Taxicab and Fleet-Owner Section of this National Safety Council is old enough to have very much statistics to work on. We have our individual statistics, and I don't know how one of those would apply to the others or how an ice cream company might be interested in some other company like the Standard Oil Company fleet.

Has anyone anything to offer on the statistical end of it?

Mr. Wood: I think we have a whole lot to come. You are not in the taxicab business, are you, Mr. Dobbs? You mentioned running into the rear end of the truck. Probably 40 per cent of our accidents are that kind. So we really have a great deal to come. Any kind of a vehicle operated by a driver is confronted with the same traffic problem.

CHAIRMAN HARMAN: The traffic problem is the same, no matter what company you represent.

More Publicity Needed for Accident Prevention

MR. MINEUR: Mr. Chairman, I think all fleet-operators have the same thing to contend with. I think there is one thing that is common to all of us. That is the question of publicity. Why can't we get the newspapers of the United States to take an active hand in publishing pictures on safety? If the pictures carry the message, why can't our newspapers give one picture a day on the question of operating automobiles?

CHAIRMAN HARMAN: That is a very good idea, getting it into the newspapers. Our newspapers are very free to give printed articles, but they are not much on giving illustrations of any safety work.

The next committee is our Program Committee.

J. T. SMITH (Yellow Cab Co., Philadelphia): I have no report except that program outlined as announced in the booklet.

CHAIRMAN HARMAN: We have now a Round Table discussion on "Safety Devices and Their Maintenance." I want you to feel perfectly free to talk now.

F. E. SHEARER (Standard Auto Accident Co., Detroit, Mich.): I would like to have some gentleman's opinion as to whether he thinks a public bus carrying 30 passengers, for example, should be equipped with a speedometer?

The reason I ask is that in New York I ran across a large bus line, 100 buses. The speedometers in these buses were either not operating or had been taken off. In taking that matter up with the president of that company, he said, "We don't want our passengers to become nervous. If we have old ladies riding, we don't want to make them nervous when they see that speedometer picking up."

"The speed limit is 30 miles and the driver is responsible for anything that happens over that. The maximum speed on an open road is

supposed to be 36. It actually is 45. To my experience, there is no actual sense of speed on an open road at 45 miles an hour."

He suggested that speedometers be placed on the steering post where nobody but the driver could see them. The objection to that was the driver will always paint his side of the story to make it appear as favorable as possible for himself.

I would like to have someone else's opinion as to whether there should be a speedometer on a bus.

J. E. DOMIS (General Necessities Corp., Detroit): I think there should be a speedometer. My wife was on one of those buses one day and was very excited and nervous when she got home, telling how fast this bus drove. I think the people who ride have a right to know whether that bus is going 90 miles an hour or 15, as they are supposed to be. I think it is a good chance for anybody riding on that bus to observe from a safety angle and report that driver.

Keeping Drivers Within the Speed Ordinances

MR. LYNN: Down in Kansas City our transportation department takes this attitude on speedometers, that unless we can give a man a bus with a speedometer, we can not hold a man responsible for observing the traffic regulations. If he exceeds the speed laws or any of the regulations, the company pays his fine, but he gets a letter in that case. If the speedometer is working and he gets into any trouble, that is entirely up to the operator.

Not only are we trying to keep men within the speed laws by means of speedometers, but we set the governors on the coaches so they can not exceed the speed laws, and they are tested by tachometers once every 30 days, actually tested on the road by the transportation department. So we have three angles from which we are trying to watch the operation.

We have one express line that is supposed to give high-speed service inside of the city limits. If a man has a limited schedule, we insist on his being there on time, and the tendency is for him to get there, and that is the reason it is necessary to take all these precautions. The schedule is 25 miles an hour and he has to run 25. Naturally the tendency is for him to go over speed.

From the mechanical standpoint, I can't see but what every businessman would be vitally interested in giving the man not only a speedometer which is working, but also a governor, because the expense goes up about as the speed. I think it is a good chance to save a lot of money.

MR. MINEUR: We have about 40 men in our garage. We don't have speedometers on all our trucks, but we do have them governed down from 40 to 35 miles an hour, particularly on large Pierce Arrow trucks. We find that any speed above that, when they are carrying a load of ice and ice cream, which brings the gross weight up to about 40,000 pounds, is detrimental to the operation of the truck. It runs to ruin in no time. We have them checked by inspectors that do nothing else

but inspect the vitals of the truck at the end of each day, and no truck moves the following day on which they find anything wrong.

F. B. HENNETTA (Yellow Cab Co., Roanoke, Va.): I want to do away with all speed laws and run under control. Now the railroads all over the country run on that rule—under control. You know and everybody knows that a bus running 60 miles an hour sometimes is perfectly safe and under control. Another time it may be running six miles an hour and it is dangerous. If they make the rule 10 miles an hour and a man is running six and kills somebody, whose fault is it?

If we find anybody not running under control, punish them severely. Run under control! Right in our town now our men have a rule to run under control. Never mind city limits. There are four different speed laws on Bond Street, and nobody thoroughly understands them. The trucks are allowed to run 10 miles, taxis 15. One car is allowed to run six miles around a corner, another eight, and there isn't any sense to it at all. Run under control and don't mind the speedometer.

FRANCIS MCGUIRE (Eastern Dairies, Inc., Springfield, Mass.): We had considerable trouble with the buses on speedometers. It seems the average person who rides in those buses takes great delight in finding something they don't like, generally speed.

Quite a large bus operator has a speed limit. The fastest rate of speed is 30 miles an hour. If there are two infringements, they discharge the driver.

Keep the Vehicle Always Under Control

The average bus companies realize they must abide by most laws. They realize it is their bread and butter and do not do anything objectionable, so as to bring criticism on the buses.

I think a man would be safe at 35 or 40 miles an hour with a bus load of passengers if he only uses the speed where he knows it is allowable and safe. But when we talk about six and 10 miles an hour, it is out of the question.

I think bus operators work out their own salvation. You see them on the road pull over when they hear a horn. Their speed is reasonable. I think they are very near perfection.

CHAIRMAN HARMAN: I have thought of your suggestion to run under control. I have railroaded for a good many years myself, and will have to confess that running on a railway with a clear right of way, or at least your right of way handed to you, is much different from an automobile down a state or national highway where there is no speed limit; and I think the thought of control is leaving the matter entirely too much to the man.

If your man knows what speed is, then you might leave it to control, but I will venture to say there won't be two men in 10, if you cover the speedometer and put them out on a clear five-mile strip, who can tell how fast they are driving.

I don't think the question has ever been asked me by a passenger as to why we didn't have a speedometer.

I can recall several instances in my own case where I have had a splendid driver but with a lot of speed. One was a good business-getter, bright, energetic, enthusiastic in his work, but every day I would get a report that he was exceeding the speed limit. So I took him in my own car. It was summer time and I took him out on the boulevard.

I tried him three times in 10 miles and at no time did he guess how fast I was going within five miles. It showed he did not possess the faculty of judging speed. Many men would judge the speed within a mile or two per hour, but there are some men who can't. Eventually we took it out of him. He is with me today and has made a splendid driver. I am simply giving that as my own experience.

Speedometers Should Be Placed on Every Bus

MEMBER (Aetna Life Insurance Co., Hartford, Conn.): It might be in order to leave speedometers off the taxicabs. I think it is a grave mistake to consider leaving them off the bus, and I would seriously question the insurance of any fleet of buses where I found the owner had left off the speedometer or put it out of operation, simply because he was afraid some of the older passengers might become frightened. I should think, looking at it from a psychological standpoint, he would be concerned as to what the public would think, because we all have to cater to the public, and if the public is convinced you are operating a safe line, they will patronize it.

I happen to know something about the bus line running between Hartford and Springfield, and I know that they are making a very serious effort to break up any speeding by their drivers. I have talked with their officials and find that it is to their interest as far as the public is concerned to get the public to patronize that line, and they know the public won't patronize it if they feel the drivers are going to exceed the speed limits at all.

So I should say, regardless of whether speedometers or other safety devices are used, owners of automobile fleets should be interested in doing such things as will incur the good will of the public.

MR. LYNCH: I wonder if this meeting would be interested in knowing some of the safety features incorporated in our buses in Kansas City, which we have to have in order to operate double-deck buses with one man. The dead-man steering wheel stops the bus in case the man lets go of the steering wheel, and the doors are interlocked with the brakes and a few things of that kind.

CHAIRMAN HABMAN: It is all safety device, whether you consider speed or the man getting hurt. I would be glad to have you give them your experience.

MR. LYNCH: The problem of course was to make money with buses, and we figured we couldn't do it with two men. The next problem was to make a safe, double-deck bus carrying 63 people, only operated by one man.

Naturally on the hills of Kansas City the first thing was air brakes.

The next thing we decided to do was circulate the passengers, bring them in at the front door and let them out at the rear door, with one operator in charge. We made the doors automatically controlled by means of door engines. With only one man on the bus, of course we never wanted the doors open except when the bus was stopped, so we interlocked the brakes with the doors.

The man opens the front door by taking his foot off the heel rest. At the accelerator or pedal is an ordinary cup. He sets his heel in that and that rests on a valve stem of an air valve. When he takes his foot off, that cup raises up about three-quarters of an inch and permits the air to go in and open the front door. The air that comes in through this heel rest is only permitted to enter when the brakes are applied. When air is in the brake chambers, it is then relayed in the heel rest.

Any time a man is coasting down a hill, he can take his foot off the accelerator and the door will not open, but when he comes to the curb and makes his stop the next thing is to turn to greet his passengers. As he turns about, the door opens as he looks toward it. It looks rather uncanny as you sit there and watch. As he turns back around to start, he naturally reaches for the accelerator pedal with his right foot, so when his foot hits this heel rest, the door closes.

Control of the Bus Doors is Always Insured

There is no danger of anybody jumping on or off at that door except when the bus is stopped. The door is closed before the bus is moved.

For example, the rear door is handled by means of a treadle on the floor in front of the door, just the same contrivance, only instead of a heel rest, a big plate on the floor. He uses this in letting the passengers out. As soon as they are off, the doors close automatically. The driver doesn't have to pay any attention to the people. His attention is entirely with collecting fares from the front.

The door closes when the brakes are released irrespective of the passengers, so it is impossible for a passenger to alight from the coach at the rear except when the coach is standing still. There is no danger of getting hurt that way.

Now one other feature that is incorporated is the dead-man's wheel. Some of you electric operators know a dead-man's control. It is the same on the steering wheel. The steering wheel is composed of two portions. A man holds it with either hand. Whenever he lets go of the steering wheel with both hands, it drops down three-eighths of an inch and strikes an air valve, which drives the air into the brake chambers and stops the bus. You can be driving 30 miles an hour and get up out of your seat, and the bus will stop like that. You can fall dead, or be drunk and go to sleep, and the bus will absolutely stop. You might be in the center of the street, but there is no danger from a man going to sleep.

There is another thing we had to take into account. The doors are automatically closed. Suppose, for example, there was an accident which injured the operator. It had to be arranged so that the pas-

sengers could free themselves. So when anything happens that causes a man to drop his steering wheel when the brakes are not set, the air that goes into the brake chambers also goes into the door on the opposite side and equalizes the doors so the passengers can walk up and pull the doors open and get out to safety.

In order that one man might have control of the entire coach, it was necessary for him to know what was going on in the upper deck, so after some four or five months we finally arranged a periscope which is right up in the ceiling of the coach, and a man just glances up there and gets the entire picture of the upper deck. After he has the picture, it doesn't do him any good unless he can say something, so we have a loudspeaker at the side. If he sees somebody on the upper deck standing up while going under a viaduct, he says, "Sit down, Rube," or something of that kind.

This seems like a vision, a dream, but when I tell you that we have been operating there for a year and are still operating you will know that it is possible.

Discussion Regarding the Use of Bumpers

CHAIRMAN HARMAN: I appreciate that talk very much. I am sorry we didn't hand this subject to you to talk about. He has given us some very good ideas. He happens to hail from my town and I know they are operating 90 buses and while they are new, they have been very successfully operated as far as accidents or public hazard are concerned. They have been very successful, and no doubt it is due to these many devices.

J. T. SMITH (Yellow Cab Co., Philadelphia): What about bumpers and headlights?

CHAIRMAN HARMAN: Mr. Hilmes, have you got your fleet fully equipped with bumpers?

MR. HILMES: No.

CHAIRMAN HARMAN: Can any fleet-owners give us any ideas on that?

I can say this for a cab operator, we have them on all our taxicabs. I only put them all on since the first of April, and it has stopped the mashed fender. I can't say that it has stopped any particular accidents, because I don't know that it has.

MR. SMITH: How about the severe injuries and knock-downs?

CHAIRMAN HARMAN: We have had very little of that now or before. I can't say any measured amount of the success could be contributed to the bumpers, but with us from the financial point, the fender maintenance was excessive, because they were always nicking the fender against some other car. The bumper has practically eliminated that.

MR. SMITH: We have 276 out of 1,100 cabs equipped with bumpers, but our figures do not separate the bumper-equipped cars in any way. In the beginning, before we had bumpers at all, we were of the opinion that in case of knock-downs the injury with a bumper would be a great deal greater than without the bumper, the way it would strike a person and throw him.

GLENN ROYER (Columbia Casualty Co., New York City): With a bumper on a vehicle, it would appear you are going to fracture or break when you strike, but in investigation of about four knock-downs where the headlight or fender struck a person, they were much more severely injured than by bumper knock-downs. You would be surprised to know what a fender can do to a human body. A headlight will make a very bad accident, but your bumper has considerably more to give than you would think. Furthermore, it presents a plain surface and you don't get the mangling.

I believe in modern traffic you want your bumpers on account of the radiator problem. A punctured radiator would pay for a good bumper.

MR. MINEUR: On all our cars we have rear bumpers. Rear bumpers on the trucks are bumpers enough.

Drivers Inclined to Depend Too Much on the Bumper

MR. HILMES: Seven years ago we had bumpers on all our cabs. We will recall at that time they weren't as up-to-date as now. We took them off for two reasons; because they were always getting broken, and after investigation we found that the driver depended too much on the bumpers, with the result he struck a lot of things, and people, which he didn't strike after we took them off.

However, we are very much in favor of the bumpers that are designed now. Only last Saturday night the bumper on one of those cabs saved not only the cab, but a lot of other things. The cab broke away and started to cross the viaduct, and hit the rail on the other side. If that bumper hadn't been there, it would have gone through the rail.

MR. WOOD: This isn't a commercial bumper at all. It is a piece of plate steel about four inches wide and pointed on two brackets, which fasten to the spring to the manifold. Of course that type of bumper would not have as much flexibility as a commercial type of bumper, but it serves the purpose as far as saving fenders and radiators is concerned.

CHAIRMAN HARMAN: Can anyone here give us any experience on governors, which are naturally a safety device, as speed control from the mechanical end of it?

MR. HEMMAN: Governors have been very peculiar and hard to get to function properly, but there is a governor on the market now that is a vacuum type and will give power, but I have found on all light-weight vehicles where power is not a necessity you can make a governor for 10 or 12 cents by cutting a gasket out of bronze or copper and perforating it with 16 holes to give the desired volume.

I have used that eight or 10 years on trucks and it has served its purpose well. I don't know any reason why it couldn't be successful in taxicabs or buses, and that will only control your engine on your direct drive. It will give you full velocity on your lower gears or hill climbs.

CHAIRMAN HARMAN: Do you use governors in your fleet in general?

MR. HEMMAN: Everything is being equipped with governors practically all the way through. They are also sealed with our own seal and monogram and traveling mechanics inspect those every 30 days.

GLENN ROYER: (Columbia Casualty Co., New York): I had an experience with a driver of a heavy Mack. He had a through run from Philadelphia to New York City. I talked speed with him for a while and he finally admitted the truck was governed but he was driving at night and early morning and made remarkable time.

I doubt very much whether you can answer your whole problem until a governor is devised that actuates from car speed instead of motor speed. I think that is where you come out.

On the proposition of speed, if we can go back for a moment, railroad companies do not govern their equipment, at the present time, although they have made efforts. Some have put speedometers on their engines so they can give their men a top speed, but our friend from Virginia here opens up a very interesting subject when he says, "Drive under control."

Be Able to Stop Safely if You Have to Suddenly

Last night I made a statement to some drivers in these words, "Drive them so you can stop them if you have to."

Your speedometer certainly has a place on deluxe buses, running on modern, concrete highways between cities where top speeds of great velocity are possible, if a man has no speed judgment; but to give a man an arbitrary speed limit means nothing when you analyze accidents, because a car might be perfectly safe at 40 miles an hour on a straight pavement when dry, and immediately dangerous when the pavement is coated with ice.

In trying to get drivers to come down and use that judgment, I have found this effective. Tell them their speed is directly contingent upon the effect of the brakes and their brakes are not effective unless they can friction between the pavement and tires. Therefore, regardless of the inspection the garage gives you, in the first block you are traveling apply your brakes and see what you can do. When it begins to rain or snow, do the same thing occasionally.

How many of us have had this experience? We drive for maybe a hundred miles on straight, smooth roads, making good time. Rain or snow comes and we don't use our brakes. Then an emergency occurs. We are driving at top speed, we don't know what the pavement is, and slam into it.

If you test your brakes occasionally during the day, I think you will get that control judgment that you want, and the thing more or less solves itself without a speedometer.

CHAIRMAN HARMAN: The next thing on the program is a paper by Mr. F. W. Parks, C. H. Cowdrey Machine Works, Fitchburg, Mass.

BRAKE INSPECTION AND MAINTENANCE

**F. W. Parks, Sales Manager, Cowdrey Brake Tester Organization,
Fitchburg, Mass.**

It is rather difficult to present a paper of this sort without giving the impression that it is concealed advertising. Because of certain experimental work conducted at the North Broad Street Garage of the Yellow Cab Company of Philadelphia, your chairman invited me to discuss this subject here today.

Our organization has conducted experimental and research work for several years. We have had occasion to test the brake performance of several thousand cars. It is from this background that these observations are drawn.

"There has never been a science in any subject until a measuring means has been developed." Brake inspection and maintenance has never been on a scientific basis comparable to other parts of the motor vehicle, such as the power plant, or the lighting and starting mechanism. There is a very good reason for this. There are many scientific units of value in common public use in connection with the motor vehicle. The motoring public has adopted engineering terms, such as miles per hour, horse power, candle power, watts, volts, amperes, etc. But there has never been any such accepted unit term for describing brake performance.

Before the motoring public can adopt any term or name to describe brake performance, automotive engineering must first determine performance standards, and give a name to the unit that describes that performance. To be sure, deceleration is a term used among engineers but it is apparently too deep for general use.

As a result of this situation, brake performance has from necessity been described in terms of personal impressions, such as bad, fair, good, etc. But these are merely general terms and mean nothing definite whatever. You are all familiar with the result of this situation in practice, a driver reports to the shop that his brakes need attention, based merely on his personal impression. So a mechanic repairs and readjusts the brakes until they pass his own personal impressions of efficiency. And you all have seen many examples of the conflict of these two personal impressions. How chaotic this state of affairs would be if it existed completely throughout our every-day life. Suppose the butcher had no scales on which to weigh meat; or the druggist no scales on which to compound prescriptions!

The motor vehicle is such a comparatively new development of civilization that most engineering attention has been directed toward making it run—cheaper, quieter, faster, etc. You will find many instruments on the vehicle pertaining to running it, but not one instrument of any sort to indicate whether it will stop.

Our accumulated data enable us to submit to the automotive industry the accompanying "Table for Grading Motor Vehicle Brake Performance."

We are adhering to the practice already established by the Bureau of Standards and adopted by several states, that all brake performance be interpreted as from an initial speed of 20 miles per hour. We also concur with the resolution of the Eastern Conference of Motor Vehicle Registrars, that all brake tests shall be made by using an instrument especially designed for the purpose, rather than the "painted line across the road" method, which is admitted to be grossly inaccurate.

The Mathematics of Brakes

For the first time in the history of the industry, so far as we know, we have established mathematically the theoretical relationship which exists between motor vehicle weight, retarding force, and deceleration, and have actually measured the retarding force. Our equipment measures it in pounds of road pull, and at each wheel separately. The sum of the readings obtained at each braked wheel is the "Total Retarding Force" for the corresponding pedal pressure.

We have prepared charts by means of which stopping distance may be predicted. These charts are remarkably accurate when used in connection with our machine.

Greater Safety with Less Expense

Let us assume that we are dealing with the brake operation and maintenance of a fleet of 100 two-wheel brake taxicabs. For city traffic, perfection can not always be maintained, so let us set as our bogey a grade mark of C-2.

That is to say, if every cab in our fleet can stop in from 35 to 40 feet from a speed of 20 miles per hour without appreciable slewing on a clean, level, dry, smooth, cement roadway, our braking systems are in good operating condition for two wheel brake cars. If we can keep within this bogey, our accident record should be materially reduced. Also if we can do this, we will automatically and unconsciously accomplish other highly desirable results.

But how are we to go about it? First, so long as it is the driver who takes the responsibility and who does the complaining to the repair shop, let us settle with him. Suppose we locate a brake testing machine near the garage door, so that each morning as he drives out he may stop for a few seconds, apply his brakes, and take a reading of both wheels without leaving his seat.

Let's not go into the science of it all with him, but just assure him that if each wheel on his cab reads within a certain green space on the dials of the brake tester corresponding to from 750 to 850 lbs. of road pull, his cab is O. K. for the day. His brakes are then equalized, and at a point which will give him as good brake performance as he has a right to expect from a two wheel brake cab. That is, he will be able to stop

GRADING TABLE
for
MOTOR VEHICLE BRAKE PERFORMANCE
From an Initial Speed of 20 Miles Per Hour

Stopping Distance	Comment	Grade
Between 15 ft. and 16 ft.	Commercially perfect for 4 wheel brakes	A-4
Between 16 ft. and 18 ft.	Excellent for 4 wheel brakes	B-4
Between 18 ft. and 20 ft.	Good for 4 wheel brakes	C-4
Between 20 ft. and 25 ft.	Fair for 4 wheel brakes	D-4
Between 25 ft. and 30 ft.	Poor for 4 wheel brakes	E-4
Over 30 ft.	It's no longer a 4 wheel brake car	F-4
Between 30 ft. and 32 ft.	Commercially perfect for 2 wheel brakes	A-2
Between 32 ft. and 35 ft.	Excellent for 2 wheel brakes	B-2
Between 35 ft. and 40 ft.	Good for 2 wheel brakes	C-2
Between 40 ft. and 45 ft.	Fair for 2 wheel brakes	D-2
Between 45 ft. and 50 ft.	Poor. Brakes need attention	E-2
Over 50 ft.	Vehicle unsafe on highways	F-2

in 35 feet from 20 miles per hour on a clean, dry, level, smooth, cement roadway with a vehicle weighing about 4,200 pounds.

But now, having given the driver a yardstick by which to approve or condemn his brakes, we must give the shop the same equipment. We have removed the guesswork from the driver's seat by setting a standard. Therefore, the brake mechanic must have the same standard. That is the only way we can prevent unnecessary disagreements regarding brake performance, between the drivers and the mechanics.

Here's where our troubles are likely to begin, and they may obtain for a few weeks. There may be a few traditions to break down and bad habits to cure. Of course, it's better to have one man in charge of all brake work, especially if he can be made to see that his is the most important end of the cab. He has been led to believe, through shop tradition, that the rear end is the greasy, dirty job, while a transfer to the front end has meant social advancement to him. Unfortunately, too, in many shops, advancement to the front end has carried with it a raise in pay.

Where there has been no single mechanic on brakes, and all hands have had a try at it, one may find some wonderful attempts at improvements in original hook-up design. With eight mechanics in one garage, left to their own devices, it takes but a few months for them to make startling brake changes, particularly in lever positions, for the entire fleet.

Once get this condition of mal-adjustment into a fleet and it ceases to be a joke. For the cost of tires, brake lining, and shop labor can be increased very decidedly by such mal-practice. But do not blame the men; blame the management. Put one man in charge of brake work. You have one man responsible for the stock room, why not for brakes? Establish a standard practice, and hold your man to that practice; make

changes in that practice if and as you see fit, but do not permit him to do so unknown to you.

For the first month this program may cost you more than formerly. The drivers will have to have a new toy and may be persistent in their criticism of the new method. The brake gang may run into a snarl on many cabs, and may spend considerable time correcting difficulties that required many months to accumulate, and previously went unsuspected. The brake testing machine helps them to locate eccentric drums; bell-mouthed drums; levers out of parallel on cross rods, and out of position at drums; worn pins, sleeves, and bushings; warped bands; worn cams; linings loose on rivets and so forth. The first few weeks may prove to be quite disheartening.

But once the fleet has been through the correcting process, easier sailing is ahead. Each job now takes much less time. The brake foreman knows in just what position he will find his leverages, because no one has attempted to improve upon them behind his back. He can now get along with fewer men. And in the end this is what should develop:

Results of the Brake Testing System

1. Accident record shows a drop.
2. Money outlay in the settlement of accident cases decreases accordingly.
3. Money outlay for repairing rolling stock due to accident decreases.
4. Tires last longer, due to better brake equalization.
5. Linings last longer because of better brake equalization.
6. Tie up of rolling stock for repairs due to accidents and brake lining jobs shows a decrease.
7. Fewer arguments regarding brake performance between drivers and shop.
8. General body repairs due to chassis strains caused by unequalized brakes reduced.
9. This equipment and system of standardized brake inspection and maintenance practice might have quite an effect in court in winning accident cases, as proof of exceptional care.

Many taxicabs are equipped with disc wheels, which many garages insist shall be removed for each adjustment of the brakes. When brakes are adjusted with the aid of our machine, we find that this waste of labor can be eliminated except in a few of the worst cases.

In advocating a more scientific and standardized practice for brake adjustment and maintenance, we are not recommending an increase in expense. Returning to our example of the 100 cab garage, the cost of operation would be about as follows:

First time through the fleet, three men, one hour per cab to correct mistakes.

Later, one man to adjust and maintain brakes in good condition;

average time, one-half hour per cab including relining. This would pass each cab over his machine once each week.

For small fleets the drivers' daily inspection machine may be eliminated and the dual service performed by one machine.

Savings from the Financial Standpoint

From a financial standpoint, it hardly seems necessary to defend standardized practice in our case of the 100 cab garage. The cost of equipment should be saved several times over each year.

Take the tire bill as just one example. For 100 taxicabs the yearly tire bill is somewhere near \$24,000, I am informed. Better equalized brakes will undoubtedly increase the life of tires. Better brake inspection will undoubtedly eradicate those egg-shaped drums which lock in the same spot at each brake application, thus wearing out tires. The amount of tire bill reduction would vary widely in different garages, dependent upon a number of local conditions. But it is only necessary to reduce the tire bill six per cent to pay for the necessary brake testing machine equipment in one year.

Take another example for illustration of the financial soundness of the investment; the stopping performance of the fleet. If we test scientifically the stopping ability of 100 two wheel brake vehicles, we find that only a few can stop within 35 feet from a speed of 20 miles per hour. The balance of the fleet performs all the way down the scale even to 100 feet stopping distance. In almost any fleet tested, the number of vehicles which should be ruled off the highway is surprisingly large.

Now, obviously, this inability to stop must affect accident records. If one vehicle can stop in 35 feet and another requires 95 feet or even 55 feet, then the probability of accidents will be reduced if all are brought within the 35 foot performance. Some fleet operators pay out one and one-half per cent of their total income in settlement of accident cases, which is an appreciable sum. Reducing this to one per cent might pay for the machine equipment in one year. At the same time, the reduction in number of accidents affects cost of repair and cost of rolling-stock tie-up.

It seems almost fundamental in any mechanical operation that the labor cost of doing work right the first time, and knowing that it is right when it is done, must be cheaper than hit-or-miss methods. Most fleet owners are paying more for a poor result than this recommended method of brake adjustment and maintenance would cost them. The payment is in added costs elsewhere, and may slip by unnoticed until carefully investigated.

Better work at less cost is the slogan which has made the automotive industry of the United States what it is today. This slogan may be well applied to the important problem of brake adjustment and maintenance.

CHAIRMAN HARMAN: I want to thank you for your very interesting report, and would like to hear from anyone who has any questions to

ask on this brake adjustment, or any comments to make in connection with this report as rendered.

HARVEY D. WOOD (Yellow Cab Company, Chicago): I would like to ask Mr. Parks what he has to say in connection with wet brake-lining. Of course I understand the machine doesn't keep your brake drums dry, but assuming that your car does go out of the garage with the brakes properly adjusted, the car gets out and gets into the wet, and naturally it is commonly known that you haven't then got the braking power you had when dry. How can you deviate from that standard scale you have laid out?

MR. PARKS: You can't. That is to say, any such routine doesn't change outside conditions a bit. The brake-testing machine is merely a yardstick.

Now in setting up a standard you must first define the conditions under which that standard is to operate and must assume a clean, dry, level, smooth, cement road. If that road becomes dirty, oily, wet, and is up-hill or down, you have altered the conditions. So far as wet brake-lining is concerned, you have again altered the condition, because it is a well-known fact that different brake-linings have different characteristics when wet.

So all we may do is to assume certain definite conditions, set a standard, assuming definite conditions. We have still got the weather conditions outside, which I was hoping someone would mention in this previous discussion.

Ability to Stop Within the Clear Coast Ahead

Dr. H. C. Dickinson, of the Bureau of Standards, has made a suggestion. I can't give the wording of his proposed rule exactly. It was to this effect: the driver of a motor vehicle should have the privilege of driving just as fast as he can drive so long as he is able to stop within the clear coast ahead. The clear coast ahead was defined as that distance in the direction the vehicle was going which had no obstacle that did not have a legal right to be there.

That answers the question so far as this wet brake-lining or wet street surface is concerned. If the driver can't stop in the clear coast ahead, he is not driving cautiously.

The machine doesn't do anything that could not have been done before perhaps. It merely offers a mechanic something he didn't have before to measure the result of his work.

MR. HENRETTA: I think that gentleman made a very clear and nice advertisement of my argument—under control. It would be too bad to let a subject like that go without clinching it. I believe it ought to be advocated by this body, some uniform system of compelling people not only to carry a driver's permit for themselves, but carry a brake permit for their car. In other words, to have their cars tested either by a municipal body or someone from each place who wants to enter into it to that extent and issue those permits.

MR. PARKS: I might explain that in Massachusetts there is a regula-

tion, a state law, and the registrar may designate brake service stations and the signature of those brake service stations is acceptable to the registrar.

A vehicle may be condemned by the inspector. They don't necessarily have to go to that inspector. Another inspector will do, provided the operator can bring in a certificate from one of them.

MR. ROYER: I am not going to endeavor to quote from memory, but someone said, a motor vehicle should not be driven at a speed in excess to that from which it may be stopped within its assured clear course ahead.

Now we have a battle with this brake proposition which is impossible for us, because our men were forced to go around with portable instruments.

When the boys get a bad reading there may be one of a number of causes and they try to analyze that thing by going over the system. Presently you will find one wheel will drag and the other revolve with the stream pressure. That requires an adjustment, of course.

Brake Adjustment With and Without Passengers

The way they endeavored to get at that with light and medium weight vehicles was to try to get a wheel drag, and you can see which wheel requires attention. That is immediately dangerous. If one of the wheels happens to be in powdered grit, sand or pebbles, any dirt like that alters it, and you may not get a positive knowledge of what you can draw.

For the benefit of those who want to get into that end of it, be sure you try your drag test on a perfectly smooth, clean surface. You can sweep a section of the garage and get it.

There is one question I would like to ask. You state you would inspect these brakes when you got out to the garage. When you get that bus full of passengers, what effect would that have on the brake?

MR. PARKS: You have raised a very interesting question. You remember the example taken was that of taxicabs, the relationship between the rate of the vehicle. In that case the ratio is so small it is practically ignorable.

That is not true, however, in the case of buses. There is one case that I can tell you of. At the 15th and Cumberland Street Garage of the P. R. T. in Philadelphia we had to devise means for putting an imitation load in order to adjust the brakes under loaded conditions, and it is unfortunate, but true, that at least certain types of braking mechanisms have been so designed that the braking effect is entirely different when empty than when loaded, particularly when the live load bears such a heavy proportionate ratio to the proportionment of the vehicle, as in the bus.

In the case of a cab weighing perhaps 4,450 pounds you have about 600 pounds of load, so that small increase may be ignored.

MR. ROYER: I have tested this one particular instrument that we have and I have tried with several drivers. I have a big, heavy driver,

and going over 20 miles on hour on a good, smooth pavement, he would try his brakes and he could stop that bus within about 32 feet. I get a little man under the same conditions and he will try these brakes and can't stop in 45 or 50 feet. It proves we have to get a minimum if we are testing these buses and get an average-sized man.

MR. PARKS: I might add that pushing the brake equalization effect on four-wheel brakes materially alters the amount of pedal pressure necessary in order to produce the maximum amount.

I have in mind one particular case from a very authoritative source, which I am not permitted to quote. There was a case of a small, four-wheel brake car with 180 pounds pedal pressure, and with the ordinary distribution of retarding force such as given by a good brake mechanic by the sliding on the floor method spoken of. That vehicle was stopped in 24 feet in the speed of 24 miles an hour. That is not particularly good for a four-wheel brake car.

The following day the same car and the same man, with the car driven only a mile and a half, had its brake readjusted and the retarding force properly distributed on the four wheels, and it was tested again. The stopping distance came down to 18 feet and the pedal pressure from 180 pounds to 160 pounds.

Bus Operation on the Hills of Kansas City

MR. LYNCH: The brake situation is one that is very close to my heart. I have a rather hard problem in the brakes on the buses in the hills of Kansas City. We have run some interesting tests and experiments. One test was 7,000 miles long and the temperature of the brake drums was read every six miles. We were after a lot of things besides brakes. We found without any apparent reason your brake equalization will shift from wheel to wheel. In other words, as the bus rides along you might start out with an equalized brake and in an hour's time in 15 miles the brake will be on the right-hand wheel. In 15 miles further it would be on the left-hand wheel, without any change in equalization so far as the mechanism goes, because they were air brakes with the same pressure between the lining and the brake drum. It was the matter of a little drop of oil or grit from the road, throwing the equalization off. The brake temperature would drop from 600 down to 300 and the other would go up in proportion.

The total amount of energy in those brakes was constant. We would run 15 miles an hour and stop.

I have come to the conclusion that this brake problem is something that we are all talking about, but doing nothing about. The first thing I did when I got into Detroit was to call my good friend at the Timken Axle Company about brakes. He said, "We know less today than we thought we knew five years ago."

It seems to me the big problem is brake lining. When you get a brake lining that is right, you will then be able to forget your brake problems and it looks like a brake lining is going to be something along

the line of a metal brake, something that is not affected by moisture, by oil, or by gravel or road dirt that flies up into your brake drum.

There are some very promising products on the market at the present time that look like they are going to solve the major portion of our problem. There are some linings that look like we can adjust our brakes and expect to forget them for 25 and 30 thousand miles without any more attention.

I am absolutely disgusted with the present brake linings. I don't think you can do anything at all toward equalization with those linings. In this chart that you gave for performance of four-wheel brakes, you had particular reference to the passenger car, I presume, Mr. Parks?

MR. PARKS: Yes.

Two-wheel Brakes vs. the Four-Wheel Brake

MR. LYNCH: What bus carrying as much as 75 per cent of the load on the rear axle, with two-wheel brakes, will give you almost the same performance as four-wheel brakes? The sliding of the tire is the limit with which you can go. Suppose you have four tires in the rear. It is going to change it materially when you go to talk about buses and trucks in performance.

MR. PARKS: It has been our experience in such buses as we have had opportunity to test so far that it doesn't vary materially from that statement.

You made a statement a moment ago that due to the increased weight on the rear axles and increased surface content that you could get nearly as good performance in two-wheel brakes as four. Personally, we haven't seen that happen. Our experience is rather limited, however, but I am inclined to believe that I would like to see it done, if it is going to be done.

MR. LYNCH: That gets into the next paper anyhow.

One other question is the question of load. If you can obtain a brake lining where your connection or friction is constant with air brakes, you can take care of your load without any consideration from the driver at all. You can use a variable load brake which will give you the same retardation irrespective of the load.

MR. HENRETTA: The question came up about a 300 pound man with his foot on the pedal. Your brake efficiency is retarded. Would it be feasible on that pedal to put a resistance coil spring, so you could only get the maximum pressure required on the pedal?

MR. PARKS: I don't know, because I never heard the question raised before.

MR. HENRETTA: It could be arranged. That would be on the principle of the loaded and empty brakes. The same principle could be applied to the pedal, I believe, with maximum resistance coil on the pedal.

MR. PARKS: The previous speaker raised a point. I thought you gentlemen might be interested in. It is a bit startling, but you take an inclined plane of glass. (Some of you may have heard this before.)

You take a miniature automobile of the four-wheel brake design. Don't have any pedals, but just adjust each wheel of the miniature automobile, incline your sheet of glass at an angle greater than an angle of repose, so the miniature automobile will slide down.

It is an interesting thing that it will slide straight with any two wheels locked excepting the two rears. You may lock the two front wheels or the two wheels on either side, or diagonally crosswise, and the car will slide straight down this piece of glass. But if you lock the two rears, it will turn around.

It so happens that problem was submitted to the Bureau of Standards some months ago. It is now public property. I understand they are now doing some experimental work to find out why that rather curious situation exists, but it would seem to imply that the two rear wheels are the least two wheels that need brakes.

As far as I personally am concerned, if I were having a car built for myself and was only going to have two brakes on it, I would prefer they would be on the front wheels. If I were building a four-wheel brake car, instead of having the brake effort adjusted on this small ratio commonly mentioned in the advertising matter of automobile manufacturers, I would prefer to have 60 per cent in front and 40 in the rear.

We believe this has been more neglected than any other part of the automobile, and are inclined to believe that the next five years will see a great deal of progress in this connection. I heard one man say that the ordinary external brake was a mere modification of the type of brake in use 2,000 years before Christ by the Egyptians.

The Pavement a Big Factor in Brake Control

MR. HEMMAN: We have various kinds of brakes for four wheels. You have your tires to contend with. A taxicab driver has a puncture. He may throw on a new tread, which throws his brakes out of equalization.

Have you ever taken into consideration your pavements? I am not familiar throughout the states, but in Chicago we have creosote pavements. I don't care what tires or brakes you have, you can't stop when it is wet. Let's stop that kind of pavement.

The next thing is asphalt. In Chicago we have granite-surface pavement in all our parks, and I don't care what brakes you give me, I will stop, unless the pavement is coated with ice. I will go through all our boulevards and stop and not skid.

Probably 25 years ago when we had dirt roads and macadam roads, sprinkling wagons were all right. They settled the dust. But now with sanitary pavement, I don't see any use of the sprinkling wagon. But they come around in Chicago and flush these pavements, and the taxicab driver puts on his brakes and skids across the pavement.

In the asphalt district, Mr. Sprinkling Man goes along and sprinkles. One of the members of the family is out with a light-colored dress, and he comes along and throws water all over her clothing, and you get a cleaner's bill.

I think that is good food for thought, and if we get behind it we can eliminate that, because I believe in a good city they flush their streets at night.

CHAIRMAN HARMAN: I think it would be commendable at one of our meetings to recommend that to the National Safety Council as a consensus of opinion, and that fleet-owners and taxicab men and bus owners exert their efforts to do so.

MR. MINEUR: I think it is generally agreed that the braking equipment is a very important factor. The man who operates the brake is by far the most important factor.

In New York City, if we get in touch with them, we can find out their system of checking up on brake workouts. They go out every once in a while on the highways and stop trucks and automobiles indiscriminately and ask to test their brakes. That is a very unscientific way to get at it, but some of these fellows, to my knowledge, had defective brakes and have been advised to report to one of the state agencies for examination later on to show that those brakes have been adjusted.

A Semi-annual Brake Test in Kansas City

CHAIRMAN HARMAN: In Kansas City we have a semi-annual brake test brought about through the traffic officials, and the local Safety Council has always rendered 70 per cent of the service. Where there is one policeman, there will be five members of our Safety Council who will go down. It is a voluntary proposition. The policeman stops the man and says, "We would like to have your brakes tested."

In certain cities at certain hours of the day, they will make these tests. The only thing you have is a ticket to put on the windshield that shows you have had your brakes tested. If a man's brakes are very much out of adjustment, the officer recommends to the owner that he go some place and have his brakes adjusted, as he may get into trouble.

MR. HENBETTA: We have a test system in Roanoke of that kind, and are handed a certificate, but after hearing this gentleman discuss it scientifically, I found we don't know anything about what is done.

S. J. STEINMANN (Indemnity Insurance Company, Philadelphia): In connection with brake troubles, I was wondering whether or not there is anything in the material used in construction of the brake drum itself, that is, hard metal or soft metal? I have heard some discussion on it at a prior time, and am wondering if anybody here knows anything about it.

B. D. DEWESE (Safe-T-Cab Corporation, Cleveland, Ohio): On that particular subject I think the brake lining fellows are now making better lining. Therefore, the brake drum fellows are doing a lot of experimenting.

We are just now getting so-called steel drums and low-carbon steel drums and having them decreased. What the results are, they claim they don't know. They are trying to keep brake drums from wearing

out too fast and trying to make them expand evenly under heat. That is one of our brake troubles.

CHAIRMAN HARMAN: Has there been a test made along the lines suggested by Mr. Lynch in his bus operation, for the pleasure or small car? I don't know what you call it, but it is something like the metallic substance they use in the brake lining on a railroad train or a carburetor.

MR. DEWEESE: The American Car & Foundry, I understand, has been conducting those tests for years and I have seen some interesting experiments in metal brakes on automobiles, with reasonable success.

They have failed to overcome that one great thing we all know about, in other words, metal contact. They have had a little difficulty in applying those in such a way they don't get shattered. Any who have had brakes shattered are pretty well scared.

CHAIRMAN HARMAN: What is the general consensus of the meeting on the gentleman's suggestion here about our offering a resolution to the National Safety Council on street-sprinkling in larger cities?

MR. WOOD: I so move, Mr. Chairman, that this committee pass a resolution to the National Safety Council to be incorporated in the minutes of this meeting to the effect that the resolution should be worded later, but to carry out Mr. Hemman's thought, that sprinkling of the streets during the daytime should be discontinued.

MR. ROYER: Don't we want to put some words in about the undesirable pavement surface?

CHAIRMAN HARMAN: I would be very glad to appoint a committee to write a resolution of that kind. I would like to make Mr. Hemman chairman of that committee, and Mr. Royer is on the same committee. I will also appoint Mr. Steinmann. These gentlemen will be a committee of three to present to the session tomorrow morning a resolution on sprinkling and pavement surface.

I have been delinquent in selecting our Nominating Committee. We will do that now. I will appoint the following:

Mr. L. D. Hemman, Armour & Co., Chicago.

Mr. J. E. Dobbs, General Necessities Corporation, Detroit.

Mr. F. B. Henretta, Yellow Cab Co., Roanoke, Va.

Mr. H. D. Wood, Yellow Cab Co., Chicago.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The meeting convened at 9:45 o'clock in the Small Banquet Hall, Statler Hotel, Detroit, Michigan, Chairman Harman, presiding.

CHAIRMAN HARMAN: The first thing on the order of business is a report from our Nominating Committee of which Mr. Wood is chairman.

HARVEY D. WOOD (Yellow Cab Company, Chicago, Ill.): Mr. Chairman and Gentlemen of the Taxicab and Fleet-Owners' Section: The Nominating Committee submits for your consideration the following names as officers for the year 1927:

REPORT OF THE NOMINATING COMMITTEE

Chairman, J. T. Smith, assistant general manager, Yellow Cab Company, Philadelphia, Pa.

Vice-Chairman, J. Robert Clair, director of safety, Checker Taxi Company, Boston, Massachusetts.

Secretary, Joel E. Dobbs, safety engineer, General Necessities Corporation, Detroit, Michigan.

Poster Committee, Harvey D. Wood, safety director, Yellow Cab Company, Chicago, Illinois.

Statistical Committee, Russell Reel, statistician, Yellow Cab Company, Des Moines, Iowa.

Program Committee, Glenn Royer, Columbia Casualty Company, New York City.

The Executive Committee is as follows:

Dale Harman, general manager, Yellow Cab Company, Kansas City.

Lee Miles, president and general manager, Cab & Transfer Company, Louisville, Kentucky.

CHAIRMAN HARMAN: One section of the committee has been omitted here, as you may have noticed. That is the Engineering Committee. This committee will be as in the past appointed by the National Safety Council office.

It seems our committee has covered the situation very thoroughly, and if I can get a motion from the floor, we will elect these men in a body.

(The motion was made and seconded and carried.)

The next thing is to try to bring up the unfinished business of yesterday. I know Mr. De Weese is here, and would like to have him come forward and read his paper on "Advantages of Four-Wheel Brakes."

ADVANTAGES OF FOUR-WHEEL BRAKES

B. D. DeWeese, Safe-T-Cab Corporation, Cleveland, Ohio

I haven't prepared any formal paper because I believe that round table discussions are much better in bringing out the valuable points. Also I am very timid about discussing four-wheel brakes because one gentleman said here yesterday that the head man of the Timken Detroit Axle Company said he didn't know anything about it, and last year I talked to the vice-president, and he didn't know anything about it.

Therefore, I think if we start on the premise that the engineers are rather in the dark on the question of four-wheel brakes, we can pry out the points a great deal better than to assume any system of four-wheel brakes or two-wheel brakes is the final answer. I don't believe that is true. As far as this meeting is concerned, in fact the whole meeting of the Safety Council, the question we are interested in is, is this four-wheel brake device, regardless of its type, a safety device?

In other words, we want to know what a vehicle equipped with four-wheel brakes saves in the hands of the average man more than a vehicle equipped with two-wheel brakes. I think that is the big question we are interested in. If it is, regardless of some slight mechanical differences or some slight extra cost of maintenance or something of that nature, it should be adopted.

Now let's start from that point. Is it a safety device? You all heard the paper yesterday by Mr. Parks, who has unquestionably gone into the theory of braking a great deal more than I expect to touch on it, and he pretty conclusively held out that a four-wheel brake car will stop in one-third less distance than the rear-wheel brake car only. It is pretty well determined that a four-wheel brake car, unless you have that ability to lock the rear wheels, regardless of what else you do, will skid less than a rear-wheel brake car only. Those are two points that are also fairly well established.

Out of about 45 builders now (I am speaking of the pleasure car field more than the commercial car field) about 37 or 38 say four-wheel brakes. There are conspicuous examples that do not equip. We can mention them, because it is no secret. Some of them are Lincoln, Hudson and Dodge, probably about three of the largest users of rear-wheel brakes only. On the other side we have the vast General Motors organization, who are almost universal in their acceptance of the four-wheel brake principle. They don't use them on their lightest cars. They wouldn't say they wouldn't be a good thing to put on there. I think they would answer, "Well, we don't need them."

But Mr. Willys at Toledo doesn't even agree with that, and he is quite a figure in the industry. He says, "I just got out the Whippet and it has four-wheel brakes and should have."

That is the way the controversy has been going on for some time, but I think the general impression in the industry is that we are headed

directly for universal adoption of four-wheel brakes. I don't think there is any question about it; the public is going to take care of that.

Let's assume now that last year we built four million motor vehicles. There wasn't a large percentage of those equipped with four-wheel brakes. This was because the Ford, Chevrolet, and such vehicles in the light class naturally dominated the production. On the other hand, in the heavier cars there was a very notable percentage equipped with four-wheel brakes.

Let's leave that for a minute and go out on the street. First we have to look at this thing. If it is a safety device, we can argue about that one way or the other, then we have to jump over and take facts as they are on the street.

You all know, if you drive rear-wheel brake cars now, if you are going along behind some fellow who has advertised, "This car is equipped with four-wheel brakes," you have to lay off pretty well. That is equally true for the truck, bus, or taxicab. If you are on Michigan Avenue, Chicago, you are going to have to go 35 miles an hour or whatever they tell you to go. Over on Carnegie Avenue, Cleveland, we have them go 35 miles an hour at certain times of the day. If you go down there, you have to keep up with the procession or get off the street. Therefore, you fellows who are going to drive rear-wheel brake cars only are going to have to use more vigilance than the others.

The Question of the Law in the Case

I think that is the biggest factor we have to consider in commercial operation, that we have to run our vehicles over the same highways and same congestion as the pleasure vehicle. Therefore, the pleasure fellow is going to force us to do something we may not want to do.

Let's take for a minute the law of the case. Mr. Newcomb, of Cleveland, who is a very able lawyer along the lines of accident cases, having made a great study of them, prepared a thesis on this subject about two years ago for the Columbia Accident Company of Cleveland. It merely deals with the four-wheel brake as a safety device in the law from this angle: that the taxicab is a public vehicle and the bus is a public conveyance, therefore, under the law they become common carriers. The law of the land says a common carrier must have a brake on each wheel.

Mr. Newcomb says: "Let us assume that two years from now (that is today as this was written two years ago) we have an accident. We go out here and your taxicab is going along at the rate of speed allowed of 35 miles an hour, and is following, let us say, a Nash. Mr. Nash equips his car with four-wheel brakes, and due to some obstruction ahead, he has to stop quick and jam on the brakes, and you go into the back of his car."

You know the mental alertness of two people is not the same. There is no such an equality of mental alertness. That has been entirely elim-

inated, because we can't find two people who will do the same thing in the same way.

Then take Mr. Newcomb's example: suppose you go into the back of the car and kill a person on the back seat. Mr. Newcomb said if he were going to take the case of the person who was killed, he would say:

"Gentlemen, I am going to prove statistically that the great majority of motor car manufacturers have already adopted this safety device. I am going to prove that the car is better under control with that than with any other device. Here is a common carrier. Here is something that is transporting passengers for hire, the same as the street railways and steam railways.

"This vehicle is not equipped with a safety device. Therefore, they have not used that due diligence and caution which the law says they must in order to avoid this accident."

So that deals with the law side of it. I think you are going to find some judge some of these days is going to say, "Well, you didn't take every precaution. You didn't have this commercial vehicle properly equipped with all the safety devices that are available."

Two General Types of Automobile Brakes

I don't know whether you are interested in types or not. I am not here to discuss types. It so happens I was with the Columbia Accident Company during the battle of the brakes. You remember we had paid advertisers, one fellow for and one against. It pulled the subject out in the open and created a lot of interest and bad feeling. I remember I almost had a fist fight with a friend of mine over four-wheel brakes.

We will have just a brief discussion of types. We have two general schools, that is, we have a mechanical school and the hydraulic school. Probably Fred Dusenbergh, in Indianapolis, was the foremost exponent of the hydraulic principle in this country. He actuated his brakes by oil or glycerin, as the Hydraulic Brake Company does in Detroit.

The mechanical school is divided into two parts. You might say we have the Isotta Franchini type. It comes from the foreign car, actuating front brakes. Brakes are attached to the front axles. Then we have Benedict's. They both conclude now that internal expanding brakes are the thing to use.

You might say the Cadillac, Buick and Nash are among the foremost exponents of four-wheel brakes on pleasure cars, and they don't agree that you should use the internal brake all the way around. I think the Buick used the external brake, and Cadillac used the external rear and internal front and Nash does the same thing. Pierce Arrow used the Isotta Franchini enclosed brakes. I like to think of enclosed and exposed brakes.

In my experience with four-wheel brakes, I have never as yet seen an enclosure, meaning a method of enclosing a front brake, which was entirely fool-proof. By that I mean so that water or grit could not get in. Grit can get in a very small space and so can water. We can

use enclosed brakes with shutters on them so we can keep a certain amount of those materials out, but they will get in; and if we make a good enclosure, they stay in after they get there.

So that is the problem of the engineer. He turns around and makes a wonderful, nice, enclosed brake and then drills holes in it to let the stuff that gets in come out. I don't care whether the brake is external contracting or internal expanding; I believe some sort of water sheds would be a good thing. You can take an external brake and put something on it and when you go out for the average drive you won't be troubled with a whole lot of water.

Of course the truck fellows and the bus fellows and the taxicab fellows have been very slow and backward about taking on the four-wheel brake, but they have not been condemning four-wheel brakes. Their principal reason has been mechanical difficulties. While we want our commercial vehicles as near fool-proof as possible, we don't want them laid up. We say, "Two brakes give us enough trouble. If we had four, that is twice the trouble." So we have been very careful about equipping our commercial vehicles with four-wheel brakes. But it looks as though we are going to be forced to do it whether we want to or not.

Another thing, I think the public is going to force the passenger carrier to do it. For example, I believe this condition is going to come around in the taxicab business. I believe if one operator says, "I am not going to have four-wheel brakes—I don't need them;" and another gets four-wheel brakes and advertises them to the public, it is going to cause the first fellow to lose business, because the public as a whole is beginning to believe four-wheel brakes are safer than rear-wheel brakes only.

The Taxicab and Bus Business Highly Competitive

I think the taxicab and bus business is highly competitive and will continue to be. I think, though, from what I have seen of the four-wheel brake in commercial car operation, we needn't look for any more expense than we can look for on the rear-wheel brake because longer wear of lining and those features will offset any adjustment.

Personally I don't believe it is true for this reason: wear and strain on braking mechanism is caused by leverage and pressure. On a four-wheel brake job, naturally pressure per square inch is considerably reduced on each brake drum and the wear of the lining is considerably less. There is quite a variance of how much less. I have heard all the way from 25 per cent to 75 per cent. Of course that is a hard thing to determine because conditions vary radically. I think as a whole you can say we are not going to have any more trouble with the four-wheel braking systems as worked out today than we would have with a rear-wheel braking system.

There is one more point I might bring up. The coming of the four-wheel brake has improved brakes generally. We have a lot better rear-wheel brakes than ever before. There is no doubt about that, and those

fellows who are going to stay with the rear-wheel brakes are going to continue to try to improve them.

There is another economy. I believe with the coming of the four-wheel brakes and balloon tires, the chains on the light vehicle will be practically eliminated. You don't need chains because you are going to skid on brick. On the four-wheel brakes if you put chains on your rear and apply your brakes you have the same skid that you would with rear-wheel brakes only. It gives you the same tendency to skid as before. It has been pretty well proven that four-wheel brakes and balloon tires eliminate chains except for Ford driving.

Now if there are any questions, I would be glad to have you bring them up, but that is all I have to say on the subject.

Two Papers Taught a Lot About Brakes

CHAIRMAN HARMAN: Mr. DeWeese has surely covered this situation thoroughly, and we want to thank you for the able talk you have given us. Between Mr. DeWeese's talk and the talk given us yesterday by Mr. Parks, we have learned a lot about brakes.

F. B. HENRETTA (Yellow Cab Co., Inc., Roanoke, Va.): I would like to ask Mr. DeWeese's opinion on one point. He brought the taxicab into a kind of close place there in the eyes of the law. In his opinion, would it be all right to use the service brakes in the leverage, leaving your emergency for the rear?

That would give you less tendency to skid by using front brakes for service and would give you the benefit of the four brakes for emergency.

MR. DEWEESE: That has been brought up a great deal. You don't get the advantage then of four-wheel brakes. That is the only thing against that. But for a service brake, I think the brake on the transmission is going to be eliminated entirely. We have to have two chains in our brake, but as Mr. Parks said yesterday, he would rather have a front wheel brake, if he is going to have any and can not have four-wheel brakes. That is absolutely true, and anyone with experience would say so, especially if he was on a slippery street with rear-wheel brakes.

This is true except in the turn. In the turn you have the so-called semi-releasing front. We have a semi-release brake and don't get a lock. When we lock a front brake on a severe turn your tendency is to go straight ahead. That is the reason for this 60 proposition or 75 or 65, meaning less leverage on the front than rear.

However, frankly, except on a severe turn, you can go out and lock all four wheels, turn the front any way you want to and there is no effect on the car at all, if you have a good system.

There is one thing I fall in though, and that is brake equalizers. I had a talk yesterday with Mr. Carrow. He is a famous French engineer who invented the paro brake which is pretty generally adopted, and now Mr. Benedict is carrying it on under the name of Benedict's.

I asked Mr. Carrow, "Why don't you equalize your brakes?"

He said: "Here's the answer. After 14 years fooling with that brake, my theory of braking is, if you cut out all equalizing, stiffen up your brake mechanism and your brakes so as to cut out so much spring, then adjust your brakes just as equally as you can; and then because they don't happen to be 100 per cent right, you leave them alone and let them wear down, after they wear themselves equal, they will become very good and stay that way a long time."

We put that into effect. It is a new idea and it is absolutely true. Mr. Carrow knows exactly what he is talking about. As a rule there is too much fussing about brakes. If we have good brakes, if we will adjust them so they are reasonably equal and then leave them alone, we will soon have a condition where they will wear in and we will have much better brakes. Equalizing really accentuates that.

They talk about equalizing systems, but there is one thing we have never been able to do—equalize the effect of the tire on the footing, and until you can equalize that, any talk of equalizing is bunk. You have the pressure on four tires exactly the same, and still if one tire is soft or one tire on the wet footing, you have no equalization.

There is only one system. A man by the name of Smith invented a brake starting from the tire on the footing. That was on the Ford for about a year, and it comes as near doing that as anything I ever saw. It is absolutely controlled. In other words, if you are on a slippery pavement and your tendency is to lock, your resistance is built up there.

Two Fundamental Objectives to Strive For

H. W. HEINRICH (Travelers Insurance Co., Hartford, Conn.): I have been very much interested in the papers read and the discussions, but it strikes me we have as yet in this Section discovered no one particular goal towards which we should strive to get the results we want.

The chief goal I have in mind is not the things we have been so far discussing. It is not four-wheel brakes or two-wheel brakes, for if they are not used, they are not effective in stopping accidents. Speedometers, if they are not watched, are not effective. It is the same way with a number of other operations.

The two fundamental things in my opinion for the chief objectives this division might aim at are two things discussed yesterday. One, I believe, was the clear space or course ahead, and the other was the business of driving under control. But in those two also there lies a fundamental that has not been talked about.

Take for instance driving under control. If two men, both having their cars absolutely under control, approach an intersection point at right angles and are both driving 20 or 25 miles an hour, and their cars are so physically constituted that they can not stop within the proper distance, if they both insist on right of way, they will get it, and it will take them right away to the hospital.

It is not the business of brakes or cars particularly that should constitute our chief objective, but the driver himself. That is all vague.

That is general. Everybody might say, "I will admit it is the driver." We all know that. We have heard of education and safety campaigns and things like that.

Now I just want to mention that one point. If that is our objective, to make the operation of any and all motor vehicles safer for the driver and passenger, and for the public in any order of importance they may stand, then we must know what, in the business of operating vehicles, constitutes the chief causes of accidents. I know it with respect to my own limited experience, but do we know it here, and if not, shouldn't we find it out? Shouldn't we determine what that big thing is?

The Reckless Driver Can Be Cured

We have determined what that fundamental cause is that lies back of four-wheel brakes and back of the car operation, back of everything, and it is the driver. The driver can be cured. It has been our experience that it is not the custom to hold the man who supervises that car personally accountable for an accident when he hits anybody else. There may be occasions when he is to blame, as when he leaves his car improperly parked, but he has a chance to claim that it was the other fellow's fault. When he hits anything, he should and can be held personally accountable for that accident. The driver comes back and says, "The darn fool ran right in front of me!"

The driver is personally accountable and you can make him stay on the job and be happy, in spite of it. That is one big, specific remedy that will cure this business of accidents.

Let the head executive talk to the driver and prove to him that he thinks it is fair to hold him accountable. Let the chief executive tell him that he himself is sold on safety, wants it, is going to have it, that the man's job depends not only on how he runs his car and the revenues and commission he makes, but on safety as well as production.

If the chief executive will do that, and spend a little time on it, he will create that spirit in the drivers through having contact with the big men, that spirit of being on their toes and mentally and physically alert so they are efficient producers.

CHAIRMAN HARMAN: Thank you very much for those remarks; and I believe we are coming to that in our Friday program. We have Dr. Viteles, of the University of Pennsylvania, here and he is going to give us an extensive talk on that and he has had the training of men from the psychological standpoint as well as actual standpoint.

If there is no objection, we will follow Mr. DeWeese's talk on brakes with a rather free-for-all talk from everybody on the use of chains. I would like to have Mr. Wood, of Chicago, talk on that, as they have been doing a little experimenting in Chicago recently that will possibly be new to some of you.

HARVEY D. WOOD (Yellow Cab Company, Chicago, Ill.): The Yellow Cab Company of Chicago decided about six weeks ago to experiment without chains on the wet street. The principal purpose of the experi-

ment was to find out how important a factor chains are in preventing skidding accidents.

I refer only to taxicab operation, because the elements here have to do only with that particular industry. I might start back a little.

In Chicago, and everywhere else I suppose, when they start sprinkling we have a general order go out to all our stands and garages for "Chains on." It is a universal, general order. All our taxicabs, 2,500, put on chains, and they keep those chains on until orders come out "Chains off." Regardless of whether the streets are dry or not, it is uniform.

They found, as many of you men have probably found out, too, when it starts to rain there are, in a city like Chicago, about a million people that want taxicabs all at one time, within the same minute almost. That, in other words, is your biggest period.

Now take 2,500 taxicabs and tie them up for a space of time, at least five minutes. A man is pretty good if he can get two chains on the rear wheels in five minutes. Take 2,500 taxicabs and multiply that by five minutes and you have an awful lot of lost time at that peak period when everybody is clamoring for a cab.

Interesting Experiment With the Chain Problem

Skid chains are not the cleanest things in the world, neither are tires under those conditions. Ordinarily streets aren't just what they might be at that time. We all like to keep our drivers looking as spick and span as possible, and usually when that man gets through putting on his chains he is not only besmeared with mud and dirt on the outside, but his temper probably is not the best to receive a customer and treat him with the courtesy we like.

So with that thought in mind, they decided to experiment, and the deciding factor is going to be (because it is still an experiment) whether or not accidents as a result of not using skid chains will compel us to go back to the use of them.

We have had very pleasing results. As a matter of fact, immediately after this order went out, we had two days and one night of rain. Chicago always gets her share of rain, and so we had a real crucial test; and I am glad to say that during those 36 hours we had less accidents than we have had during the same period of dry weather.

Now there isn't anything unusual or startling about that when you consider accident statistics, because if you gentlemen attended the General Session yesterday in the Ballroom of the Book-Cadillac, you saw in those statistics the larger percentage of our accidents are during dry weather and in the daytime. Now what does that mean? To me it means this, that in the daytime and dry weather the ordinary driver drives faster than at night and in wet weather. We all know that speed is a big contributing factor to accidents.

In other words, a man hasn't his car under control, an unexpected emergency pops up, and with the physical mechanism of his car, it is impossible to stop before that occurs.

I have talked to a number of ordinary drivers and they feel this way

when the streets get wet—I will give it to you in their language—"We used to get those chains on and we felt we were all wet. We could get back in the car and away we could go on asphalt and concrete or creosote at the same speed as on a dry street without chains. Then an emergency arrives, and an unexpected thing happens, we strike on our brakes, our chains serve as skates and we skid right into them. Now we feel a little creepy. We know we haven't chains. Now we feel we haven't anything there to hold us, and we go along a bit more carefully."

It has been that thing alone that has cut down the accidents during wet weather. I haven't brought any data along as to the number of accidents or comparative figures or charts, which I would like to have and am going to get a little later on, but generally speaking, our experiment has been very satisfactory.

Now we don't expect to do away with chains entirely. It is obvious that during snowy weather and slushy streets you must have chains in order to get anywhere at all. That is to come yet this winter. We of course will use our chains during snowy weather or when there is snow on the streets, but for wet spells and rain we found so far the experiment has been very satisfactory.

CHAIRMAN HARMAN: Would be glad to hear from anyone now on the chain. We want a general discussion.

Further Discussion on Use of Chains

B. D. DEWEESE (Safe-T-Cab Corporation, Cleveland, Ohio): Here is one point. If you have a dry street with a lot of dust and oil on it and it starts to rain, that is the worst time. It is only a matter of five or 10 minutes until the surface of the street is again at the point where the friction between the tire and footing is not as good as it was on the dry street but much better than when the rain first started. It is true in cab operation. If the driver didn't instantly put them on, in five or 10 minutes he would be beyond the point of the greatest danger.

CHAIRMAN HARMAN: I might say that I am the second oldest Yellow Cab operator in the United States. The rules and regulations have been rather universal with us.

In our city our main arteries and our boulevards are all a pavement that is oiled about twice a year, in the spring and in the fall, and when it starts to rain the streets are just covered with bubbles of water.

We heard of this move in Chicago to go without chains as a safety precaution. I went so far as to have our board of directors meet and see whether they sanctioned my opinion. We couldn't think of doing it in Kansas City and didn't attempt it. We have a few old drivers that feel they have the privilege of breaking a rule. We even got after them, because we were afraid they might go without them.

We use the chains there. Mr. Wood's talk on how much loss of time there is, is very true, but we have our men educated almost to the point that when it starts to sprinkle, before the rain has really begun, they have their chains on.

I would like to hear from the fleet-owners, too.

J. T. SMITH (Yellow Cab Co., Philadelphia): Lots of times you have some very peculiar ideas as to how things are going in the way of accidents. We took off chains during May in Philadelphia, and for a while I thought the accidents were in far greater numbers than they had ever been with the use of chains, but I had some comparisons made. I have taken July, 1925, and August of this year, July being with chains and August of this year without chains. In July, 1925, we had 3.3 collisions per 10,000 miles. In August, this year, we had 3.2 per 10,000 miles without chains.

There is one thing that comes out. We find that in collisions without chains they are less severe. A man naturally drives with more caution without chains than he does with chains and the collisions are less severe.

As far as costs are concerned, I might say that the accident cost per 10,000 miles on rainy days in July amounted to approximately \$175 for 10,000 miles. In August the cost for 10,000 miles amounted to approximately \$110, backing up that statement that they are less severe and less expensive.

Experience With Use of the Rubber Chain

MR. WOOD: I am purely an accident prevention man and have been trained to look at everything from the accident standpoint, but we have estimated in Chicago that if we can go ahead without chains, it will save us the cost of chains and the wear of tires to the amount of \$200,000 a year.

MR. HEINRICH: Some talk has been made recently on the use of rubber chains, and the claim has been presented along this line, that there is no appreciable rumble or jar of the car. The chains can remain always on the car, and will give the approximate braking effect in all kinds of weather that the steel chains give.

If anyone knows anything about them I would like to hear it.

L. D. HEMMAN (Armour & Co., Chicago, Ill.): I never use skid chains and never allow them to be used. I believe during the snowy season you need a shovel. You don't need a skid chain on a solid tire. It is like a man with a sledge hammer.

There is a rubber skid chain put out by the Goodyear Tire Company. I got a set of them and that is all we had this spring. I put them on the rear of my car. I drive a Cadillac coupe weighing 4,600 pounds. I put them on at the start and left them on. You can't hear them. I put four men in the car, pulled out in the road in a foot of snow, and went right through. But at high speed on a slippery pavement, if you slap on your brakes so you lock your wheels, you slide forward. You get no side-sway. They must have been on the car fully three weeks, and you can't notice any wear on them at all, and I imagine the amount of service I gave them would wear out about three sets of the metal cross-chains.

CHAIRMAN HAEMAN: We gave a test to a pair of Goodyear rubber chains and found they were all right in rain, but in snow in our town

where it is hilly, they were absolutely no good. The cab actually stuck in the snow with these chains on.

What has been your experience, Mr. Toye? Have you had any experience down in New Orleans?

JOHN L. TOYE (Yellow Cab Co., New Orleans): We tried one set, but we are thinking seriously of doing away with chains altogether. We have a level city.

HENRY J. MINEUR (J. M. Horton Ice Cream Co., New York): I might say we have discontinued the use of chains on our lighter trucks and cars. We find that stressing the point that men should be more careful during rainy weather has produced good results. Our experience has been particularly good during or after rainy weather. We have had better experience than during dry weather. On large trucks during snowy weather we use chains.

MR. WOOD: I would like to suggest that we appoint a committee to make some technical tests to determine the coefficient of friction produced by using steel chains on a tire on ordinary wet streets, asphalt or concrete. I would like to suggest that such a committee be appointed to report some real information on that at our next session. I personally don't believe that ordinary steel chains give you much friction on a wet asphalt street.

C. F. COWDREY, JR. (Cowdrey Brake Tester Organization, Fitchburg, Mass.): I think that suggestion should be that test be made with straight pneumatic tires and balloon tires also.

CHAIRMAN HARMAN: I think your suggestion is very good. The chair will appoint a committee, which will be announced at the last session, to get some actual facts.

FRANCIS MCGUIRE (Eastern Dairies, Inc., Springfield, Mass.): I would like to ask the members if any of them have had any experience with steel cables in place of chains. We have been experimenting with them and some of our men like them very much. I can't really tell you a thing about them, as to what results they are giving.

CHAIRMAN HARMAN: Is there anything further you would like to say on the chain situation? If not, we will start with the day's program.

We will now hear from Mr. L. D. Hemman of the Armour Company of Chicago.

LIGHT TRUCKING

L. D. Hemman, Automotive Department, Armour and Company,
Chicago, Ill.

Automobile accidents cause many injuries, deaths, and tremendous property damage, and how to stop the growing number of these accidents is a great national problem. The loss in money due to automobile accidents is an immense economic waste that is a tax on automobile owners. The bright side of the present situation, however, is the knowledge that most accidents can be prevented. This is especially true of the commercial vehicle in fleets where a control and system can be used.

Safe and sane operation will give fleet operators a better standing in the community, because frequent maiming and crippling of people and damaging property is not a good advertisement and does not create the impression of efficient business management. It will also help to keep the fleet owner's cars in commission, thereby saving him considerable loss from lack of use.

In operating the safety plan it is essential that some one person be in an executive supervisory capacity. Through his hands all communications and materials pass. Reports should be rendered to him and he should be held responsible for carrying out the measures decided upon. However, one person's attention will not make a safety plan work successfully. The enthusiasm of everyone having anything to do with the fleet and its operation should be enlisted.

Safety Plan Depends on the Morale of the Drivers

The success of a safety plan very largely depends upon the morale of the drivers. If they are not sold on the idea and do not give it their whole-hearted cooperation the maximum effect can not possibly be attained.

Drivers should be appealed to from these angles.

Aside from a saving effected by reducing the number of accidents, the fleet owner will find many other savings made when his organization is working for efficient fleet operation.

In February, 1917, I took charge of the delivery system of "The Fair," one of Chicago's large popular department stores. While I have no intention of passing any comment on conditions there, I will say, however, that it was their belief that their service was not only costly, but the poorest in town.

Now, having set myself to the position, and having taken the time to make a fair survey, I came to the conclusion that an educational program was needed more than anything else. Their equipment was good, consisting of 78 trucks and 265 horses. The motors were all of good make, but running wild. The shop was good and handled by good help. We were having considerable trouble and expense due to careless driving and no follow up, especially with our larger vehicles; that is, the furniture and bulk trucks. Due to the height, we were constantly having bodies pulled off or wrecked from being driven into overhanging obstructions such as branches of trees, fire escapes and low viaducts.

The first step taken to remedy this was the installation of governors to control speed; then we attached an enameled sign to the lower windshield frame, just in front of the driver that read: "WARNING! 95 per cent of all accidents are due to carelessness. This truck needs 12 foot clearance. Be careful of overhanging obstructions.

I am pleased to say that this solved that problem. We then started holding weekly meetings at the various branches. While this gave fair results we were not wholly satisfied, so we then made a ruling that whenever a driver had an accident or complaint registered against him that he must appear at my office before reporting for work on the following

day. This naturally lost him time for which he was reimbursed if found not to blame. When he appeared at the office we would go into the accident thoroughly. We had a table in the office showing a miniature layout of a street and a street crossing and with two toy autos which enabled us to go through the circumstances of the accident just as it happened. From this procedure we endeavored to determine the negligent party and this was also an aid to the driver in preventing a recurrence.

Drivers were required to make out accident reports in detail of all accidents, however slight, and we classed an accident as any occurrence that happened other than regular performance. These reports, along with any complaints, were registered alphabetically in short form in a small book for ready reference, and would at a glance give the complete record of any driver.

We now changed from weekly meetings locally to monthly meetings. These meetings being held at the main garage the first Monday of each month. In attendance were the drivers and their helpers from each branch, accompanied by the branch superintendents so that they could also get our ideas and follow them through the month.

Picking the Jury Was an Important Point

Now, at these meetings we selected a jury, the jury being picked from the drivers and each branch being represented on the jury. To be eligible for jury service it was necessary that a driver have a clear record for at least one year, this meaning that he had no accidents or complaints registered against him. With the first of these meetings we were naturally anxious that the report of the jury should be fair and in accordance with our ideas. We therefore appointed on that jury as foreman the cost clerk of our repair shop. This man was above the average of intelligence, an organization man and well liked by all.

In opening these meetings the first order of business was roll call, after which court was opened, the jury selected and offenders of the preceeding month were brought to trial. Acting as a judge and clerk, I read the accounts of all accidents and complaints from the book mentioned and commented upon each, asking the offending driver for his explanation and then the jury retired. In their absence the meeting went into general session and with the assistance of the shop superintendent we discussed all happenings and complaints, endeavoring to sell the men the idea that they were salesmen, not mere drivers, and that as a company representative the impression left by them on any client should be a pleasing and lasting one. Also, that in driving through the streets they should remember that each pedestrian as well as motorist was a possible customer of the store and that through courtesy and safe driving they should lead the public to understand that the name "The Fair" really meant courtesy as well as quality.

When the jury returned the foreman read the findings. Penalties exacted by the jury ranged from a day to a week's lay off; assessment

of damages for the accident anywhere from 25 per cent to the whole; and among the verdicts of guilty there were some with recommendations of leniency; as in one case verdict read, "We, the jury, find the defendant guilty as charged, but being possessed with the knowledge that his wife is now in the hospital we feel that he can not afford a lay off or fine, so we therefore recommend that he be let off this time with a reprimand."

The jury's report being all in, sentences were then imposed and the meeting adjourned to the shop where trucks and their separate units could be seen by all. Here the shop foreman explained the causes of different sorts of wear and breakage.

Ability to Drive Had to Be Demonstrated

At time of employment no man was allowed to take out a company truck until he had first demonstrated his ability to the shop superintendent, and the shop superintendent's word was final whether he worked for the company or not. This had the tendency to have them take care of their equipment, as they knew that the shop superintendent had costs to meet and that if they did not help him meet them they would be out of a job. We also gave them to understand that they in turn had a right to refuse to drive a truck not fit for service because of bad breaks or steering apparatus, and that the company would back them up for refusing to take such a truck out on the road.

We now adopted the National Safety Council program of placing safety posters in garages and slogans below windshields, changing these regularly.

Now, while we made careful selections in purchasing our equipment and necessary supplies for their maintenance, operated a good efficient shop, governed our speed, made regular monthly inspection of our equipment and kept same well adjusted and lubricated, it is my belief that our big improvement and saving came from our educational campaign and safety meetings.

The first full year's operation of the program as outlined reduced our operating costs \$100,000 over the preceding year, and in 1924 we spent \$20,000 less than was expended in the year 1916, when everything was considerably cheaper.

One other change we made was in taking from the hands of attorneys the handling of our property damage claims. Instead I had our C. O. D. investigator make an investigation of all accidents, getting signed statements where possible. Our average losses in full settlement of all property damage claims for the past four years was under \$500. The investigator also attended all trials, as having gone over the ground and talked to witnesses he was well fortified to act as prosecuting attorney or witness for the defense, giving both sides of the case as soon as heard.

Starting with 265 horses and 78 motors, of which 50 were electrics, I have left that organization with 100 motors, 30 of which are electrics; I added 22 cars to the fleet and traded off 20 electrics on gas trucks. In

making this change we also dispensed with 200 horses. I do not mean that the changing of 20 electrics to gas and the adding of 22 more made it possible to eliminate 200 horses; it was, however, one of the important factors.

I have now, since June 1, of this year, been located with Armour & Company in charge of operation and maintenance of their vast fleet of cars numbering over 3,000, and am endeavoring to work out something with this organization similar to that at "The Fair." I have started with the installation of governors which is about complete. I have also started having accident reports sent direct to my office so that personal contact can be had with all drivers.

We are now putting in full operation the National Safety Council's plan of placing safety posters in all garages and loading docks, and are placing metal card holders just inside and below all windshields directly in front of the driver which hold the safety slogans. We are adding to the slogans on safety others on the care and lubrication of machinery parts which are changed four times monthly:

Following are some of these slogans as distributed monthly:

January

1. Drive as you would if the boss were sitting on the seat beside you. *Grease universals.*
2. Drive safely or not at all. *Test oil in transmission and differential.*
3. Remember! Reckless driving is not a Demonstration of Skill. *Change oil in motor.*
4. Do not stop or start suddenly. "Save Gas and Oil." *Grease each week.*

February

1. Even a pedestrian has a right to cross the street. Give him a chance. *Grease universals.*
2. Children are thoughtless! THINK FOR THEM. *Grease pack wheel bearings.*
3. An accident while backing up is not an accident. It is a deliberate act. *Change oil in motor.*
4. Remove that Switch Key! No idle running. *Is transmission or differential leaking?*

March

1. In case of accident use discretion and be courteous. Remember a soft answer turneth away wrath! Sell the name "ARMOUR." *Grease universals.*
2. Strictly observe traffic signals and warning signs. They are not put there to amuse the children. *Change oil in motor.*
3. Don't ride that brake! *Is differential throwing oil in brakes? If so, check your level; undoubtedly too much oil in bowl.*
4. Never release clutch unless you are going to stop or shift gears. *Grease each week.*

April

1. Accidents don't just happen. There is a cause. *Grease universals.*
2. Don't stop or start suddenly. "Save Gas and Oil." *Test oil levels in transmission and differential.*
3. There are a lot of drivers, but not many careful drivers. Get the safety habit. *Change oil in motor.*
4. The right of way isn't worth dying for. Life's too short anyway. *Grease each week.*

May

1. If you have a smash-up everyone will seek to blame you for it. *Drain transmission and differential.*
2. Your truck can cause more destruction in one minute than you can pay for in all the rest of your life. *Grease universals.*
3. Remember! Every person you meet, whether afoot or astride is an Armour customer. Do your bit to keep them "Armour Sold." *Grease pack wheel bearings.*
4. Be careful today and live to enjoy tomorrow. *Change oil in motor.*

June

1. An accident is as dangerous for you as for anyone else. *Grease universals.*
2. Always handle yourself under the eye of the public so that the name "ARMOUR" when seen on a truck spells "COURTESY" as well as "QUALITY." *Change oil in motor.*
3. When in doubt always stop! *Is differential throwing oil in brakes? If so, check your level; undoubtedly too much oil in bowl.*
4. If you owned this car how would you handle it? *Grease each week.*

July

1. Don't be a road hog! Sell the name "ARMOUR". *Grease universals.*
2. Don't ride that clutch! *Test oil levels in transmission and differential.*
3. Don't cut corners. *Change oil in motor.*
4. Don't dream while you are driving. *Grease each week.*

August

1. Keep your eyes and ears open! *Grease universals.*
2. Approach all corners slowly. *Grease pack wheel bearings.*
3. Better be late than sorry. *Change oil in motors.*
4. Children at play may not hear your horn. *Is transmission or differential leaking?*

September

1. Oil and Grease cost less than Parts and Repairs. *Grease universals.*
2. Keep radiator full. *Change oil in motor.*
3. Do not overload. *Is differential throwing oil in the brakes? If so, check your level; undoubtedly too much oil in bowl.*
4. Spread your load over body so as to keep proper balance. *Grease each week.*

October

1. Grease Universals. *Oil and Grease and proper driving will get results for which we're striving.*—W. H. S.
2. Drive carefully! You may meet a fool. *Test oil level in transmission and differential.*
3. Your horn is alright but remember you can not blow them off the street. *Change oil in motor.*
4. Turn corners slowly. *Drain transmission and differential now! Wash out with kerosene and refill with Zero Test compound. Cold weather is coming.*

November

1. A safe driver has no accidents. How are your brakes? *Grease universals.*
2. You have no right to take a chance; the other fellow may have to take the consequences. *Grease pack wheel bearings.*
3. When you find it necessary to use horn, also use brakes. *Change oil in motor.*
4. Coast up to all stops, but never down hill. *Is Transmission or Differential leaking?*

December

1. THINK! Before you take the chance. *Is Differential throwing oil in brakes? If so, check your level; undoubtedly too much oil in bowl.*
2. Never leave truck on an incline without blocking a wheel. *Change oil in motor.*
3. In descending steep hills, shift to first and leave clutch in! Never out. *Grease universals.*
4. You can't stop quickly on slippery streets. *Grease truck each week.*

CHAIRMAN HARMAN: I want to thank you for that paper.

Along the line of weekly meetings, sometimes we feel we can't have them, but in my business where we have 400 or 500 cab drivers, if we don't have a meeting every week or every other week, they want to know what is the matter. I can see better driving on the streets following these meetings.

J. E. DOBBS (General Necessities Corp., Detroit): Our program is pretty much the same as Mr. Hemman's, which brings out in my opinion, that a great deal of the fault and cause for accidents lies with the man. We must educate the man as to what is the right thing to do in driving a truck on the streets, get them down to the office and investigate the reports, and keep right on top of the man.

When an accident happens, I get the man down and I find out in questioning him that he did something which, to his best knowledge and belief, was supposed to have been right. In the course of argument I convince him that he was wrong. In that case, the man was wrong, he was the cause of the accident, and it wasn't bad brakes or slippery pavement or anything else.

I think poor judgment and lack of education are the greatest causes for all accidents.

WM. F. YORGER (Public Safety Superintendent, St. Louis Safety Council, St. Louis): I have to leave this meeting, and I have just a few words to say. I have been engineering the St. Louis Safety Council, and there are a few things I want to leave with you men who operate taxicabs and with you fleet-owners.

I don't know what your connection is with your councils in different cities or whether you have them or not, but I want to say, one of the most important things in your business is to eliminate that liability cost to which you are all subjected. The second thing is to get the people to use your service.

Now the Yellow Cab Company of St. Louis came to our council and said, "We need you." Here's what they do and it has been the secret of their success. They have a meeting of their cab drivers. They meet every second and fourth Thursday of the month. At that time such men appear before them as the Coroner of our city. These speakers are all furnished by the Council. That is our service to them, also the direction of streets.

The Cab Driver Can Be the Ideal Driver

They are the men who are confronted with these different problems. They are shown where the taxicab driver is looked upon as the ideal driver of the city, that he is the man the public looks forward to, that when they step into his cab they want to know they are going to get to their destination safely, that they are going to get there with the least bit of trouble, and that there is a man behind the wheel who knows his business and knows the traffic laws and how to operate a motor vehicle properly. Those are the things that will help in bringing business to their company, which is a very good one.

There was one thing I wanted to take up before I left here. You mentioned your block streets, your wooden blocks. I can't see any reason why any city of any consequence should sprinkle those streets. There is where you call upon your Council. We have taken that up in our own city. Our wooden-block streets are not sprinkled. We have these large sweepers and that work is done at night in order to get off the dust. That is the only reason you sprinkle your streets anyway. However, those conditions are local, because the sprinkling problem is part of your city administration duties.

Now then, your city may have a contract. Ours has one which runs into next June. If that is eliminated the sprinkling conditions are eliminated and it will result in the flushing of the streets.

You can go to a taxicab driver and say, "Let me show you something. When you are driving 60 miles an hour, do you really know how fast you are going? Just take one-half the speed you are driving. If you are running at 30 miles an hour by your speedometer, you are driving 45 feet a second. If you are riding at 25 miles an hour and you apply

your brakes, if they are in good condition, you can't stop in less than 35 feet.

Those things brought out to your driver, showing him how to reduce accidents, reduce the liability cost of the company. In reducing that liability cost the whole thing reverts back to the driver.

The Yellow Cab Company of St. Louis found out that it was the only means by which they could eliminate the accidents, to such an extent that now every driver that goes throughout the month without an accident has his dues paid in the local union by the Cab Company, which means that one particular cab company pays out \$1,250 a month; yet they save a lot of money.

MR. MINEUR: There is a point that I might leave, and that is to eliminate that claim of the driver that the company was wrong or some outside force was responsible for the accident.

We have a trouble card that the driver is supposed to turn in every night if anything is wrong with his particular car. That places the responsibility on him. He drives the same car day after day.

CHAIRMAN HARMAN: If there is nothing further on this subject, I believe we have time to go into the bus operation. Mr. Brown, of Philadelphia, is with us and will give us a little talk on "Bus Operation and Heavy Trucking."

SAFE BUS OPERATION

**N. T. Brown, Vice-President, Philadelphia Rural Transit Company,
Philadelphia, Pa.**

Mitten Management has been operating in Philadelphia in coordination with the street car and sub-way-elevated lines of the city, a fleet of motorbuses to the number of about 400, in addition to which we operate an intercity bus service with Philadelphia as the hub, and reaching to New York City on the north, Washington on the south and Atlantic City on the east. All our buses are of the gas-electric type, which was developed by Mitten Management engineers in cooperation with the engineers of the General Electric Company and the Yellow Truck & Coach Manufacturing Company after several years of research. The gas-electric principle thus developed has been generally adopted by manufacturers and operators, and in our opinion is the feature which has made the motorbus entirely applicable to city transportation.

P-R-T motorbuses have had an enviable record of safety, and it is about this particular phase of operation that I wish to speak.

The gas-electric bus is superior, in our opinion, to the mechanical drive from the standpoint of safety. The smoothness of operation during the period of straight-line acceleration produces practically no jar as compared with the uneven advance of the mechanical drive. The significance of this feature is at once apparent when one considers the large number of stops per mile in city transportation service and that passengers are continually walking in the aisles toward vacant seats when the bus is accelerating.

The elimination of gear shifting enables the operator to keep both hands on the wheel and his entire attention on the traffic through which he is driving. The conservation of human energy because of the elimination of approximately 5,000 shift operations per day is helpful in preventing accidents, since the driver is more alert than he would be if he was compelled to shift gears, thereby more slowly reaching the point of physical exhaustion.

The gas-electric bus is provided with three separate and distinct brakes. The foot and hand brakes are common to the ordinary type of motor vehicle, and in addition there is a regenerative electric brake. In making a stop, the operator uses both the foot and hand brake at the same instant, doubling the safety factor. The electric brake is used in emergency, being especially valuable in controlling the bus on a down grade, its effectiveness being in direct ratio with the vehicular speed. That is, when the bus is moving slowly, the braking power is slight, and increases as the speed of the bus increases.

The Handicap of the Brilliant Headlight

To protect against rear-end collisions because of frequent stopping, each bus is equipped with a rear stop-light. A tell-tale light is mounted on the dash in a position to be readily observed by the driver, so that he may tell at a glance whether or not the stop light is in operation, and govern himself accordingly.

The constant bane of every motorist is the brilliant headlight which blinds him at every hundred yards along our roads and our city streets, and many accidents are caused because of carelessness in the focusing of these lights. The headlights of P-R-T buses are kept properly focused in accordance with the state law, and recently we have installed safety lights which can be played on the edge of the road, allowing the upper headlights to be turned off entirely, and eliminating even the slightest glare in the eyes of the approaching driver, at the same time lighting up the side of the road so that there is no danger of ditching the bus.

We have installed in our central garage, a brake testing machine, by means of which brakes are scientifically and equally adjusted, so that the pressure is the same on each wheel when the brakes are applied. The machine indicates the weight of the pull on each wheel, and instantly records any inequality of braking power, as well as whether power is being lost due to dragging brakes, when the brakes are in the off position. High points on the brake lining and drums, and similar brake failures are also indicated. Equal distribution of braking force on both rear wheels has eliminated the hazard of skidding on wet pavements.

It is thus possible for us, by regular test of every vehicle, to assure ourselves that brakes are at their maximum efficiency at all times. Since good brakes are a vital factor in the prevention of motorbus accidents, their mechanical perfection, at all times, is vital to successful operation.

Adequate inspection of a large fleet of motorbuses is a requisite, not only in order to make every vehicle safe at all times, but in order that

maintenance may be kept at a high standard of efficiency. Inspection of buses is regular and frequent, and every mechanical detail is tested by expert mechanics.

Nor is the importance of trained personnel lost sight of. In fact, we recognize that the human factor is probably the greatest of all in the prevention of motorbus accidents. Drivers are employed only after passing rigid medical examinations, and after meeting equally rigid standards as to weight, height and age. These men are thoroughly trained in motorbus operation before they are allowed to operate in regular service. Because of this care in the selection and training of men, we have succeeded in building up a force within the past two years, which in appearance, in courtesy, in skill, in operation and in general efficiency has won the plaudits of the public of Philadelphia, and numerous comments from visitors to the Sesquicentennial this summer bear testimony to the esteem in which this operating organization is held because of the high standard of its personnel.

The bus is no longer an experiment. It has come to stay. It has a definite place in the coordinated transportation system of the great city. It finds a field of increasing usefulness in intercity and interurban service. It is encouraging to see that street railway and steam railroad managements are coming to a realization of the fallacy of attempting to thwart the progress of a facility which has so thoroughly met the popular taste by contributing a great share to the speed, comfort and safety of modern passenger transport.

In addition to these factors of safety as outlined, there is maintained in the central office a system map, the duty of one man being to place a pin on this map showing the location of each accident which may have happened. These locations are then analyzed, with the idea of determining whether or not any of the factors contributing to the accident hazard can be removed; for instance, possibly the moving of the traffic officer from one side of the street to the other, or the changing of traffic regulations at this location, or the removing of a billboard or shrubbery which may obstruct the view of the driver approaching an intersection. We have found that this has materially helped to reduce the number of accidents.

Discussion Following Mr. Brown's Paper

CHAIRMAN HARMAN: Mr. Brown, I want to thank you for your able talk on this subject, and if there is anyone who has any questions to ask, I know Mr. Brown would be delighted to answer.

F. C. LYNCH (Kansas City Public Service Co., Kansas City, Mo.): I was quite interested in Mr. Brown's paper, particularly with reference to the safety features of the gas-electric. I operate a few gas-electric buses. In fact, I think that I have the only insulation in the United States where the exact duplicate equipment is in service, both mechanical and gas-electric. In other words, the first bus that comes will be on certain routes, exactly the same as to body, engine, chassis.

I can't say it appeals to me that gas and electric are any safer than mechanical. I don't know whether Mr. Brown intended to convey that impression. There is a certain handling of the mechanical which is desirable.

In other words, when a man is moving along in traffic with a mechanical job in low or second, he can control his speed very nicely by the position of his foot on the accelerator and creep along with the traffic, as you all know. The gas will come along and the engine will help him to brake, and it makes a very nice handling proposition for traffic.

If you use gas-electric and are on a slope and trying to creep along, you are continually going from brakes to power and power to brakes. As Mr. Brown says, you have no retardation from your engine similar to your retardation in your mechanical job. At your low speed, if your resistance with your propelling motor is set so that it is practically a dynamic brake, it doesn't have any effect in the traffic and it makes it mean to handle from that standpoint.

MR. BROWN: In answer to the gentleman's question, we do believe that the gas-electric bus on a wet street is superior to mechanical driving. When we constructed our first gas-electric bus the accelerator pedal was on the right foot, which was customary with all automotive equipment. It wasn't very long after that we discovered we could add a safety factor to the vehicle by moving the accelerator pedal to the left foot, therefore, using power and brake, the same point of efficiency as you use engine compression. In other words, when the vehicle starts to slide and the rear end starts skidding, it was a touch of the gas and a touch of the brake.

I have never been able to find any vehicle that will skid as long as the wheels are revolving. I discovered that some years ago. If I could keep the wheels on the street car moving, I had no sliding take place.

So we put our gas pedal under the man's left foot. I won't say it is safer, but I believe it is easier to handle in traffic, due to the fact that the man has both hands on the wheel and his eyes ahead of him, and at no time does he have to shift any levers. He has his left foot on the gas, his right on the brake and both hands on the wheel, where I believe they belong.

CHAIRMAN HARMAN: We are very fortunate in having Mr. Brown here today as well as Mr. Smith and the gentleman who talks to us Friday morning on the training of drivers, for there is hardly another concern in the United States so situated as they are in Philadelphia, where one company operates street cars, interurban cars, city buses, interurban buses, taxicabs and airplanes. Therefore we are able to get a lot from people who have experience in all of the transportation lines that we are interested in.

I will appoint Mr. Hemman as chairman of our Committee on Sprinkling. The idea yesterday was to get a resolution up to the National Safety Council to give us such assistance as they could.

ADJOURNMENT

FRIDAY MORNING SESSION

October 29, 1926

The meeting convened at 9:55 o'clock in the small Banquet Hall, Statler Hotel, Detroit, Michigan, Chairman Harman, presiding.

CHAIRMAN HARMAN: I find after our Nominating Committee made recommendations which were adopted, that Mr. Glenn Royer feels he will be unable to attend and asks us to accept his resignation. It was rather difficult to get all of the original committee together. Some have left town and some we couldn't find.

I don't know that this is in order, but if there is no objection, the chair will appoint a man to fill that vacancy. I will take it for granted you all agree with me, and in place of Mr. Royer I am going to appoint Mr. Henry D. Mineur, of the J. M. Horton Ice Cream Company, New York City, to fill the vacancy.

I will introduce this morning Dr. Viteles of the University of Pennsylvania, at Philadelphia.

THE SELECTION AND TRAINING OF TAXICAB DRIVERS

Morris, S. Viteles, Ph. D., University of Pennsylvania, Philadelphia, Pa.

Possibly the most important single psychological factor in accident causation in the taxicab business as well as in any other transportation business is the differences in ability among men driving cabs. If all men were alike there would be no place for an employment office in any industrial organization. The employment office could be replaced by a policeman whose only duties would be those of keeping the applicants for employment in order and of sending in to each department the numbers called for by that department.

Unfortunately for business administration, all men are not alike. The very word "selection" implies that they are not alike. That they are not alike is a matter of common observation, as often made by the man on the street as by the scientist weighing the nature of these variations in his laboratory.

However, there are marked differences between the man on the street and the scientist in the way in which they describe human variations, in the methods used to uncover them, in the fineness of the differences observed and in the way they are explained and utilized. The layman is satisfied to talk blithely about how alike and unlike people are, using the term "likeness" and "unlikeness" very loosely. The scientist, with a punctilious regard for exact phrasing, speaks of "individual differences" and "variability;" and assigns a very definite meaning to this and similar concepts.

The man on the street depends on a casual observation of differences; the scientist insists upon controlled conditions and specially designed apparatus. For example, we all know that some men work fast and others more slowly. The layman is satisfied to use the term "sluggish" or "slow" or "fast" or even "as fast as lightning" in describing these differences without attempting to measure them with any degree of accuracy. The scientist recognizes that the same sorts of differences exist, and he sets up a tapping key in series with an accurate timing device and an exact recording device. He examines 20, or 100 or 1,000 subjects and finds that the rate of tapping varies with age, sex, mental stimulation etc. but that even under the same conditions the rate of tapping of practiced adults of the same age varies from five to 14 taps per second (See Whipple), and that these figures indicate persistent, characteristic individual differences. He calculates central tendencies and variations from the central tendency and in the end is able to state exactly to what extent the individuals differ in this trait and to suggest, perhaps, the cause of these variations. He not only insists upon accurate recording but he measures in the most refined units of time. Whereas the layman uses the term second or minute or even five minutes almost interchangeably in referring to small units of times, the scientist measures time to the thousandth of a second and describes individual differences in terms of these units.

Testing the Efficiency of the Mind

Making use of these exact instruments and refined methods, he has found, for instance, that men differ in the number of digits they can recall after a single repetition—that some adults can recall only five, others as many as 12. He discovers that after a single reading of a paragraph some adults recall as many as 12 ideas and others as few as one, whereas the greatest number of individuals tend to recall four. In so far as movement is concerned, experiments demonstrate that the time taken by an individual to react to a visual stimulus may be as much as twenty-thousandths of a second longer than that to an auditory signal, and, more important perhaps from the point of view of selection, that the time differences in response among individuals to the same stimuli may be as high as half a second, and that the differences increase as the complexity of performance increases.

In the matter of imagery, it is found that some men have clearer and brighter images of objects they see than of sounds they hear. Some can not form an image of or carry a tune; others can not see in retrospect a beautiful vista but can form clear, bright images of tunes and movements.

The scientific selection of taxicab drivers or workers in other fields of transportation or industry, involves merely an application of this scientific method in analyzing and measuring such individual differences. The differences to be measured in the case of the taxicab drivers are more complex, more varied than those of rates of tapping or speed of memorizing, but they can and have been submitted to similar analysis and

measured in ways which make it possible to separate the unreliable from the reliable driver.

The complexity of these underlying factors is demonstrated by the fact that many men who have made outstanding success in one or another profession are unreliable drivers. For example, I know a surgeon under whose care, in case of need, I would place myself without a moment's hesitation, but in whose car I would be as loath to drive, were he driving, as in the car driven by a low grade imbecile. So far as his ability under the distracting conditions of traffic is concerned this man grades very low. To say this is not to reflect upon his ability as a physician. It is merely to say that the two are complexes or different ability. It is in the analysis of the nature of these complexes and in their measurement that the psychologist is contributing in one way toward the reduction of a mental hazard in accident causation.

Examples of Psychological Research

An example or two may suggest the nature and accomplishments of psychological research in this direction. Reaction time in car operation has been studied by two investigators—Moss and Allen—who find that the average time taken by a driver to place his foot on the brakes in response to an auditory danger signal is 0.54 second—or, in other words, that the average person traveling 30 miles an hour would go 22 feet before he began braking the machine after hearing the danger signal. However, some drivers in the group showed a reaction time as low as 0.31 seconds, others a reaction as high as one second. The importance of such differences in selection are self-evident, particularly since variability in performance seems to increase with reaction time.

Differences in accuracy and certainty of response under the complex distracting conditions of the street—as measured by specially designed apparatus—have been recorded in a number of investigations. An apparatus of this type, designed by me and at present in use in the selection of motormen and cab drivers, shows a variation ranging from zero to 50 in the number of incorrect responses to four signals presented in haphazard order, and a significant relationship between the accuracy and speed of these responses and performances on the street after employment. Detailed descriptions of this apparatus have been published elsewhere, but the facts, for example, that in one case the number of motormen discharged because of accidents decreased from 14.1 to 0.6 per cent following the use of this test, and that in an investigation by another observer (Snow), using apparatus designed by him, a pronounced decrease in accident rate followed the application of tests—are extremely suggestive.

Other individual differences influencing accident rate, such as age, years of experience in driving, education, etc., could be mentioned and experimental results cited. But those given above are sufficient to demonstrate the nature of individual differences affecting accidents and to indicate the specialized technique devised by the scientist for their measurement.

As a practical problem the employment manager, or foreman, and the

psychologist interested in selection, are doing fundamentally the same thing, using different methods. Psychology in selection is not a cabalistic art by virtue of which the psychologist evolves a mystic formula of perfect selection out of his inner consciousness. He starts with a common-sense recognition of differences, which is the property of all of us, and merely develops a technique and an improved method for analyzing them and for making the measurement of them more accurate and reliable. At best even the psychologist's method is imperfect enough, but it is a little better, in the same way as the dietician's mixture of carefully weighed foods for the diabetic patient generally proves a little better for the patient than his haphazard choice, if not as tasty.

Selection, however, is not the only way of reducing personnel accident hazards. To even the most optimistic vocational psychologist the possibilities of improved selection seem limited by the inherent weaknesses of test procedure and by variations in the behavior of mankind other than those of ability and temperament. He knows that the adjustment of the employee is determined by many other factors than the ability to perform the job, and that even if the selection instruments were perfect, accidents would still take place and labor turnover for this and other reasons still appear on the monthly reports of the employment manager.

Improvement and Training Are Logical Steps

This point of view reflects no discouragement with psychological tests and other improved methods of selection in industry. It is merely a frank recognition of their limitations. It still recognizes the importance of selection in accident prevention, and the justification of further research in this direction. It merely implies that it is necessary to go a step beyond improving selection in the process of pairing workers satisfactorily with jobs.

Improvement of training is the logical and necessary step beyond selection. It is so important a step that the speaker feels justified in devoting the major portion of his time to a consideration of the psychological factors of importance in training.

For the purpose of this paper the term "training" will be used in a rather broad sense, to cover not only the formal instruction given as a preliminary to placement on the job, but with reference also to the continuous and uninterrupted process of education by means of which workers are kept adjusted on their jobs.

It is no exaggeration to say that the administration of personnel is largely a problem of training personnel to meet changing and higher standards of accomplishment. Training, in this sense, is a continuous process, to each phase of which the factors determining the efficiency of routine preliminary training are equally applicable. From this point of view, the day to day campaign for the reduction of accidents is nothing more than the education of the worker in the avoidance of accidents.

Training, whether of the preliminary or follow-up type, should be based

on a recognition of certain elementary principles underlying human behavior. It should take note of the tendencies towards behavior which develop accident hazards, and be directed toward the elimination or reduction of these hazardous tendencies. One such tendency, a tendency given inadequate recognition in the vast majority of industrial training courses, is associated with habit formation.

The operation of any motor vehicle involves a number of habitual responses which must be set during the training period. Learning to drive a car consists largely of learning to perform a number of movements in a certain series with a minimum amount of attention and effort. Safe driving is habitual in character. The safe taxicab driver, for example, is the one who always slows down in approaching a street corner; who always looks back before turning; who always maintains a safe braking distance between his car and the car preceding him, etc. He does it always because it is habitual; he does it without stopping to figure it out—to decide that it is the best thing to do.

Establishment of Desirable Habits Essential

The desirable driver makes a habit of avoiding bumps; he makes sure that passengers' fingers are safe before closing the door; that no one is leaning against the door before opening it, etc. The tendency toward the appropriate behavior is so firmly established that the driver performs it as naturally as he lifts his fork to his mouth in eating.

To establish desirable habits so firmly is the prime function of the training course. An application of the principles governing habit formation which have been worked out in the psychological laboratory, can contribute considerably to the achievement of this objective. Experiments in the laboratory have shown, for example, the influence of a factor described as "habit interference" in the formation of habit. The exact nature of this factor can be illustrated by a simple experiment. A subject is asked to sort 80 cards, containing 10 cards each of eight suits. Each suit is in the form of a design, that is, a square, a triangle, a circle, an ellipse, etc. Copies of each of these designs are arranged in a given order on the table before the subject, and he is instructed to sort the cards on to the table, placing each card of each suit on its appropriate design as quickly as he can.

If he is given ten trials there will be noticed a marked decrease of time on each trial, starting with perhaps as high as 300 seconds for the first trial and diminishing to 80 or 90 for the last. The time decreases because the subject remembers better in each trial where the card is to be placed. The card is seen and the hand is moved in the proper direction more and more quickly until, in the last trials, the subject need pay no attention to the movement of the hand. It moves automatically in the right direction. A habit of movement has been established.

The designs on the table are now rearranged, so that the square appears where formerly the circle had been; the triangle in place of the ellipse, etc., and the subject is instructed to sort the cards again. The interest-

ing and significant thing is that in the first two or three trials of sorting to the new arrangements, the times are almost invariably longer than the time taken in each of the first two or three trials in sorting toward the original arrangement. This is because the subject must not only make the proper response, but he must resist the tendency toward the habitual response which has been firmly established in the first ten trials, and which tends to interfere with the formation of the new mode of response.

The fact of such habit interference is largely overlooked in industrial training. There is a failure to emphasize the standard procedure and the continuous repetition which are the only safe methods for the formation of safe habits of operation. The well established principle that the accuracy with which a certain action is performed is decreased if antagonistic actions are practiced with it is almost totally neglected.

Habit Interference vs. Habit Formation

I remember very well a training course in street car operation which I took as a student apprentice as a preliminary to the analysis of the duties of this job. In this course, after a day of preliminary instruction in the school room, the student was sent out to learn operation on the road under a so-called line instructor. Each day there was a different instructor, and each showed a personal preference in the way he handled the controller, the air brake handle, and other mechanisms involved in operation. One day, for example, I was taught to take a short bite of air, another day a long bite; one day to speed up at one rate, another day at another rate; one day to open the door with the right hand, another day with the left hand, etc.

The total effect of such differences in training from day to day is to stress habit interference instead of habit formation, and to leave the student, at the end of the training course, unprepared to meet the conditions on the road with a set of firmly established habits providing the only safe avenue to safe operation on the road. The effect of such training is to decrease the accuracy of response and to increase the time of response in a way that interferes with safe operation. The potency of such improper training in accident causation in street car operation can not be overestimated.

The same holds true of taxicab operation. It is extremely important in cases in which inexperienced applicants are hired and taught how to drive, and perhaps not equally so, but still extremely important, even when experienced drivers are hired. There are still a thousand and one details of safe operation of extreme importance in accident prevention which the private driver must be taught prior to placement on the job, and, which, in the case of all drivers, must be reinforced by continued emphasis after placement. Slowing up at street corners, signaling to other vehicles, to pedestrians, loading and unloading procedure are a few of the many examples which could be cited.

Without attempting to discuss in detail ways of handling this problem, it seems important to note that the assignment of a man to a single

instructor does not adequately meet the problem. There may be variations in instruction on the part of one instructor, unless he is carefully selected, carefully supervised and a definite program and standard procedure in training also developed.

Looked at from the point of view of drivers, training should have the same objective, and should be approached from somewhat the same angle as is the intensive drill in the use of bayonets in the case of soldiers. The object of such intensive bayonet trial is to set up habits of response so certain that action occurs without preliminary thought on the part of the soldier. If the soldier had to think before parrying a thrust he would be struck while the thought processes were still going on. To think, in this sense, is to choose between possible actions. As a matter of fact the soldier has not the time to make a choice. The movement on his part, in a certain direction, must follow immediately upon the movement of his opponent and be appropriate to that movement.

Careful Drivers Are Habitual and Automatic

In the same way each taxicab driver must be trained so that in so far as daily operation is concerned, so far as safe methods of driving are concerned, they will be entirely habitual and automatic, and, at the same time, free from the possibility of contradictory movements which will place him and his passenger in danger. The chief value of a safe driving campaign in which, for example, drivers are urged to give the right of way at intersections, lies in the further fixing of safe habits of driving. In one company, with which the speaker is familiar, the beneficial effects of such a campaign continued for months after it had closed. Habits had been fixed.

This emphasis on habit does not imply, of course, that there are no circumstances in which the driver must use judgment; must think quickly. It merely assumes that the chief factor in safe day to day operation is safe driving, and in this sense dependent upon the establishment of habits of operation associated with safe driving.

There is another psychological principle, perhaps less well known than the one discussed above, that may well be considered in preliminary training and equally well in the more intensive educational or safety campaigns. This is what is known by the psychologist as the principle of ideo-motor force. It states simply that the presence of an idea in the mind leads to action—that thought, in other words, produces action.

A simple illustration of this principle is found in an experiment occasionally used as a parlor trick. A small ball is slung on a piece of string about 12 inches in length. The subject is told to hold his hand out at arm's length, with the end of the string in his hand, the ball, therefore, swinging at a distance of 12 inches below his hand. He is instructed to close his eyes and then to think either of a pendulum swinging to the right and left or of a pendulum swinging backward and forward. The experimenter watches the movement of the ball, and from this movement can tell whether the subject is thinking of right and left or of backward and forward. For, curiously enough, when the subject is thinking of

right to left the ball swings in that direction, and when he thinks of backward and forward, the ball moves accordingly.

The explanation of this apparently mysterious performance is simple enough. The idea "left to right" in the mind of the subject is accompanied by contractions on the part of the muscle responsible for this movement, contractions small enough to be unnoticed by the subject, whose attention is centered elsewhere, but marked enough to set the ball in motion.

The same principle can be illustrated by asking the subject to hold his arm straight out in front of him and to think of right or left. The appropriate movement follows the thought of right or left, and the subject's thoughts can thereby be "divined."

Other apparently mystic phenomena can be readily understood if this principle is known. For example, a few years ago a gentleman appeared in Philadelphia and laid a wager that he could find an object hidden anywhere in this large city. His conditions were straightforward enough. The object was to be hidden anywhere in the city. He was to be placed, blindfolded, in an automobile, alongside of the one who had hidden the object. The automobile was to be driven through the city slowly, the only requirement being that at some time during the trip the automobile pass the place at which the object was hidden.

An Interesting Experience in Mind Control

The conditions were accepted. The gentleman with this uncanny ability sat in the automobile with his hand lightly placed on the arm of the one who had hidden the object. As the automobile passed the spot at which the object had been hidden the experimenter called a halt. He stepped out of the automobile and instructed the one who had hidden the object to move around the pillar—for that is what it proved to be—in a crevice of which the object had been hidden. They walked around the pillar together, the experimenter still holding his hand on the arm of the one who had hidden the object. For the second time he called a halt, with the announcement that the object would be found on the side of the pillar at which they had stopped. The object was found there.

The explanation of this is likewise simple. This experimenter knew something about ideo-motor force. He knew that as they approached the place at which the object was hidden there would be small muscular contractions in the arm or in some other part of the body of the one responsible for hiding the object. His hand, lightly placed on the arm of this person, detected the small muscular contractions accompanying the thought of the hidden object, and it was by this means that he was able to locate this hidden object and many others hidden at different times by different observers.

What is commonly known as kleptomania is a pathological exaggeration of this same tendency in an individual. The sight of an object awakens the idea of taking the object and the appropriate movement is performed. In the case of normal people the force of this idea is over-

come by inhibitory tendencies. The abnormal kleptomaniac is incapable of conquering the idea which sprouts into the appropriate action.

If you observe a crowd at a football game you will likewise notice the influence of the same factor. When the ball is moving toward the north the crowd lists to the north; when it is moving south the list of the crowd is in that direction. At an exciting prize fight ideo-motor force may take on a dangerous form in the shape of an excited fan who accompanies his shouts of "slam him" with appropriate movements of arm and body—to the danger of those sitting around him.

Studies of the types suggested above, both of normal and abnormal individuals, show the extent to which the presence of an idea prompts a movement. A consideration of this factor is of utmost importance in the choice of material and methods for the training course. It shows, for example, the superiority of positive over negative suggestion in training and in supplementary safety campaigns; and the superiority of "do" over "don't" in instruction and discipline. It suggests the need of presenting only those positive ideas and images which will lead to safe action, and the extreme importance of avoiding the negative idea which leads to action appropriate to it rather than to safe performance.

In the light of this principle it seems preferable, for instance, to show pictures of how the right thing is done rather than pictures showing the wrong way, for the idea to which the picture of the wrong way gives rise may result in action appropriate to it. The ineffectiveness of "don't" in the safety code and in the driver's manual of instructions likewise becomes evident. Such "don'ts" may create the very tendencies toward wrong action, a guard against which it is the purpose of training to erect. Negative suggestions set up a mental hazard, positive suggest a tendency toward behavior which gives the driver strength in his struggle of mind over accident.

Further Mental Factors May Be Weighed

Many other mental factors can be weighed with profit in selection and training. Thus, for example, the attitudes of the instructor and supervisor, as they affect the emotional attitude of the driver, deserve serious consideration in a training and supervisory program. An impolitic approach on the part of the instructor may awaken an antagonism, a feeling of unwillingness to cooperate which may seriously affect the attitude of the driver toward cooperation. Unjust censure on the part of the supervisor on the street, or criticism at the wrong time, or sarcastically worded, can produce an emotional blow-up which may be the direct cause of a serious accident.

The extent to which emotional attitudes of these sorts influence accidents may be seen in the experience of one manufacturing firm in Philadelphia. Because of the difficulties of guarding machinery, the accident rate remained high in one department of this company. It was found, moreover, that it was much higher among new employees than among experienced workers. At one time there was occasion for lay-off, and naturally men more recently hired were laid off first. It was

expected that paralleling the lay-off of new men would occur a noticeable reduction in accident rate in this department. As a matter of fact the accident rate went up, the direct cause of the rise being the feeling of uncertainty created in the minds of the men who remained at work. Each one was worried that he might be the next to be laid off. The effect of this worry was to distract attention from the job, to create an uncertainty in response that resulted in a marked rise of accident rate.

This is merely an example of a situation which arises in other forms in taxicab operation and which is subject to control. Other factors which might be discussed are laws governing retention as they can be applied in training, factors influencing attention, the effect of fatigue, etc., but time is limited, and it seems "good psychology" to close—to avoid fatigue and the emotional blow-up on the part of an audience which constitutes as great a mental hazard to the speaker as do some of those discussed above to the driver.

Discussion Following Doctor Viteles' Paper

CHAIRMAN HARMAN: We appreciate your talk very much. It was most interesting. Has anyone any questions?

F. C. LYNCH (Kansas City Public Service Co., Kansas City, Mo.): I just want to ask one question. That is, do these characteristics of the men change? In other words, does the time change in which one man will react to a visual signal? The way I feel this morning, I might not get by the examination. Other mornings I might feel better. Over a period of years does that change?

DOCTOR VITELES: There is no doubt the conditions of one's body and other conditions do affect results from a test study such as this. There is no doubt that reaction changes in men, but the change occurs within a narrow range and beyond that range no amount of additional training, no amount of improvement will induce reaction. It is those limits we are trying to measure.

In other words, in the east, instead of measuring response in two or three minutes, we use half an hour to train a man. We give him 15 or 20 minutes, as much time as he needs, then we test the response. If we tested him in two or three minutes, we would not get an accurate estimate of that man's abilities, because he might not feel well in the morning, etc.

In measuring tapping it is found they vary with mental stimulation, but no matter how much you urge men, one man will tap faster. One man will start at 12 and increase to 14, but there is still that difference between the man who taps seven times in normal conditions and the man who taps 12 times.

CHAIRMAN HARMAN: I presume most of the taxicab operators here are aware of the fact that many of the large cab operators are using a mechanical test, that is known as the fear action test. It is an electrically operated machine. I regret to tell you that I am very poorly informed on it. We have just purchased one in our business in Kansas City, and it is installed. I expect to take a man from Chicago back to Kansas

City to put it in operation within the next couple of weeks. The Doctor no doubt can describe that in detail.

DR. VITELES: Ours is quite different. The test we use in Philadelphia is a test that I designed for the selection of street car motormen six or seven years ago, and the principle is quite different from that which Dr. Snow uses. For instance, Dr. Snow depends on one single performance lasting a half second. In my opinion, that can not give an index. We take a half hour, and in that half hour we give him a set of four signals coming up in haphazard order.

In other words, that reaction of fear is only one very small part of the bigger program of trying to test his ability to drive under ordinary conditions.

MR. LYNCH: I would like a little information. Is it going to be possible for you to start an educational campaign among the fleet-owners that are not large enough to have a Doctor of Psychology on their staff? Are you going to be able to give them enough so they can actually employ the men on a scientific basis such as you are doing?

Psychological Tests of German Boys

DR. VITELES: I think what we would have to do is what they do in Germany. In Germany no boy is accepted as an apprentice to learn a trade unless he passes psychological tests. The union manufacturers have combined to insist upon the psychological tests as preliminary to apprenticeship.

Germany knew that in order to compete with the allied nations, she would have to produce more economically than the allied nations, and she decided the best way would be to get the best man to do each job.

There are some small plants which can't afford to have a psychologist. They have a central testing bureau and send the apprentices to the testing bureau. Three or four plants use the same bureau.

CHAIRMAN HARMAN: I might say, Mr. Lynch, in answer to your question, the National Association of Taxicab Owners, to which most of us cab-owners belong, is really the starter of this method of training the cab-drivers. For the benefit of the fleet-owners, we appreciate the fact that we are training men for the driving of one particular class of public service—taxicabs. While there is a difference, a Green or Yellow or some other kind of a car might be used, they are all standard gear-shift, about the same size and weight, and are handled in the same line of traffic. We appreciate the fact that the fleet-owners here are dealing with trucks to a large extent, some small-sized, some medium and some large-sized.

I think in the Hoover investigation of traffic conditions the principal object of some of these different tests was to be brought into the licensing of drivers in different states with the object of having a code of rules that not only a driver of a public car would be subjected to, but also the driver of an individual car would have to take a certain test. It might not be as rigid for my wife or my son or myself to drive my

own car as it would be for a man that was going to drive a government mail truck or an ice cream truck or a taxicab.

Did you get the same idea, Doctor?

DR. VITELES: Exactly. As a matter of fact, I may add to that I was on a sub-committee to the Hoover Committee, which hasn't made any report. A series of tests were to be used in connection with the licensing of drivers.

J. E. DOBBS (General Necessities Corp., Detroit, Mich.): I would like to ask about the psychological test. After testing a man, can it be determined definitely that a man is potentially hazardous, or whether it is just a chance that he doesn't come up to the test required, and by eliminating this group, you may eliminate the majority of accidents, but be unfair to the individual?

My question is whether we could determine that this particular man is potentially hazardous to put on a truck?

DR. VITELES: Well, of course, that is the most important objective to the test, to separate the unreliable or hazardous drivers from the safe drivers. Now in test construction we first analyze the job, then construct the test. Then we give that test to a number of new men. The test is not thought to be of any use until it has been proven that the ones who fail the greatest number of tests are the most hazardous drivers, and the ones who pass have the least accidents.

Not Perfection But a Start Toward Perfection

The question you ask is whether or not the test can do that perfectly, or whether it is unfair to some individuals, whether for example it is fair to one-third of the individuals? The test is not perfect. The employment manager who turns a man down may be more unjust, and generally is more unjust, than the psychological test, because his standards are not well-established. He is using standards that have not been checked. We are using standards that have been checked, and our standards are undoubtedly more reliable than the average employment manager. We hope to achieve this perfection.

It is better to be unjust to a few men than to a whole group of men, and cause death to a little child in the streets. There is enough justification to be unjust to a certain group of potentially safe drivers. It is not perfection, but a start toward perfection.

S. H. HILMES (Yellow Cab & Baggage Co., Omaha, Nebr.): Your men on the streets with your instructors, does one instructor take them through the entire course, or do you go to a certain point with one instructor and then turn him over to the other?

DR. VITELES: Now I will have to make a little confession. I can answer that question definitely in this way: the analysis I reported here occurred in the case of the Mid-Western Electric Railway six or seven years ago, when they started psychological tests of that kind. As a result of my experience, the course of instruction was changed so that a man gets his experience with one instructor for three or four days, long enough to set those habits.

The same thing is true with a street railway with which I am not associated. They have a better-organized school. They keep a man in school with headquarters instructors for four days, but one man stays with one instructor. Every procedure is standardized so that all the instructors are teaching the same procedure.

The taxicab and bus course hasn't been so well organized. The company with which I am connected is not as well organized as it might be.

MR. WOLFE (Travelers Insurance Co.): I was very much interested in what the Doctor had to say on reaction and can see very well where a man seeing the images quickly has a certain reaction, but I can't quite see how callousness is associated with these tests. For instance, you might put a man through the test and show he reacts very promptly, yet he may be very much more callous than a slow thinking man. Of course, I can still see how even a callous man, because of his quick reaction, can avert an accident, yet if he wasn't callous, he might not have been quick enough to avert an accident due to callousness.

A Clever Device for Testing the New Driver

DR. VITELES: This is a very important point. There are two answers to that question. There is a little device for measuring carelessness, but I don't know how it is working. The device is simply this: two little trains running in a track five feet square. The two trains run in separate tracks but the two tracks intersect, at three points. One of these trains moves at a high speed, not under the control of the driver. It moves automatically and every once in a while changes its speed.

The other train is controlled by the driver, and he is instructed to move that train as fast as he can without bumping the other train at intersections and without going off the track. If he goes too fast it will go off the track.

We give him one trial of two minutes. He can drive around about 22 times. The automatic train moves 22 times in two minutes.

We give him a second trial, and say to him, no matter what he did, "You did very well. I want you to try it again, but you made one mistake before, you didn't go fast enough, so I want you to try it again and go just as fast as you can. But remember, no accidents!" In other words, we try to establish the attitude of mind of speeding up in the hope we will distinguish between the careless driver and the reckless one who is willing to take a chance when given an opportunity, and the one who says, "No, I am not going to speed up, because I want to avoid accidents and collisions."

We find one man will react by refusing to speed up and say, "I would rather go slow," and others will quickly drive all over the place.

There is still another answer to the question. The man who is able to drive, who has quick reaction, even though he is careless, is still a better bet than the slow, unreliable fellow who may also be careless.

In the case of taxicab drivers, if we want to know if a man will use good judgment in handling passengers—whether he has a sense of dis-

tance which will help in parking in a small space, whether he uses good, common-sense judgment as a whole, whether he can speak well enough—we use the 30-minute paper test which we find very successful. We find the men tend to leave the job sooner when they make low scores.

MR. WOOD: I know that Doctors of Psychology vary a lot in their opinions on that subject, but I want to give you men the benefit of Dr. Snow's experience in Chicago.

Dr. Snow had three major tests: first, the intelligence test; second, fear reaction test by this mechanical machine; third, what is known as carelessness test.

During the past winter he selected 1,000 men to whom he gave all three of these tests, and he kept a card on these men, that is he kept a record of their accidents. He had on that card the man's name, age, nationality, and whether married or single. He also had on that card the man's score in the intelligence test. He had on there his nerve reaction test, and he had his score in recklessness test.

The Intelligence Test Found of Least Importance

Now strange to say (I don't know whether we ought to make this public; if not, we will strike it out of the proceedings), during the summer Dr. Snow has had two men, graduates of the Philosophy class in Northwestern University, compiling data that have been accumulated over a period of months on these thousand men to determine the merits of this test. Dr. Snow, as well as the rest of us, was very much surprised to find the intelligence test was of the least importance. In other words, a man may fall down completely on the intelligence test, but stand up well under the fear reaction test, and do exceptionally well in the carelessness test, and not have any accidents.

On the other hand, he may have a good score in the intelligence test, but fall down on the fear reaction test and make a poor recklessness test and have a good many accidents.

So in comparing the two, he found the intelligence test was of the least importance in selecting drivers for taxicabs.

For the carelessness test he uses a big block with a metal plate covering it that is raised about a quarter of an inch above the block of wood. Now the plate is cut up into a mass or puzzle. I have tried to work this with my pencil.

At the corners are little brass-headed tacks imbedded in the wood. The applicant can't see them. They are connected electrically to a recording machine something like a stock-ticker that goes off in measures of seconds or a given measure of time.

The applicant is told, as the Doctor said here, that he is to take a metal stylus, or pencil, and he is to start in at the beginning of this puzzle. It is almost apparent how he can get through. He is told that he is to start out and go through that line as rapidly as possible, and that the speed with which he goes through there is going to be one of the important factors as to his efficiency in the test, but, as the Doctor

also mentioned in his test, he is not to have any accidents. Accidents will determine largely his score.

He goes hurriedly through this thing, and the thing to test is whether or not he goes through the corner, so the time between these two points is measured in this instance. If he slows up here and goes very carefully around here, the time interval between the contact with these two metal points would show he was careful in going around this corner. Still on the straight-a-way he would speed up and not slow down until he got to the corner here where eminent danger existed.

That is the carelessness test, and so far he found that to be most valuable. The men who passed this test made a good record with less accidents than any other fellow.

DR. VITELES: May I say a word in connection with the fact psychologists don't agree? This paper test, which I call the intelligence test, is not really a psychological test.

We find it also shows no correlation in the accidents on the part of the drivers. If we were considering accidents alone and had to discard a test, we would throw the paper test out in a minute. It does show beginnings of significant correlation between score and earnings and between score and general fitness. They are very important to the taxicab operator and it is for measurement of these rather than the measurement of the accident tendency of the man, we are using our paper test.

How Shall We Develop the Safe Driving Habits?

J. T. SMITH (Yellow Cab Company, Philadelphia): I think there is one thing we can't overlook. We have our drivers' organizations. Now how are we going to develop these safe-driving habits? Everybody seems to admit that good driving is by habit.

I think everybody that was at Cleveland last year will remember hearing Admiral Simms talk on "Habit Formation," and how he compared that in the Navy with driving contests.

In one of our recent contests we allowed it to run over a period of eight weeks' time, this showing courtesy at crossings, complete control at crossings, signalling intentions. The reason for running it that length of time was to develop habits in a certain percentage of our men. Some wouldn't do it once probably during the entire contest. Other men would be inclined, without knowing it, to develop the spirit of the thing and the habit of automatically slowing down and automatically signalling.

In Philadelphia we have hard-boiled supervision of our operation. We write up a man for fast crossing, too fast for safety, and a man is penalized according to our merit plan. Too fast a crossing is a rate of speed in excess of 15 miles per hour. We have 40 supervisors, 20 on days and 20 on nights. The city is divided into districts with 40 men observing driving at crossings, etc., and the men have to answer the reports made in regard to their driving. It automatically develops that habit of slowing down at crossings.

The community safe-driving school is a factor in helping to develop the habit of better driving.

CHAIRMAN HARMAN: I happened to think of something in connection with my own everyday duty. I am getting ready to start the psychological test of men and this has baffled me.

Andy Waite is one of the old-time cab operators, and I know he will agree with me that the principal cab operator is the man that produces the most revenue. Mr. Henretta will agree with that, too, providing he is normally safe and courteous.

I have two men, one is 45 years old and will weigh 225 pounds, and is about as ignorant as a white man can be. He has been in my service 285 months and has not had an accident. The hardest thing we have to do is to keep him neat in his appearance. He is a slovenly fellow and is slow in movement. He and another young man vie for honors every month in the amount of revenue they collect, and the amount of miles they cover, and the least expense in the operation of their respective vehicles.

Apparent Contradictions in the Statistics

The other man is a young man, possibly 32 or 33, and he has been with me practically the same number of months. He is very bright. Why he is driving a taxicab, I don't know. He is snappy, young and quick.

There are your two extremes; and yet they are the money-producers of our company, having about 320 to 340 drivers. One fellow is nervous and flighty, always in a hurry. You have to watch him in breaking speed laws, and yet he never has an accident, and never does break the speed laws.

DR. VITELES: I am afraid you will get very tired of me before I am through, but I can't help saying something in that connection. I was almost ready to jump on my feet when the chairman said the most important thing was to get revenue, until he added, provided they are safe and courteous.

We made a study in which we compared 25 per cent of the best earners among men hired in 1920 with 25 per cent of the poorest earners. Now we found that the best earners had no more accidents than the poorest earners, and that the poorest earners had no more accidents than the best earners. The fact of accidents seemed to be entirely distinct from the fact of earnings. We found the best earners averaged a few more reports on recklessness than the poor earners, but they had no more accidents.

The hiring of men for the avoidance of accidents isn't tied up definitely with accidents. We find, for example, that by analyzing an application blank and assigning a definite score for each item on the application blank, we will be able to throw out the poor earners. We have checked it up on another group, and it worked successfully. We have made an intensive study, but the accidents and earnings do not conflict at all.

CHAIRMAN HARMAN: Gentlemen, I am afraid we will have to pass on to the next. We are going to be crowded for time, and the three subjects this morning I feel dovetail pretty much. Mr. Truett is the Director of Safety in the city of Baltimore, and he comes to me from the president of our National Association of Taxicab Owners, Mr. W. W. Cloud. I take pleasure in introducing Mr. Truett at this time.

COMMUNITY SAFE DRIVING SCHOOLS

John H. Truett, Director, Baltimore Safety Council, Baltimore, Md.

The preceding paper has treated thoroughly the subject of selection and training of drivers. It is unfortunate, however, that the methods treated in this paper can not, at this time at least, be applied to the individual driver. The value of this selection and training among the owners of commercial and transportation fleets has passed the experimental stage and is now recognized as a necessary fundamental practice leading to safe and efficient operation.

This especially applies to those companies that are public carriers. Their business would be seriously affected if a feeling existed among the public that they could not entrust their lives in these conveyances without a reasonable assurance that they would be carried safely. Therefore, it is not only a humanitarian duty, but also a business duty to have as safe drivers in our fleets as it is possible to select, and then increase and maintain this safety by training and supervision.

We frequently hear the uninformed and reckless observer say that the taxicab or truck drivers are the most careless upon our highways. This opinion is based on hurried observation of isolated cases and in some cases is by persons who possibly have never ridden in a taxicab, much less a truck.

Persons highly trained in a special line often can do things that others could not do without disastrous results, as, for instance, a diver can dive from heights without taking chances that would mean almost certain death for the untrained diver. The worker in a large steel mill must be trained and after training can spend his day working among the many gears and machines with comparative safety. Put an untrained man in his place without guidance or supervision and he is in great danger. This also applies to the experienced chauffeur; what ordinarily would seem to be taking a chance to the uninitiated is not a chance at all. The driver's training has taught him to judge distances and he has, in the majority of cases, a machine that is in perfect operating condition and has it under control. Therefore, we should not be guided by gossip, but facts; and what are the facts? Taxicabs of responsible companies are rarely seen in an accident, especially a bad one.

How then can the individual driver be reached to make him more careful or as well trained as the commercial driver? How can the interest in safe driving be held constant among the commercial drivers who slip occasionally?

The program of local Safety Councils includes a Safe Drivers' School. A stage is created to promote an educational program that could not be created in any other way. Progressive employers know the necessity for occasional talks to their employees. These become stereotyped and lose power if coming from our own organization over a long period. You could not hope to have a man in public life who is interested in accident prevention, or some other good speaker, visit many of the companies and give their employees an inspirational and educational talk. but this can be done in a large group meeting as an activity of the Safety Council, at the same time bringing into this training field as many individual drivers as possible. Such speakers as the head of your Police Department, Traffic Court and other judges, coroners and automobile administrators can talk to your men on such a program and it can not help but broaden the education of drivers as well as give them material for thought in careful driving, as a stimulation to what you, as employers, may be doing.

A Safety Council is a non-sectarian, non-commercial, non-political body, whose objects have no element of controversy, and it can promote a safety program for you that would not be possible of achievement by any other interest or organization.

Just a word of the experience of the Baltimore Safety Council would possibly be of interest.

Safe Drivers' Schools in Baltimore

Five sessions of Safe Drivers' Schools have been held since organization of the Council, under the leadership of Mr. W. W. Cloud, president of our largest taxicab company. These meetings are held at night from 8:00 to 9:30 p. m., usually in a large school auditorium. The program consists of a speaker on some safety subject, technical or mechanical instruction, moving pictures and entertainment. A well balanced program should be about 25 per cent safety and 75 per cent entertainment. Some cities have gone so far as to have boxing matches to secure interest in attendance. Others have used new comedy films and vaudeville acts. Certificates of graduation are issued to those attending a large percentage of the meetings. The Baltimore experience has been as follows:

Number registered in schools..... 6,515

Number of certificates issued..... 2,597

This is an average for each session of 1,300 registrations and 520 certificates issued.

This record is for white schools; separate schools were held for colored drivers, which, of course, were much smaller than the white schools, and the end is that we have reached this number of persons who operate dangerous machines upon our highways with an educational program, the necessity for which is apparent to anyone who uses the streets of our great cities.

The standardized cab companies have gone far in improving driving conditions on our streets and highways, through their careful selection

and training of drivers. The majority of these organizations maintain schools of instruction, first requiring applicants for drivers' positions to pass an examination as to their physical and mental fitness. Some also use psychological tests which help eliminate the hazardous applicant who otherwise might successfully pass.

You, the operators, are more familiar with this than I am, but I understand the practical experience along the lines of several of the large cab operators of Chicago and Philadelphia have satisfactorily reflected the advantages of this highly scientific procedure.

Much has been written and spoken on the subject of engineering methods of handling or treating street and highway traffic problems and the adoption of safety mechanical devices. All of these when properly applied and adopted are helpful, but the consensus of opinion of those who have carefully analyzed and studied the subject is that safety education is essential; without it we are apt to blunder along, paying in costly ways for our experience and in the end accomplishing little.

In this work of education, some of your companies are cooperating splendidly, have affiliated with their local Safety Councils and are prominent in their activities. This is not only helpful in a general and national way, but it brings to the individual company local prestige and a broader conception of the subject of safety.

Let me urge upon you operators not only the great importance of the Safety Council work, particularly as it can be applied to the education of drivers of motor vehicles of all kinds, but also your duty to your local Council which will heartily welcome and sincerely needs your support.

I would like to add that on the program of the local Safety Council in our home city we had quite a bad experience. We analyzed the situation in Baltimore as to fatalities where trucks were responsible in comparison with passenger cars. We found it very high.

We invited all the truck operators to a luncheon in a hotel and put the problem before them. We said, "We would like to prepare some kind of a program," and suggested a program of competitive campaign. We have in that campaign 31 companies who have entered so far, and they represent close to 2,000 trucks.

We started that campaign the first of April, this year, and I am glad to say, gentlemen (whether it is luck or not, we have no yardstick to measure), but we have killed 15 less people in Baltimore this year than last.

Safe Driving Contests in Kansas City

CHAIRMAN HARMAN: Before going on to the next speaker, I see the Director of Safety of our Local Safety Council in Kansas City back there, Mr. Julian Harvey. Mr. Harvey, I would like to have you tell these gentlemen about our experience with this truck proposition in Kansas City.

JULIAN HARVEY (Director, Kansas City Safety Council, Kansas City, Mo.): Giving credit where credit is due, I would like to say that I

stole the idea from Mr. Truett, and we experienced the same results in Kansas City that he has.

We started a contest along this line the first of August and had sixty-odd fleets, representing 2,000 motor vehicles. We are asking for information from these various concerns, which is very easy for them to give. The interesting fact has been the very general and ever increasing interest in this contest on the part of the individual fleet-owners.

To illustrate, a concern in Philadelphia, affiliated with our organization, sent someone into my office to inquire as to the details. They said they had seen the effects of it in an organization which was contesting; the head of that organization told them of that effect, and they wanted to know how they could come in and participate in the contest.

Remarkable Interest Shown in the Safe Drivers' School

I don't care how old we get we always like the spirit of contest, and I believe there is a wonderful opportunity along this line. Within the individual plants we encourage the holding out of some sort of reward to their men for careful driving.

Last month in Kansas City the concern which leads in the contest operated 2,338 truck days without a single accident of any kind. That represented a good many thousand miles.

I think it would be well for you, if you are doing anything of this kind, to see if something can not be done along this line, because it is one of those many things we must do and keep after constantly if we are going to control our accident situation.

CHAIRMAN HARMAN: Mr. Truett, I want to thank you for your most able article on this subject, and assure you we appreciate it.

I am a bit afraid I delved into your subject in a small way day before yesterday in describing some of the methods we have pursued in order to get a larger attendance of public car drivers in Kansas City; and I can say for Mr. Harvey and his organization in Kansas City, they have done wonderful work.

I recall very distinctly three years ago I went to one of the first meetings we had and there were between 500 and 600. I went to our next to the last meeting and the crowd was estimated at between 2,100 and 2,200, so you see how we have grown in Kansas City in getting these drivers to attend these meetings.

I don't think there is a cab operator or a fleet operator that can spend his time to any better advantage than to get his drivers to attend these meetings and to get them interested.

We hold a picnic every year for our drivers and shop men, office men, and everybody and their wives and families. When I got over to this meeting, which was held in the Street Railways Auditorium, I felt I was at one of our own picnics. There were some of my drivers there whom I didn't see how they could have got off to be there, but it had been arranged and they were there with their wives and children and having a general good time. We had a wrestling match one night, and a boxing

match one night, and are getting ready to prepare for entertainment next year.

I am fitting up a gymnasium in our garage to encourage the athletic proposition, to get the drivers enthused so they will go to these drivers' schools with more enthusiasm and do more good.

We will now hear from Mr. Barney Graves, of the Green Cab Company of Cleveland. I know from the standing of the Green Cab Company in that city and from my long acquaintance with this man's boss, that he has something good for us.

STIMULATING AND HOLDING THE INTEREST OF COMMERCIAL DRIVER ORGANIZATIONS IN THE GREATER SAFETY MOVEMENT

Barney Graves, General Manager, The Green Cab Company, Cleveland, O.

The results of any safety campaign for commercial drivers depend very largely upon the general morale and relation of drivers to the company. Before drivers can be expected to cooperate in any campaign for accident prevention, they must be thoroughly sold on the general policies of their company and also on their job. An employer who does not have the confidence of his men will always find it hard to secure their cooperation in avoiding accidents. On the other hand, if the drivers like their work and are interested in the welfare of the company, it is comparatively easy to get worth while results from a safety campaign.

In my experience with cab drivers I have found that any lack of interest shown by them is due largely to their lack of knowledge of the duties of the "present day" cab driver. In other words, many drivers think their only duty is to drive their cab and collect their fares. This class of driver will soon find his job very monotonous. He is on the same plane as the livery driver of the past and, instead of being a modern salesman of transportation, is merely an order taker.

We, of the Green Cab Company, of Cleveland, all realize that our drivers have been responsible for our success and we do not hesitate in telling them so. Instead of our schooling stopping with new drivers when they have passed their examinations and driving tests and are assigned to their cabs, it has only started.

As soon as they start to work, we set up a ledger sheet for each of them and figure their profit or loss weekly. These records are then recapped at the close of the month and posted to a permanent record. This enables us to determine at any time, whether any driver is an asset or liability. His average revenue per mile is taken as the selling price and the previous month's cost per mile as his cost. If he shows a profit for the week which is absorbed by cost of an accident, he is considered a liability to the company.

We then divide the drivers into four groups, based on the amount of profit they made, and their rate of commission is based according to

their profit rating. Each driver who shows a loss is then called into the office, we analyze his case and explain to him the cause of his loss to the company. The two principal causes are "dead mileage" and accidents.

After installing this system of individual driver's records and analyzing each case with the driver, we found that over 50 per cent of the unprofitable ones were showing a profit within a month.

This close personal contact with each of the drivers, whereby you compliment him on his improvement and caution him in his mistakes, certainly gives him more pride in his work and places him in a more susceptible mood for any campaign or work you want to carry out.

Safety Campaign Must Be Well Planned

Before trying to sell drivers on the "Greater Safety Movement," the first great step is to see to it that each and every official and executive of the organization is sold on safety and promises 100 per cent cooperation in selling safety to the drivers. If only the safety director is trying to put it across, he surely has an up-hill pull, for it is impossible to sell anything without first being sold on it yourself. Team work is very important, so if all the officials from the president down want accidents stopped and will pull together and organize a well planned campaign they are bound to get results.

On February 1 of this year the Cleveland Safety Council started a series of monthly meetings for commercial drivers. All companies employing drivers were invited to participate and all of us were more than pleased with the results obtained from them. Mr. Carl Smith of the Cleveland Safety Council certainly deserves a lot of credit for these meetings, for he spared no effort in making every one interesting to the drivers, and the drivers, instead of losing interest, looked forward to them from month to month.

This was due not only to interesting lectures but to well planned programs consisting of good vaudeville acts and prizes given by the different companies to the lucky admission tickets. The opening meeting in February was greatly responsible for the interest shown throughout the season. At this meeting, Dr. Charles Herbert Rust, of Worcester, Mass., gave a wonderful safety talk. His subject was "I Wonder."

There were 160 companies who participated in these meetings with an average attendance of 1,000. The Green Cab Company won first place in attendance and the Cleveland Railway was second. Almost everyone would get a lot more out of this safety work with drivers if they would only put more into it. These schools and meetings require money, and with insurance rates so high there is no better investment for a cab operator than a subscription to safety work.

At the beginning of this series of meetings, we decided to start a safety campaign of our own. We had approximately 500 drivers on our payrolls at this time, so we divided them into eight teams of approximately 63 men each. Each of our drivers has every eighth day off, so the division was made this way, which meant that one team was off every eighth day.

We then called a meeting of all drivers and all executives, starting our meeting with a short entertainment by our company orchestra, and then explained the details of our plans to them. Each team elected a day captain and night captain from among their members. The captain's duties were to supervise the driving of the men on his team and cooperate with the safety director of the company by reporting all cases of careless or reckless driving. Team members were identified by a distinctive button bearing the team number, which was worn on their uniform caps. The captains wore a special button with their team number, so the men could distinguish them.

Cash Prizes Offered

The company set up \$1,000, divided into first and second prizes, \$600 for the winning team and \$400 for the second. The team costing the least amount for all accidents, personal injuries, property damage and collisions, was to receive the difference between cost of accidents and \$600. The second winning team was to receive the difference between the cost of accidents and \$400.

The contest was to last for one month. The winning team was also offered a banquet and theatre party and the second team a theatre party.

At the close of February's contest, there were many drivers on losing teams who had no accidents; so in March it was announced at a drivers' meeting that all drivers who would continue throughout March and April without any accidents, and who were on losing teams, would be given a real surprise and treat by the company. This announcement held the interest of our drivers more than anything we ever did.

Method of Determining Winners

An accident was defined as "any occurrence which requires a report of loss to person or property" and failure to report an accident barred any driver from participating in the reward and also might cause immediate dismissal.

Each week all accident reports, regardless of how slight, were taken by the claim adjuster and assorted against the teams, together with the approximate amounts set up against each team required to settle claims of personal injuries, property damage or damage to our cabs. Even broken windows and dented fenders were charged against the teams. After the standings were determined, they were posted on a conspicuous bulletin board. These were posted at least weekly.

Results of Campaign

The total cost of accidents for the winning team for February was only \$324.59, which included everything from a scratched fender to personal injuries. A banquet was held at the Hotel Cleveland, after which each driver on the team who had no accident received his check. This was followed by a very interesting and complimentary talk by Traffic Judge Skeel. This was followed by a theatre party.

The total reduction of accidents for the first month's contest showed an actual saving of 61 per cent over January, and street conditions were even worse, as we had a sheet of ice on the streets almost the entire month.

The March winners only cost us \$411.95, and April winners, \$302.50.

So much interest was shown during this three months' contest, not only by the drivers, but also by our executives, from President A. F. Waite down to the men on the wash rack, that after the first month's eight of us who were executives of the company, each drew a team and did our best to win the prize.

Three Months Winners

The safety department's records showed that at the end of three months, 132 drivers had not had a single accident. These drivers had covered over 750,000 miles during this period.

We then took this bunch of drivers for a day's outing and dinner at one of Cleveland's prominent road houses, where each was presented with a Green Cab safety button by the company and a white gold signet ring by our insurance company. The boys prize these presents more highly than anything we have done for them.

All the time and money we spent on this campaign certainly proved a good investment for us and was responsible for a decrease in labor turnover.

Profit Sharing the Keynote to Accident Prevention

The climax of creating and holding the interest of commercial drivers was reached in July of this year, when at a special drivers' meeting, Mr. A. F. Waite announced to all the drivers that he had decided to make every man a partner in his business, with the result that now the company is still The Green Cab Company, operated and controlled by the same management, but any time you ride in a Cleveland Green Cab, you are riding with the owner of the cab.

This has resulted not only in cutting accidents approximately 50 per cent below our previous campaign record, but also has given Cleveland the best cab service possible, with much more courteous treatment, and has resulted in the drivers making about three times as much money for themselves.

CHAIRMAN HARMAN: I want to thank Mr. Graves for that most able article.

Has anyone any questions he wants to ask the young man from Cleveland?

J. E. DOBBS (General Necessities Corp., Detroit): I would like to ask him how they arrive at the settlement of the claims, the adjustment of the claim, for instance?

MR. GRAVES: Of course in Cleveland it is compulsory that we carry insurance. We had in mind our future insurance rates as well as our safe driving, and we work very closely with the insurance company. They furnish insurance to adjust these claims, and the policy is to

settle every claim as quickly as possible. With his past experience he is able to estimate.

The same thing holds true in damage to the other fellow's equipment. In case it can't be settled right away, it is only estimated. But at the close of the month, before the final results were posted, I personally went into it with the claim adjuster, going over all the reports of the month.

HARVEY D. WOOD (Yellow Cab Company, Chicago): I would like to introduce this resolution:

Whereas, During the fifteenth Annual Convention of the National Safety Council, the attendance at the Taxicab and Fleet-Owners Sectional Meetings has been greater than at any time in the history of the Section, and

Whereas, It is believed that this increased interest has been largely due to the tireless efforts and personal attentions on the part of the officers of said Section, be it therefore

RESOLVED, That the members in attendance at this Section, now in convention, extend their hearty thanks and deepest appreciation to their retiring chairman, Mr. Dale Harman.

(It was moved, seconded, and carried that the resolution be adopted and made a part of the transactions.)

(The audience arose and applauded.)

A Suggestion to Concentrate Section Meetings

CHAIRMAN HARMAN: I appreciate that very, very much.

I believe most of our larger fleet-operators have had an opportunity to say something within the past three or four days, and I know the cab-operators have. I feel we have dominated this meeting, but this is possibly due largely to the fact that we touch the public a little bit closer than the fleet-owner. We get our money from him, while the fleet-owner does not at all times, at least not directly. I know Armour Company get theirs in a roundabout way, and so does the ice cream man, dairyman, etc.

I would like, before we adjourn, to hear from my friend, Andy Waite, of Cleveland. He didn't get into town until yesterday, and while one of his young men has given us an able paper, I would like to have Andy come up and say a word to us.

I might say that this man has, in my opinion, been batted around more in the taxicab business than any man I know of, and still he is always on top.

A. F. WAITE (Green Cab Company, Cleveland): That is characteristic of the taxicab business, I think.

I haven't a thing to add to this meeting. I think Mr. Graves has presented our situation over there as we had it last winter. We found this close cooperation with our men did a lot of good.

There is one suggestion I would like to make, Mr. Chairman, to be passed on to the management of the Safety Congress. I would suggest

that these sectional meetings, at least this Section, be held all in two days. I believe it could be done. It is almost impossible for a taxicab operator to spend a whole week away from his home town. I was unable to get here until last evening. I wanted very much to be here before.

I think if that were taken up with the higher officials, it could be arranged that we could have this all within two days and we who couldn't spend the whole week would get the benefit of the meeting. I would like to have that passed on.

CHAIRMAN HARMAN: I would like to hear from some of the other members on that subject. I rather agree with Mr. Waite. There are other branches of the council meeting both morning and afternoon, and I believe we could accomplish all our work, and if any member would like to stay three or four days, he would have an opportunity to free-lance and attend other committee meetings in which he might be interested.

HARVEY D. WOOD: I notice Mr. Rawson here, who used to be an officer of the National Safety Council. I would like to hear from him.

An Advantage in Attending General Sessions Also

MR. RAWSON: It was my privilege to have a small part in organizing this Section.

There is no reason in the world why this Section should not have its meetings just exactly the time it wants them; but there is this suggestion which is thrown out to all sectional officers in considering such matters, and that is that the Taxicab Section is probably interested first in its own particular business, and second, in the safety movement.

The Executive Committee recommends that they try to hold their meetings in the mornings, so their delegates may attend the general sessions in the afternoons.

The National Safety Council has two or three sections which are very largely attended. Sometimes they run 400 and 500 in attendance at one session. They have so much business that they meet all day long for three and four days of the week. I am thinking of the Steam Railroad Section. With the exception of those two or three sections, most of the sections try to arrange their meetings in the morning and attend general sessions in the afternoon.

I can appreciate Mr. Waite's point, the difficulty in staying away from a man's business so long, and I imagine it must be particularly hard for some who come from a considerable distance. But if it is possible, I recommend to you the desirability of trying to attend some of the general sessions also, so you may get some of the general pictures in addition to the very important subjects in your own business.

I hope I am not too presumptuous if I say that I feel a great deal of satisfaction in seeing you so well attended and hearing about your excellently arranged program for your meetings here. I know in the beginning we felt that the men in the transportation business were not quite as responsive as we had hoped they would be. It proves, I think, that there is need for the Taxicab and Fleet-Owners Section and it is very worthwhile to have meetings at the Congress.

CHAIRMAN HARMAN: I appreciate your little talk very much, and I want to tell you we are going to keep at this Cab and Fleet Section of the National Safety Council until it is going to be the predominating Section.

In fact, when I go back to this railroad proposition I see two or three old railroaders back in the crowd, and am apt to be one myself. I spent 23 years operating cars on rails, and I don't think they are in with the automobiles that haven't a track or train. Every automobile is covering 100 miles to the individual railroad car's one mile, so we are in the highway. I regret to say that in the Safety Congress the accidents of automobiles are largely in excess of railroads today, and it is for that reason that I think this Section of the National Safety Council should get back of it and get more interest in it, and get these men that are operating automobiles to get as enthused as the group we have here at this time.

Further Ideas Regarding the Section Sessions

MR. HEMMAN: It has been somewhat of a hardship to get away for a whole week to attend this convention, but I feel the time has been well spent.

Perhaps, as you said, the taxicab-operator has a little different contact with the public than the fleet-operator, still we have a lot in common, and I might suggest for the Congress next year that we all come in on the points we are interested in, and perhaps the taxicab-operators can have the first two days of the session and the fleet-owners have the last two days of the session, with the second afternoon or the third morning to take up those points that are of interest to both.

The taxicab men could come in on Monday morning and have their session Monday and Tuesday mornings, Tuesday afternoon the fleet-owners could meet with the taxi men and take up such points as would be of benefit to them.

If I have anything to say about it, we are going to have a lot of fleet-owners here next year.

MR. DOBBS: I think it would be a very good idea if a roster of everybody's name, address and occupation was passed out for every member here, so we could continue this meeting through correspondence instead of dropping it and going home until the next meeting.

I should like to write to Mr. McGuire and another man here who do the same kind of business I do and ask them questions on different points. If I were in the cab business, I would certainly write to Barney Graves and ask for his program.

I think the meeting should always start with a roster as soon as it gets going, so we can get these names in our minds and get better acquainted.

MR. HEMMAN: I would like to second that motion. We have 5,000 vehicles scattered in 48 states in the Union. I would like to get acquainted with the men throughout the country.

CHAIRMAN HARMAN: I think Mr. Hemman's suggestion is very good.

If we meet the first two days of the Congress, it would be all we would need, and the fleet-owners could meet the last two days. Then we could have a roster of every man who registers and those attending could take the names of any men who offer subjects that they would like to correspond about.

Our chairman for next year is here. I am sorry he wasn't able to be in one of these meetings before this one, but am glad to know that Mr. Smith will be able to take advantage of all that. No doubt we will reap the reward next year.

ADJOURNMENT

Textile Section

New Officers of the Section

CHAIRMAN: G. W. COOK

Travelers Insurance Co., Springfield, Mass.

VICE-CHAIRMAN: R. B. SHERMAN

United States Finishing Co., Norwich, Conn.

SECRETARY: HARRY C. WASHBURN

Fisk Rubber Co., New Bedford, Mass.

Committees

MEMBERSHIP: H. W. DONALD, Chairman

American Mutual Liability Ins. Co., Boston, Mass.

STATISTICAL: HARVEY SAUL, Chairman

The United States Finishing Co., Providence, R. I.

POSTER: IGNATIUS MacNULTY, Chairman

American Woolen Company, Andover, Mass.

PROGRAM: DR. GEORGE VAN EMBURGH, JR., Chairman

The Clark Thread Co., Newark, N. J.

PUBLICITY: DR. R. P. KNAPP, Chairman

Cheney Brothers, South Manchester, Conn.

ENGINEERING REPRESENTATIVE: W. H. HEINRICH

The Travelers Insurance Co., Hartford, Conn.

EXECUTIVE COMMITTEE (The Officers and)

BENJAMIN F. GRIFFITH

J. & P. Coats (R. I.), Inc., Pawtucket, R. I.

October 26, 1926

DR. GEORGE H. VAN EMBURGH, JR., Chairman

Medical Director, The Clark Thread Company, Newark, N. J.

THE Textile section convened at 9:20 o'clock in Parlor C. Statler Hotel, Detroit, Michigan, Dr. George H. Van Emburgh, Jr., Medical Director, the Clark Thread Company, Newark, New Jersey, presiding.

CHAIRMAN VAN EMBURGH: The first item on our program is the reports of officers and committees.

Mr. H. C. Washburn, Poster Committee.

**REPORT OF H. C. WASHBURN, CHAIRMAN, THE
POSTER COMMITTEE**

In submitting the report of the Poster Committee, I wish to call attention of members to the fact that the success of any committee must of necessity depend upon the full cooperation of all members of the Section, if favorable results are to be obtained. Form letters were sent out to every member in February soliciting material from which representative bulletins might be made up. Although the committee received many replies the response was not as general as we had anticipated.

In addition to personal letters the entire section was again circularized in May. From the replies received it was very evident that many of the members were experiencing difficulty in obtaining just the type of poster desired pertaining to the particular hazards of their plants. One or two stated that they were undecided as to the feasibility of continuing to order bulletins for use in their mills because of their general, rather pertinent, application, but few suggestions for improvement of the posters were received.

A Poster Committee can have no better source of material than from the Section members themselves, and if each will cooperate fully with the incoming chairman by sending in just one photo, sketch or suggestion, your committee will have material sufficiently diversified to make possible bulletins or posters applicable to all of the various operations in the textile industry.

However, the present committee received and forwarded to the National Safety Council material from which some fourteen posters were made up, samples of which have appeared recently in the NATIONAL SAFETY NEWS at the rate of one monthly, and I am informed that the Council has on hand at the present time material enough for the Textile Section to run several months longer.

CHAIRMAN VAN EMBURGH: I happen to be chairman of the Poster Committee the year before last, and I experienced the same difficulty that Mr. Washburn has met with this year. I met a good deal of lassitude, and when they said "We are not getting the posters we want," I came back at them and said, "Tell us what you do want, and we will try to prepare posters in such a manner as to re-stage the cause of the accident." They were not just exactly sure what they wanted. I hope that next year we can get a better crystallization of what they really do want, so that we can have these accidents, the causes of them, re-staged and published accordingly.

CHAIRMAN VAN EMBURGH: I think that Mr. Douglas and Mr. Lewelyn of the Membership Committee are not here. They have been working very hard this year. We have a number of new members who have come into the fold, and while they have accomplished a great deal in correlating the efforts involved in getting memberships, I think there is still a great deal more work to be done on that, and we will probably continue the next year with the same committee and see if we can not bring that to real productivity.

Are there any further committees?

B. F. GRIFFITH (Pawtucket, R. I.): Mr. Chairman, I would like to say something about the Publicity Committee.

CHAIRMAN VAN EMBURGH: Mr. Griffith is chairman of the Publicity Committee.

REPORT OF B. F. GRIFFITH, CHAIRMAN, PUBLICITY COMMITTEE

Gentlemen, Last year we got out one publicity letter. I was very much disappointed in the information that came to me. As you know, the success of the Membership Committee, the Statistical Committee, and practically all committees of this Section depends largely upon publicity.

I was quite severely hampered in getting out publicity letters, because I could get no information. I would like to recommend at this time that anyone who has one little item of information send it in, for no matter if they think it is of no importance to themselves, it may be of great value to the rest of the Textile Section. I hope that the chairman of the Publicity Committee this coming year will receive copies of letters of all the other committees, know what all the other committees are doing; and when it comes time for him to send out the publicity letter, to get the most effect from the membership from a collection of statistics and from the effect of all other committees, I hope that he will have this information so he can get it out on time and make the publicity letters of real value to the Section.

I think that is a wonderful source of information for the Textile Section. I know that I have plenty of items in the plant I am working for that I can put into publicity letters, but you don't want to write publicity letters all on your own information. You want the ideas of everyone else.

CHAIRMAN VAN EMBURGH: My experience has been that a great many of the people who are working on safety in the textile industry feel that they have done nothing startling or outstanding. I have talked with a great many of them, and asked for their ideas, and they say, "We are going along pretty much the same this year as we did last year and the year before, and we did not do anything unusual or startling. I don't want my name in any bulletins."

We want to know exactly everything that happens with regard to the safety record of their plant, and I never have come away from any other plant without taking with me something of interest, adding something to my experience. If the men and women doing safety work will only send the chairman of the Publicity Committee their thoughts, their records, their accident experience, they will give him something definite to work on.

Where we were scheduled to send out four or five letters this year, we had material for only one. I hope that next year we will come across with some real live matter.

Now, I would like to introduce the first speaker on the program, Mr.

B. F. Griffith, who is the safety director of J. & R. Coates, Incorporated, Pawtucket, R. I. Mr. Griffith has had four or five years of very hard up-hill work in which he has accomplished remarkable results. I have been particularly interested in the work he is doing, interested in seeing the remarkable drop that has occurred in not only his frequency but his severity rates.

THE KEYSTONE OF TEXTILE SAFETY

Benjamin F. Griffith, J. & P. Coates (R. I.), Inc., Pawtucket, R. I.

In the plant of J. & P. Coats (R. I.) Inc., of Pawtucket, R. I., recent and remarkable successes have been attained in a carefully planned safety campaign. This success has resulted in an actual saving to the company and to the employees. Concerns that are about to organize for safety (and those that are already organized) I believe should profit by the experience of others and I shall show what I believe to be the best form of safety organization and how it should be supported.

Textile hazards are less numerous and of a lesser degree than in many other industries. However, a relatively large number of serious accidents occur. It seems to me that textile manufacturers can and will, at a slight cost, prevent fully 75 per cent of all lost-time injuries, as soon as they realize that there is an actual saving.

When considering why accidents should be reduced and how to reduce them, it is well to pass the grim question of pain and suffering, as that we know and deplore, and endeavor to find a way to prevent injury as a sound policy of good business practice. Preventing injuries to industrial employees is a problem not easily solved in a single application of bulletins or speeches; but, as in golf, you must hit the ball and study its course down the fairway or across the green, and the next time you hit show improvement in your game.

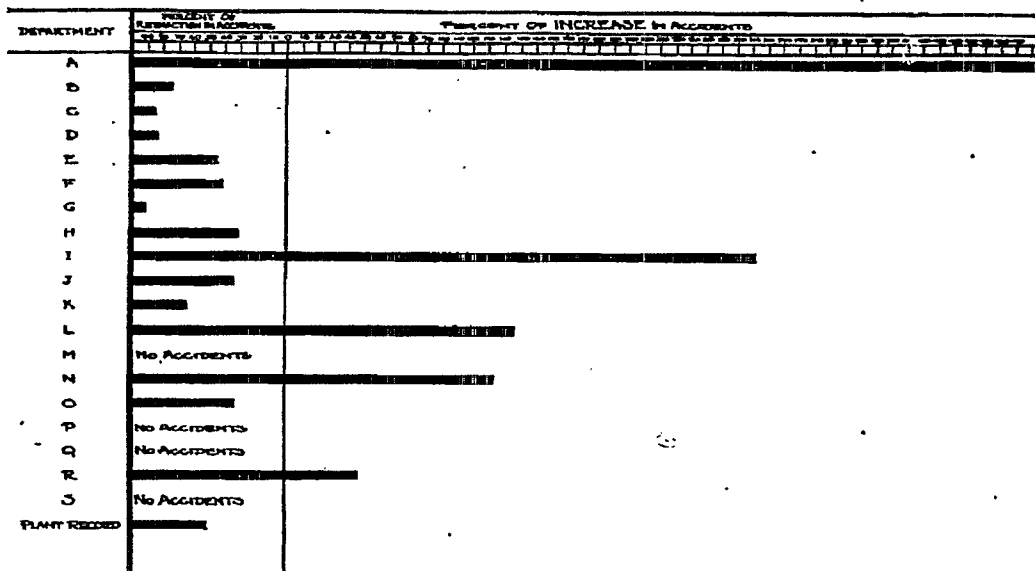
Comparing a safety movement to the Roman arch, a foreman stands above as the keystone—on one hand absolutely responsible to the management for the prevention of accidents, while on the other hand the employees look to him for advice, for to them *he is the management*.

In any industry where production is systematically and economically arranged, the slightest break in process, causing spoiled goods, loss of production, etc., is reflected upon the good management of the department. I think I am fully justified in saying, also, that any accidents involving lost time in a department reflect in like fashion upon its management, and if proper instructions and safeguards have been provided by the plant management, then the foreman should be as fully criticized in the latter case as in the first.

In order to prevent injuries to his workers, the foreman must develop public opinion against accidents until carefulness becomes a habit, and he must instill serious interest and enthusiasm in the safety movement. New workers must receive from him thorough instructions in machine operations and general conduct relative to safety. This must be followed up during the new worker's period of training.

In recently reviewing accident causes in the textile industries, I noted a large number of cases that might be directly or indirectly caused by poor housekeeping, which is all too frequently the cause of accidents. I believe that the clean orderly room inspires carefulness on the part of the workers, as all persons have a certain amount of unconscious adaptability which raises or lowers them to the standard of their associates or associations. Good housekeeping is part of the foreman's

— COMPARATIVE DEPARTMENTAL ACCIDENT CHART —



job and if he can maintain his department in good order he not only prevents accidents, but will improve sanitary conditions and further assist in the freer movement of articles in the course of manufacture. Good housekeeping often opens our eyes to improved systems and more economical department control.

The man who advances to a foreman's position has been picked because of his interest in his work, his ability as a leader and his knowledge of processes. He gains his position because, in the judgment of the plant management, he has the equipment for the job. To the plant management, then, he looks for his instructions. The keystone of accident prevention is the foreman, but the responsibility of the management in a safety campaign can not be overestimated. When the plant management says, "Mr. Foreman, accidents must be prevented—it is part of your job," then accident rates will start downward.

Up to this point I have endeavored to show that part of the safety

direction of a plant which applies to the manufacturing organization. Besides the work of the foremen and managers in preventing accidents, there should be a safety committee organization. This organization should be apart from direct manufacturing control and its functions so carefully worked out that there will be a maximum effect from a most economical arrangement. I have found, after developing several forms of committee organizations, that the most satisfactory is one that is so arranged as to accomplish a two-fold purpose:

- First: To carry up from the employees suggestions regarding safety;
- Second: To carry down from the safety supervisor and management proper safety publicity and instructions.

In the individual departments of our plant we have what is known as the "Workers' Safety Committee," composed of representatives from each section. This committee meets with a chairman, who in turn is a member of the safety council. The safety council is composed of the general plant managers, the plant doctor, the head nurse, the employment manager, the workers' committee chairman, and the safety supervisor. Thus you see that every department and every position is represented in the council. This, I find, is the simplest and most economical form of committee organization, applicable, of course, to our industry.

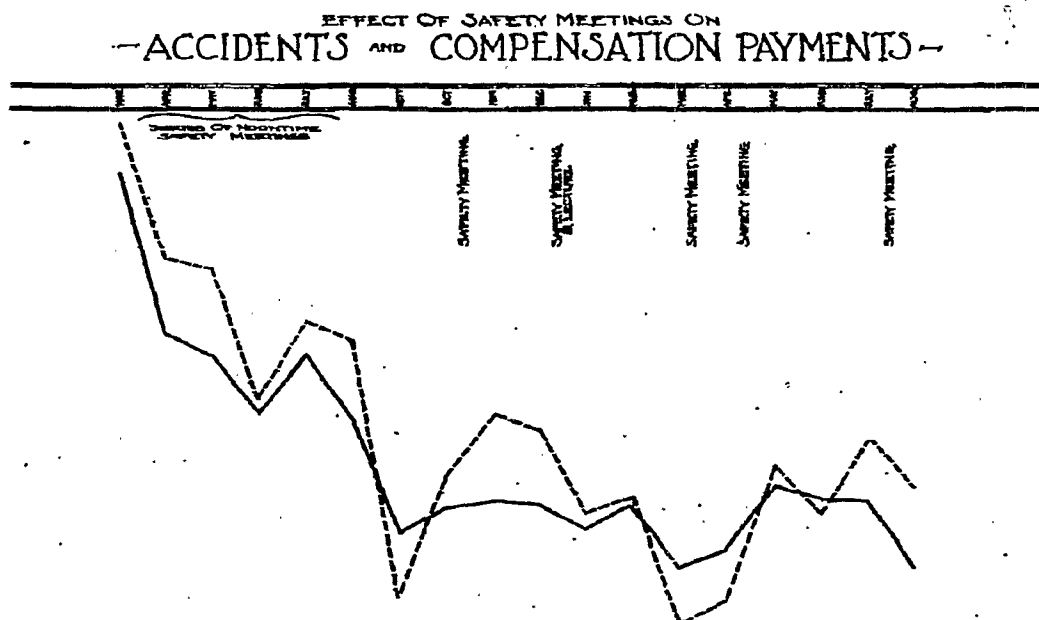
The Safety Engineer Welds the Organization Together

At this point the safety supervisor steps in as a tying band to hold this organization intact and to provide for its smooth and sure functioning. Here we find him as a leader to the workers and an adviser to the management, confident in his convictions and persistent in his work, a man who in justice to himself, to the management and to the workers, does not accept nor try to accept any responsibilities for successes. The position he holds is between the plant management and the workers, and it is in this advisory capacity that the safety supervisor must act.

Foremost amongst the duties of the safety supervisor is the problem of keeping the committees active at all times and not allowing interest to wane. His ability to do this largely depends on his records and the influences he is able to bring to bear.

The records and reports of the safety committees should be carefully compiled. In the first place, the workers' committees should be required to submit reports of their monthly meetings with the safety supervisor. I have found it well to have reports of this type made on a standard form, outlining the procedure of the workers' committee meeting. This report should include such items for consideration as mechanical precaution, employees' interest, suggestions for safeguards, etc. When this is received by the safety supervisor, the meeting of that committee is checked off for the current month on his record book. At the end of each month, the safety supervisor submits to the general

manager a report of those committees that have not made a report, and if the committees have not met they must then give proper reason to the general manager. This assures a regular monthly meeting of each department workers' committee. From such reports the safety supervisor may write off, on individual cards, all safety suggestions. These suggestions should be investigated and the cards kept active until the necessary work is done or the suggestion is rejected.



The safety supervisor should supply the workers' committees with statistics and information for the successful conduct of their meetings and for their drive for fewer accidents amongst the workers. In our plant a condensed copy of the first aid report is forwarded monthly to all committees, showing details regarding accidents, such as:

1. Lost-time cases and causes by departments.
2. Lost time by departments for month.
3. Lost time by departments for current year to date.
4. Frequency and severity rates.
5. Infection cases.

In addition to this, a chart is made up for use at the meeting and for bulletin publication, showing the comparative standing of each department for the current year. This is the chart I have reproduced here and it is of the greatest value in arousing interest in safety, as it is abso-

lutely fair to all. The chart shows the percentage of increase or decrease in lost time for each department. In order to do this, the lost time of each department is taken for two years and a basic severity rate is set for each. The result is that each department sets its own rate, which is indicated in all cases by the zero line. The comparison of departments is on the percentage of increase or decrease in their own previous records. You will readily see that this eliminates the question of varying hazards between departments and any increase in accidents in a particular department can not be laid to increased hazards nor the influence of other departments. It is needless to say that the safety supervisor, in his own interest, does not use any more black ink on these lines than is necessary, as the chart is watched by critical eyes that will correct the slightest error or report the slightest doubt.

Augmenting the work of a safety organization, during the winter months it is well to hold safety meetings at night for foremen, at which accident rates may be discussed and outside speakers brought in to talk on some particular phase of safety. In addition to this, to assure good attendance at such meetings it is well to provide vaudeville entertainment, etc.

The Foreman Is the Key-man in Textile Industry

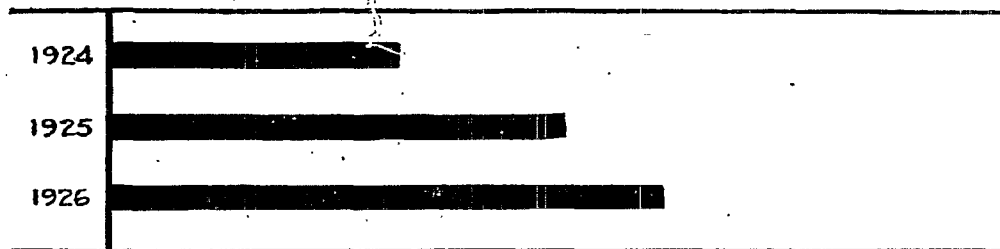
You will note that I give a chart here which shows a list of our evening meetings, together with the rate of lost hours and compensation payments. In supporting my theory that the foreman is the key-man or "The Keystone of Textile Safety," let me point out the effect upon accidents and compensation after properly converting the foreman group to safety and instructing them. On the chart you will see that after each meeting is held there is a resulting decline in accident rates and payments, and that all drops, although followed by some reaction, are for the greater part continual. Analogous to this, I have also found that the meeting of the workers' safety committee in each department has a direct and immediate result upon their accident rate.

With the establishment of a working safety organization there will result not only a reduction in lost-time accidents, as shown by my third chart, but an increase up to 100 per cent in the number of minor accidents reported. It is interesting to note what causes the latter, and the results. The cause is fundamentally the safety drive to have all accidents treated, as actually no greater number of minor accidents occur, but those that do are treated rather than neglected, and the number reported is therefore greater. The result is a complete reduction of lost-time infection cases, the development of confidence in the first aid department with its corresponding influence on the health of the workers, and lastly, the broader promotion of safety by the nurse through her confidential talks with the workers regarding their injuries. This increase in the minor accidents reported continues for some time until the safety movement reaches its point of saturation.

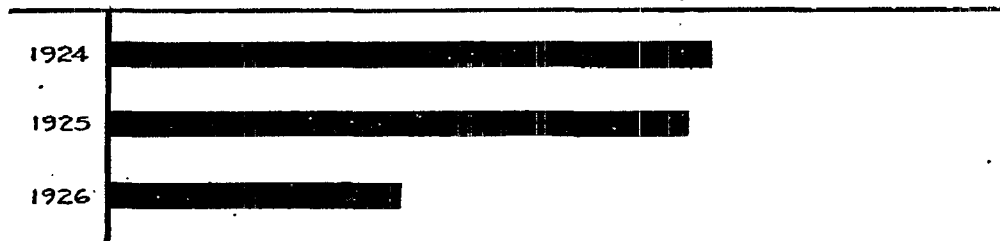
It has been the opinion of many practicing physicians and even of

those doing part-time industrial work, that a safety movement and health campaign is not wholly beneficial to their practice. On the contrary, I have found that while the plant or clinic physician may lose for himself and others the individual care of many accident cases, and while he may treat many medical cases at an agreed rate, he has not only the greatest opportunity to improve health in the particular plant and assist in the

—FREQUENCY OF MINOR ACCIDENTS—



—SEVERITY OF ACCIDENTS—



safety movement, but further through the increase in good will towards the first aid department he may assist himself and his associate physicians, and be a healthful benefit to the whole locality which that industry represents.

Cooperation by the plant physician is most essential in reducing the periods of lost time. This cooperation may come in many ways, for example, by having the physician give or secure the latest and proper methods of treatment, by his securing X-ray pictures of all doubtful cases, and by his deciding definitely the exact time when patients should return to work. It is often that much lost time in the future is saved by the good judgment of a physician in allowing a little longer rest for the patient. The physician is a professional man, and the employees learn to respect him. To him I shall always look for a good influence among our workers for safety.

With the success of a safety movement always comes a reduction in

compensation payments. Where concerns are self-insured, I have found that many exceptions are taken to the existing compensation laws, in favor of employees, in which more liberal allowances are made or compensation periods unnecessarily extended due to humanitarian ideas on the part of mill managers. In order for a safety campaign to be successful, the compensation laws of any particular state must be followed to the letter. I do not criticize charity gifts or appreciation payments, but these must be separate.

In summarizing textile safety, we return to the foreman as the leader who understands and practices the principles of safety as directed by the management, and a man who is familiar with the general principles of the compensation laws of his state. The reduction of accidents is due, finally, to the foreman's absorption of safety principles and his confidence in the movement. He is the one who is responsible for the production of his machines. He must also be a man who is the foundation of the safety organization, who stays generally in the background, yet he is the greatest safety asset—"The Keystone of Textile Safety."

The Management Must Be Wholeheartedly Sold on Safety

CHAIRMAN VAN EMBURGII: Mr. Griffith has characterized the foreman as the keystone of safety in textile manufacturing. I agree with him absolutely, but it has been my experience that you can not get that keystone to do very much unless you can get the management wholeheartedly sold, 100 per cent, or pretty close to that. I have talked with a number of foremen in industries, and they say, "I have got my job; it is to turn out production and keep the frames all running, keep the workers satisfied, and the management is not bothered very much about safety, and I have got hell enough here now without trying to find any more for myself. If my boss tells me I have to do it, then I will do it, but when you tell me I have to do it, why I have my job right here."

It seems to me that safety in any industry is very much the same as sunshine and light. If you can get the management to radiate safety and enthusiastically get in back of safety and then pass it on down the line to the superintendents or assistant superintendent, and finally down to the foremen, they will realize that if they don't come across and get results, they are going to be talked to; then they will get in back of the safety movement also. But unless you can sell the management, I don't know how you can do very much with or expect very much from the foreman. I have seen a number of meetings of the safety committee or safety council, in which the management sat in, degenerate into a sort of a routine, and everyone who came in was bored. They had their roll call, their reading of accidents, and—"why did this happen?" "Oh, Tom Brown's carelessness. He has been laid off and we won't have any more accidents like that." The cases are run through quickly, and the management says, "Anything further?" "No." Then the meeting is adjourned for one month, and everybody goes out with a sigh of relief, glad that is over with.

It is very unfortunate to find what happens unless the management is whole-heartedly sold on safety. I think that while I can agree absolutely with Mr. Griffith, that the keystone of safety is the foreman, the management, after all, is the big stick back of the whole affair.

There is another factor that Mr. Griffith spoke of that I would like to bring out. He said that they have a system in which the workers hand in suggestions for the improvement of safety in their departments or other departments they may be acquainted with. I would like to know to whom these suggestions are handed, and what is done with the suggestions after they are handed in.

I have known cases in which those suggestions have come into the hands of foremen, and the foremen have said, "If we report a condition of that sort, the superintendent is going to come down on my head. You know darn well that condition should never have existed. Why don't you clean it up? Or why can't you come to me and not put it in writing? If the fire pail is empty, tend to it, but don't turn in a written report. It is going to be a black mark against me and against my department."

Very often those reports are looked upon as personal by the foremen.

Then, I have known dozens of those reports to come through to the management and they say, "Has an accident of this sort ever happened?" "No, I can't remember one in three or four years." Then they say, "Oh, well, that is not likely to happen. We will just table that for a while and let it go."

Balancing Cost Against Accident Possibility

Or again, the question will come up, "How much will it cost to put a guard rail or a hand rail on this particular platform?" The engineer will estimate that it will cost \$5,000 or \$6,000. Then someone will turn around to one of the men who supervises that department and say, "When did you have an accident on that platform?" And he will say, "I can not remember one in five or six years." Then they will say "Oh, we will just let that go."

Workers have said to me, "I have sent through three or four suggestions, and nothing has been done on them. They have never told us whether they got them or why they didn't act on them." I think that where workers hand in suggestions, they are at least entitled to the courtesy of a reply.

That has been one of the things we have carried out in the plant I am associated with. If we believe that the suggestion is a favorable one, the work is commenced, but if we find for some reason that we do not want to act on it, the worker's suggestion is put on the bulletin board with a note right underneath it, telling why, at that particular time, the management does not feel that it is desirable to go ahead with the suggestion outlined.

There is another thing: if we want a reduction in our major accidents,—and by major, we mean all accidents that require losses of time in the shop beyond the season in which the accident has occurred, or one in which there has been some permanent disability—if the major accident

frequency rate and severity rate is to be reduced, we must insist that all accidents be reported immediately after they occur, no matter how slight. There are a number of very interesting phases to it that I have experienced.

When we started that many of the foremen said, "You are sending girls away from their rooms, away from their machines, you are taking 15 or 20 minutes of their time two or three times a week for tiny little scratches that we have never had any trouble with; I have never known a person in my department to have any real trouble with them. Now, they have to go down to the hospital and get it dressed. It has got to be a nuisance. They go on and work just the same. They pull out the sliver and suck the blood out and go ahead and work and it is all right." They say they never have any trouble, but every once in a while we get a severe infection, and those people who are working with them know just as well as we do what a tremendously harmful thing some of these infections can develop into, and what a tremendous compensation advantage it is when they have such a condition as that.

The Point of View is Influenced by Ignorance

I had one foreman say to me, "It seems to me you must waste a lot of bandages and dressings and ointments taking care of these little bits of scratches. It must be costing a good deal to run that first aid department. I wonder whether the company objects to it or not." But when you start having every case reported, your minor accident frequency rate is going to go up, and almost as surely the major accident rate is going to go down.

Now, one of the first things that I saw in our plant when I started it was that the foreman began to have a good deal against him. Perhaps he had, say, six accidents last month; and then, after the rule to report all accidents was put into force (because we had a case which developed infection as the result of failure to report immediately), the foreman began to have 50, 55 and 65 accidents counted against his department. He said, "Here I am helping the doctor, helping the safety work, and it is just boosting the frequency rate in my department. I am not going to be so keen about reporting anything if that is to be the result." So they began to hide cases again.

Then we had to divide it next into minors, sub-majors and majors, and tell the departments that the only cases we would count against them would be the major accidents; so that if they happened to have 150 minor accidents, in their department, it wouldn't be any detriment to them unless they are due to gross neglect or to the fact that a safeguard has been off when we go in there and try to straighten things out. The only ones that count are the major accidents, in which there is actual loss of time or permanent disability. That has done a lot to get the cooperation of the foremen in reporting every single accident immediately.

MR. GRIFFITH: In regard to your question, the matter of getting the

safety suggestions, as reported by the safety committees attended to properly: in our plant the reports of the workers' safety committees come directly to the safety supervisor. He has a card system in which he writes off that suggestion. He takes that card, and if it is for the maintenance department, he has an order for the job if it requires an order. If an order has gone through for the job, it many times requires an estimate. If it has not an estimate, why, it will go through and be approved or not approved.

The safety supervisor, if the order has not gone through the maintenance department, goes directly to the department and says, "Here, you are putting a suggestion in for something that needs to be done, and nothing can be done on that until you put an order in. If you are firmly convinced in your mind that this should be done, the management wants an order put in for it." The order is then put in, and the safety supervisor follows that order through the work department, checking up from time to time, he checks up in the estimate department to find out how it is going, and finally the estimate itself comes to the safety supervisor's department.

Routine in the Decision on Safety Work

He investigates that personally himself, with the order, and the estimate in his hand, to find out if the job, if possible, has been overestimated or if it really should be done. He passes the order back or the estimate back with his recommendations and, of course, this is either rejected or accepted upon the recommendations of all the different men whose hands it has passed through. If it is rejected, the matter is taken up with the safety committee that put in the order or put in the suggestion, and at that time we explain why it has not been accepted, if it has not.

I might say that I attend a great many of the workers' committee meetings, and the last workers' meeting I attended previous to the current month, they put in about six suggestions involving quite a bit of money, and the management asked them if they thought this work should be done. The mill manager was very emphatic in saying that he thought they would save money by doing these things, eventually. He approved of every single order, and when I got back to their next meeting, the work had all been done, greatly to the satisfaction of the committee.

ARTHUR BARLOW (Armstrong Corporation, Pennsylvania): For about 13 years I have been coming to the National Safety Congresses, and trying to see what I could get out of them that would be good for us, but I feel that I have been rather selfish in not trying on some occasion to tell what good we have got, and the results we have accomplished.

The talk this morning has been so closely related to the policy we follow in our factory that it has been inspiring to me to hear how successful you have made it, and it might be inspiring to you to hear how it has been with us.

For 14 years I have been the chairman of the safety committee of our factory, groping as one in the dark how we should get safety across to the workers. We began by forming a safety committee from the foremen's association, and arranging periodical inspections. We have a most enlightened and humane organization back of us. They were the ones to initiate the thing. As time went on, we found that as machinery began to be more and more safeguarded, those problems that seemed to us in our ignorance the only ones that should be tackled—that was guarding the machinery—did not bring about the corresponding reduction in accidents, which might have been expected. There was still something else to get to, and that was the education of the workers to take an interest in themselves.

Eleven Years of Successful Safety Contests

So we started—we are now in the eleventh year—safety competition. It is a very simple thing—we offered money prizes of very little value for the suggestions that were sent in. Our first idea was to offer a yearly prize by awarding points according to merit for the suggestions brought in, and those who had the highest number of points at the end of the year would get a gold medal and about \$25 or \$30. It was not very much, but the results were very, very satisfactory. We began to get quite a lot of suggestions, but the majority were of minor importance. Now, it struck me that we had here the keynote of the whole situation; directly you get a man interested in sending in something that affects his own comfort or safety or his well being, and you take him up and keep faith with him, and try to do the thing that he thinks ought to be done, then you have won a convert.

To make a long story short, for the month of September, out of a personnel of about 2,000 workers, we had 450 suggestions. The majority of those suggestions, I grant you, were of very minor importance, but the far-reaching effect of getting in 450 suggestions from a lot of men shows that you have aroused the intelligent interest of the organization, and they are working for and are interested in their own safety and welfare.

We call our competition the "Safety and efficiency competition"; we coupled that up and we give prizes for the best suggestion on it in each month, whether it relates to safety or efficiency; and if the quality of the efficiency suggestion warrants it, it is handed right to the factory executive for further action and greater attention.

Then, we run every year a first aid class. We are starting in a first aid class now, and we shall have to make some selective system, for we have not the means of teaching them all. We have the class held for one hour on Friday evenings, and the time spent in attending that class is paid for. We have an association of certificated members, many of them with medals and bars from the Red Cross. There is not a minute of the day, from Saturday midnight to the following Saturday midnight,

but there is someone in our factory that has had at least elementary instruction in first aid.

CHAIRMAN VAN EMBURGH: There is one point that Mr. Griffith brought out in his paper that has been of exceeding interest to me. He said that in arousing interest in his safety meetings for the foremen and the management, he had many times at his meetings staged a little vaudeville act or an entertainment of some sort. I happen to have been present at two or three of these meetings, and they were the most interesting things, I think, that I have ever seen in any safety work anywhere. Mr. Griffith knows, apparently, that you can do a lot more with people after you get them in a good humor.

At one of these meetings, he started off with a little entertainment, and the people just sat there at the start, because most of them were a little bit skeptical and wondered what this fellow was trying to put over on them now. They had a little vaudeville, a little cabaret, and after a while everybody got into the best of good humor. Then Mr. Griffith sprung the thing he wanted to get over. He turned around and said to the manager of the plant, "Wouldn't you like to address us?" Well, I watched that man's face, and the expression on it, but he did get up and he made an address. It went over. I think it was a wonderful thing to do. I have tried to copy it a little in my own plant.

Statistics Show at Least One Life Saved

H. L. CATES (Employers Liability Corporation, Boston): I was interested in one thing that Mr. Griffith said, and that was the fact that he had saved at least one life during the past year. I am sure that there is an interesting story behind that statement, and I would like to know just how it was that he accomplished that.

MR. GRIFFITH: I don't want to say how we saved that life. I am basing that expression, we will say, of saving one life and 16 serious disabilities on our previous experience through all the years that we have had statistics in our plant. We have had the rate of one death per year. Whether we have had two deaths one year and gone without an accident the next—we have gone at that rate. Our accident rate of 16 serious disability cases is only based on two years' previous experience, but the death rates we had for a number of years. This last year is the first time since I have been in this organization that we have gone without a death in the plant.

One of the best workers we have in the organization for safety—he is a foreman—was on top of a platform in our dye house, by the overhead pulleys and shafting where we had a platform across for the men to walk on. Some maintenance man had very carelessly left a board at right angles to the main platform. This man came along with his assistant, and he said to his assistant, "Don't step on the end of that plank, because it is a loose plank, you will go down." The next thing we knew, the man himself was down on the floor.

We have a system of getting a report right through to the first aid

department. We have got it on a special telephone line, and we got word to the nurse within about 30 seconds, and she came over there just in time to save him from going out as a result of the shock. He had multiple fractures and bruises, and we rushed him to the first aid department. We spent \$100 on X-ray pictures of that man, and we did everything we possibly could to save his life. The nurse was there in just one minute and approximately 40 seconds after the accident, and she had about 350 yards to cross, to come across the yard. The fact that we were so well organized, of course, assisted us a great deal, and we had a first aid car right by the first aid room.

Commenting on what Dr. Van Emburgh said about our meetings, I held such a meeting no later than Thursday evening. We had some 800 of our employees present. I talked for about 15 minutes, and I had another man talking for about half an hour; but I think that the one thing that impressed the value and importance of safety and got the whole big idea across for the evening was the entertainer we had.

He said that Pat and Mike were in a street car accident, and they were all bruised up and in pretty bad shape, and the claim agent came around and made settlements with them. Then Pat met Mike on the street the next week, and he said, "Well, what did you get out of it?" Mike says, "\$500." He says, "Well, that's funny, I got \$1,000 out of it." Mike said, "You got \$1,000; you were not hurt any worse than I was." "Well," he says, "I will tell you how I got \$1,000 out of it. I got \$500 for myself, and my wife and I were rolling down the bank, and I had the presence of mind to kick her in the face."

CHAIRMAN VAN EMBURGH: If there is no further discussion of Mr. Griffith's paper, we will go on to the next one that we have scheduled by Dr. Glenn W. Cook, the Travelers Insurance Company, Springfield, Mass. Dr. Cook is one of the past chairmen of the Section, and one of the most ardent safety workers in the New England states.

ORGANIZED ACCIDENT PREVENTION IN COTTON MILLS

G. W. Cook, Supervising Engineer, The Travelers Insurance Company, Springfield, Mass.

By organized safety in cotton mills we mean, that in addition to the usual efforts made by the management to prevent accidents, the employees are called upon to cooperate. Safety committees are formed, and they in turn review the accidents in the plant at periodic intervals, and suggest remedies. The safety committees also often make safety inspections of the plant.

A safety inspector is appointed who has entire charge of the safety problem in the plant, and who inspects the plant regularly and investigates all accidents. Various educational activities are carried on, such as bulletin boards, contests, etc., and safety literature distributed. Records are carefully kept of accidents and the entire force is stimulated to reduce accidents.

There are many varieties of safety organizations and many ways of getting the desired results. In any case, accident prevention becomes a plant activity in which the entire plant personnel is enlisted.

A safety engineer inspecting a cotton mill will find the physical hazards and the human element about the same as in any other industry, and consequently the problem appears the same. However, on outlining his plans for organized safety to the management, he will probably be reminded or warned that a cotton mill is different, with the inference that what is done in other industries to prevent accidents is either unnecessary or impractical in the cotton industry. It is necessary, therefore, to know what these real or imaginary differences are before a successful organization can be developed.

Inter-plant Visits Promote Progress in Safety

I called upon a cotton mill superintendent a few years ago and found him very much elated over the fact that he had just visited two other cotton mills in a near by city at the invitation of the managers. I inquired if it was not the custom for cotton mill superintendents to visit other mills and exchange ideas. He informed me emphatically that this was a thing simply not done in the cotton industry. This apparent secrecy in the industry, with the failure to exchange ideas, is a handicap to safety work and is probably the cause of the second handicap—complacency.

The safety engineer will often be met with the remark from cotton mill men, that the cotton industry is not a hazardous industry. This is true if compared with extraordinarily hazardous industries, but the insurance rates paid by the cotton mills indicate that they are about as hazardous as the average industry. What the cotton mill superintendent means to infer by this remark is that there is practically no hazard in the cotton industry, which is untrue, and this selfsatisfied attitude must be overcome if real safety work is to be done.

We know now that through organized accident prevention the cotton mill can reduce accidents in as great a ratio as any other industry, regardless of what the normal ratio of accidents in the cotton industry may be.

The real handicap to safety organization, however, is the type of personnel organization with which the safety engineer has to deal in a cotton mill. The agent, manager, superintendent, or as he is sometimes called, the master, is usually in complete charge of the mill. He is "the whole works." In few other industries is he in so complete control as he is in this one. Under him are foremen, called overseers, who in turn are in complete charge of their rooms or departments, such as carding rooms, spinning rooms, weaving rooms, etc.

The words "Agent," "Master" and "Overseer," are undoubtedly British, and perhaps the organization is patterned after English cotton mill organizations. I do not wish to criticize the system of management in a cotton mill, but merely to point out the handicap it presents to a safety

engineer. The superintendent in the average mill does not have the functional assistants usually found in other industries, such as an assistant in charge of employment, sanitation, fire, etc. In fact, these various duties are either handled by the superintendent, or delegated to the overseers in their own departments. The introduction of a safety inspector, with full charge of safety in the entire mill, is foreign to the system of management, as is the practise of holding committee meetings where the plant problems are discussed.

Organized accident prevention is essentially a cooperative enterprise, and it is doubtful if real safety efficiency has ever been accomplished in a mill in any other way. There is a part for the management, a part for the foremen or overseers and a part for the workmen, and it is difficult to introduce this democratic attitude into any plant which has always been managed by a military or line organization.

Safety committees are looked upon with suspicion, and the first meetings where the overseer and second hand sit in on equal terms are often made somewhat humorous by the absolute silence and tongue-tied attitude of the second hands. The superintendent hesitates to appoint a safety inspector who will go into the various departments and possibly interfere with the affairs or prerogative of the overseer. In turn the superintendent is not in the habit of receiving suggestions or advice from his operatives or mill hands.

The Experience of Three Cotton Mills

However, these difficulties are mostly personal and the result of a long established mental attitude. They can be overcome, have been overcome in specific cotton mills, and safety organizations established successfully in these mills have accomplished really remarkable results.

To demonstrate this, I will quote the experience of three cotton mills, one in Connecticut, one in Rhode Island and one in Massachusetts. In each case, they had been operating the same as the average cotton mill, with the idea, probably, that the cotton industry was not hazardous and therefore safety was not one of its problems. In each case this attitude was overcome and a safety organization established. A safety inspector was appointed who made weekly inspections of the plant. Safety committees were formed who reviewed the accidents in the plant monthly and worked out methods of preventing them. Safety posters and the various paraphernalia of organized safety education were adopted and put into use.

In the case of the Connecticut plant with 200 hands, the following results were obtained. In a six months period following the establishment of the safety organization, the lost time accidents were reduced in number from 15 to nine. The compensation accidents were reduced from 11 to three, and the hours lost due to accidents were reduced from 256 to 62. Since then, this plant, with a thoroughly organized safety organization has actually gone six months with only one compensation accident and 20 days of lost time.

In the case of the Rhode Island plant with 350 hands, the following results were obtained in a period of six months following the perfection of the safety organization. The lost time accidents were reduced from 10 to six, the compensation accidents from four to one, and the days lost due to accidents from 138 to 57. With added experience, this plant has also improved their record and has actually operated 10 months with only one compensation accident, seven lost time accidents, and 64 days lost time due to accidents. I believe that both of these represent striking examples of the value of organized safety work in a cotton mill.

The Massachusetts plant represents, in my opinion, the most cleancut demonstration of the value of organized safety, that I have ever seen.

Dividing the Mill Changes the Management

In December, 1924, a cotton mill employing about 2,000 hands was sold to two parties. The size and arrangement of the buildings were such that the mill could be divided into two equal parts. All the machinery and equipment were divided item by item down to the last waste basket. The help was also divided, nearly all remaining as they were. The overseers and the entire personnel of the management were divided likewise, so that when the division was complete, there were two exactly duplicate plants operating side by side and making the same product.

The first plant we will call Plant "A." This plant continued to operate as before and as the average cotton mill operates, with the usual effort towards safety and with the following results. During the first nine months there were 56 compensation accidents, and 1,294 days lost time due to accidents.

Plant "B" or the other half of this original plant, was purchased by a concern which thoroughly believed in organized safety. The plant was immediately organized for safety, using all the up-to-date methods, with the result that during the same nine months period there were only 14 compensation accidents and 212 days lost time.

In other words, Plant "B" had one-fourth as many accidents as Plant "A" and less than one-sixth as many days lost time. In nine months there were 42 fewer employees injured seriously enough to receive compensation in the plant where safety was organized. This plant, employing 1,200 hands, has since operated for nine months with only four compensation accidents and four months without a lost time accident.

These statistics, I think, answer very clearly the questions first, whether there is an accident problem in the cotton industry; and second, whether organized safety is worth while.

These results can be duplicated in any cotton mill, providing the management realizes that there is an accident problem in the cotton industry and is willing to approach that problem in a democratic way, realizing that it is a problem of the whole plant personnel, a cooperative enterprise, in which the girls on the spinning frames are as interested as is the overseer or the agent.

CHAIRMAN VAN EMBURGH: I think there has been very little of a democratic feeling in the management of the average cotton mill. Perhaps it is inheritance that has caused that; but I know of one large cotton mill employing about 5,000 employees where, up to the time of the organization of the safety committee, there had never been a joint meeting of foremen and superintendents. The attitude always had been to pit one man against another, not to let one superintendent know what the other superintendent was doing, to make the most out of each one of them and make them jealous of each other. When the first big meeting was held, 28 superintendents and assistant superintendents sat in one room, and a discussion was carried on. I happened to be present, and it seemed that everyone in the room was tongue tied for the next 20 minutes. Everyone was afraid to say anything. If one fellow had had experiences that might be of benefit to the others, he was afraid to get up and tell about them, or tell where he had made his mistakes, for fear of the consequences.

Changing the Plan to Hold Department Meetings

MR. GRIFFITH: Getting the men to talk in meetings, I have found very difficult. I have just started an idea that I think will be interesting to everyone here, although it is not new. We have been holding our safety council meetings, composed of our workers' committee, who are foremen or sub-managers in the plant, and I have acted as the president and conducted the meetings. Starting in with our next meeting we will have what we call "department meetings." Our council will sit intact as it is at the present time, and our carding and spinning department sub-manager or manager, will conduct the meeting, and he will give a short talk and tell of the accident hazards in his department. He will bring out all the particular points that he thinks will be interesting to the rest of the departments in the plant. I am sure, after having a little experience in this, that is going to be extremely successful, because when the safety supervisor gets up and talks, the rest of them keep quiet, they don't say a thing. When the general manager or managing director gets up and talks they all keep quiet, but when someone starts talking who is right on the level with the rest of the men, it is a different story. They are willing to come back at him, make comments, and suggestions and criticisms.

IGNATIUS MACNULTY (American Woolen Company, Andover, Mass.): I was much interested in the two papers, particularly Mr. Cook's. The organization he refers to may apply to any kind of a textile mill. He refers to the agent as being a supreme authority. Possibly no other industry has the authority placed in one man like the agent of a mill; but I think he will also recognize that the overseer in a large mill, where the department is very large, has a supreme authority. He is an agent for that particular department, but he is an organization that has not been mentioned today. The officer is not the only foreman. You have an officers' meeting. You have meetings of the help, but there

are two men that come in between them, and sometimes more essential than the overseer, and that is the second hand. He is very often the man that does the hiring and firing and the barking. The overseer does the barking, he is the director, in fact, between the operator and the management, and not always the overseer.

Now, I think it is hardly fair to the overseer that this great responsibility should be charged up to him, when very often it is not so. Theoretically it is so, you will say. But practically, in the ordinary every day work, it is not so. He is far and away above the help. He does not even discharge them; in many cases, he does not even hire them. The second hand does that. He is the manager to the average operative who is hired or fired or barked at, and he only meets the help, and they know the second hand.

There is another gentleman who is also very important, and that is the section hand. I know places where the section hand does the hiring; and where he does not do the hiring, he usually does the firing, and he does the barking for the other two.

Now, who calls meetings of the second hands? And who would take up a section hands' meeting? Nobody does it. I know people who are not a hundred miles from here who tried it. The overseer was not very happy about it. He was not very happy that the second hand would be called in in an advisory capacity; and when it was mentioned that the section hand might be called in and have meetings, and have points of contact, the second hand was not any too happy.

The Second Hand Is an Important Factor

What is the use of fooling ourselves? When you talk organization, you must talk organization either 100 per cent or not talk it at all. You must get more second hands into large plants. I agree with Mr. Cook that in the small plant of 200 to 400 people, these men do not have exclusive power, but you go into mills of 5,000 and 6,000, and sometimes 7,000, and the overseer is very far away from his help, and is by no means the direct contact. If you are going to get contacts established, you have to reach these other two foremen. They are as essentially foremen in the American firm as the overseer is.

The second hand is the essential, practical, every day foreman in an ordinary large plant, and the other fellow has his place. Now, we tried it, and we found a great deal of success in tackling the problem of the second hand and tackling the problem of the section hand, and making contacts.

Now, you notice that your accidents do not get very much less. Tom Jones and Mary Brown are having accidents. Why? Because you have not organized your human contact with the man who comes directly over them; he is not telling them about the machine, but telling them about the job, and how they should do that job, and the hustling that is required.

Now, I am not, understand, blaming anyone. The call of an industrial civilization calls for hustling. If you are an American, you are a hustler.

And it is during that hustling process—not the process of manufacture, but the process of hustling—that your accidents are taking place. You can invent all the guards possible and still have accidents, and you do have accidents in spite of those guards.

Now, you all said this morning that men were tongue tied, and a whole lot of other things were wrong with the safety meeting. Of course, you know the reason why. Each one of the speakers has stated that there is a certain amount of fear on the part of an operative who goes to a meeting, and the boss says, "Why did you bring that down?" "Well, we were told by the foreman." Do you know a boss that is pleased to go to a meeting and find that there have been suggestions made regarding deficiencies that he should have known existed. Of course, you don't.

Details of the Textile Plant Organization

I don't mean by that that the boss will fire me. I know a great many overseers who would not dream of firing anyone who would bring up a suggestion, but the help knows that he would not be pleased about it, so they don't bring it up. The suggestion is weakened at that particular point. Your help is not sold on the problem of safety, because he knows that the organization above him has not been linked up properly and that the section hand is afraid a little of the second hand, and the second hand is afraid of the overseer; and so, between the three, you have not got a complete link set up in your organization to establish an avenue of approach from the operator to the section hand. And then they both go to the overseer. I know cases where an overseer does not even know that his girls have been fired until, through an employment office, he finds that they have been discharged. Then, rather than follow it out with a very efficient employer service, he will not reinstate the girl for a few days or a few weeks, or maybe not at all.

So I just thought, Mr. Chairman, that I would inject in here the question of the overseer not being sufficiently the foreman in the room, that is all; and that we are simply beating at the air when we are taking a perfectly innocent man and saying that he is the key man, when he is not the key man. Some overseers are good fellows and are keymen, but the great mass of the key men are not the overseers, but the men who are subordinate to the overseers.

MR. GRIFFITH: Mr. MacNulty is a friend of mine, but I don't quite want to let him get by with all of that.

In the first place, perhaps I have not made myself clear in the matter of organization. We have no men in our plant that are called overseers, and yet we are a textile organization. Our managers are mill managers, when we speak of managers. Our sub-managers are floor managers, and our foremen are section hands or second hands. That is our crew. I am covering everyone right straight down, and there is a further subdivision of the second hand and the section hand in our plant, from

which these men are first selected for the safety committees, and all of this group sit at the foremen's meeting. In addition to that, I might say that I do know a great many bosses, or a great many men who are in charge of departments, who are mighty glad to bring in suggestions. I might have covered this point in my talk. If you can arrange your organization so that you can get your men to bring in suggestions, I think you have done something that is very remarkable, and I feel that in a way we have accomplished it in our plant.

We have what we call a sanitary inspector. All he does is housekeeping and safety work through the entire plant from morning until night. He reports directly to the safety supervisor, on conditions in the plant. Whether that is due to sanitation, safety or anything that applies to his department, if he sees something that would perhaps improve a system, he reports it to the safety supervisor. The safety supervisor in turn takes that matter up with the plant superintendent, not the managing director or the general manager, but with the plant superintendent. The result is that if the foreman or sub-manager or manager knows this is going on and felt they might get by without having it reported to them, they don't get by very long. Now, they feel that they would like to be the first one to report any condition in that department; and the result is that the bosses are reporting conditions and we are getting a great many of them all the time.

Get Along by Making the Help Like You

MR. COOK: Mr. MacNulty, I think, is pretty near 100 per cent right in his idea, on the key men in industry. The key man in the textile industry, and the key man in any industry is the foreman, or whatever you want to call him, but he must be the man that has direct, visual contact with the workmen; that is, the man that bosses them, and with his own eyes sees what they are doing. When you get a step removed from that, he is not a key man at all.

MR. MILLER (Wamsutta Mills, New Bedford, Mass.): I happen to be an overseer, and I want to say in regard to Mr. MacNulty, as far as my case is concerned, and my fellow overseers of the Wamsutta Mill, he is entirely wrong. I am the boss in my room, and I hire and I fire my own help, and I give my second hand the same privilege, also my third hand, so they will all have the respect of the people that work under them; but if anything is done, they have to report to me immediately, and, of course, I naturally back them up.

Now, in regard to safety, I think the best way to get along with your help is to first make them like you. You have to use diplomacy with them, you have to win their respect, and, naturally, when you do that they are going to work for you and your interests.

A careless girl or a careless boy is the one who has accidents. Now, a careless worker, I don't want them working for me if I know it, and I have got to be around my help to find out these things; I have got to know everything pertaining to my room and my activities at all times,

and I know where I stand. I could not run the department by sitting in my office and cocking my heels and staying in there.

To show you that this has proven pretty successful, Mr. Knight and I went through a year without a lost time accident, a whole year; and I think at the present time Mr. Knight has 250 hands or more, and I have in the neighborhood of 200.

The only way to do is keep at them all the time. It is all very well to go to a safety meeting and then come back in the room and forget it. You might as well not go. It is one of those things that you have to keep out of the rut. If you get into a rut, you are going to lose all you have gained. You have simply got to keep after safety like you do all other branches of your work, remind them of it all the time.

I will take a new girl and I will bring her to a girl and say, "Now, you look out for her, and watch that she does things right." She is instructed by myself, the second hand or third hand, whoever put her to work—but we have these girls looking out for one another. My help is mostly girls, and I had one trouble; I could not seem to stop them from running downstairs from away up on the top floor. The only way I have broken that is to send my second hand ahead when they were going out, or myself, or have a second hand bring up the rear. Well now, they have gotten into the habit of walking down the stairs, and they walk down now whether we are ahead of them or not. Safety grows, it is a habit, and it grows if you gradually drill it into them, but in order to be successful at it, you have to keep at it and keep out of the ruts.

Each Mill Has Its Own Individual Organization

We have safety meetings of the second hands, and we have third hand safety meetings, and we are only too glad if our second hand or third hand goes down with some suggestions. There aren't any of us that aren't big enough down there but that we want to see the credit go where it belongs, and we encourage that giving of suggestions, and we never have any trouble.

THE CHAIRMAN: I think perhaps there may be a little ambiguity, due to the differences in the organizations that exist in some of the mills. I happen to know that in Mr. Griffith's mill, his foreman, due to the type of organization they have, is pretty close to the key man—that is, he approaches very close to being a key man. In other mills, I know that the second hand or section hand is the actual contact man. I think that Mr. Griffith would be perfectly willing to have the interpretation on foremen made a little bit broader to include not only a foreman, but any man or woman who makes the actual contact, whether that person be a second hand or a section hand. That person is the key man, and while organizations like Mr. Griffith's mill and the American Woolen Company's mills, and the Wamsutta Mills may differ a little, I think the interpretation we should put on it is that it is the man that makes actual contact—and whether one person is in charge of his room and

holds the position of overseer or whether another person is in direct contact or not, is something that I would rather not take up here.

The next paper on our list this morning is by Mr. Lewis E. MacBrayne, general manager, Massachusetts Safety Council, Boston, Massachusetts.

HOW UNUSUAL RESULTS WERE ACCOMPLISHED BY A GROUP SAFETY CAMPAIGN

Lewis E. MacBrayne, General Manager, Massachusetts Safety Council, Boston, Mass.

The Massachusetts Safety Council has conducted, during the past few months, two inter-plant contests for accident reduction among industrial groups. One of them was among 11 textile corporations employing a total of 12,584 workers, in the city of New Bedford, Mass. That ancient port, once the center of the American whaling industry, is now famed for its textiles. It has a mill (it is no exaggeration to say) for every whaling vessel that once sailed from its wharves.

It is hardly fair to claim that any unusual results were obtained from this contest, although one corporation in the group had a clean record of no lost time accidents for four out of the six months. It was, however, the first inter-plant contest of a semi-public nature carried on among textile mills; and that fact permits me to observe, for a moment, the attitude of cotton manufacturers on the question of organized safety work. I am desirous of doing so because, in a way, these meeting machines serve as a broadcasting station by which we may reach, through the published proceedings of the Congress, and other agencies of publicity, a much larger audience than is here assembled.

The textile industry, while it is one of the oldest in the United States, is not yet fully sold as to the value of plant safety organization. There are two clearly defined groups of mill managers. One, brought up to view with suspicion anything that is carried into the plant from the outside, considers that its duty to the employees is done when it protects them with insurance. The other, alert to find and correct any item of waste that may enter into the cost of production, is ready to try out methods that have reduced accident costs in other industries, and even to experiment in new ones that may be better adapted to its own industry.

There is a prevailing opinion, on the outside of the textile industry, that the first group is composed of the veteran mill agents and superintendents, many of whom fought their way up from the ranks, and that the second represents the younger generation of mill managers, many of whom are graduates of textile schools. While it is true that the younger mill manager seldom fails to respond to the recommendations of the safety engineer, it is also a fact that some of the most effective safety work has been done in large corporations still under veteran management, and the agent himself has been the motive power behind such effort. So much for that.

It is my observation, reinforced by the experience of safety engineers

who are familiar with the details of textile plants, that there is some relation between successful mill management and good safety work. Usually the factory that is making money on its cloth is also making it on a lower cost of accidents, as represented by the payment of workmen's compensation. It has gone beyond the machine guard part of the problem, and made a study of the human element, which, as we know, is educational rather than mechanical.

No management is really sold on safety, when it limits its effort to guarding machinery. I have heard of one textile plant, employing 1,500 operatives, that has expended \$2,000 on machine guards within the past year, but it has neglected all recommendations relative to the instruction of workmen in personal habits of safety. It has no reduction in its accident experience for the year.

On the other hand, it is noticeable that the mill superintendent who is sold on safety, and looks upon his safety committee as something more than a gesture, puts over his program with 90 per cent of the overseers and second hands. The textile mill superintendent is seldom an office man. He usually spends the better part of the day in the plant. The overseers discover how he stands on most questions.

Returning now to the subject of my paper. We found, in the city of New Bedford, that inviting all the manufacturers to cooperate with us in conducting a friendly contest to reduce lost time accidents did not by any means guarantee that they would do so, even though the idea had the endorsement of all the insurance carriers. A letter, followed by a personal call, merely served to clarify the two groups to which I have referred. One group responded with quick acceptance, and welcomed the opportunity to stimulate the interest in their safety work. The other group declined curtly, and in one case indignantly, to be drawn into such a contest. This was regrettable, for not all of them were having a favorable accident experience.

Newspaper Publicity Was Enlisted to Good Advantage

The 11 corporations that entered were each designated by a key number and were so known to the others in the bulletins that we sent out from time to time during the contest. They reported to our office each month their average number of employees, the number of their accidents, and the days lost. The basis for the contest was their averages for the three months preceding.

To keep up the interest in the campaign we used newspaper publicity. 1,100 copies of a booklet entitled "Textile Mill Hazards," and later held a rally for overseers and second hands in the hall of the New Bedford Textile School. The program upon that occasion included musical numbers by mill workers, an illustrated talk on "Cotton Fibre" by the secretary of the National Association of Cotton Manufacturers, safety motion picture reels, and a round table discussion. The meeting aroused much interest and was reported by the press.

Originally we had proposed to carry on the contest for three months,

but at the end of that period it was unanimously agreed to continue it for another quarter. There were two reasons for this. One was that the safety committees in the several plants were genuinely interested. The second was that one plant, with nearly 1,100 employees, had established a clean record, three months without a lost time accident, and a number of people wanted to know whether it could possibly be done again. At the end of this first quarter only three of the plants had reduced their frequency, but six had lowered their severity.

To make the second quarter more of a sporting proposition, it was agreed that each plant should attempt to beat the average of the six months preceding, which of course included any gain made in the three months just ended. Quite naturally the plant that had made the perfect score found it difficult to better it, but it ended the contest with four clean months out of the six, with an accident frequency of 1.4 per 100 employees per year, and with only 18.7 days lost per 100 employees per year.

Good Records Made in the Contest

The plant winning the second quarter of the contest had more than 2,000 employees, but went 26 days without a lost time accident. Its rating for the three months was 1.1 for accidents and 27.2 for lost days. Another plant finished the contest with a score of 1.8 for accidents and 19 for lost days. There were five corporations in this second lap of the contest that recorded a decrease in both frequency and severity.

It is hardly fair to conclude, as I have observed already, that the contest gave us unusual results in comparison with what the plants had been doing in the way of safety work; but there were, nevertheless, some interesting conclusions. The two plants making the best records for the two three-months periods are both successfully managed. They sell a product widely known. One has a full time safety engineer of exceptional ability, and the other has an agent who has taken a personal pride in developing an effective safety organization within his plant. Both drew inspiration from the National Safety Congress held in Cleveland a year ago, and both have participated in conferences of the Massachusetts Safety Council.

All of which seems to bear out my contention that there is a relation between the well organized, progressive textile plant, and a safety program that gets results. A competent safety organization in these two corporations was merely a part of good management. Winning this or any other contest meant interesting the entire organization in lower accident costs.

Miss Brooks (Managing Secretary Paterson Safety Council): I am managing secretary of the Paterson Safety Council, and we have done a little work in the industry, and we find our most difficult problem to be getting the executives interested in safety work. The foreman is sold. We had a course in foremen's safety work last year that was very successful, but it seems to be very difficult to get his employer actively interested and backing up the safety work in the plant, and they feel that that is the first thing that should be done.

MR. MACBRAYNE: One method that we have to stimulate that is their chances to be on our board of directors of the State Commissioner of Labor and Industry, and he is very deeply interested in the relation of our work to industry. It gives us an unusual point of contact in getting at the state inspectors, and changing their attitude on their duties of inspection. We worked very quietly for three years. We would say to the state inspector, "Your job is not to go into this mill and find fault. It ought to be your job, after visiting 50 or 100 plants, to go to this one that is a little behind." That is, we are trying to sell the state inspectors the idea of passing safety information. Now, once or twice a year we stage a banquet at which some such person as the State Commissioner of Labor and Industry is the toastmaster or speaker, and at that meeting we endeavor to get in certain managers whom we want to sell on the general idea of safety. Usually the toastmaster, if he is not the commissioner, will be the head of some very large plant.

When It Is Plain the Management Influences Safety

Howard Coonley, who is one of the speakers at the banquet tomorrow night, is a member of our organization, and he is head of a very large industry operating in three different states. When Mr. Coonley presides at that meeting, these men who thought it was only a safety engineer's job and did not get very much higher, in a great many cases realize that the whole thing is hand in hand with management. Sometimes they will say, "We know such and such a secretary, they have eliminated all the falls by changing the girls from high heels to low heels." Then he checks up and finds that the secretary of that mill is interested in safety, and he probably is sold on whether he can have as good a plant as this man.

We always find that the big organization, with the management interested, is also holding its own in industry.

MISS BROOKS: May I ask, in those other shops, do they have active safety committees that meet on company time to discuss conditions?

MR. MACBRAYNE: Well, no. Practically all of the mills that entered into this did not have a complete organization. Generally speaking, the mills that would not come in have no organization, and the insurance carrier was very anxious to get them in in order to stimulate the organization. There were different forms of meeting.

CHAIRMAN VAN EMBURGH: I think keeping up interest in safety is one of the real jobs that any man or woman working for safety has got ahead of him.

There is a museum of safety at Jersey City, and the company with which I am associated has on two occasions been invited. We have taken these foremen, overseers, second hands and section hands, or anyone else who would like to come, in 30, 40 or 50 large jitney busses; we give our clerks a supper in the cafeteria free of charge and a little entertainment to fill in the spare time, and then fill the jitney busses

and drive them 10 miles to the city, take them all through the museum, spend a pleasant hour discussing the various features, then come downstairs to the large hall where they have been addressed. I have heard a great many remarks like "Say, that is fine, that's great, why didn't we do that before?" Well, we took them at their word, and we arranged for meetings at 5:00 o'clock, 5:15, but then they said, "Oh, gosh, I don't want to go to that, I have an appointment; if we have any more meetings, let's have them on company time."

We tried it during the noon hour, and found that that did not go very well, because the boys wanted to eat their lunches; they usually eat in about four or five minutes, then they want to play some soccer or the girls want to go upstairs and dance; they would rather do that than listen to any safety talks, so really I have been a little bit up in the air as to what these people do want.

I will say that when we have taken them to the museum, they have been whole-heartedly interested in it, and when we have given them talks on company time, they have paid the best of attention; but when you try to keep them after hours or at the noon hour, they don't like it.

I wonder if Mr. Roach would not like to say a word to us. Mr. Roach is deputy commissioner of labor in the state of New Jersey, and he has been one of the men who has done a great deal to help us with our safety work.

Section Enthusiasm is Observed and Praised

MR. ROACH: I was very much interested to notice the vigor and determination with which the debating is carried on in the Textile Section, quite at variance with some of my experience at some of the other sectional meetings.

It seems to me there should be no trouble where so much enthusiasm abounds on the part of the safety engineer, the overseer and second and third hands to arouse a similar enthusiasm on the part of the safety committees in the various plants in which they are located.

I agree with Mr. MacNulty in a great many of the things he says in regard to the difficulty of making a proper contact with the workmen, and of getting the safety committees and others entrusted with safety work in the plants to criticize plant methods and operations, that perhaps are the inheritance of many, many years in the locality; and I am conscious of this, that no well organized safety movement is worthy of that dignified term unless it has received the approbation and the moral and spiritual support of the plant manager, the chief executive who is, in the final analysis, responsible for everything that takes place in the plant.

Now, if the plant manager has no more than a casual interest in safety and says "Well, all the other plants in the textile industry seem to be doing something along this line, and you boys go ahead and organize and see what you can do"; and does not approach that subject with spirit and determination, I am quite sure, having a job to hold myself, that the men who are on that committee are not going to make any

very critical observations of plant practice within that jurisdiction. It can not be done, and it won't be done; and I tell you, gentlemen, that in many mills with which I have had contact, workmen and subordinate foremen, too, view and regard with a great deal of conscious irony these passionate appeals that are made to them to, "For God's sake work safe," when they are working under surroundings of excessive heat or dust or in uncomfortable work places that should not exist in this modern day of American engineering and industrial plant perfection.

It should not, and it does not exist in well regulated and properly conducted plants, where the plant manager really and honestly believes in the doctrine, "Am I my brother's keeper?" I mean in a decent, intelligent and purely democratic sense, stripped, perhaps, of the sob sister stuff that has more or less brought that kind of an expression into disrepute in these late and rather cynical days. I look with a great deal of interest and a certain amount of conscious state pride on the efforts that they have made in my friend, Van Emburgh's plant, to make the work places not only safe, but comfortable and make them so attractive that people want to stay in that plant; and that can not be done unless the plant manager gets the engineering department together and says, "Boys, what are the state standards on this?" And if you have not state standards of industrial practice to regulate industry, then I would say that whatever state you are in, whether it is in Massachusetts or Rhode Island or Connecticut or New Hampshire, you are living away back in the dark ages.

Develop Intelligent Standards of Practice

The first thing you want to do is to get the engineering department together and develop certain definite, intelligent standards of practice that are available for the direction of plant managers and departments of labor, and that they receive the approval of the American Engineering Standards Committee. Then you may find that instead of spending \$2,000 in the course of a year, it may be necessary, to make that plant right, to spend \$150,000; but if that amount of money is required, why shouldn't it be spent? Improved machines come in, old ones are scrapped, new processes arise that require the erection of new buildings, and new processes of manufacture. The old goes into the scrap-heap, the new comes in, with added production, reduced cost and improved quality in the product. And so it goes on with labor. Labor is production, tremendous production, and some of the more intelligent administrators of industry in our country have really discovered how productive labor can be when it operates under helpful, safe conditions of practice.

That is the message that I would like to leave with the Textile Section. I wish that all our mills in this country were connected with this sectional branch of the National Safety Council. I know that some years ago I was in the south, and I walked into a mill there, a fine, big, wonderful mill, rather crowded with machinery—one of the new types

of mills—and I saw one foreman in there with an air jet, blasting the dust, lint and dirt from the machines. As I was passing by, I spoke to him, and I said, "Well, that seems to me to be a rather rough practice in a place like this, to fill this place all up with dust in here, breathe it yourself and give it to the workers." He said, "Oh, you know, that's all right. It is a fine product here. We use nothing but first class No. 1 Sea Island cotton." That man really and conscientiously believed that that product was not harmful. We do not believe that a place in which they do that is a good place in which to work.

If you want your safety committees to do interested, enthusiastic work in your plant, get the big fellow at the top to come and say, "Here, I am going to be down at that meeting, and I want you fellows to go the limit to make that shop a safe place, irrespective of cost"; and then, when we have discharged the responsibility, we are going to make these factory fellows know that we want cooperation on their part. If you do that, I think you are going to get it.

CHAIRMAN VAN EMBURGH: Is there any further discussion on Mr. MacBrayne's paper, or on anything that Mr. Roach has said?

MR. GRIFFITH: I just want to make one comment on bringing the Commissioner of Labor in various states into it.

I had, you might say, practically sold the foreman on accident prevention. I had not sold the management. I had been told by the foreman that many of the managers say, "Go ahead, do something for safety," but they do not cooperate. I had the Commissioner of Labor of the state of Rhode Island address our managers and sub-managers and foremen, and I had the management of the plant well represented at this meeting. The Commissioner of Labor came there and he talked as the Commissioner of Labor of the state of New Jersey has talked today. He talked to the management of the plant before the foremen; and from that time on we have had very little trouble with the management.

I think that the Commissioner of Labor of any state has the statistics and the figures, and is a very great influence in any state towards the reduction of accidents and in selling the management of any particular plant.

CHAIRMAN VAN EMBURGH: Is there any further discussion? If not, before we adjourn, I will appoint a Nominating Committee.

If Mr. Cook will be good enough to serve as chairman of that committee, I will ask Mr. Harvey Sall and Mr. Griffith to serve with him, and have their report ready for tomorrow.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926

The meeting convened at 9:30 o'clock, Dr. George H. Van Emburgh, Jr., presiding.

CHAIRMAN VAN EMBURGH: There was a report of the Statistical Committee yesterday that was deferred until this morning. I would like to ask Mr. Sherman, as the chairman of that Committee to report this morning.

REPORT OF R. B. SHERMAN, CHAIRMAN, STATISTICAL COMMITTEE

The report of the Statistical Committee, due to the nature of its work, which is very largely routine and clerical, must be brief. The compiling of the statistics, which are sent in by our members, is very properly taken care of by the National Safety Council, and there remains for the committee very little to do but endeavor to get more and more of our members to send in their figures, as the greater the variety of statistics we receive, the more comprehensive story the summary will tell.

An appeal was made this year by special letter to members and also in our *News Letter*, with the result that 32 members sent in their figures, as compared with 21 last year; a gain of 11 members, but still not enough, for out of 110 members of the Textile Section we should have more than 32 reporting.

I shall not attempt in any way to analyze these statistics. This, of course, must be done by each member according to his need and be left to each company to compare the experience of its own plant with that of the industry as a whole. The statement does, however, show a reduction in severity rate from .89 in 1924 to .45 in 1925.

The goal of this committee is to have 100 per cent of the members reporting, and with this goal in mind, our efforts during the coming year will be increased.

CHAIRMAN VAN EMBURGH: Are there any comments on Mr. Sherman's report?

MR. COOK: Although there are only 32 reporting it is interesting to note that the first year we asked for statistics, we had 17, and last year it went up to 32; and it is climbing all the time, and we probably will get a very good cross-section as we go along, of conditions in the textile industry.

CHAIRMAN VAN EMBURGH: I think at first the members of the Textile Section were rather reticent about reporting, for fear that their statistics would become known to other plants; but since we have convinced

them that nothing but a code number is used, they will feel a little more free in reporting their accidents.

The first paper this morning will be upon "Health Problems in the Textile Industry," by Dr. B. T. Knapp.

HEALTH PROBLEMS OF THE TEXTILE INDUSTRY

Dr. B. T. Knapp, Cheney Brothers, South Manchester, Conn.

It may seem from my title that I am conversant with such problems in all the textile industries, but I regret to say that such is not the case. I have acted as physician for Cheney Brothers, silk manufacturers, South Manchester, Connecticut, for the past seven years and this is about the only one of the textiles I have first-hand knowledge of. However, I assume that the health problems in the wool, cotton, jute and hemp industries are much if not quite the same as ours, with the possible exception of the factor of added dampness in some of the operations in the others, notably cotton manufacturing.

With us, the plant medical department is about 11 years old. It started first in a small way in 1914 with a nurse, then a doctor, nurse and clerk shortly afterwards. It has grown until today we have a personnel of 15, including three full-time physicians, three nurses, two laboratory technicians, X-ray technician, two dental hygienists, a physiotherapy technician and three of the clerical staff.

We extend the services of the various departments mentioned to all employees, during working hours, and if required the laboratory service is extended to employees ill at home, and also, of course, the nursing service. The doctors have never attended employees confined to their homes, unless the patient is a compensation case. The dependents of employees are offered the services of the clinical laboratory, X-ray laboratory and nursing service at cost, or below in some cases, but not the services of the physician; for thus we strive to live in amity with the practicing physicians in a town of 22,000 people.

The aims of the medical department are as follows:

- A. Care of all compensation cases.
- B. Examination of all applicants for employment.
- C. The treatment of all cases of ambulatory illness which apply for relief.
- D. Treatment of all out of work accident cases that apply for the same and are not employing an outside physician.
- E. Periodical physical examinations upon request.
- F. Attendance by visiting nurses at the homes of all employees confined there by any physical disability excepting contagious disease. This service is extended to dependents when requested at a small charge.
- G. Dental hygienist service which includes, besides prophylaxis, the taking of X-rays when needed.
- H. The general X-ray service which is routinely used in all compensa-

tion cases when X-ray is indicated, and is further extensively used in the diagnosis of internal diseases. Also it may be used by those injured out of work for the diagnosis of possible bone injury, foreign bodies, etc.

I. A state certified laboratory is equipped to do all tests done in any up-to-date laboratory at present. This laboratory service is also extended to the patient ill at home, in that, when requested by the family physician, the technician is transported to the bedside by the visiting nurse to obtain specimens for whatever tests are required.

J. Refractions of eye by a specialist of all cases whose vision is found to be defective by the Snellen's chart or otherwise.

K. Physiotherapy treatment directed by the physicians and under the administration of a trained technician is given those cases where it seems a necessary adjunct to the other treatment.

L. The furthering of propaganda for the prevention of disease by suitable talk, posters, health hints, etc.

The volume of work may be gauged by the following yearly report:

Total visits	35,265
Total compensation treatments	6,803
Total non-compensation cases	28,466
Total new compensation cases.....	1,228
Total treatments made by doctors in first aid rooms.....	13,169
Total treatments made by first aid workers.....	3,495
Laboratory cases	3,652
General X-rays	1,277
Dental X-rays	561
Employment examinations	1,025
Dental cases	4,152
Total calls made by nurses at home.....	7,263
Total new calls made by nurses at home.....	3,103
Actual nursing treatments.....	2,617
Periodical examinations	60

No natural raw silk is produced in America; therefore it must be imported from Japan, China or Italy, but mostly from Japan. It comes to us either as reeled silk from Japan, China or Italy, or as frisons and imperfect cocoons from China and Japan. In whatever form it comes it must pass through a great many processes before it is ready to ship as finished goods.

About 4,000 employees are necessary to manufacture the output of these mills. Their nationalities represent 16 to 18 nations, of which American born constitute 46 per cent, Irish 18 per cent, Italian nine per cent, Austrian and German six per cent, Swedish five per cent, Polish four per cent, and the balance scattered among Lithuanian, Scotch, English, French, Russian, Swiss, Canadian and a small miscellaneous group. Thirteen per cent are American born of American parentage, 33 per cent are American born of foreign parentage and 54 per cent are foreign born. Ninety-six and one-half per cent can read and write English, and only

two per cent are illiterate or unable to read or write either English or their native language. In the office force, 86 per cent are American born, nine per cent Irish, and the balance of five per cent are scattered among various nationalities with English and Scotch predominating. Of this group 22 per cent are of American birth and parentage, 64 per cent are American born of foreign parentage, and 14 per cent foreign born.

Our work covers a wide range of diversified occupations, numbering 371 in all, without regard to the sub-divisions which occur in many occupations. Some idea of the diversity in work represented within our organization may be obtained from the following list selected at random: weavers, cooks, mechanical engineers, winders, telephone operators, chauffeurs, dressers, chemists, doctors, spinners, locomotive engineers, cravat workers, teamsters, accountants, printers, electricians, engravers, warpers, carpenters, dental hygienists, loomfixers, laborers, clerks, inspectors, mill superintendents, dyers, twistors, painters, librarian, quillers, machinists, etc.

Contact Begun at Time of Employment

The first contact of the medical department with the employee is at the time of employment when every applicant, no matter what his station is to be, is given a physical examination. This examination is necessarily not an exhaustive one, as time does not permit, but every male applicant is required to remove the greater part of his clothing and he is systematically gone over from head to foot in about ten minutes, and by following a routine form it is possible to accomplish this examination in the time stated. With female applicants, examination is confined to the following: head (that is scalp), eyes, nose, throat and ears, neck, upper chest, including heart, the pulse rate and its other characteristics noted. The feet and ankles are examined. If the applicant, either male or female, is over 40 years of age, or if there is any indication, though they be younger, a blood pressure is taken.

Recently we have required routine Wassermann. Any other laboratory work that is indicated is done in our laboratory. The teeth of all applicants are examined by the dental hygienist and usually an appointment is made for a regular prophylaxis every six months or oftener; they are also advised as to needed attention by their dentist.

The applicant is then rated and if turned down for employment is told why, and told if it may be possible to change his rating in the future after needed medical or surgical treatment. All this is recorded on the examination card which is kept with the individual records in our files. We reject for various reasons about four to six per cent of applicants. Those who have objected to the routine physical examination for employment number less than one-half per cent of a total of 25,000 examined since 1916. Our labor turnover at present is about 25 per cent of the working force.

In fitting each applicant to the job he is being hired for we find a valuable aid in the book of hiring specifications, in which there is a photograph of each job, and beside which there is a list of the physical

requirements. Thus at a glance, after our examination, we know whether the applicant will fill the bill. Of course, the employment division also has a copy of the hiring specifications, and the applicant is carefully compared with the requirements before being sent to the medical division for examination. These hiring specifications are gone over from time to time by the plant physicians who visit each job and make suggestions regarding changes in these requirements.

Our next contact with the employee probably comes when he is injured at his work. These cases are handled as far as possible by the company physicians in the medical department. Cases requiring major surgical operations are referred to a consulting surgeon who takes care of them in conjunction with the company physicians. Our compensation cases number only a small proportion of the total cases seen daily. We treat only about one-half as many work accidents as out of work accidents, and the number seen would be still smaller if we did not require every employee injured, no matter how slightly, to be seen by the plant physician. Our redressings as far as possible are done in the first aid dressing rooms, with which each mill is equipped. Two physicians divide the eight mills, visiting them each day between 8 and 10 a.m. During this time they also treat any out of work accident that applies, and also refer any cases of illness that wish to be seen to the medical department.

Accidents Are Promptly Reported to the Foreman

A system requiring each employee injured at work to report his accident to the foreman within 24 hours after it happened, on pain of losing his first week of compensation, greatly aids us in keeping down the severe consequence of neglected injuries. Also our lost-time accidents are reduced by requiring the department head to find a job for the injured man unable to do his regular work. In case of injury to the lower extremity where a man is unable to walk, a car transfers him to and from work. I am indebted to Dr. Van Emburgh for many helpful suggestions regarding the operation of this scheme, which he has had in effect at the Clark Thread Company for some time. We find, as he did, that it is rarely that a man can not be given some work.

Fortunately our injuries in the mill are not as a rule major ones, but as we look after the employees of several public utilities controlled by Cheney Brothers, we do occasionally get some cases of severe accidents from the electrical department, sewer and water departments, and South Manchester R. R. In the industry proper, we do have many injuries of hands and feet, including many fractures, principally the digits, or an operative may have his hand caught in a machine. These as a rule are our most severe mill injuries. The flying shuttle is a potential source of severe injury. Fortunately, thus far, it has only resulted in contusions and puncture wounds, but is capable of great penetration should it strike the eye squarely. However, it seems impossible to so guard these machines so that the shuttle will not occasionally fly out. A laborer lost his eye just before I came away from a piece of steel from his pick.

With our system of prompt attention by a first aid worker—there are two in each mill trained by our doctors—our infections are comparatively few. Subsequent dressings are always directed by a physician, the nurses not being allowed to pass judgment on any case.

Injured employees are paid one-half the regular wage if they lose time, beginning the day of the injury if they belong to the Mutual Benefit Association, plus so much for each dependent child. If not members of the benefit association, compensation does not begin until the end of the first week, as required by the state law, and they receive nothing for dependent children. If they can keep at work and the time of convalescence is short they are paid full wage even though they are not on their regular job. If it is a long convalescence they receive the pay of the job that they are on plus one-half the difference between the regular and modified job rate; that is, the modified job usually means less pay.

Occasional Cases of Dermatitis Are Found

The only cases of occupational illnesses we have to deal with are occasional cases of dermatitis, caused by handling wet silk, usually in skeins. Sometimes a dermatitis arises apparently in susceptible individuals from the dyes also. Of course, we do occasionally have a machine worker who is affected by the oil he comes in contact with.

In all cases I can not help but feel that the individual is somehow peculiarly susceptible. They are usually very stubborn to treat and the first requisite seems to be to take them immediately off the job. Specialists are more or less on the fence regarding many of these cases, as they have declared to me that they are very difficult cases to testify about in court, and I am sure that they feel there is always some susceptibility on the part of the patient.

We may next see the employee for some illness, either an acute cold or intestinal upset, or it may be for some chronic disease that they consult us. We are usually able to do a great deal for these patients in the way of diagnosis, for, with three physicians, we can devote sufficient time to each case so that with our various laboratory facilities we can arrive at a diagnosis before a great while. It is only when the illness may make him a bed patient that we lose contact with him.

We are consulted by the employee for every conceivable type of illness, and I must say this takes the major portion of our time. The acute or subacute transient ambulatory maladies we are usually able to treat successfully in the medical department during working hours, but where we feel a case needs consultation with a specialist, as in some gastro-intestinal ailments or skin condition, or whatnot, we so advise the patient and give him the names of several consultants to choose from. These are usually Hartford men as they are near at hand.

If the patient indicates a desire to see such a specialist we then supply him with a letter to the consultant of his choice which includes a history of his case, the laboratory results, and whatever treatment we may have given him. He is also supplied with any X-rays that may have been

taken. A reply is requested containing the consultant's findings and advice, and whether or not he would like further laboratory work and X-rays. This when received is filed with the patient's medical record. By this cooperation with consultants we are able to keep in contact with the patient and follow his case to its termination. The satisfaction of this is apparent and ends much added interest to our work which would certainly be lacking were we merely allowed to look after compensation cases.

In conjunction with this purely medical side of the work, we run a chest clinic. Here cases that have been seen by the plant physician and are known to have or are suspected of having some respiratory or heart condition, are gotten together once in two weeks and gone over by a consultant in this specialty from Hartford. He comes to our medical department for the morning. He reads their X-rays, advises their treatment and indicates when he would like to see them again. All this is recorded on a special card.

Experience in Combatting Tubercular Cases

Of course, the primary idea in starting such a clinic was to have a check on our tubercular cases. These cases when they are found are advised to take treatment in one of the state sanatoria. In order to facilitate their leaving their work and going away without too great a financial hardship we operate what is known as our Tuberculosis Free Bed Fund. This association supplies the cost of the sanatorium treatment. In addition, if a member, they are paid their regular benefits from the mutual benefit association while away from work. The Tuberculosis Free Bed Fund receives its financial support from voluntary subscriptions from employees. This is taken up at irregular intervals, usually every two or three years as needed. Whatever sum subscribed is duplicated by Cheney Brothers. All employees are entitled to the benefit of this organization whenever necessary. Besides dependents of employees are given its aid if needed.

Our proportion of tubercular cases to all others is relatively small. We seldom have more than four or five cases in the sanatorium at once and not more than 12 to 18 cases in all under treatment or observation. When able to return to work they are taken back and re-examined at regular intervals. It is generally supposed that the incidence of tuberculosis is higher in the textile industries, but such is certainly not the case with us. It runs pretty evenly with the community at large and this is not excessive and, as you all know, has been constantly on the descent for the past ten years. There are eight counties in our state and we are fifth on the list as regards the incidence, there being four counties where it is more frequent than with us. This is rather remarkable when the location of the town is considered, as it is located in a very changeable and somewhat damp climate in the Connecticut River valley.

Before passing on to other problems I would like to mention our attitude toward cases of Lues and Neisserian infection. We do not penalize these cases that apply for treatment by a lay off or release, feeling if

we did so there would probably be many cases in the future which we would know nothing of, and hence we would have a greater menace. We do occasionally ask a man, if his appearance due to Lues is unsightly, to stop work for a short time, but provided he will take treatment and report regularly to us he is given his job back later. We administer our own salvarsan which the state supplies. The state also does all our Wassermanns, and I feel we have pretty good cooperation. In several instances our laboratory has demonstrated the Spirochaete from the initial lesion and these cases, under careful supervision from the plant physician, have been regularly treated with salvarsan, mercury or bismuth until cured.

Our X-ray department is of inestimable benefit to us as we not only use it for our compensation cases where bone injury is suspected or foreign bodies have to be located, but extend the services to employees for out of work accidents. For this a cost charge of the labor plus material is made. Also for diagnosis of disease this service is constantly used. For this no charge is made to employees and cost only to their dependents. Our X-ray technician is a graduate nurse and has developed a very fine technique. We have two X-ray equipments, one for general work and a small Victor unit for dental X-rays. We do nothing as yet therapeutically with X-rays, but hope to some day.

The Laboratory Is an Invaluable Aid

Thus far our dental department merely does prophylaxes. We have never employed a dentist, but I believe we may in time. However, this department renders distinct and valuable service in checking up the teeth of all applicants and doing prophylaxis on workers every six months or oftener. A great many of our troublesome or borderline cases of myositis, and myalgia are traced to focal infection which the dental X-rays disclose.

Speaking of focal infections, not infrequently where the tonsils are found to be the site of disease, and the patient is unable to employ a nose and throat specialist, we have removed their tonsils in the medical department. However, the status of these cases is always studied and no cases that can afford to pay an outside man is done by us. In order not to offend the local nose and throat man we first gained his sanction of this move.

In our laboratory we do all the usual work that is done nowadays including blood chemistry and basal metabolism readings. Such a laboratory is, of course, an invaluable aid to us in diagnosis, particularly when we occasionally have a small epidemic of malaria. For this disease, despite little mention of it in the literature, is still not uncommon in New England. One interesting epidemic our laboratory helped us out on a few years ago was trichinosis, which suddenly made its appearance among several of the Italian workers. In these cases most of them had eaten uncooked pork sausages, which must have been the source, as all the fresh pork inspected was found uninfected. Several of these cases ran a eosinophilia up to 40 or even 55 per cent. They all suffered, with

more or less severity, the gastro-intestinal and muscular symptoms of the disease and in the muscle fibre of one case the trichina was found.

In our eye work, besides the Snellens Test given each applicant at the time of employment, all are again given this test every two or three years, and cases found that need refraction are refracted by an eye specialist who comes to our clinic once a week and in a room fitted for his use these cases are gone over and prescriptions for glasses are given. By an arrangement with the American Optical Company, glasses are furnished slightly above cost. Besides the cases who need refraction, as found by the specialist at the time, he does his Snellens Test for any applicant who needs the same, or any case the plant physician suspects from symptoms as needing it, are also refracted. This work is paid for on a fee basis, so much for each case.

The Periodical Physical Examination Important

In silk manufacturing there are many operations that require close use of the eyes and it is of the utmost importance to the manufacturer that the eyesight be of the best if valuable cloth is not to be spoiled. Also, as can be readily seen, access to such a service very frequently clears up troublesome headaches, stomach trouble, cough, etc. In connection with eyes, the wearing of goggles in some of the hazardous jobs in the machine shop is, of course, the logical preventive measure, but in practice I find it difficult to get machinists to appreciate this fact, and it seems, except in some cases, very difficult to get them actually to do this.

We find our physiotherapy department, which we have had in practice for about two years, a very valuable and necessary adjunct to treatment. In the first place, the operatives, more enlightened nowadays than of old, know of this therapy and inquire for it. In the second place, many of our backs and extremities, both compensated or otherwise, are extremely slow in responding to treatment without it; also some infections, and these do well with the various means at our disposal in the physiotherapy department. Here, we have the usual appliances, deep therapy lamp, diathermy, ultra-violet, air and water cooled, whirlpool baths, etc. The department is in charge of a graduate technician who is also, of course, a masseuse. I feel that the time of convalescence is materially cut down in many of our cases by these means.

The periodical physical examination interests us greatly, and we only wish time permitted us to do it more routinely, as at present we extend it to everyone, but stress it particularly for the executives and foremen. We strive to make it very complete and comprehensive. We routinely X-ray all teeth, do a complete blood count, Wassermann, and a twenty-four hour specimen of urine, and whenever indicated, any other laboratory work, such as a blood chemistry, basal metabolism, quantitative urinalysis, kidney function test, etc. A complete report in the form of a letter is sent each person examined, explaining in simple terms any defects found and the remedy suggested. If a visit to a specialist is indicated, it is suggested in a letter, and a willingness to make appointment is expressed. The time for the next examination is stated and the man

is notified when that time comes. No charge is made for this examination. Many interesting defects have been brought to light, needless to say, and, of course, I know that this has been of extreme value to the worker. Also, it fits in very well with our constant campaign to make people realize the increased frequency and great danger of the so-called diseases of middle life or degenerative diseases.

By posters, health hints on pay envelopes, talks to foremen, etc., we are constantly striving to spread the gospel of preventive medicine. We try to direct them along the right road as to diet. So many of them are seemingly indifferent as to what they eat so long as it only tastes good. They prepare their midday meal very rapidly and eat it equally so, and I can not help but feel that many of our cases of chronic gastritis and worse have their inception here.

Again the question of overweighing in middle life arrests our attention. It is a difficult problem to get these people to realize the necessity of reducing. However, after a talk in which the dangers of overeating and overweight are pointed out we can sometimes get them to heed our advice. We also bend our efforts constantly to get them by exercise, fresh air, proper clothing, ventilation, etc., to build up a resistance to the omnipresent cold which is so costly to both the employee and employer.

There Is No End to This Preventive Work

However, in speaking of preventive work in general I want to stress the point that is known, but not always appreciated, that there is no end to any of this preventive work. It must be kept up continuously—a veritable bombardment of written and spoken advice must be rained on them at all times to keep constantly in their minds the necessity of such personal hygiene, that is, exercise, proper diet, fresh air, proper clothing and sufficient rest.

Much thought is being given now to the problem of old employees. When should they be pensioned, or if their length of service does not permit this, released? In the first place, in order not to have too great a number of elderly employees on the payroll at one time, it would seem wise, in order not to increase such a needless responsibility, to have an age limit beyond which an applicant for employment will not be accepted. Either this or it should be understood if accepted, that no responsibility would be incurred by the industry thereby. This may seem rather heartless, but there is really no reason why an industry should overburden itself with superannuated employees.

As to the old age pension, a man who has reached 70 years and has had 25 years of continuous employment with the company is eligible for a pension. With women, the age is five years less, that is 65 years. In pensions for partial incapacity, a man must be under 70 and over 65 years of age, or a woman under 65 and over 60 years of age; for total incapacity, a man under 65 years of age and over 55 years of age and a woman under 60 and over 50 years of age. In most instances where a pension

is granted for either a partial or total incapacity, 25 years of service is required. However, this requisite is sometimes waived in special cases.

Senescence, as we know, is a relative thing, as is shown by the fact that some reach physical incapacity for employment at 55 or 60 and even less, and occasionally if the required term of service is completed and there are extenuating circumstances, they are pensioned. With others who started with the company when in their teens, their term of service may be in excess even of that required, yet they are only 50 to 55 years of age. Almost invariably these workers wish to continue work. We have men at these ages who have been with Cheney Brothers for from 40 to 45 years who have no idea of requesting a pension now. We have several men over 70 still at work and one nearly 81 recently died. These men are all eligible for a pension, but prefer to work; and I believe it is an excellent thing for them, for how rapidly we age when taken suddenly from our usual work and left with nothing to do but await our end!

That accidents are more numerous among the old employees our records do not show, for the reason, I believe, that being long accustomed to their jobs they handle it with a precision and care not always found in younger men. Of course, whenever there is physical indication for retirement, and this may amount to an actual hazard in leaving them on the job, we recommend a pension.

The Old Age Problem in Industry

So in handling the question of old age in industry it seems to me the rational method is first, not to accept for employment those beyond a certain age. Pension those who are eligible if they wish it or if it seems they are no longer capable of doing their work, and allow the rest to work as long as they are contented, provided there is no hazard.

From my rather sketchy attempt you may gather that the health problems of the textile industry are in the main much the same as they are in all industries. We are constantly confronted with what for the past 15 years, I am glad to see, has come to be regarded as a necessity of striving to keep workers well and on the job; and the logical means to this end seems to be care, first, in the selecting of applicants for employment, placing the proper individual on the job that best suits him. Next, endeavor to keep him safe from accident while on his job by teaching and preaching safety first methods, rendering him immediate and continuous surgical care if he is injured until he is cured, offering the saner methods of treatment for his minor ills that he may speedily recover and have no complications, and interesting and advising him in seeking a diagnosis of his more serious ills, interesting and advising him in how to avoid the insidious diseases of middle life that spell early old age, incapacity and economic disaster. Thus by repeated periodical physical examinations and much emphasis on personal hygiene, together with reference to a suitable specialist when indicated, he may receive rational treatment and not fall into the hands of quacks and charlatans who abound.

Lastly, when he has arrived at the required term of service, study the individual and not his age, and allow those who are able, contented and willing, to work, and those who are not, to retire. And I can state that with all the various intricacies and detail connected with the daily care of the workmen of a plant whose population is 4,000, if you can do the right thing and all of it for each one who consults you, it is a problem in itself; and I can only conjecture how much more of a problem it must be to the physician in those industries which have, in addition to these problems, actual industrial diseases to guard against. Fortunately for us in the textile industry, there are few of these and rarely serious.

Further Discussion of the Dermatitis Problem

CHAIRMAN VAN EMBURGH: Dr. Knapp has mentioned that they have a number of cases of dermatitis or inflammation among workers handling wet silk and coming in contact with dyes. We have exactly the same problem in the manufacture of cotton thread. We find that many of our workers who handle green or red colors, or black colors in hanking, winding or spooling, will probably, after about two to ten days, begin to have little blisterlike formations appear on the hands. During the summer time it is particularly prevalent, and some of them have thought it was poison ivy, but we get it when there is snow on the ground, in the middle of the winter and at all times. There is only one thing to do for it, and that is to take them off the color and put them on white. That is a trade dermatitis for which the state laws holds us absolutely liable.

Whether or not tuberculosis is a prevalent thing in the textile industry is a question that has been discussed a great deal. I personally take exception to anyone that says the textile industry is chock full of tuberculosis. I don't believe it. I have gone into that problem very carefully in the past three or four years, have studied it and never have found a thing to substantiate it. I think the claim has arisen from the fact that in many of the textile industries the processes are attended by the formation of a good deal of dust and lint flying around in the air.

One has heard a good deal about breathing in dust from metals and materials causing tuberculosis. Where they see dust flying around in those departments, they think that must cause tuberculosis. I had the Board of Health in the city of Newark come down on me two years ago, and demand that we completely change one of our departments because a case of tuberculosis developed where there was dust flying around in the air. I looked through the record, and found that it was the first case of tuberculosis in there in 21 years, and I told them that, but the Board of Health said, "Well, it is dusty in there, and dust causes tuberculosis." Now, I will say that the breathing in of dust or the change of climatic conditions does irritate the mucous membrane. We have a great many cases of chronic catarrh. I find chronic catarrh a great deal more prevalent in those who work under dusty conditions than those who do not work under dusty conditions.

We examine all our employees' vision, because in the textile industry, good vision is necessary in order to turn out a good product. I have been amused when I have found people who were doing work where they had to see at a distance of 15 or eighteen inches, whose vision had been tested only as to a distance of 20 feet. We use the Snellen chart, with large letters at the top, and smaller letters as you go toward the bottom; you stand 20 feet away and you are supposed to be able to read with each eye independent of the other at 20 feet. That is called 20-20 or normal vision. That is good vision for far sight, but that is absolutely no guarantee that you will have good vision at 15 or 18 inches. I have seen many of those folks required to get glasses because they could not read at 20 feet, get glasses to use on a job where they have to see at a distance of 15 to 18 inches. Then the inspectors will go through there and see that they are working without glasses, and will say "Well now, unless you wear your glasses we will have to report you to your foreman, and you won't be able to continue to work here." I think that is manifestly unfair.

Little Difficulty in Getting Men to Wear Goggles

We have not had much difficulty in getting our mechanics to wear goggles. Up to a few years ago, we had a great deal of complaint about it. Many of our machinists and mechanics have to wear eye glasses, and when we compel them to wear a plain lens goggle it tilted the eye glass, bringing it too far up and distorting their vision. We had a lot of trouble in that but in the last two or three years we have fitted these people with super armor plate glass, ground to the same specifications as the ordinary eye glass, but there is the protection of the super armor plate. We find that these people not only use their goggles at work but they even use them to read their papers at night, because it saves them the price of a pair of good eye glasses.

DR. KNAPP: Who makes those super armor plate goggles?

CHAIRMAN VAN EMBURGH: The American Optical Company.

I think in most of the textile industries, we employ a very large percentage of female help. The standard of what to do with a pregnant worker is one that I have been very much concerned with. Those girls and women who are married and are working to help keep the home going, when we find that they are pregnant, how long are we going to let them work? We know that there are increased hazards that come with pregnancy. As the weight increases in the front of the body, the tendency is to throw the shoulders back to counterbalance the weight.

Now, those people immediately become an increased hazard from the stumbling point of view. They are not able to see the floor as well as they did before, they are not able to see the steps, they are much more likely to fall. The difference in their posture leads into increased hazards. Where shall we make those people stop work?

I have been interested in reading a number of articles by the Germans in which they say that a pregnant woman ought not to be permitted to

work after six months' pregnancy. I have also been interested in knowing that they say that women who work in the textile industry are particularly prone to miscarriage, and there are two cases cited in the literature in which it is demonstrated that this is the case. Fortunately, neither of these was cited against the company. I would like to know what Dr. Knapp's attitude is on that question of pregnant women in industry.

MR. GRIFFITH: I would like to raise a point in connection with that last remark. I have quite a lot of things that I want to speak about in connection with this talk.

We have had two miscarriage cases in our plant within the last two years. Of course, in one sense it does not make any difference, it is not considered as a compensation case in any way, or the work is not responsible for it. One case was six months and the other was about four, and they came out all right. I don't know whether it has anything to do with the work or not.

Eight Cases of Tuberculosis in Four Years

I also wanted to comment on the tuberculosis question. In our plant we have had eight cases of tuberculosis in four years. Seven of them were aggravated cases, the case had become arrested and they had been aggravated and they were all card room cases, all the seven. The eighth case was a card room case, and we found it was due to bovine tuberculosis. That case developed in a man who was on the farm, and we brought him in the plant and put him in the card room without proper examination at that time, and he threw it off very slowly. All those eight cases were aggravated cases. They had it for some time previous to the time they came in the carding room, and in every single case they had been employed there less than three months, and we were sure that the case was an aggravated case for that reason. They had it in a mild form when they came into the plant, and I have not, in my experience in the textile industry, found a case that you could lay directly to the conditions in the carding room. These are all aggravated cases.

I wanted to ask Dr. Knapp if he has any figures on the relation of old age to accidents?

DR. KNAPP: We have some, I believe, but I have not them with me.

MR. GRIFFITH: I have found that 76 per cent of our major accidents are to employees who have been employed two months or less. Eighty-six per cent of our accidents are to employees who have been employed two years or less. Practically the entire balance of our accidents, except for one or two per cent, are long-time workers, workers who have been there for years.

Why I wanted to speak about this, we have a system in our plant whereby an employee who has worked there a great number of years is entitled to a pension. We always give our pensioners, after they go on pension, a thorough physical examination. Now, we find two things: first,

that the pensioner will go on examination sooner if they are not in good health. They will die sooner, and it is costing us a great deal more to keep them in condition, medical expenses and so forth, and it is costing the company a great deal of replacement. I thought you would be interested to know that we are considering a plan where, after a person has been employed in the plant for 30 years, we start giving him a physical examination every six months, and at that time we take a complete history of what the case is, all the faults and so forth. We are doing this to extend the period of time that that prospective pensioner will be on the job. I am convinced that after looking through our records and finding out how long each person has been on pension after they have been pensioned, we will be able to extend the working life of the worker probably five years more than they are working at the present time. Instead of going on and pensioning at an average of 35 years' employment, we will have them going on pension after an average employment of 40 years. The result will be, we will be keeping a large group of skilled workers on the job; in addition to that, they will be earning more money all the way through and be in better health; and again, we will extend their life line just that much longer.

I would like to ask Dr. Knapp regarding the compensation being reduced for the first week. Is that allowed in the State of Connecticut?

Compensation After the First Week of Disability

DR. KNAPP: The state law only requires compensation to be begun after the first week of disability.

MR. GRIFFITH: Is that ever paid? In the state of Rhode Island after the insured person has been out four weeks, he is entitled to the first week's compensation.

DR. KNAPP: It is never paid in Connecticut. That, of course, is arbitrary with us. If they belong to our mutual benefit association, we pay them from the time they are hurt, but if they don't belong, we begin it as the state law requires, one week from the time they are injured.

MR. GRIFFITH: Well, then, how would you reduce that?

DR. KNAPP: In the first place, it is a means for getting those people to join their mutual benefit association. That is the first step that it accomplishes; and as I say, the first week's compensation, and the compensation which is paid in addition for each child—they lose both if they do not belong to the benefit association. But we do not pay them that first week unless they belong to the benefit association.

MR. GRIFFITH: The most important fact there is to get them to join the mutual benefit association?

DR. KNAPP: Yes, for their own good.

MR. GRIFFITH: Have you any figures on the relation of accidents to health of the worker that is insured? That is, have you ever made any comparisons there?

DR. KNAPP: We never have, and I don't think your statistics would be very convincing, because it is pretty hard to find any individual who

has not something the matter with him physically. In the rare case when you find an individual with nothing the matter with him, considering all minor ailments, and so on, that would be about one in 100,000, I think, conservatively.

MR. GRIFFITH: I just spoke about that, because I have noted cases where accidents have resulted from indigestion, slight dizziness and things of that kind, and I was wondering whether there were any figures on that.

DR. KNAPP: In regard to that, I can say this: I have had two cases that have been working on machinery, and we suddenly discovered that they were epileptics, and we took them off that work and put them on work that was not near machinery at all—much to their disgust, because they said that it was all right, and there was no danger. One man, however, fell one morning in a position near his machine. We had no idea that they were epileptics. One was a man, and one was a woman worker.

Personal Hygiene Influences People's Accidents

MR. GRIFFITH: What relation do you find between personal sanitation and plant sanitation and accidents? Do you find that as your sanitation increases, your accidents decrease?

DR. KNAPP: I have no figures directly bearing on that point. Personal hygiene has a great deal to do with some of these people's accidents. For instance, they come into the mill after they have stayed up half of the night, have danced until midnight and they feel tired and fatigued, not fresh, and they are more liable to have accidents and be careless while they are in that condition.

MR. GRIFFITH: I have had a little experience in watching our first aid room cases. We find not a great many major cases occurring on Monday, but we get a larger number of minor cases on Mondays, especially. We also find that after vacations, if we can get by the Monday and Tuesday after a week's vacation, we are doing mighty well without some serious major accident. I was wondering whether you, perhaps, had had that same experience?

DR. KNAPP: Well, Monday is always our biggest day. I don't think so much from accidents that have occurred within the shop, as from accidents that occur over the week-end, from playing football and things of that sort.

MR. GRIFFITH: Of course, we do not count those in, but we do find that a large number of minor injuries occur in the plant on Mondays.

DR. KNAPP: I think that is natural, because people have got their hands out. You know yourself, if you stop doing a certain thing for two weeks and take it up, you have forgotten some motion, you have forgotten something that you did mechanically when you were doing it right along.

MR. GRIFFITH: Commenting on the eye cases, plants which have routine eye examinations when the employee enters the plant perhaps would not

have as interesting figures as I have. We have examined our examiners all through the plant. We have quite a large number of examiners examining our thread in the different processes. As soon as it leaves the carding and spinning we have examination, and after it leaves the twisting, we have examinations. The result of examining all of those examiners showed that 23 per cent of them had eyes unfit for examination work. I had predicted that we would have a percentage a little lower than this, and I don't know whether I was believed or not. I did it just on a chance, from the experiences of other plants, and I found that we had 23 per cent with poor eyesight.

MR. COOK: I would like to ask Dr. Knapp the size of the personnel who handle his work?

DR. KNAPP: Fifteen in the medical department. We have three doctors, three nurses, two dental hygienes and two laboratory technicians. There are three clerks, a physiotherapy technician, and one x-ray technician—15 in all. It has grown gradually since 1915.

MR. COOK: And that is for how many employees?

DR. KNAPP: It is about 4,000 now. We have been up as high as, I think, 4,800. Of course, there is a store in New York, and we have a force there of about 350, but they are looked after by another physician.

Examination and Rejection of New Employees

CHAIRMAN VAN EMBURGH: In regard to the examination and rejection of new employees, we are taking five and six per cent. We have been able to place a few more than that in our industry, and our rejections are from two or three per cent. That is, two to three per cent are rejected because we feel absolutely that we can not put them out with safety to themselves or to the company.

I think there is a great deal more opposition to physical examination than one might imagine from the expression of opinions at a gathering of this sort. I have been on a committee to promote periodical health examinations among the doctors, and a great many of the medical men themselves do not believe in it.

There is no uniformity of feeling in favor of examination of new employees or periodical examination of old employees. I think it is a thing that we are going to come to, and I think the thing that is going to drive us to it the surest, is the fact that many of the industrial diseases are being made compensable—lead poisoning, mercury poisoning, benzol poisoning—there are seven industrial diseases in the state of New Jersey that are compensable. Now, most of those diseases do not develop rapidly as the trade dermatitis of the hand, due to dye, but they are diseases of long accumulation in which the person usually is exposed to the hazard for months or perhaps years before definite symptoms of the disease develops. Many of these people will wander from one plant to another. Perhaps three or four months after he comes to work for my concern, he develops a typical lead condition. We are going to be entirely responsible for that man's condition as it exists at

the time of the disability beginning. How much part we have played in the causation of his disease we are unable to say, but I should say very little; that most of this was coming from the place where he had been previously employed, and then accumulating the poison for a number of years. However, we are going to pay fully for it.

Now, there are a number of things that will show whether or not that man has intoxication with lead or with mercury, and those are signs that a doctor is going to be able to pick up.

When these diseases that are developed in industry, are made compensable, industry is going to find it necessary to protect itself by a lot more careful physical examination of employees at the time of their entrance into employment.

Rejections Are Influenced by Compensation Board Decisions

DR. KNAPP: While what Dr. Van Emburgh has said is so fresh in your minds, I want to say that one reason why our number of rejections has gone up is the peculiar decisions that are rendered by the Compensation Board, particularly in our state, but I guess in all states. You must remember that employees nowadays have been compensated for diabetes and tuberculosis and chronic nephritis that they have had independent of the work they have done. Nevertheless, it has been decided that they are compensation cases.

That is why our rate of rejections has gone up from four to six per cent.

As an illustration of some of the decisions that are rendered now, a man was compensated for who was killed on his way to his home from work. He did not take the regular railroad crossing to go to his home, but he took a short cut and a train ran him down and killed him. The Compensation Board declared that this man was striving to help his employer by taking that short cut home, in that he was getting home quicker so that he could get back quicker and be less tired.

Answering Dr. Van Emburgh's question about pregnancy, in the first place we make it a point when females are employed, to ask all married women if they are pregnant. As far as I know, we have never had a case of an abortion in the plant that is traceable directly to their work. I do not say that such cases have not happened, but they have not been traced to that. We urge them to stop work when they are six months pregnant, and we insist on their stopping work six weeks prior to the expected delivery of the child. As far as I know, that works out pretty well.

As regards the tuberculosis question, I will say that our cases of tuberculosis, strange as it may seem, have not occurred in the dusty occupations or in the damp occupations. One point that stands out in a survey of our mill is the fact that the highest percentage of health is reached in our dye house, which is probably the wettest and dampest and steamiest room in the whole mill. There are two factors that enter into that, however, and one is the fact that they are

all male employees there, and a pretty rugged type of individual is required for this work. It is handling wet yarn; yet there is no tuberculosis there that I know of.

Most of the tuberculosis cases we have had were in the weaving rooms. That is, in either the weaving of the broad goods or the silk, or the velvet weaving. It is not a dusty occupation, it is not a damp occupation, certainly; and yet, in the dressing rooms, where there is more dust, where there is this organic dust of the cocoons when they are opened, and gum and so forth, we don't have a great deal of tuberculosis there. But, as Dr. Van Emburgh said, I fail to see that the claim that textiles are chock full of tuberculosis can be substantiated. We have all the tuberculosis we want, but we do not have all that you might expect.

As regards the eye examination, I neglected to say that it is just as important that they be required for near vision as for far vision. When an applicant comes for employment, his vision is examined at 14 and 18 inches, and also at 20 feet, and he is not accepted unless he passes both satisfactorily.

In regard to objecting to examinations, Dr. Van Emburgh is exactly right. I know of a doctor himself who objected to examination. This doctor was going to be employed. It was by a rolling mill out in Ohio, and he objected to a physical examination; but the doctor went ahead and gave it to him, it was found that he was deaf. The point that is brought out by some physicians—that the periodic examination is not the thing to do, that it cuts down their practice—that is absolutely false, because as the Health Institute has shown, if you examine a worker frequently, he is going to go to his doctor for small ills, for things that he would not otherwise go to him for.

CHAIRMAN: The next speaker on our program this morning is Mr. J. M. Sandel, Director, Bureau of Safety Standards, Pennsylvania Department of Labor and Industry, Harrisburg, Pennsylvania.

PREVENTING ACCIDENTS FROM FLYING SHUTTLES

J. M. Sandel, Director, Bureau of Industrial Standards, Pennsylvania Department of Labor and Industry, Harrisburg, Pa.

An accident hazard in one of our oldest basic industries—a hazard that has been with the industry ever since power was used—has been successfully overcome. Most of the clothing we wear has been woven and wherever weaving is done a flying shuttle is employed. Everybody who has been in a textile mill realizes that the shuttles do fly from the looms, but the problem of guarding them had not received as much attention as other safety problems have.

It has been customary to erect a "target" or barrier opposite the end of the reed cap of the looms so that, should a shuttle fly, it would strike the target. Such a guard had been installed on many looms and the scars on this barrier tell of its effectiveness. Sometimes, however,

the shuttle will miss this barrier and strike a weaver of another machine. The effectiveness of such a guard was questionable because shuttles fly from the looms for a variety of causes, and the barrier has been improved by experiments and constant study until we now have a number of different types, with essentially the same features, for all kinds of looms except carpet looms.

Probably the first question that should be answered in connection with this subject, is whether or not it is necessary to provide guards for shuttles. The accident records over a period of time will conclusively show this necessity. A summary of 64 accidents due to flying shuttles which occurred in the state of Pennsylvania during the year 1924 shows the following:

Part of Body Injured	Number of Accidents
Head	2
Face or Cheek	8
Temple	3
Nose	5
Mouth or Jaw	3
Eye, or near the Eye	5
Neck	1
Ear	2
Hand or Fingers	15
Arm, Elbow or Shoulder	10
Chest	1
Sides or Back of Body	5
Foot or Ankle	4

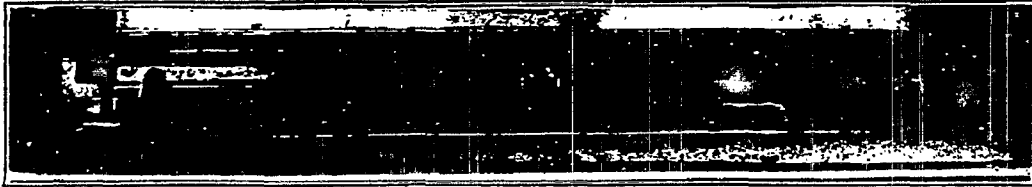
These are not all of the accidents that occurred in Pennsylvania from this cause during the year and the other accidents did not cause the amount of lost time that those given above resulted in. It is easily conceivable that there were many other times when the shuttles flew from the looms and did not injure a person.

The accident records caused the Department of Labor and Industry to require that shuttle guards be applied on all looms. At the time of that decision, there were very few commercial guards available and the textile industry of Pennsylvania felt that they could do better than the commercial guard manufacturer and offered to get busy with experimental work to develop guards.

The results obtained by the industry are far and away ahead of what a commercial manufacturer would be able to secure and the work of installing the guards has widely progressed in looms all over the state, with the exception of carpet looms which are a special problem.

There is very little difference between the guards developed for silk, cotton, wool, and tapestry looms where one shuttle operates. The principal thought is that the guard is attached to the reed cap and extends the entire length of the reed cap over the shuttle and should the shuttle

fly upward and outward, the guard is designed to trap it and throw it into the box at the end of the loom. Shuttle guards for the plush looms are a slightly different problem since two shuttles are used and the spread between the different parts of the weave is much greater, but this has been successfully overcome.



Slide No. 1

The experimental work in developing the guards brought out all of the problems that would be encountered in any safety work. Production must be secured with the least amount of interference. There is no question but that the guard was a handicap to the weaver as he had been accustomed to working without one, but with a little practice the guard could be used. Material selected should be strong and sub-



Slide No. 2

stantial enough to stand a blow from a shuttle without parts breaking which will fall into the weave. It must be securely attached to the reed cap and not be dislodged in time by the vibration of the machine. Lastly it must enable the weaver to work at his weave when the loom is stopped.

The hardest problem was to secure the cooperation of the weavers. Many of them who were approached were aware that shuttles will fly, but even so it was a long time before they gave their cooperation heartily. Most weavers are paid on a piece work basis and they had their minds on their earnings when the problem was presented to them.

The guards have been installed in Pennsylvania long enough, by this time, so that we know what particular designs and features have

been found to be reliable; for example, attaching brackets and parts to the reed cap with screws is not satisfactory; through bolts must be used. Castings must be made of malleable iron instead of grey iron and rods over the weave which trap the shuttle must be steel rods at least one-quarter inch in diameter and riveted or welded to

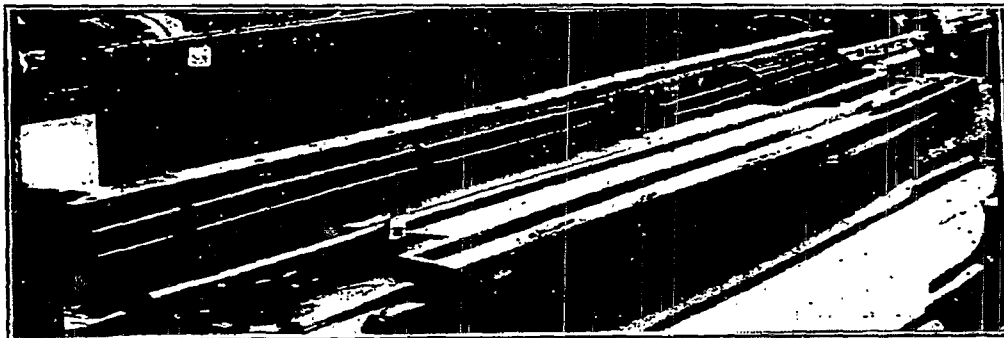


Slide No. 3

the brackets. The space between the rods and the reed cap and the rods themselves should be less than the thickness of the shuttle used.

Slide No. 1

This is an improvement of the first design of shuttle guard that was approved by the Department of Labor and Industry. The rods can be moved back until they are flat against the reed cap when the loom is



Slide No. 4

stopped and weaver is working at the weave. The first forward motion of the reed cap brings the rods in position where they will protect should a shuttle fly.

Slide No. 2

This guard consists of steel rods bent to the shape that will give the protection and attached to the reed cap with through bolts. The rods do not meet in the center owing to the location of the filling fork of the loom.

Slide No. 3

This is also a stationary guard attached to the reed cap with malleable iron brackets. It consists of two rods and the rods are welded to the

brackets. The ends of the rods are turned down to deflect the shuttle to the box.

Slide No. 4

This is another guard approved by the department which enables the rods to be moved out of the way when working at the weave. Even in the other movable types, the first forward motion of the reed cap brings the rods in the protecting position.

CHAIRMAN VAN EMBURGH: Mr. Sandel's talk and illustrations of a way of preventing these projectile shuttles from getting out and injuring our employees is very well worth while. Up until this morning, I did not realize that there had been a guard perfected that would work as well as Mr. Sandel has indicated. Of course, we are going to have opposition on the part of many of our old employees to a guard of any type. Each of them sees an accident of that sort so seldom that he feels they are very unusual, but when you take the sum total of the experience of the industry or a set of industries in a state, we find it very considerable, as Mr. Sandel has indicated.

DR. KNAPP: I would like to ask two or three questions. In the first place, if the better guard he has pointed out is fool-proof, if it prevents virtually every shuttle from flying out? Also if he knows of any fatalities that have resulted from these flying shuttles? And if you don't think that the speeding up of production has increased the number of flying shuttles—that is, the speeding up of the looms for increased bonuses has not increased the number of flying shuttles? The faster a shuttle goes, the more apt it is to fly out.

Increasing the Speed Increases the Danger

MR. SANDEL: With the increase of speed there is, of course, an increased opportunity for flying out. Your warp does not lay so well on the race, and that is the place where we feel that the shuttle is deflected more than any other. We found one or two instances where the part of the loom that travels forward was not just right, and that the shuttle would fly out of the race, because both sides were not just uniform. But as to their being fool-proof, we can not say that what we have is perfect, but we feel that we are approaching something that is close to being perfect, and that we are past the experimental stage, and at a point where we really have something.

DR. KNAPP: Do you know of any fatalities from flying shuttles?

MR. SANDEL: None.

DR. KNAPP: I can easily conceive of a flying shuttle striking a man in the eye and giving him meningitis, and causing his death.

MR. WASHBURN: This is a subject that is somewhat of interest to me, from the fact that during the past few months we have been having a number of accidents in our plant, or rather in one of our three plants, due to the flying shuttle hazard. In investigating those accidents and coming in contact with those looms more than I had in the past, I got into position where I was almost tempted to keep away from the loom,

because they graphically demonstrated to me with what force one of those shuttles came out of the loom, and in this particular case they fixed the loom so that the shuttle would come out in spite of the guard which was on it at that time. Because of the fact that our work is on heavy material entirely, in fact, coarse weaving, that shuttle came out of the loom and was shot, catapulted, you might say, for a distance of fully 30 feet.

We have had a number of minor accidents due to glancing blows of those shuttles but I do know of cases in a radius of 50 miles from our plant where more serious accidents have occurred. In fact, in the next city to us only a month or six weeks ago, a smaller shuttle came out, struck a girl under the eye with such force that it forced the eye out of its socket, and it was necessary to remove the eye entirely.

Other Experience With the Flying Shuttle

These accidents caused me to make a special effort to see if I could not find out what improvements had been made in the present type of shuttle guard, and I got in correspondence with a number of different people relative to the matter. But I did not seem to find any marked improvement on the present type of guard. So we went to work on the matter in our own plant. The guards that we had on did not differ very much from what have been shown on the screen today, except possibly that they were not made of heavy enough material. But we have now improved the guard, in fact, made a new guard entirely, more substantial, bringing it closer down towards the warp, and have tested it out under all circumstances, so that we have practically come to the conclusion that it is fool-proof. The shuttle can not come out of the loom; they have tried it in every way, shape and condition; and we feel so confident about it now, that we are going to install it on every one of our looms.

It does not differ very much from any of these guards already shown on the screen, except that it has been extended somewhat, made more substantial, attached by bolts such as Mr. Sandel shows inside of the guards, and has been brought down nearer to the warp.

The weavers are very eager that they be put on the looms.

I would like to ask Mr. Sandel how low those guards came in the reed cap, how close to the warp, the lower end?

MR. SANDEL: That, of course, depends upon the size of shuttle you are using and the distance of the motion of your reed. We have to have the guards so placed that when the reed is in its farthest forward position, the bottom rod will be lower than the thickness of the shuttle, and if we pitch them forward on a slant from the reed cap, we feel that any tendency of the shuttle to leave the race as it goes across will be caught by the fact that the lowest rod is in that position.

MR. WASHBURN: Well, will there be no tendency to depress the warp and the shuttle, to get it underneath that guard if it was not down pretty close?

MR. SANDEL: I do not feel that we have encountered that at all. If there should be, the force of the shuttle would be somewhat arrested.

MR. WASHBURN: The shuttle does not always come out of the end of the guard.

MR. SANDEL: Oh, no, far from it. That is one reason why we found that they go all the way across the reed cap, but the general tendency is if the shuttle leaves the race anywhere along the travel, that it will strike the guard and be deflected downward, possibly in the end of the box, possibly under the loom. At any rate, the force is greatly decreased when it strikes anything, so that if anything should occur, it will be minor compared to what might happen.

MR. WASHBURN: How does this thing come down again? Does the weaver have to pull it down before she starts up her loom, or does it automatically drop? Is it heavy enough to drop?

MR. SANDEL: Yes, on any of the guards that are removable. It drops automatically. With those, the question of supervision comes in, to prevent the employee from tying on.

MR. WASHBURN: On that guard with the hinge, you say the first forward motion brings that down?

MR. SANDEL: Brings it down, and it locks there.

Many Accidents Due to Fault of Operation

MR. WASHBURN: Is there any possibility of the shuttle going far enough through or across to come out before that thing comes down?

MR. SANDEL: Well, there is. There is a possibility that the shuttle would fly out and meet the movable part of the guard on its way down.

MR. WASHBURN: That, possibly will answer the former question.

MR. SANDEL: Yes, that plus the fact that it requires supervision is one reason why the department does not favor that type of guard; but we have a number of them, nevertheless, where they have been installed in certain plants, and checked in those plants under supervision.

MR. WASHBURN: As I said before, we were having a great number of accidents in one of our plants, and after investigation we made special efforts to get in close touch with the weavers as to how they were doing the work; and we found that possibly half of all the accidents were due not so much to the fault of the machine, as to the fault of the operation.

MR. SANDEL: What you saw on the screen has been practically all silk looms. The silk mills have been foremost in this work in the state of Pennsylvania. The tapestry, cotton, upholstery, and velour have been a little slower, and we feel that the silk looms are now protected. There are only five cotton mills in the state, and we have been working with a corporation which manufactures cotton looms, and they have developed one guard that I spoke of and described; but the other industries are coming on a little slower. The department has not been pushing this, but we find that the industry has responded in a fine way, and we have been cooperating with the industry.

CHAIRMAN VAN EMBURGH: We will get along to the last paper of the morning by Mr. Ignatius MacNulty, of the American Woolen Company, Andover, Massachusetts.

MINIMUM REQUIREMENTS FOR SAFETY IN WOOLEN MILLS

Ignatius MacNulty, American Woolen Company, Andover, Mass.

In coming before you this morning, I am going to speak a few words first and then give you my slides afterward, describing the nature of the accidents and the way that we have of handling them in our mills.

Yesterday we had a discussion on the key man in the industry, and a little difference of opinion was expressed. I will touch a little on that question, and I want you to feel that while one group holds the view that an overseer is the key man in industry, and that is correct, there are other key men in industry, and those who believe that the overseer is the key man should not forget the other keys.

When Cohan wrote his play, he called it "Seven Keys to Bald Pate." If you only had one key, you could not unlock it, but if you had seven keys you could; each key fitted into one part of that key hole.

I notice that the fellows that wrote the Bible long ago mention that there were keys to the Kingdom of Heaven—not a key, but keys.

Now, you see, there is wisdom in a number of keys.

With that support behind my remarks, I want you to feel frankly that it does not minimize the key man, called the overseer. There is one key man that has been entirely eliminated or obscured in the problem of accidents, and he is also a fundamental key, and that is the state. None of you referred to the state. The old writer in the Book of Proverbs says, "Where no counsel is people fail, but where there is a multitude of counsel, there is safety." Now, the old gentleman that wrote that book certainly was a safety engineer.

Consequently, like Cohan, you might have other counselors, and say the gentleman who wrote that down had a very human touch in his knowledge. Therefore, you must not feel aggrieved when someone says that one particular group is not necessary.

Now, the state is that multitude of counselors. The state first lays down the foundation as to what regulation there will be governing life and limb in industry. If the state did not make those reservations, it would be very difficult to convert us to establishing those regulations, and to prove this, there is generally opposition when the state proposes new regulations—not always vindictive opposition, but opposition. Our state is a key man in industry. He represents public opinion, he represents the enforcement of law, he represents the well-being of the community; therefore, the state is the first key in the group of counselors in the industry; and don't forget that in advocating your various keys. File one of them down to fit in with the state law.

Now, there is another key in industry very essential, and that is the employer. If the employer is not interested in safety, the overseer can not be interested in safety. You left him out. The employer must be a safety man. He is in that group of counselors, a good employer, and the average employer today is a good employer. You have only to look back on the efforts that have been made in welfare lines since the war. You have had evidence here this morning from the point of view of the medical men, the efforts that have been made for the health and well-being of the employees.

The employers in those cases were certainly key men. They were men that were very much interested in safety in industry, in health in industry; so he ought to get emphasis placed on him.

If he is a good employer, he will first find out from the State Board of Accidents, Board of Labor and Industry, or whatever you may call it in your respective states, he will get in touch with them and have the inspector come and talk over the new regulations with him, so that he can apply them to his industry.

Every Executive a Keyman in Safety Organization

Then, after the employer, comes our friend the overseer that we love so much; but I want my overseer friends to feel that I was friendly to them, and defending and not criticizing them yesterday. It is not fair that the overseer should be asked to accept the entire responsibility as a key man. That he has his place in the key hole is true, but he is one of the other keys. Now, the overseer has quite an important function to perform. I think he is about the most important of the group, because largely—forgetting the difference in operation in foremen, and just accepting it on the pure principle of a foreman—he is the contact man, he is the man who usually comes in contact with the help, and knows them, and his attitude is known very clearly to his help.

And then you have the other key man, the fellow away down, the fellow on which you are all built up—the employee. There he is; he is the foundation stone in industry, he is the energy, he applies his human body to that machine, and sets it in motion. Before he steps in in the morning, your engine does not move. He gets right in the power house, workman No. 1, and touches something, and instantly powerful machines are set into motion. Surely he is a key man.

Now, here is your group: you have the state, you have the employer, you have the foreman, you have the workman, each contributing to the efficiency and safety in appliances. If you do not have those four counselors, linked up, you certainly do not have safety. If you do not regard the law, and you have litigation arise out of your accidents, then you are not paying attention to the state. If the foreman doesn't work in his employer's interest regarding safety, he is not a good foreman, and if the workman does not pay any attention to his foreman, he is not a good workman.

I thought I would bring these things before you this morning, to show

you just what I meant yesterday by the key man; and I know I have your friendship in that when you know that I am not criticizing anyone adversely.

Now, let us go back to the workman and see his attitude. I read in the papers that some great personage comes to the country and wears a peculiar hat, and the result is a great many people follow the shape of that hat. A peculiar color appears in a garment, and that color becomes the mode of the moment. A royal prince changed the line in his pants from the side to the front, as they have it in America, and immediately all the people in that country had their pants pressed the reverse way.

Now, why is that? Example; example; example. They were following the example of leadership, however funny it might be. It is a wonderful strength to follow the leadership of somebody who sits on high. We don't worry whether the high person is royal or not, so long as there is a highness in our human relationships; we accept that and follow it.

If the example that we follow, most of us, in our daily life, covers the colors and shape of our dress, the soles of our shoes and the color of hats, if we follow that in our ordinary social relationships, we shall surely follow something inside of the factory. Why? There are the same folks; the people in the factory are not different from the people in the highest places, they are the same people under a different set of conditions; and the same mentality, the same spiritual outlook is working in the factory that is working outside the factory.

Employees Are Keenly Susceptible to Executive Influence

If a man will change the shape of his shoes in 1926 from the shape we had in 1925, that same man working in a factory will follow the attitude, the shape, the desire, the atmosphere created by his foreman, by his employer and by the state. Of course, he will. And so, why should we not set up an example?

The average American boy and girl in the average city is the product of either the high school or the grammar school. Perhaps one-third of them will be high school graduates, and some will be grammar school graduates. They are reading today a morning paper and an evening paper, and the American newspaper today is more than a newspaper. It is a living magazine of impulses, describing human emotions and human activities. It is more than news. No paper is worthy of the name today unless it has a magazine section, a medical section, a section on psychology, and many others.

Your employees are reading those articles; they are developing their mental activities. You come into a mill and address a safety meeting at 11:00 o'clock today and you go back in the afternoon without responding yourself to the speech delivered in the forenoon—do you think you can do that without their knowing it? Why, of course; you have to sell them. They must buy it from your attitude. They know whether you are really interested, or whether you are talking to kill time. They

see these men intensely interested in the fabric. The overseer must be, or he would not be there. He must see that that fabric comes out as perfect as it is possible to do it. He must not make any errors, or very few, or he will be no longer in charge there. He must see that the physical conditions are as specified by law; that is his job.

Now, if that foreman puts the same intelligent effort that he puts into manufacture of the fabric, into the safety work—it is not alone the weaver, nor the spinner, nor the foreman's work, nor the workman's work, nor the bosses' responsibility; it is harmonizing and harmonizing by a complete effort right through the department for safety. Whatever the man does, he knows that unless he does that correctly he will not be employed there. If he has the same feeling regarding the relationship of safety, uses the same care and the same effort towards safety in that department that is put into the other thing, he will respond to the safety influence, and he will become a safety man.

One little word to my insurance friends. The insurance man's contention is that the accidents could have been prevented, should not have taken place; but that accident may happen in the street and the man is not arrested. A policeman does not always carry out his duties as he ought to. He does not do it to be vindictive. We have not lost confidence in our police department because very often an individual policeman will be guilty of a wrong act. We do not condemn the entire police department, neither do we very often discharge the man. He is reprimanded.

Both Doctors and Ordinary Workmen Make Mistakes

The doctors make mistakes. They are covered up once in a while, but they make mistakes just the same as anyone else, you see. But we do not disallow doctors in society, we do not disallow them in our social life. We realize they are human, and they are bound to make errors of judgment, and they change their point of view; and it is hard to get some doctors to move, it is hard to convince some doctors on a thing that is of keen business interest to them.

If that is so of the departments of Public Service and Medical Service, who are intellectual groups, why do you find fault with the workman not responding to his treatment? Can you find a criticism? Can you take a group of men and women—a group of medical men from anywhere—and put a standard up and find that those men and women will measure up to it? Of course, they won't.

I went to a show the other night, and I had to listen very attentively to the discussion behind me. "Is that right?" one lady said to the other; "are they real college men?" There was the instinct that did not realize the whole thing was make-believe. It was an exaggerated thing to her. Those two people working in a factory or mill or warehouse would be using the same intelligence. One would not notice a sign that you might stick up on the wall, and the other one would notice it. You put up a sign, "Wet Paint," and just sit there all day and count the Browns and Robinsons that will test it and touch it and see if it is wet.

That is the same mind, isn't it? Of course it is. Yet you find fault with him and say, "I don't believe you should have that accident." You have to recognize that you have a group of people of different mentality, different spiritual and different physical strength, and that the weak man and the weak woman in industry must be figured in as part of the job, as part of the whole life around us, and must not be found fault with. I emphasize that—fault must not be found with them; they must be recognized as an essential part, as fundamental as the man who is perfect.

Now, I am going to give you a few accidents that we have had here.

I have here 50 cases of mechanical accidents. I reduced the 50 to 27 specific cases; and out of the 27, 17 were females in mechanical accidents and 10 were males. Twelve of those accidents that were mechanical were due to cleaning machinery in motion. Twelve were females, and three were men.

Are Women More Prone to Accidents in Machinery?

Now, why is it that a woman is more prone to be injured in a mechanical accident than a man? You see, woman is particularly prone to take a susceptible attitude towards the machine, notwithstanding the fact that psychologists and some medical men say that woman is psychologically superior to men. They say that they are spiritually superior to us. Now, I merely mention that to show you that with this background she is more prone to touch the moving thing. Now, why is it? Why is it that a woman, more than a man, is fascinated with a thing that is in motion? But she is not; on the law of average, it does not show so. You take a little child and put a toy on the floor, you buy a toy that has motion—if you have the money at all, you will buy a superior toy—so that your little boy or girl will be attracted by the motion. You train the child to respond to something that moves. That child grows up physically, and it may not grow mentally as big and strong as it does physically, and you push it against something that is moving, and the inherited desire to feel and chase after a moving thing is manifest. You say, "That man should not have done it," but he does it, and he will continue to do it. We are guided mentally and physically to some extent by things we had when we were young. It is a fundamental thing in industry, and you can not change the facts.

Now, we could study and harness that thing and bend it to service, and not even fool with it; it is the finding fault with the thing that is a fact to which I raise my objection this morning. It is finding fault today. We don't find fault with the sun. The sun comes out in the middle of July and is intensely hot. What is the use of finding fault with it? I prepare myself for the sun. My house is so built that I can prepare myself for the hot days. I have windows open and screens put in. The same thing will apply to winter. Now, apply the same reasoning to your industry. Don't fight it; don't get angry at it. Adapt yourself, and find out the fundamental causes, and try to remove some of them.

So, the man who is careless—I don't know of one single case of a man deliberately going and getting himself injured. He reduces his earning power. All the arguments are against the man that is perfectly sane deliberately getting himself injured. Sometimes it may look otherwise, but it is not so. If we understand and sympathize with the weaknesses of the man, he will learn that he ought not to be careless and become a propagandist for you. But he knows that Jones has been sent down, he knows there is litigation about Jones' case, knows there are arguments that have made Jones very discontented. That has a reaction on those fellows. They talk to each other more than they talk to you and me. They have a peculiar viewpoint in the work room, a viewpoint on that room and the men in that room. That same group of men would not have the same point of view outside. Why? Because their environment outside is entirely different.

Now, all those things go to make up what we call accidents.

In looking over these instances we find out that age has nothing to do with it. Sex has a little. According to my list here we have them from 15 years of age to 45 years of age. We have them from four months' employment to eight years' employment, doing the same things, repeating the same things. It is not a particular thing peculiar to any one group of ages or any particular sex, or any particular length of service. How many overseers have you known that have been injured after they became overseers? I know quite a few men who have been overseers for 15 years. I know of a case where an overseer was killed doing a thing that nobody can convince himself the man was doing. He fell into a carding machine when the cards were being cut up, and he was killed.

There Are Fewer Mechanical Accidents Every Year

I merely mention that to show you that serious accidents are not confined to youth, to any particular sex, or to any particular class.

In our mechanical accidents we had 23 cases of those, and we reversed the figures: 17 of them were males and six were females.

It is a funny thing that this non-mechanical accident is the thing you have to face. The employer has reasonably solved the problem of accidents by following state laws, and improving machines as his business called for and as knowledge and humanity demanded.

The average employer has reasonably solved the problem of mechanical accidents. There are less of them every year; but we are not lessening a great deal the non-mechanical accidents. You will realize that yourself where you have a very close check on lost time, and induce people to come in and properly oversee the work. This is not a criticism; it is merely to bear out that those accidents are taking place. The accidents are there, constantly happening day in and day out—and why? For these reasons I am telling you, that we are trying to ask from a group of people something that we do not ask from the community that live around us, and of which we are a part, ourselves.

Why is it that we have more accidents at home, and there is not a word about it? More people are killed at home in a year than we kill in industry, and there is not a word about it. More people are killed on the highways of the United States by the common people themselves than the manufacturers of the United States kill in a year. I mean the man who drives an automobile is killing more people today—more of the common people. He is responsible for more violent deaths than the total industry of the country. If your industries killed anything like the number of people that are killed in a year by automobiles, there would be Federal investigation, your business would be tied up.

The Accident Follows Upon a Series of Mistakes

Not that I am advocating that they should go to jail, but the judge takes a commonsense view of it. He knows that the man did not vindictively injure or kill a pedestrian; he knows that there was a series of mistakes that entered into it. All those things are taken into consideration, and men use their intelligence. Now, if we used that in industry, we would come pretty near solving the problem of our accidents. We would certainly not be telling men to become discontented. The great thing in industry is to get men to feel that they must be contented with the effort made by the employer, by the state, by the foreman, by the insurance man—because he must be included in industry. He is part of our industry, he accepts risks that somebody else does not want to accept, so he is an essential part today of our life.

Now, if this group gets together and lets it be understood that an honest effort is being made to prevent accidents, and that there is no vindictiveness or anger or disgruntled feeling involved, we will come nearer to solving the safety problem, and we will lessen the attacks of the unthinking groups that want to put out of business legitimate business, and perhaps we will understand each other a little better.

I am trying to place before you not a mechanical thing, not a thing applying to the boss, applying to the overseer or applying to the workman, but the thing that applies to us all—that we are all key men, that we have all a little tongue of the key to fit the key hole in the lock, and to make it operate correctly. When we do that, we will come nearer to having an understanding of the employer with the workman and the foreman with the workman, and we will have a better spiritual outlook. If you do not get it from yourself and those around you, the unfortunate clergymen can not give it to you; you must get it in your human relationships with each other. You must have the feeling that that is part of the spiritual life also, that the industrial question is a responsibility; and maybe that explains the reason why so many people are dispensing with going to the Sunday services. People are not going because they are not getting the spiritual contact from their human relationships, industrial relationships, that they should get.

So, as the old writer in the book of Proverbs said, "There is wisdom in a multitude of counselors, there is safety."

(Mr. McNulty then showed a number of slides illustrating common hazards in industrial plants.)

CHAIRMAN VAN EMBURGH: Mr. McNulty has been very kind indeed. I think perhaps he has used a little bit of the psychology we spoke about yesterday morning. We think it has been very interesting.

Just one more thing before we go: The chairman of the Nominating Committee has handed me a slip with the suggestion that the chairman of the Textile Section for the following year be Mr. Glenn Cook; that the vice-chairman for the coming year be Mr. Sherman of the United States Finishing Company; and that the secretary be Mr. H. C. Washburn.

If there is no other suggestion, I would like to ask the present secretary of the Textile Section to cast a unanimous vote for Mr. Glenn Cook as chairman, Mr. Sherman as vice-chairman, and Mr. Washburn as secretary for the coming year.

I also would like to say that the request has been made, and we are going to try to act on it during the coming year, to keep all past chairmen of the Section on an ex-officio executive committee. That will give us the benefit of their experience, and perhaps will prevent our repeating a number of things that have been done before. We are trying this year to bring back into the ex-officio executive committee as many of the past chairmen of the Section as possible, and we will continue to do that.

I think the Section meetings this year have been better than any I have attended during the last three years, and I think we have had a great deal of good from them.

ADJOURNMENT

Woodworking Section

New Officers of the Section

CHAIRMAN: E. ROSS FARRA
U. S. Gypsum Co., New Brighton, Staten Island, N. Y.
VICE-CHAIRMAN (MANUFACTURING): JOHN B. GRIER
American Car & Foundry Co., Wilmington, Del.
VICE-CHAIRMAN (LOGGING): W. L. WALLACE
Edward Hines Yellow Pine Co., Lumberton, Miss.
VICE-CHAIRMAN (SAWMILL): J. I. THOMPSON
J. J. Newman Lumber Co., Hattiesburg, Miss.
SECRETARY: A. O. JACKSON
Aetna Life Insurance Co., New York City.

Committees

PUBLICITY AND NEWS-LETTER EDITOR: A. O. JACKSON, Chairman
Aetna Life Ins. Co., New York City.
PROGRAM: G. A. ORTH, Chairman
American Car & Foundry Co., New York City.
POSTER: H. D. HERRON, Chairman
International Harvester Co., Chicago, Ill.
ENGINEERING REPRESENTATIVE: G. A. ORTH
American Car & Foundry Co., New York City.
EXECUTIVE COMMITTEE (The Officers and)
G. E. SANFORD
General Electric Co., Schenectady, N. Y.
H. G. WIBERG
Lumber Mutual Casualty Insurance Co., New York City.
W. S. PAINE
Aetna Life Insurance Co., Hartford, Conn.
HARRY GUILBERT
The Pullman Company, Pullman, Chicago, Ill.

October 26, 1926

HERBERT G. WIBERG, Chairman
Chief Engineer, Lumber Mutual Casualty Insurance Co.,
New York City

THE meeting of the Woodworking Section of the National Safety Council convened at 9:15 o'clock in the Sun Room of the Tuller Hotel, Detroit, Michigan, Mr. Herbert G. Wiberg, Chief Engineer, Lumber Mutual Casualty Insurance Company, presiding.

CHAIRMAN WIBERG: The first thing I want to announce is the Nominating Committee to select officers for the Section for next year. I will appoint Mr. G. E. Sanford and Mr. J. W. Smith.

G. E. SANFORD: There is a little uncertainty in the minds of some as to the appointing of Nominating Committees, and yet, the NATIONAL SAFETY NEWS, a month or so ago, published a list of all the Section Nominating Committees.

The reason for that dates back some five or six years. In the old days there was no Nominating Committee, and new officers were not considered until the time of the Congress. The Nominating Committee that was elected from the floor would pick out three or four names, men probably who had given addresses or those who were taking part in the discussions. In many cases, those men wouldn't know they had been elected officers of the Section. They may have been entirely unfit for the job; they might not have any time at all or only be slightly interested in the work of carrying on a Section, which is quite some job.

The present scheme is to tentatively appoint the Nominating Committee in the spring. That Nominating Committee sounds out the members, finds who are willing to do something and gets their consent to serve if selected. The nominations actually are not decided on until the time of the conference, but the Nominating Committee has a job to find out who in the Section is willing and able to carry on the necessary work.

We have a list of individuals who are willing to serve, if nominated. We don't want you to think that it is handled by a clique at all. If there is anybody present, he may be some total stranger to me, that is interested in the Section and wants a chance to do something, tell him to get in touch with me, give me his name and address, and we will try to find something for him. We may be able to use him as the chairman of a committee. We want everybody to work that is willing, and we are always very glad to get volunteers, because it is an awful job to get some of these people picked out who have the time to give to the work of the Section.

CHAIRMAN WIBERG: Thank you, Mr. Sanford, for explaining that situation.

The first paper this morning will be by Mr. W. J. Hockett, Safety Supervisor of the General Electric Company, Fort Wayne, Indiana.

METHODS OF INTERDEPARTMENTAL SAFETY COMPETITION

**W. J. Hockett, Safety Supervisor, General Electric Company,
Fort Wayne, Ind.**

That "competition is the life of trade" is as true of safety as it is of trade. After all machinery has been guarded thoroughly and improved methods of production have been adopted, so far as they have been developed, there yet remains a big safety job, which is to stop the accidents caused by carelessness of workmen.

This part of the job will depend upon education and interest. The spirit of competition may be used to a great advantage in creating and stimulating interest.

Men dislike to admit that sentiment affects their actions and they are liable to refrain from discussing subjects that are closely related to sentimental things. By making safety a game or contest it is somewhat removed from sentiment and may be discussed as a game. Groups will quickly get into the spirit of a contest and they will see that their fellow workers do their part.

Workmen don't like to see their department record trailing and they will boost it by their talk and carefulness if they are given full information as to what is happening.

The crowd at a race, the radio audience that listens to results of a football game, the groups in front of the score boards when the world series is in progress and the enormous gate receipts at the prize fights all tend to show that people are imbued with the spirit of contest. They get a big thrill and a real "kick" out of the progress of the game.

Arrange to let a group of employees follow the safety or "Keeping Fit" contest daily and they soon become enthusiastic.

Contests Appeal to the Sporting Instinct

Then, there is another big human element in contests that we must not overlook. We hear a lot about "chance taking" in our safety work. "Chance taking" has behind it the gambling spirit. We must take advantage of this trait by turning it toward safety if we want the most good to result from our safety work. The contest has a lot of the chance taking elements and this really appeals to people. Preaching, cautioning, disciplining, and scolding do not get the best results. It is the team spirit and the natural interest that must be awakened to produce real results.

In a large organization the safety engineer can not see all the individuals, so he must have help. Safety committees of foremen and workmen increase the safety salesmen in the plant and provide the necessary help. The organization of such committees may be used to develop team work and thus influence the person who can't be reached otherwise.

Competition may be arranged between individuals, departments, plants or specially arranged groups. In a plant of a few hundred employees, departments are a good basis for competition. Where a company has a number of plants, contests between plants put the entire group in each plant from the manager down on the alert.

In the General Electric Company we have used many schemes to promote interest. Our experience shows that we never really got under way until contests between plants were arranged. Now every plant is trying hard to stand near the head of the list.

In order to keep in the procession each plant organizes its departments into local competing units running them against each other. Now the person who breaks a department's good record is almost in disgrace.

We recently had a six-year-old no-accident record in a testing department broken by an employee carelessly and thoughtlessly short circuiting an ordinary plug with a screw driver. He flashed his eyes and had to lose three days' time. This entire group of 20 men were very much out of patience with the offender. This group had done all sorts of testing of a large variety of electrical machinery for over six years without a lost-time accident. It meant a great deal to have such a record broken.

We have used for a number of years a scheme of rating sections based upon hazards and the average number of employees and I shall describe briefly this plan.

First, we find the number and classification of the employees of each department by the use of a sheet of "Employee Classification." A copy of this sheet is sent to each foreman and he enters the number of each class of employee he has working for him.

Second, a hazard factor is established for each class of employee. The factor taken is the class number that insurance companies use in classifying various occupations. The factor used in our works varies from 1 to 9 as follows:

Select or preferred.....	Class 1
Extra preferred	Class 2
Ordinary	Class 3
Medium	Class 4
Special	Class 5
Hazardous	Class 6
Extra hazardous	Class 7
Perilous	Class 8
Extra perilous.....	Class 9

Next, figure the hazard of each department by multiplying the number of each class of employee by the hazard factor for that class and add the results.

Example: Suppose a department is made up as follows: One foreman, Class 5; one assistant foreman, Class 5; one clerk, Class 2; 30 machinists, Class 5; one trucker, Class 6; and one sweeper, Class 4.

$$\begin{array}{rcl}
 1 \times 5 & = & 5 \\
 1 \times 5 & = & 5 \\
 1 \times 2 & = & 2 \\
 30 \times 5 & = & 150 \\
 1 \times 6 & = & 6 \\
 1 \times 4 & = & 4
 \end{array}$$

Hazards of Department = 172

Having obtained the total hazard of the department we then divide the total hazard by the number of employees to obtain the mean rate.

The departments are then grouped into sections which operate as one

unit, e. g., Transformer, Meter, Fractional Horse Power Motor, Induction Motor, etc., and the total hazard of all departments in this section is divided by the total number of employees to obtain the mean rate for the section.

The percentage of accidents allotted to a section is the hazard of that section divided by the hazard of the entire factory.

The standing of each section with respect to the other sections is published each month in our works paper in the following manner:

Keeping Fit Contest

Standing of Major Departments March 15, 1925

	Percent Accidents Allotted	Percent Accidents Occurring	Standing in Percent
Apparatus	5.44	3.13	42.50
Induction Motor	4.57	3.13	31.50
Meter Department	17.98	12.50	30.50

The standing is found by subtracting the per cent occurring from the per cent allotted and dividing by the per cent allotted.

Planning the Contest

The plant executives must be sold on the plans for contests and they should be enthusiastic about them in order to give the scheme the proper backing. The entire plan should then be fully explained to foremen and safety men. This can best be done in a meeting. Bulletins describing the plan will carry the message to everyone.

This entire scheme of calculation is quite complicated so explanations should dwell on the basic ideas. For instance, it should be pointed out: (1) that the hazard of departments has been taken from insurance companies' experience. (2) The number of people working has a definite bearing on the rating. (3) Accidents occurring in a department or unit as compared to all accidents that have happened in the plant determine

How Long Should Such a Contest Be Run?

There is no limit to the length of time such a contest may be run. The report of standing of departments may be given as frequently as desired to keep the interest up. At the end of a period, such as six months or a year or every month, the winner may be announced and prizes and due recognition given. The contest is then started all over again, with all departments having a clean slate.

The big advantage in this plan is that departments of very great difference in hazards and in number of employees are placed on an equal and fair basis. They can not say they are unfairly compared with departments having scarcely any hazards.

The basis may be recalculated as often as considered desirable to insure fairness.

So many fine schemes have been tried out with success and several

of these have been described in the NATIONAL SAFETY NEWS that I shall not attempt to dwell on many of them.

Our Schenectady Works has used the following plan for creating interest: The Mutual Benefit Association is divided into many small sections of not over 150 members. Two years ago it was announced that the sections in the manufacturing division having the best record for each month would participate in a cash prize to be distributed by the company. The amount would be \$15 per section. This has created much interest and every section has been keen to get this monthly prize. The results are widely advertised on the bulletin boards.

In the last two years the frequency rate for lost time accidents per million hours worked has been reduced in this plant as follows: Year 1925: 18.92; 8 months, 1926: 15.18.

These 20,000 people are really gambling each month for this prize money. They are betting with caution, carefulness and the spirit of help for their fellow employees. We are anxious that they keep up this sort of "chance taking."

Advertising and Rewards

A constant shower of advertising is necessary to keep the interest up and here is where some hard work must be done. Facts of the same old kind have to be dressed up in new clothes to make them attract attention. To launch into this subject would require another paper but let it suffice to say that homemade bulletins, the works paper and the local papers are the best advertising mediums.

Trinkets and personal gifts have no place in the awards for accident prevention contests. The award must be of such a nature that it will create pride in the group. Trophies, banners, cups, cash for M. B. A. or dinners are best.

In conclusion we must do our part as employers in properly safeguarding all equipment but this is only a small step in the big program. Interest that carries through the entire organization must be created. The department as a unit competing with others for standing, with lots of advertising to bring the standings to the attention of everyone, will accomplish the desired result.

This plan has been used successfully by a large number of companies. That accident prevention can be accomplished by means of educational campaigns and contests has been proved. When we will to do the job it can be done.

(Following the reading of his paper, Mr. Hockett exhibited a number of lantern slides, illustrating the points he had made.)

CHAIRMAN WIBERG: We are grateful to Mr. Hockett for the interesting paper that he has given us. His paper brings out what apparently a great many people don't remember, and that is, if you want to get effective results in preventing accidents, you have got to keep the proposition before them almost continuously.

Another paper on somewhat the same subject will be given by Mr. Grier of the American Car & Foundry Company, Wilmington, Delaware. His comments on the problem of keeping the interest going every day brings up a couple of thoughts that ought to provoke some discussion.

I think we will defer the discussion on these papers until all the papers have been given. If you have any questions that come up as the papers are given, let me suggest that you make a note of them so that after the last one has been rendered we can bring up these various points and thrash them out.

STIMULATING AND MAINTAINING INTEREST IN SAFETY WORK

John B. Grier, Safety Inspector, American Car and Foundry Company, Wilmington, Del.

I can not very well begin this paper just as the title would indicate—it seems that the basic foundation of safety work must be spoken of first in order to bring out the larger part of the safety program. What I am trying to say is, that if safety is not first introduced in the proper manner, it is almost impossible to keep up the interest.

Let us begin in a shop where we are introducing safety. The number of men on the payroll may be large or small, some may have spent practically all of their lives working in this particular shop, others perhaps only one day's service. You can not step into this shop, cover up all of the machines as fast as possible, and expect to get the full cooperation of the employees. The ground work must first be laid.

The safety inspector should interview personally the men and groups of men in the particular shops in which he intends to place guards, and should be very active in and around this department previous to the beginning of the installation. He should get the ideas of the men working the different machines, also of the foremen through personal contact. He will find that some of the men have very good ideas, which can be carried out sometimes at a saving over the cost of the guard which had been planned.

The men then feel that their safety has been brought about by their own ideas and guards, and it will be a pleasure to them to keep the guards in place instead of tearing them off or leaving them off of their machines when they repair them. This not only interests the machine men, but the safety inspector's presence in and around the shop, talking with the different men, will get his message to both bench hands, machine men and other workmen in the mill, and he will find that they will work with him in preventing accidents in their department.

This procedure applies to every department and building in the plant, regardless of how large they may be. After the entire plant has been guarded in this manner, the new man coming into the shop must be taught that carelessness will not be tolerated, and that anyone working

in an unsafe manner will be immediately discharged. This is the ground work which really helps us keep the safety interest at full tension.

Accidents will occur, and careful records should be kept of the manner in which they occurred and the probable cause. The safety committee should be called to investigate each accident as soon after it happens as is practicable, and the safety inspector should talk to the men in and around the department and let them know that he is aware of the facts. He should promptly take whatever action the committee finds necessary. All of these things show the men in the plant that the safety inspector is on the job and that they must be on the lookout lest they become the object of his investigations.

Regular inspections of guards already installed on the machines should be made by the safety inspector in company with the different members of the safety committee. The safety inspector should be a man who can talk with the men in the shop and one whom the men will not hesitate to approach with voluntary suggestions. The guards should also be kept well painted—this not only attracts attention, but preserves the guards as well.

Cover the Plant Well With Bulletin Boards

The foreman of each department should be interviewed frequently, and minutes of the plant safety committee meetings should be sent to them, as well as other literature furnished by the National Safety Council, Insurance Companies etc. The plant should be well covered with bulletin boards; there should be at least one bulletin board in each room or department, and large bulletin boards should be placed in the most conspicuous places, including each entrance to the plant. The bulletins used should be short, snappy messages or pictures. Printed records of the right kind may be displayed, but these must be easy to read and understand. The bulletins should be changed often, at least once each week, and should be made as attractive as possible.

The safety inspector is personally responsible for at least 50 per cent of the safety of the workmen; and his job is in the plant, out among the men, finding and correcting unsafe practices as he goes through, warning workmen who seem to be a little lax and in general showing the men that it is his one idea to help prevent their injury.

The safety committee at its regular meetings should inaugurate safety drives and campaigns, including competitions between the different departments of the plant, to see whether or not one department can run longer than another without having a serious accident. I do not mean by this, "The Flash In The Pan" type of safety, the big drive once a year to run for one month without having a serious accident. After accomplishing this, when the tension is taken off, plants frequently have more accidents than before.

Safety rallies are fine and should be encouraged, but the interest should not lag after the first month. Safety effort should be carried on even more strenuously during the following months. I have no doubt that any

plant in the United States, regardless of how large it is, could work a single month under such favorable conditions, without having a lost time accident, but they are bound to show an increase in accidents after this rigid drive is over. I like the steady persistent safety method of giving the workmen all of the literature and talks possible at regular intervals.

Our method in the Wilmington plant of the American Car and Foundry Company is to take things as I have explained them. We do not have any big safety drive or spurge for a month or so, and then forget safety altogether; but we are continually driving home to the workmen our desire and intention that working conditions be made safe—that we are interested in our employees' welfare—that their welfare means increased production and is therefore an essential part of plant operation.

Use the Injured Employee to Stimulate Safety Interest

Inter-departmental competitions, if carried on monthly, are very fine. It is not necessary to have a banquet for the winner each month, but some kind of a prize can be given. Although we do not give prizes for this work, we do give some token of appreciation to our men who have shown out-standing interest in the safety movement.

The injured employee can be used to stimulate interest in safety among your workmen. If he is taken care of properly and gotten back on the job as soon as his injury permits, he will have a much better opinion of the company; and if, during his disability, he is told how this injury could have been prevented by the proper safety methods, he will be sure to put them into effect when he returns and his influence with his fellow-workmen will go much farther than you can imagine.

It is not our idea to criticise the injured employee, because I do not believe that anyone injures himself purposely. He is injured either because he has not been properly instructed in the safe manner of doing his job, or he is a careless and thoughtless man. If the former is the case, then the trouble is with the foreman or sub-foreman, and they must be gotten after and told to get on the job. If it is because of his own carelessness, he should be told that the company will not stand for this kind of work and that a second occurrence will cause his dismissal from the plant. I have found that a second accident very rarely comes.

An outline of the plan in force in our company is, I believe, worth while. The accident records are made up in each of the different plants and forwarded to our chief in the home office. He, in turn, compiles a monthly report giving the standing of the plants in reference to percentage of lost time accidents. Along with this report is sent a personal letter which is full of food for thought to the safety man. These records are also sent to the vice-president of the company, as well as to each of the district managers. In case of a major accident, it must be thoroughly investigated and a copy of this investigation forwarded to our home office. If the explanation of the accident is not satisfactory, it shows that the safety man is not on his job; and I believe this method does as much as

any other one thing to keep the safety man's interest at high pitch. This being the case, he cannot help but carry his enthusiasm to the foremen and workmen in the plant.

CHAIRMAN WIERG: There is one thing about Mr. Grier's paper that struck me as of particular value and that is the idea of having the safety man get personally acquainted with everybody in the plant. I have noticed that in a great many plants where they have organized safety propaganda work that a great many of the workmen at the bench know nothing about it. How can they expect to have real effect unless everybody from the office boy up knows it is going on?

The next paper, by Mr. Northrup, of the Labor Department of the state of New York, is a very interesting paper in which he demonstrates pretty convincingly the use of moving pictures as an aid to accident prevention. I think it is interesting, because it points to the increasing interest of the state authorities in the work of reducing accidents. Here is a state organization that is getting up moving pictures and going out and showing those moving pictures to those employers that show enough interest to ask for the picture.

MOTION PICTURES AS AN AID IN ACCIDENT PREVENTION WORK

Robert B. Northrup, Safety Inspector, Department of Labor, New York

During the year 1925, from the lowly point of no equipment and practically no knowledge of the intricacies and art of taking motion pictures, a fair start has been made, under auspices of the New York State Department of Labor, on accident prevention work through the use of the cinema. The equipment was provided and through the effort and study of two of the personnel, three pictures, totaling five 1,000 foot reels, have been produced.

Statistics in New York state show that only 27 per cent of all compensated industrial accidents are due to machine hazards. This is largely the result of years of work on machine protection. The balance, or 73 per cent, of such accidents result from unsafe physical conditions, lack of trade ability, improper handling of tools and objects, unsafe methods in operating machines, falls, careless practices and kindred conditions.

It follows that the human factor must be considered, that educational measures must be used to stimulate mental alertness until people are trained instinctively to work safely and avoid danger. The Labor Department is now working on this problem through four avenues, verbally in lectures given at industrial plants, through bulletins and publications, by photographs, and finally, by means of moving pictures.

Many of the industries in this country in the past protected their machinery, walkways, etc., and considered this sufficient. Accidents decreased, but only to small extent. This experience showed the necessity for education in accident prevention principles and cooperation between all forces that are working on the problem.

Let me define the word education as it is used in this connection. It is not in the sense of mental instruction in mathematics or history; rather an instructive propaganda, a constant agitation in the principles of safety first, hygiene and sanitation. Cooperative accident prevention committees of executives and workers are formed in industrial plants. Shop talks are given, social activities constituting safety rallies are held, safety poster service instituted, in fact well organized service has functioned until some concerns have reduced their accidents as much as 85 per cent. Many industries do this valuable work, but the mass do not; it is the duty of the state to reach the latter and instruct them in the principles of organized safety work and the specific causes of accidents and the remedy therefor.

Motion Pictures Are an Important Adjunct

Motion pictures are valuable for this work since an operation done in an unsafe manner can be seen in moving detail from start to finish, and conversely, the safe way can be shown. The worker hears that a safety lecture is to be given and stays away. He learns that a motion picture is to be shown and subconsciously feels the call of the amusement or interest feature of it and attends. The operator who sees in a moving picture a man theoretically killed when operating a circular saw in an unsafe manner will in 99 out of 100 times think of the safe way to operate that saw when he again begins his work. It would seem that this is only human nature.

The subjects whereon film pictures will give graphic aid in preventing accidents are endless. But a few examples are quoted as follows: a story picture which includes industrial settings, with an accident and its moral; reels of technical pictures showing artisans working the right and wrong way which really means the safe and unsafe way (one of the great sources of accidents today lies in the fact that many so called mechanics do not know how to handle their tools or operate their machines); the right and the wrong of situations and conditions, i. e., work clothes, shoes, chairs, floors, housekeeping, falls, falling objects, handling heavy objects, horseplay, poisonous substances, etc., etc.

Already sufficient work with the cinema has been done in this line to develop some of its reactions on an audience of workers. The picture must not be over one-half hour in duration (two reels) and at least one-third of the picture should be of human interest—domestic scenes or a bit of comedy.

One official of a large industrial concern gave us constructive criticism when he said: "You know many of our men can not read the titles which are in English and therefore they lose much of the worth of the picture." We now briefly explain the subjects as the film runs through and where the audience requires it even familiarize an interpreter with the picture sufficiently to enable him to explain it.

The art of producing safety moving pictures is entirely different from taking purely amusement pictures. In the latter the subject or story,

the ability to act well, settings, scenery, etc., are of paramount importance. In accident prevention work, acting must be subordinate to trade knowledge. There will be those in an audience who know the trade depicted and consequently are competent critics. If a person demonstrating an operation on a machine, either the safe or unsafe way, shows a lack of knowledge of the trade and makes mistakes, the lesson that is being conveyed loses practically all of its value.

Users of films should know how certain limitations can be overcome. Let us take the matter of eye strain: do not use faulty projection or old badly scratched film. With well maintained modern projectors, fresh prints from the master negative and a suitable distance from the screen no appreciable eye strain results. The fire hazard may be eliminated by the use of non-flammable film stock now on the market and by the use of projection booths constructed of fire proof material. These booths can be constructed permanently or may be obtained in the portable type so that they can be transported from place to place. Again, the standard width film may be reduced to miniature film which can be projected anywhere without the use of a fireproof booth.

The use of motion pictures in the world of pedagogics is well established and it seems that what is true in educational lives must also be true in the message of "Safety First." A bit of experience in school work is here quoted:

Men Are Quickly Influenced With Motion Pictures

"Through the use of motion pictures in school and college, students are taught more quickly with less fatigue or strain and retain the information better. Pictures are able to standardize impressions, and make them clear and complete, uniform, lasting and specific. By them the abstract can be made concrete, the absent present. They overcome time and space. Rapid processes can be slowed down and analyzed; slow processes can be accelerated; inanimate objects animated, dead facts made to live and pulsate. Attention can be held and concentrated and the memory more deeply impressed by moving images. Scientific experiments and demonstrations performed with ideal equipment under the best possible conditions as well as operations performed in the clinic, can, by means of motion pictures, be repeated indefinitely anywhere. Microscopic life can be enlarged many times on the screen, so that what can ordinarily be seen with difficulty through the microscope and by only one at a time, can easily be viewed on the screen by an entire class. By animated drawings and models the electric current passing through a series of wirings of an electric motor, the nervous impulses passing between various parts of the body and brain or the circulation of the blood through the body can be visualized. These are but examples of the vast field that can be utilized.

"The cinema expands the experiences of the pupils by bringing to them the whole wide world—things as they are. Rushing rivers, the bubbling lava, caldrons of great volcanoes, waving fields of grain, vast forest fires, storm clouds and the mighty ocean with its pounding surf.

When geography is studied they are transported as if by magic to the scenes of their studies where they live among the native people. They study biology, and the films bring the living animal life of the world and its native environment to the classroom. In geology, the formation of the mountains and canyons through the slow process of the ages can by films of animated drawings be vividly presented to students so that they will never forget.

"Slow motion pictures define detail; the flower's bud slowly opens to a full blown flower or the dragon fly emerges from its chrysalis. Every movement may be analyzed and the memory of the animations will last far longer than merely to read about such processes abstractly, coldly and distantly in a text book.

Tests Show the Efficiency of the Motion Pictures

"Tests to show the teaching efficiency of motion picture films as measured by results obtained by the teacher in the classroom have been made. One of the most significant was conducted to determine the effectiveness of four different methods of presentation: (1) the study of the printed lesson; (2) the same lesson presented orally by the teacher; (3) the lesson depicted by a film; and (4) the film presentation accompanied by explanatory comments. A summary of the results gave evidence that "Teacher" scored lowest; "Study" came next, "Film alone" scored a little higher, and "Film-Lecture" made the highest score of all. Another test showed:

Films alone scored an average of.....	75.5
The superior teacher scored.....	66.9
The average teacher scored.....	61.36

"The significant feature of this test is that the film alone beat the best teacher 8.6 percent and the average teacher 14.14 percent; yet, experience has proven that the best results of all are obtained by a combination of the three—accurate text, efficient teacher, and a truly educational film" (A).

The possibilities touched on through laboratory work or trick photography in the preceding paragraphs as well as the results of tests in efficiency surely justify the extensive development and use of film in accident prevention work.

We are showing our pictures in industry throughout the state and find the employees attentive and very much interested. It is fine after you have put your all into the making of a picture to see one man nudge another when a point is made in a setting, and say "Wonder if Bill is getting that? He needs it." It proves the subject matter is being assimilated, will be remembered and, let us hope, practiced.

Usually a portion of the noon hour is used. Where the lunch hour is short we have yet to find the executive who does not willingly give the employees a few minutes of company time to finish the picture.

A.—Quoted from "Motion Pictures in Education", by Don Carlos Ellis and Laura Thornbrough.

Our inspector endeavors to have some official of the company see the picture and we have received many gratifying written commendations relative to the reaction of the employees to this work.

These pictures will be gladly shown to anyone desiring it. Whereas there are no facilities for renting service, it is found that the cost of our pictures is not much more than commercial renting service. In the interests of the work, the Department is always glad to furnish the negative gratis, which makes the cost to the purchaser about four cents a foot for standard 35 m/m non-flammable film or three and one-half cents for miniature 16 m/m non-flam stock. In this case the film is the purchaser's property. An insurance company has availed itself of a picture in this manner.

The picture "Woodworking Hazards" shown during this session of the Congress is in conjunction with a field study and analysis, by the New York State Bureau of Industrial Hygiene, of three hundred accidents in woodworking factories (Bulletin 139).

All of the accidents that are shown have occurred, many repeatedly. We have endeavored to make the action sufficiently slow that all movements will be clear and defined. The film is being shown primarily to groups of woodworkers throughout the state by our lecturers.

Example of an Introductory Talk

Just before the picture is shown in a factory workroom a brief statement is made: it follows this general thought:

"I am from the State Department of Labor, a public department which is as much yours as mine or the other fellow's. Through it compensation is paid the injured workmen and through it great effort is being made to reduce the appalling frequency and severity of accidents.

"In the woodworking industry in this State there are approximately 72,000 workers. In this trade 2,573 compensable accidents occurred in 1924, costing \$943,935 to compensate. Nineteen were fatal accidents. These are only the accidents that caused over one week's loss of time. No one knows how many trivial injuries occurred or how many kept a man away from work three or four days.

"These 2,573 accidents in one year represent 1,000 years of lost time which, at the most conservative estimate, is \$2,000,000 (\$40 a week x 50 weeks x 1000) loss in wages in the woodworking industry in one year in New York state alone. Add to the wage loss the compensation cost of \$943,935, and you have nearly \$3,000,000 total loss in one year in your trade caused by accidents.

"What about the cost of the other 70,000 accidents that are compensated in all the other industries in the state? Well, they cost you and me \$70,000,000 a year in compensation, lost time and doctors' bills. Men, we pay this bill in increased living expenses and taxes. Consider also the suffering of the injured, the anxiety to themselves and their families, the straightened circumstances suffered in the home due to

no money coming in or at least only a little money from the compensation Bureau.

"Think over this matter in terms of suffering, anxiety and money and you will find that you must exercise more care in your daily lives and work at machines with your wits alive every minute."

CHAIRMAN WIBERG: After all is said and done, moving pictures show in one minute what it would take an hour to talk about. The first two papers were given by men not concerned entirely with woodworking machinery, while this latter one deals entirely with that subject.

Although the first two papers were not 100 per cent woodworking, I think both brought out the fact that the proposition of maintaining interest is the same in all plants. It seems to me to boil down to the proposition of getting right on the job with the workers in those plants, and devising literature and posters and bringing to the attention of every worker in the plant the peculiar hazards in that industry, whatever they may be.

Are there any questions or comments anybody has on any of the three papers?

The State Department Offers Reasonable Cooperation

W. G. DORSETT (Crystal-Lite Company, Indianapolis, Ind.): I would like to ask Mr. Northrup if he sends those pictures and reels outside of the state of New York?

MR. NORTHRUP: We have no way as a State Department to furnish them to you. As a public department, we are, of course, only too happy to furnish the negatives, if you will pay for the print. The cost of the print is practically the same as the renting service where the negative is provided. Of course, the State Department of Labor of New York is only too happy to be able to provide the negative, if you will pay for the cost of the print.

CHAIRMAN WIBERG: What would the cost be?

MR. NORTHRUP: The standard print of this whole picture would cost \$87.32. You could, if you desired, have that picture cut up and a number of portions taken out, which would considerably reduce the price.

There is one more angle to that. We had a little problem when we started this work on how to show it in plants, in New York City particularly. The restrictions on how you can show films are a bit stringent, as they must be, of course. There were several angles to it that were involved. This print in miniature, which is the 35 millimeter, I believe, would only cost \$55. Before you used the film, you would have to determine how the laws and rules of your city and state stood along those lines.

W. L. WALLACE (Edward Hines Yellow Pine Company, Lumberton, Miss.): The thing that interests me right now is the fire hazard as to these pictures being used in open plants. Would not the showing of them effect your fire hazards?

MR. NORTHRUP: Insurance companies do take that up when they find out a film is to be shown.

In New York City, you can not show the standard film. I use both the standard and the miniature. With the miniature film, which is five-eighths of an inch wide, there is no possible fire hazard.

MR. WALLACE: That is my point.

MR. NORTHRUP: There is no rule or regulation. In fact, the New York City fire laws make a special provision allowing its use, anywhere, at any time.

VOICE: Don't you have to use a booth?

MR. NORTHRUP: No sir. We use the Bell and Howell projector, which is made for that purpose. I operate it myself. It is operated in just the way that this so-called magic lantern was used this morning. You can take the small projector and show the picture anywhere.

It might be a bit interesting to know that we use what is called the daylight screen. It is made by the Du Pont people, and is like a piece of gelatin. It is made up of prisms, perpendicular, which gives the quality of showing through the screen. The projector stands here and the screen is about 10 to 15 feet away. The audience is on that side of the screen. We show it practically in daylight. You can not, however, show it in the sunlight.

Motion Pictures Growing in Popularity

F. G. LOVETT (Industrial Accident Prevention Association, Toronto): Our association is a manufacturers' association under the workmen's compensation act. We have during the past two years used very extensively the motion picture in our safety work. We found it very effective. I was very much impressed with the film shown here this morning. We have not got that far that we have something exclusively for one industry. Our film applies to every industry; it deals with the general hazards, and we find it very successful.

Just last week, I put on four shows in two towns, two in each town. One town had a population of over 5,000 and the other 7,000. We didn't take the film into the factory, we engaged a little theater, and had the performance in the evening, and the workmen brought their wives along. I want to tell you that when you get the story home to the wives, you are getting it to the right spot. In one place we had 900 people and in the other about 1,100 people. Favorable comments were expressed in the factories the next day to the foremen and the superintendents. I think the show was well worth while.

You have got to recognize in this work that the average man doesn't think for himself. What you show him on the screen goes right home to him and he remembers that, because he has seen it. We have found this very effective.

We started this work two years ago, and the demand for this film is almost more than we can keep up with. When we put on a program in

a factory or in a theater, we not only use our safety film, but we use the film of resuscitation, the eye and eye hazards. We also put on two educational films which we rent from our motion picture department in Ontario. The government has the safety films which can be leased at a reasonable rate.

Last year, after school hours, we had the children in the theater, and we got the story across to the children in that way. I would like to state that any gentleman who is a safety engineer or an inspector can not use anything better for his work, in my estimation, than the motion picture film. We have received wonderful results from it.

Mr. BURBON (Mengel Company): Every foreman gets a one-half day vacation for each no-accident month in his department. If he goes three months without an accident, he gets an additional day added to that. Our foremen are working harder for that than for most any kind of a badge or medal we can offer. We are getting wonderful results from this little system. I wonder if anybody else here does that?

A "Safety Derby Contest" in Indianapolis

CHAIRMAN WIBERG: Where does the workman come in?

Mr. BURBON: We are giving the workmen a badge for going one year without an accident. Of course, we can't give them a half day.

CHAIRMAN WIBERG: He is not left out in the cold. That is one of the numerous ways you can keep the safety movement right before the men every day of the year. I don't know whether anybody else is using that or not.

W. G. DORSETT (Crystal-Lite Company, Indianapolis, Ind.): I would just like to mention the contest that we put on in Indianapolis for our departments. We employ about 1,800 men. We have about 42 departments. We call our safety contest there the "Safety Derby Contest." We have it divided into 25 entries. Each department has a pony. The contest is run on a handicap basis. We try to estimate as near as possible a percentage of risk and give each department a handicap.

This contest runs for three months, and the department that wins out is given a banquet by the company. Last Thursday we gave a banquet to one of our departments that won. We seem to get very good results from this. It causes quite a bit of rivalry throughout the plant. It has been in operation for the past nine months. We have had three races and no department has won it twice. It is proving to us that the handicap basis on figuring the contest is proving very effective.

H. R. ORCHARD (Marathon Lumber Company, Laurel, Miss.): I would like to know if any of the gentlemen present have had experience with colored labor, and whether they find their negro labor react to the same things that the white labor do and the trouble they may have in interesting their colored labor?

CHAIRMAN WIBERG: I think Judge Wallace can give us some information on that.

I recall that we discussed that very thing last year in Cleveland. It

seems to me that it was brought out that the colored men took much more heartily to this contest idea.

E. R. FARRA (United States Gypsum Company, New Brighton, New York): I run about 20 per cent black in the common labor organization of our plant. We have about 90 right now. I want to say that we have 17 nationalities in our common labor organization. I would much rather work with the boogies than any of the others, because if you can sell your safety idea to one or two of your black men, they will sell the rest for you. The negro can always see the funny side of everything. If you appeal to that humorous side, you will get the colored man every time. When I was with the American Car & Foundry Company in Wilmington, we had quite a number of them there. We very seldom had an accident through a black man. Wasn't that right, Grier?

MR. GRIER: We haven't had any in the last two years.

Two Months Set Apart for a Special Safety Drive

MR. FARRA: I want to give you a stunt that we are running this month. We have a continuous safety movement in the plant, but two months in the year, May and October, we sort of try to make it better than the other 10 months of the year.

During the second week in October, I was tied up in my office with an insurance proposition and last week I was getting ready to come here. We realized early in the campaign that I would have these other duties and couldn't have that personal touch in the shop that I would like to. I talked the matter over with my manager one day and we arrived at this conclusion: that we would appoint four men, one to take charge each week. The first fellow we picked was a noisy fellow. He had served on the safety committee, but had retired. Then he got to work and dug up more things in that first week than I will be able to correct in the next two months. Many of the things we corrected right away. He went into places I never dreamed of going. I didn't know there were such places in the plant.

Here is what happened. That fellow was one of the bunch. I picked my men carefully. He moved around the men in the shop all day long. I told him to start on roof one and go clear down to the top of eight, which covers about 25 acres of floor space. The man that keeps walking all day long is earning his money.

Last week we had a Polish fellow in charge. We have a large congregation of Polish in our plant. They are the hardest nuts I have to crack. Last week this Polish fellow inspected the plant day by day. I particularly stressed to these fellows that their job was not so much to find mechanical safeguards that were needed, but to watch out for unsafe practices. I was one hour and a half explaining to him what unsafe practices he might look for. I got a report twice a day from that fellow, and all the unsafe practices that he found he called the foreman's attention to.

If there is a lost-time accident, they are going to send me a wire.

I am glad to tell you that up to the present minute I have not received such a telegram.

In one of our departments, there is not a month goes by but what they have a lost-time accident. They don't amount to much, but we have a lost-time accident charged up against that department every month. We appointed a new general foreman who has charge of the night turn. We operate from midnight on Sunday to 7:00 o'clock the following Sunday morning without a stop. Since we appointed this new general foreman they operated during June, July and August without a lost-time accident, and then a man turned on his ankle (I don't just recall how it happened) and he lost 40 days. That is the only accident they have had since the first of June.

The thought I want to bring out is that if you appoint a man in charge of the plant for one week, the men all know that he is one of the bunch. I do my work in the shop professionally. Every one of you men here who are safety engineers in the plant are looked upon by the workmen as professional workmen. This is a workman, one of their own kind, one of their own bunch, and if he does it in the right spirit, and you use the right kind of judgment in selecting your man, you will get wonderful results. It is well worth all its costs.

Getting the Colored Employee Interested

G. A. ORTH (American Car & Foundry Company): In connection with keeping the colored man interested in safety in our plants, we have 18 plants employing about 4,000 to 5,000 colored people. In the beginning, they were hard people to get interested in the subject of safety. We finally appealed to their spiritual side. Among the colored gentry, as you know, they have preachers who are called lay preachers. We set out to find a scripture lesson from the Bible and we finally located one. This lay preacher would get groups of colored men together. When you talk about the Bible to your colored man, you will get a hearing. In that way we have interested these men, and as Mr. Grier, who represents us in the Wilmington district, told you a few moments ago, in the past two years we have not had an accident involving a colored man. That I will also say applies in our larger plants.

In the Brunswick plant, employing some 2,500 men, about 30 per cent are colored, and we go around from year to year without any lost time accidents. In the St. Louis and Madison districts, employing about 2,000 in each, very few of them sustain injuries, because we have them thoroughly saturated with the idea that it is almost sinful to become injured. You know that the colored man when he is spiritually inclined knows that it is wrong to commit a sin. We believe in that way we have interested our colored people.

L. C. MAGIN (Union Indemnity Company): In further reference to this gentleman's remarks about the negro help, in the south, rough labor is all largely negro. I know the Celotex Company employ about 75 or 80 per cent negro. Accidents were piling up with their help. They

thought out this scheme, the race track scheme. They had a safety-first horse up on the board. They offered rewards of \$2, \$3 and \$5 for the best safety suggestions they could get from any of their employees. Each department had its own race board. It interested the negro very much. They had a safety-first horse and an accident horse. Each time that a man was careless or in any way affected their department winning the prizes, they would go in and report him. The result was that they cut down on their accidents.

W. L. WALLACE (Edward Hines Yellow Pine Company, Lumberton, Miss.): I think you will find that your negroes are more largely imitators than anything else. I am speaking from a life-time experience in association with the negroes in the south. I didn't know that anybody else had had quite the experience with them that we had. The reports of my experiences rather confirm yours, a negro is hard to get interested. You have got to appeal, it is true, to his religious side, but his religious side won't stay put. The negro's religious side is hardly a side, it is rather a vascillating quality. As long as you can get him interested from the religious standpoint, that is all right. His sporting proclivities I was rather impressed with. If you once get him interested, you are going to find that he is the best safety worker you have got.

As I say, he is largely an imitator. If you can get his confidence, make him feel that you are relying on him, I believe then you are going to get better results from him, more continued results than from the average white man of the same class.

The Safety Engineer Is New on the Job

We have had a spasmodic organization problem. Until about three months ago we never had a safety engineer. We are groping and feeling to see just exactly the best way to do this work. While we have practiced safety for some years, our safety engineer was a perfect stranger to the negro. I am gratified to say that he seems to be appealing to the negro and doing it in a way through the religious side. He is not altogether letting it be safety, he is trying to touch the negro's personality, his personal life. He has organized with considerable success.

I am very hopeful that we are going to get something out of that. I went down there not long ago, about two or three weeks ago, and made a talk to them. It was the first time that a layman ever talked in the church, I believe. I felt a little bit strange. Mr. Buchannon is working on the outside, organizing the negroes and sort of getting them bunched together. I think he is going to accomplish something along that line. Mr. Hartley has a paper (I don't know whether Hartley is here this morning) that he will read tomorrow. They have made quite a success in reaching their negro laborers.

I think Mr. Hartley will bear out what I say, that they have had as much or more success in their negro organization than in the white.

I think it would be well to discuss it tomorrow at the end of his paper, rather than today.

CHAIRMAN WIBERG: I think it would be a good thing.

MR. WALLACE: I know they have been successful in reaching their negro employees. Mr. Buchannon, have you gone far enough into your organization to tell the boys anything about it?

MR. BUCHANNON (Edward Hines Yellow Pine Company, Lumberton, Miss.): We have three classes of labor to deal with, the negro, the Frenchman, and the white man. Before I went down to Mississippi I studied the negro in Detroit a great deal. The negro in Detroit and in the north and the east, is a little different from the negro down south.

Free Eats Always Appeal to the Colored Boys

I was talking to a bunch of the saw-gang men down there and I asked them if any had ever been up north. One of them replied, "Yes, I have been up north."

"Where did you go?"

"I was in Detroit."

"Well, where did you work in Detroit?"

"Don't you remember me?"

"No, I don't think so. I see so many of you fellows up there that I don't know you all."

"Don't you remember me in the Hupmobile plant?"

"What is the difference between working up there and down here," I asked him.

He said, "There is one big thing. When I am down here, I can go in to Mrs. Caldwell's for something to eat when I am hungry, but I couldn't do that in Detroit."

That is a fact. While I live here, my wife is a southerner. I lived out in North Detroit. My wife's father was a great turpentine man in the south. He had worked with negroes from all over the south and some of them are still with him. They come out to my house and they say, "We want something to eat." Some of them she didn't know.

I found the negro preacher about a month ago. That is one of the most unusual types of negroes I ever had to deal with. This negro is an ex-slave, about 65 or 70 years of age, and he is a talker if there ever was one. He said to me, "The thing that you want to start down here among the negroes is to get them classified." Those are his words. He used to classify the negroes.

We have got in our logging camps and in our quarters where the negroes live, houses owned by the mill companies. That is where the negroes live. Pay day is every Saturday night. Every pay night, we find the roads flooded with women and bootleggers and everything else.

We started this organization. We got all the negroes down there in our main logging camp. We had this negro preacher go and give them a talk. Judge Wallace and I went along also. We took them over to the church and we told them what they were there for and what we

wanted to do. This negro preacher explained to them in his own words that he wanted to classify them.

In addition to my safety work, I do a lot of sanitary work. That is a thing that had to be started down there. I saw the condition of things, and I started it right away. I was through the quarters the other day. A negro said to me, "I want to move out of this house."

I said, "Why do you want to move; isn't this just as good as any other?"

He said, "Yes, but next door to me they have a crap game every other night, and I belong to that League down there and I want to move out."

We would like to get the better negroes, and let the others go. We don't care about them. We have now a better element quarter and a bad element quarter.

The whole thing with the negro, I find, is this: I haven't been down there long enough to be an authority on it, but the more personal conversation you get into with the negro and the better you get acquainted with him, the more you are going to get out of him.

I have negroes who are absolutely safety men. They work among themselves. I started on the thing with the idea that "I am my brother's keeper," and the religious negroes took it up. This year's record shows where we have had bad accidents before. The record came down with a drop this month and we have been working night and day; we haven't stopped this month.

Most of These Employees Are Southern Negroes

I would like to ask Mr. Orth a question. You say you have 4,000 negroes in your plant; are the majority of them born in the south?

MR. ORTH: Southern negroes.

We have a large plant in Memphis. It is more or less of a training school. We brought them up north during the War period. As you know, it was pretty hard to get labor anywhere. We sent the people down to Tennessee. It is against the law of Tennessee to take the negroes from one state and bring them into another, but that was waived during the War period. We can not do it, however, at this time. We named a town in Pennsylvania after our safety man down there, Mr. Gerard. It is now legally known on the books of the Common Council of Burwick as Gerardville, Pennsylvania. That is how much we think of the negroes.

MR. BECHANNON: That is the only way we are going to get at them. We have done everything in our mills and logging departments in the way of mechanical safeguards. I don't think a thing is lacking. We have got to educate them. Ninety-five per cent of our labor is negroes. They go to work at 5:30 in the morning and get back at 6:00 o'clock at night. They are out all day and naturally are all tired out at night. As soon as the cool weather started, I asked them to come over. I told some of them the other day that if they had a good record soon, I would

give them an oyster supper. A few days later I happened to be going to one of the quarters and one of the negroes said to me, "How about the oysters, bo?"

I think that we are going to have a good deal better success than we have by starting an educational problem. That is the only way you can do it among the negro employees.

ADJOURNMENT

WEDNESDAY MORNING SESSION

October 27, 1926.

The meeting convened at 9:40 o'clock. Mr. Herbert G. Wiberg, presiding.

CHAIRMAN WIBERG: The first paper will be given by Mr. G. V. Fuller, Assistant Secretary of the National Council on Workmen's Compensation Insurance. That organization is an insurance concern, a sort of a neutral body that collects figures and statistics on accidents and compensation costs all over the country. From those figures, they formulate plans of rating plants on the basis of the physical conditions, that is, the guards that have been put in and the conditions which are not guarded, and also determine rates for the various types of industry.

Mr. Fuller has analyzed woodworking conditions and accidents in nine different classifications over a period of six years. I think you will find that the data he has distributed will be of great value to you in indicating where to concentrate your efforts in preventing accidents.

WHERE ACCIDENTS OCCUR IN THE WOODWORKING INDUSTRY

G. V. Fuller, Assistant Secretary, National Council on Compensation Insurance, New York City

An analysis showing where accidents have happened in the past is of little value if it is regarded merely as a post mortem or a chapter of history. Its chief value lies in its use as a preventive of future accidents.

In order to prevent accidents, it is first necessary to know something about the physical and psychological causes. This makes it easier to determine which conditions must be removed or corrected in order to prevent their recurrence.

An employer of many men has some opportunity to learn from past results in his own plant alone, but the employer of only a few men does not have this same opportunity. His accident hazard per man may be as great or greater than in the larger plant but he does not have as many men and consequently not as many accidents even from the most common causes in this particular industry. A tabulation of accidents in a large number of factories in his industry and covering a long period of time will provide such an employer with information which will be invaluable to him, for he may then see at a glance where and how his accidents may occur in the future and he can take steps to prevent them. Nevertheless, his own analysis is of much importance for it will permit him to discover certain peculiarities of his own plant or process of manufacture.

There are many State Industrial Boards and Commissions throughout the country that publish a summary report annually of accidents which

have occurred within their states. These state reports, which generally quote accident figures in hours of lost time, are very comprehensive and employers would do well to study carefully the information contained therein.

The National Council on Compensation Insurance, an association of about eighty Insurance Carriers engaged in the writing of Workmen's Compensation Insurance throughout the country, receives from its members, for rate-making purposes, detailed reports of all accidents for which compensation or medical expenses have been paid. Extensively detailed reports are filed for all accidents resulting in death; permanent total disability, such as loss of both hands, both arms, both feet, both legs, both eyes, or any two thereof; major permanent partial disability which is defined to include the loss of sight of one eye; the complete loss or impairment to the extent of 50 per cent or more of a hand, foot, arm or leg; and any other permanent injury which is compensated on the basis of 25 per cent or more of a permanent total disability; and every minor permanent partial or temporary disability, the cost of which has equalled or exceeded 50 weeks indemnity at the maximum statutory rate for the state under whose law the accident was compensated.

An Analysis of More Than Three Thousand Reports

I have just completed an analysis of 3,038 of these extensively detailed reports of accidents which have occurred throughout the country in the nine principal manufacturing classifications of the Woodworking industry. A classification from the standpoint of Compensation Insurance, as you no doubt know, is a device whereby all risks of the same general characteristics as respects raw materials, processes, hazards of operation, products, etc., are given equal rating treatment.

Briefly, my analysis covers sawmills; plants engaged in planing lumber and the manufacture of window sash, doors, blinds and other assembled millwork; cooperage; the manufacture of wood-turned products such as pulley blocks, spools, wooden heels, hat blocks, etc.; the manufacture of wooden furniture; veneer products such as fruit baskets and barrels and veneer panels; miscellaneous woodenware, which contemplates a large variety of wooden products such as ladders, household utensils, etc., which can not be assigned to any of the more specific woodworking classifications. The manufacture of carriage and wagons has been included for although it is a declining industry, it represents a process in woodworking that can not be allocated to any other classification. There are, of course, numerous minor woodworking classifications used in the application of Workmen's Compensation Insurance, but these minor classifications from the accident cause standpoint are comparable to the important classifications which I have just enumerated. This analysis covers a period of six years (1918 to 1923 inclusive) and for the accidents involved, the national compensation cost to the Insurance Carriers has amounted to over \$5,200,000, paid or incurred. During this same period and in these same nine classifications our

Member Carriers have paid or incurred losses on a grand total of 71,024 accidents, which in monetary cost has amounted to nearly \$15,921,000. This spread of data corresponds to a concurrent payroll exposure of approximately \$1,047,144,000, and assuming that the national average wage in this industry is \$1,000 per man per year, it represents roughly an employment of well over a million man-years.

My analysis, therefore, represents a little over four per cent of the grand total number of accidents in these classifications but roughly one-third of the grand total cost. It is important to point out, however, that these 3,038 cases represent all those of the most serious character both from the standpoint of suffering by the employee and that of cost to the Insurance Carriers who have had to provide compensation; for these 3,038 accidents in the average amount of \$1,715 per case, including a total of 570 deaths at an average compensation cost of \$2,545 per case; and 30 permanent total disability cases at an average of \$5,100 per case.

General Facts Are First Classified

Yesterday your chairman kindly distributed copies of my analysis in order that you might have a little time to scan it in advance of my address. (See accompanying Tables, Part I and Part II.) You will observe that I have tabulated in the first nine columns, the accident data for each of the classifications involved. The grand total data are contained in the last column. While each classification has its individual story to relate, I will confine my references in general to the grand total for the industry.

The first part of the analysis represents general facts relative to the total number of cases involved, their character in terms of type or disability and their total average costs. May I again point out that the fatal, permanent total, and major permanent partial disability cases listed represent all that have occurred within these classes in the six year period. The few minor permanent partial and temporary cases included are those only whose compensation cost has amounted to more than the amount previously described. In addition there are some 68,000 minor permanent partial and temporary disability and medical cases from accidents which have occurred in these classes and which are not included in this analysis, but the compensation cost per case averages only about \$160.

The second part of the analysis represents a segregation of cases on the basis of specific cause and for each such cause is given the number of cases, both fatal and total, with the corresponding cost of compensation including medical expense. Percentages of total cost have been indicated for the general groups of causes and where any specific cause has produced a substantial volume of losses, individual percentages have likewise been shown.

Time does not permit me to discuss many of the interesting details of this analysis. I can only leave it with you in the hope that you will give

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TABLE—PART I
Summary of Compensation Insurance Cost for Analysed Accidents

	Classification Divisions of the Woodworking Industry										Average Cost
	Code 2730-2731 Planing & Assembling Millwork Mfg.	Code 2710 Saw Mills	Code 2742 Cooperage	Code 2759 Box or Box Shooks Mfg.	Code 2794 Wood Turned Prod. Mfg. (N.O.C.)	Code 2841 Woodenware Mfg. (N.O.C.)	Code 2883 Furniture Mfg. (not metal)	Code 2915 Veneer Products Mfg.	Code 3864 Carriage or Wagon Mfg.	Grand Total	
Grand Total No. Cases (t)	729	1145	64	243	189	39	489	50	80	3,038	\$1,715
Grand Total Cost	\$1,233,098	\$1,931,354	\$99,355	\$446,255	\$292,965	\$76,599	\$874,231	\$105,202	\$142,393	\$5,201,442	\$1,558
Grand Total Compensation Cost	\$1,114,405	\$1,740,891	\$90,769	\$409,954	\$287,138	\$66,511	\$807,612	\$98,864	\$129,423	\$4,725,477	\$1,57
Grand Total Medical Cost	\$118,693	\$190,553	\$8,586	\$36,301	\$25,827	\$10,088	\$66,609	\$6,338	\$12,070	\$476,005	
No. Fatal Cases (f)	111	276	6	41	19	7	83	17	10	570	\$2,545
Total Cost of Fatal Cases	\$286,033	\$601,948	\$14,706	\$114,064	\$41,634	\$9,885	\$256,215	\$40,175	\$28,942	\$1,451,602	
No. Permanent Total Disability Cases	5	13	2	3	1	—	5	1	—	30	\$5,100
Total Cost of Permanent Total Disability Cases	\$32,367	\$49,121	\$8,018	\$28,712	\$5,500	—	\$26,096	\$3,233	—	\$153,037	
No. Major Permanent Partial Disability Cases	392	588	43	157	129	30	260	33	50	1,682	\$1,730
Total Cost of Major Perm. Part. Disability Cases	\$706,295	\$998,540	\$84,101	\$255,559	\$212,749	\$64,906	\$401,455	\$54,057	\$91,657	\$2,913,190	
No. Minor Permanent Partial Disability Cases	206	253	12	35	39	2	133	8	19	707	\$370
Total Cost of Minor Perm. Part. Disability Cases	\$186,467	\$202,422	\$11,598	\$34,915	\$31,684	\$1,806	\$115,559	\$7,737	\$22,848	\$615,006	
No. Temporary Disability Cases	15	15	2	7	1	—	9	—	1	50	\$1,370
Total Cost of Temporary Disability Cases	\$21,956	\$19,423	\$942	\$6,006	\$1,398	—	\$14,936	—	\$946	\$68,007	

it your careful study at some later date. There are a few specific causes, however, that I wish to call to your attention.

You will readily see that machine accidents have accounted for a great proportion of the compensation cost in the Woodworking industry. The 1,777 accidents at the "Point of Operation" alone are responsible for about 52 per cent of the total cost. The 256 cases due to "Driving of Mechanism and other Moving Parts" of the mechanical equipment have cost another eight per cent and "Prime Movers" and "Power Transmission" with their 61 cases have added about three per cent more. In other words, 2,094 accidents (238 deaths included), or about 63 per cent of the total cost of compensation, resulted from mechanical equipment. It is essential, therefore, in the Woodworking industry to first concentrate efforts on preventing some of these machine accidents.

The question then arises as to what specific machines have caused the most accidents. Without referring to the analysis you no doubt will say that circular saws in their various forms are the greatest accident producers. My analysis verifies this statement for rip-saws alone have produced 422 accidents or about 14 per cent of the total cost. In the manufacture of sash, doors and blinds, assembled millwork and furniture, rip-saws have been responsible for almost one-fifth of the total cost. All other types of circular saws have produced 976 accidents or an average of 22 per cent of the total cost. Here again the proportion of cost varies in accordance with the process, for in sawmills and in the manufacturing of boxes and miscellaneous woodenware these saws are responsible for about 28 per cent of the cost within these classes. These two machines, as might be expected, stand out clearly as the principal accident producers of the industry.

Many Different Causes for Ripsaw Accidents

There are many different causes for rip-saw accidents but the one which is most impressive is the "kickback of material." There are recorded in this analysis 120 cases of "kickbacks" with 73 of them fatal. In short 61 per cent of the "kickbacks" in this analysis have killed the man, and he may not have been the operator of the saw either. The cost of compensation for this one cause alone was over six per cent of the total cost. This cause with its large proportion of deaths does not stand out as a characteristic of any particular type of manufacture in the Woodworking industry, although in furniture manufacturing it is considerably higher than in the average, undoubtedly due to the large amount of hand feeding.

Does this not indicate to you that something must be done to stop this type of accident? "Kickbacks" may be absolutely prevented by guards that are on the market and I personally believe that employers should start here in the process of accident prevention.

So far as the other types of circular saws are concerned, the type of accident that stands out particularly is that due to flying chips, splinters, small cuttings, sawdust, etc. This cause has accounted for over three per cent of the total accident cost.

Planers come next in importance, for although the total average percentage of loss is only about three per cent, certain processes such as sash, door and blind manufacturing, planing of rough lumber and box manufacturing run from five per cent to 11 per cent of the total cost in their respective classifications. Kickbacks, flying chips, slivers, etc. and brushing off of shavings from machinery seem to be the principal accident causes although their respective percentages are relatively small.

Jointers, although being responsible for only around three per cent of the grand total cost, are frequent and serious accident producers in certain classifications of manufacture, such as sash, door and blind and furniture manufacturing where the proportionate cost is around five per cent.

Shapers are particularly bad in furniture plants where about six per cent of all cost in the classification is due to these machines, slipping of the operator's hand or his work in feeding, being particularly important.

The Operator's Hand Often Slips Near the Saw

A review of all mechanical accidents discloses that the slipping of the operator's hand in feeding the stock or the slipping of the stock itself while being fed is responsible for six per cent of the total cost. This cause appears in connection with practically all machines in the industry and in view of its common occurrence, it seems that steps should be taken either through mechanical devices or through education of the workmen to prevent such accidents.

Accidents caused by the catching of loose clothing and gloves in mechanical equipment are responsible for over four per cent of the total cost. It is apparent that supervision by employers over the clothing and gloves worn by their employees while in the plant, combined with general "safety-first" education, are the remedies for this type of accident.

Among the non-mechanical causes of accidents, the general group "Falling of Persons" appears to be the worst producer. The 188 cases, of which 39 per cent were fatal, were responsible for over eight per cent of the total cost. "Falls from ladders," one-third of which were fatal, produced about one per cent, while 37 cases of "Falls into hot water soaking vats" accounted for about two per cent. In the sawmill classification this type of accident has produced 26 cases, 23 of which have been fatal, and the cost has been about four per cent of the total for the classification. In Veneer Products Manufacturing, seven cases, all deaths, have been responsible for 14 per cent of the cost.

The "Handling of Objects" in general has been responsible for about five per cent of the cost and "Hand Tools" have cost the carriers a little under four per cent of the total. "Falling Objects" have resulted in over four per cent of the cost while "Elevators and Hoisting Apparatus" have produced accidents costing about three per cent of the grand total.

I have touched only the "high spots" in the analysis but I assure you that a careful study of it in detail will be worth the time so spent.

I have spoken up to this point purely with respect to compensation cost paid by the Insurance Carriers. However, this may be only a minor part of the total loss cost to the industry. When you stop to consider the aftermath of an accident, I am sure that you will agree with me that, after all, the employer loses more than appears at the casual glance. The direct losses to the employer appear in the forms of damaged equipment and imperfect work but principally in reduced production, due to the loss of producing time of the injured, the temporary shutting down of the department where the accident occurred, the mental effect upon the other workmen who may have witnessed it and so on. The effect upon the employee morale may go even farther, leading to internal labor troubles that are disconcerting and costly.

The Workman Is the Greatest Loser from Accidents

The greatest loser of all is the injured workman for the cost of the accident to him is bodily mutilation or loss of life. This cost can never be repaid and the outlay of a few dollars by the employer for safeguarding is of small consequence when compared with the suffering of the victim and his family.

I do not wish to give the impression that the only prerequisite to an effective accident prevention campaign is the determination of where and how the past accidents in the plant have occurred. As a primary step, there must be born in the employer a sincere desire to stop the suffering and death of his employees resulting from accidents within his plant. He must come to the realization that their safety is his responsibility and he must be prepared to assume it under all circumstances. If an accident is actually attributable to an employee's carelessness or stubbornness, he must still accept the responsibility, for the selection of his workmen and their retention on the payroll should take into consideration their general adaptability to "safety-first" ideas.

There may be present also the desire to stop the monetary loss to his organization resulting from accidents. This desire, however, should be secondary, for after all, the "almighty dollar" can not be placed above nor upon the same level with human flesh. Nevertheless, it does cost money when accidents occur in any plant and this cost can not be entirely ignored. It is reflected in increased insurance premiums but it also appears in reduced production which, in most instances, is of much graver consequence to the business.

There must be either existent or instilled in the workmen the genuine receptiveness to "safety-first ideas. They must feel or be induced to feel that safety bulletins, accident prevention talks, inspection committees, and other safety organization activities are not just poppy-cock or the work of some technical visionary but have been installed in the organization primarily for their own good. Confidence of all employees is the first goal and, after that is gained, loyalty and cooperation will

follow, resulting in real progress toward making the plant a safer place in which to work.

The converting of an employer and his employees into fertile ground for the planting of "safety seeds" is a problem in psychology and education, and perhaps is the most difficult step in the process of accident prevention work.

In concluding, however, I can not stress too strongly the importance of a careful accident analysis in any plant and the very material assistance which it may render in the prevention of future accidents. A general analysis of accidents within a general industry, such as the one I have presented, may be used as a basis of an accident prevention campaign but it can not take the place of one made by the employer from his own experience.

There is one feature that I wish to impress upon you most strongly; namely, the absolute necessity for greater cooperation and effort on the part of employers and investigators of the various Governmental Agencies and Insurance Carriers toward the production of more accurate accident reports. An accident report, regardless of who makes it, should not be considered as a "piece of red tape" that can be submitted in a half-hearted and semi-correct form. Every accident requires a careful investigation of the circumstances surrounding it to determine its exact cause.

Reports Should State the Real Cause of an Accident

Suppose an accident occurs where the operator's hand is caught in the saw. That accident should not be recorded simply as "hand caught in saw," for the catching of the man's hand may be only a resultant of the true cause. The accident actually may be due to the structural or other physical conditions around the machine; it may be due to some permanent or temporary abnormality of the employee, either mental or physical; it may be due to poor light, poor ventilation or any number of such preliminary causes. To prevent the recurrence of the "hand caught in saw" accident, the employer must first correct these preliminary conditions and in all probability, he will then have removed the true cause. All employers today who are truly interested in accident prevention are beginning to realize that poor lighting in a plant is causing more accidents than is generally supposed and you will find many who are providing more efficient lighting around dangerous machinery principally with a view to accident prevention.

When reporting an accident, therefore, do not write the fewest words possible, but go into the details of the actual circumstances surrounding the unfortunate event. You can not give too much information, for at the time of making your report, you do not know what it may be used for. Be careful to state the cause and do not mistake an effect for that cause. The accurate report of an accident and its correct analysis is an educational function of every plant safety organization that should not be overlooked. I am sure that the sooner we all realize that complete accident reports and careful accident analysis are important as

the only means of determining the cause, the quicker will it be possible to reduce the number of accidents by proper prevention methods and their cost in terms of reduced production, monetary compensation and most important of all the reduction of human suffering.

CHAIRMAN WIBERG: I want to thank Mr. Fuller personally and on behalf of the Section for the amount of work that he has put in in giving us this contribution. The data that you have been given should be something that you can refer to in the future and which should be of great value to you in preventing accidents.

I am now going to ask for the report of the Nominating Committee. Mr. Sanford!

REPORT OF THE NOMINATING COMMITTEE

MR. SANFORD: The Nominating Committee of the Woodworking Section presents the following names for your consideration:

Chairman, E. Ross Farra, U. S. Gypsum Company, New Brighton, Staten Island, N. Y.

Vice-Chairman (Manufacturing Group), J. B. Grier, American Car & Foundry Company, Wilmington, Del.

Vice-Chairman (Logging Group), W. L. Wallace, Edward Hines Yellow Pine Company, Lumberton, Miss.

Vice-Chairman (Sawmill Group), J. I. Thompson, J. J. Newman Lumber Co., Hattiesburg, Miss.

Secretary, A. O. Jackson, Aetna Life Insurance Co., 100 William Street, New York.

Executive Committee, the officers and the following past-chairmen: G. A. Orth, New York City; W. S. Paine, Aetna Life Insurance Co., Hartford, Conn.; G. E. Sanford, General Electric Co., Schenectady, N. Y.; H. G. Wiberg, Lumber Mutual Casualty Insurance Co., New York City; Harry Guilbert, the Pullman Co., Chicago, Ill.

CHAIRMAN WIBERG: What is the pleasure of the meeting? If there are no other nominations, I will hear a motion to accept the report of the Nominating Committee.

H. R. ORCHARD (Marathon Lumber Company, Laurel, Miss.): I make such a motion.

MR. ORMOND (Imperial Furniture Company, Grand Rapids, Mich.): In hearing the names mentioned, I did not hear any names familiar to me from any of the furniture industries. I think it would be a good thing to have one representative on that committee from the furniture industry.

CHAIRMAN WIBERG: Have you anybody in mind that would serve?

MR. ORMOND: We have some men here if they would only make themselves known.

CHAIRMAN WIBERG: Can you suggest the name of one man that you think would do some good?

MR. ORMOND: Is the representative of the American Seating Company here? I don't know what his name is.

CHAIRMAN WIBERG: I am very glad you spoke up. We would like to get the name of somebody that would be an active member.

MR. ORMOND: In Mr. Fuller's paper, he has covered a lot of the facts of accidents that happened in the furniture industry.

CHAIRMAN WIBERG: Have you in mind anybody that would take the place of Mr. Lund?

W. H. YEOMANS (Imperial Furniture Company, Grand Rapids, Mich.): Mr. Griffin or J. J. Frye. Mr. Frye is located in Grand Rapids and he is connected with the furniture industry.

MR. FARRA: I would suggest to you that Mr. Frye be nominated another vice-chairman.

J. J. FRYE: I would like to have you nominate somebody else. I have only been a few months in the work, and my knowledge therefore is not sufficient, I think, to give satisfaction. I think Mr. Griffin, of the American Seating Company, would do better work and give better satisfaction.

CHAIRMAN WIBERG: I think probably the best way to take care of that situation would be to leave the matter with Mr. Sanford and Mr. Farra. They will get in touch with Mr. Griffin, and if he is willing to serve, he will be elected as a vice-chairman in charge of the furniture industry.

Nominating Committee's Report Is Accepted

MR. SANFORD: If you want to leave the matter in abeyance for a day or a week and then send in to Mr. Farra the name of the man that you would like to have, we will be glad to have him. The Executive Committee of the Section is empowered to add vice-chairmen. If someone shows up that they haven't known about heretofore that represents some one certain line, it is the privilege of the Executive Committee of the Section to add that man's name for the year without going through a Section vote.

CHAIRMAN WIBERG: Is there anybody from the box manufacturing industry that knows of anyone that might take some interest in the proposition? We would be very glad to have the furniture people suggest someone.

I am waiting for a second to the motion that we accept the report of the Nominating Committee.

W. H. YEOMANS: I second that.

(The question was put to a vote and was carried.)

CHAIRMAN WIBERG: The next item is the discussion of Mr. Fuller's paper by Mr. McA. Keown, engineer of the Industrial Commission of Wisconsin. Mr. Keown has been working with this woodworking question for a long time. He is very thoroughly conversant with the proposition. He has investigated a great many accidents and examined a great many plant machines and guards. I don't know of any one better qualified to discuss such a paper.

I don't believe he has had a chance to go through it thoroughly because of the large amount of figures and information that the paper contains. However, I am pretty sure that Mr. Keown will give you an interesting talk.

DISCUSSION OF MR. FULLER'S PAPER

**R. McA. Keown, Engineer, Industrial Commission of Wisconsin,
Madison, Wis.**

I can not competently discuss this paper which was so well given by Mr. Fuller without further study. I want to emphasize, however, some of the points that he brought out. The first one is the value of accident prevention. These tabulations that he has presented here are actual facts, and anyone will do well to give those figures careful study so that the experiences of the past can be used in preventing any accident in the future.

Mr. Fuller spoke particularly of the 3,000 major injuries of which 1,777 were at point of machine operation. Of those accidents, a very large number, as he pointed out, were caused by circular saws. The figures that he has given there check out very closely with the accident experiences in my own state, Wisconsin.

Mr. Fuller also mentioned the hazard of the operator's hand slipping into the machine while the machine was operating. That is, I think, a very important cause of accidents, and one which can be pretty largely prevented by the use of slip mats and the proper kind of guards. We so often find guards on saws that are simply a hood over the top, fixed or adjustable, and if adjustable, it is adjusted for the material put through and then becomes no guard at all. The only right type of saw guard, in my opinion, is one that rests on the material while it is being processed and on the table when there is no material in the saw.

The responsibility of employers for accident prevention is very explicit. I think it is almost impossible to have the workmen safe unless the employer does his part, makes the plant safe by furnishing guards, a good type of guard, wherever they may be necessary. That is an incentive to the workman. It is just like good housekeeping. It gives the workman more of an incentive to take some pride in his work and the place in which he works.

Before I came down here, I did not know from the title of Mr. Fuller's paper just what line of discussion he would use. I brought along a few pictures of saw guards. These are not commercial guards, they are guards that have been made in various plants. There were several others that I expected to have to show to you, but they had not arrived.

We have been doing considerable in Wisconsin during the last few years on saw guards. We found that 50 per cent of our woodworking accidents occurred on saws of various kinds, not all circular saws, but saws under the broad classification. In 1923 we had 677 saw accidents. In 1924 we had 637. In 1925, 545. I don't think there were any less saws used, but I do know they are being better taken care of. You can buy on the market now some very good commercial guards. There are still some operations on which there seems to be no satisfactory commercial guards, and it is up to the individual employer to develop the guards for that particular kind of a job.

The jointer accidents that Mr. Fuller spoke of, we have the same trouble with in Wisconsin, 10 per cent of our woodworking accidents being from jointers.

If we can have the slides, I will be glad to explain them to you.

(*Slide.*) This is in the box department of a lumber company. It is just a little side light on that particular guard. The Milwaukee Association of Commerce runs each winter a foreman's safety school. One night I was talking to the woodworking section on saw guards. A number of the individuals showed commercial guards and home-made guards. This was three years ago. One of them showed me a hood over the top, that I mentioned before, which I considered almost useless in the way of a guard. When it came time for the discussion, a foreman from this particular plant said it was the best guard I showed, in his opinion, and that he wanted to see the saw. There was no doubt about that. That brought on quite a lot of discussion and others didn't agree with him.

He went back to the plant and the next winter he brought up a saw table with that guard on it. It is cutting box material, half the table splined. You will notice there is a spring here. This guard rests on the splitter here and is also forward. As you push this part of the table, the guide comes against it and the guard recedes until the piece has been cut. It has no movable side wing.

Another Guard With Splitter and Slide

(*Slide.*) Here is one developed in the Kiwechefer Container Company. Here is the splitter and the slide. This piece has a slot in it going over the pin and a spring inside that barrel which keeps the pull forward. That is somewhat similar to the other, except that it has the adjustable side wings. That was developed in that particular plant about three years ago.

(*Slide.*) Here is one that is used in a box factory for a sliding table. The particular thing they do on this saw is make Kraft cheese boxes. They take 12 thicknesses of material. It is just a wooden veneer hood, made of veneer stock. This part up here is adjustable. Whatever the width of the material is, it is adjusted so that that projecting part comes out in front just as with the material, so that as you push your table forward, you don't see the saw at all. The whole hood is pushed back against the spring. As you withdraw the table, the hood follows back to the forward. That was developed in the Keel Woodenware Company.

(*Slide.*) Here is one that is rather crude. All they had at first, however, was the cast iron guard that covered the upper half of the saw. They then took veneer stock and put side wings on it. I think they had several accidents before they put them on. They haven't had any, as far as I know, since then.

This comes out pretty well to the front and does not give you a whole lot of protection. It could be changed somewhat to take care of that.

(*Slide.*) Here is another home-made one. It is rather crude look-

ing, as you can see, but it is pretty good protection. This slides up and down on the back. It is an overhead swing saw.

(Slide.) I have one more of this. This is for an under saw. These are loose pins that move up and down as you pull the lever forward to bring the saw out in the open. The whole thing drops and the pins come down until they strike the material or the table, if there is no material. I think the next slide will, perhaps, show that a little better.

(Slide.) This one shows it down, the saw forward and these pins which are loose upset at the upper end and striking the table and the saw. I don't think that would be very satisfactory in a plant that is a production plant, because they do bend these pins. They are perhaps five-sixteenths of an inch in diameter. It, however, shows what somebody was trying to accomplish.

A Guard for the Under Swing Cut Saw

(Slide.) Here is another one for the under swing cut-off saw. It is a home-made guard. This is all wood. This is made of wood bound with strap iron. It has been guarded in that way for perhaps five years, and they haven't had any accidents since it has been so guarded.

(Slide.) Here is another one for the under swing cut-off saw. The hood is fastened to the extension on the arm.

(Slide.) Here is another one where there is an arm fastened. These slots are made to fit the particular work that is being done.

(Slide.) Here is another one where the back rest is cut out.

I have not shown these with the idea that they are 100 per cent guards. What I want to convey is that people are interested in the guarding of these dangerous machines, and they have some man in the shop, some foreman, design a guard. That is his guard, and he takes more pride in it than if some party from the outside came in and told them to put on a certain kind of guard.

The Ward Hemlock Company has a quick action under-swing saw with a guard that I haven't the picture of, which is very interesting. The saw is guarded entirely when the saw is in position, with a cast iron guard. They had a number of accidents on this saw. The men always had to use gloves, because it cut their hands up. Fortunately, they had no serious accidents. One of the men in the plant decided that he could guard that. They cut off this cast iron hood, and put on a separate one that is operated not from the saw itself, but from the floor, connected to the floor, and from there to the swinging saw and it works fine. They haven't had any accidents. It has only been put on since this summer. There is no objection on the part of the operators to using it, and that is a great thing in saw guards.

CHAIRMAN WIBERG: I think in accordance with our regular procedure, we will have the other papers and then come back and discuss them if any one has any points.

Our next paper will be given by Dr. David Shapiro, who happens to

be connected with the same company that I am. He will give us a talk on first-aid out of the experience of at least 14 years of industrial surgery work. During that period he has come in contact with thousands and thousands of different types of injuries and different requirements for their treatment.

PRACTICAL SUGGESTIONS FOR EFFECTIVE FIRST AID.

Dr. David Shapiro, Medical Director, Lumber Mutual Casualty Insurance Company of New York, New York City.

From both humane and economical view-points, the subject of first aid is of vast importance. Its economical value consists in preventing the loss of service of employees and decreasing the cost of insurance by keeping down the loss experience on the risk. I shall therefore endeavor to impress upon you several of the practical principles in the application of first aid. First aid treatment is not intended to replace the services of a physician, but to prepare the patient for the treatment that is to be instituted by the doctor upon his arrival, which frequently may be delayed by various circumstances.

In all instances where the injury is not a very minor one, a physician should be summoned, because there are injuries not alone to the various internal organs, but even superficial wounds which may appear trifling at the onset but become of serious consequence if surgery is not resorted to as soon as possible. The results obtained very frequently depend upon the intelligent handling of the injured individual immediately after injury is sustained; therefore, I would suggest that every employer assign at least one, and if possible two, persons in his employ who will be prepared to handle emergency cases by having made a thorough study of the principles of first aid. The all-important factor in the application of efficient first aid, is calmness and collected thought on the part of the individual administering it. Several of the conditions with which you are confronted quite frequently, will be taken up briefly in the order of their importance.

The first is the condition commonly known as shock, also termed collapse or prostration. This varies in degree according to the severity of the injury and is recognized by faintness, at times complete unconsciousness, extreme pallor, profuse and cold perspiration, shallow breathing with very rapid pulse. Collapse is thought to be produced by a dilatation of the internal blood vessels, thereby causing a stagnation of blood internally; treatment must therefore be directed toward accomplishing an adequate circulation.

Where patient is suffering from shock, medical aid should be summoned immediately, but before the Doctor arrives, lay patient flat on the back, and if possible, with head lowered in order to have blood rush back to head; loosen clothing and apply external heat to the extremities by means of hot water bags, heated blankets, etc., after hav-

ing first made certain that applications are not hot enough to cause burns of the skin. If patient is unconscious and, therefore, unable to swallow, do not force stimulants into the mouth as it may cause death by strangulation. If unable to swallow, use inhalation of smelling salts or ammonia water that has been well diluted. If capable of swallowing, give one teaspoonful of the aromatic spirits of ammonia in water, or whiskey well diluted. In the absence of any stimulant, a small quantity of hot water may be given.

The second condition to which our attention must be directed is hemorrhage. The symptoms of excessive bleeding are exactly similar to those occurring in shock. Hemorrhage must be controlled immediately, as it greatly lowers vitality and may cause death. Slight bleeding from a superficial abrasion, or more particularly from a punctured wound of a limb, should not be interfered with; in fact a little gentle squeezing of area so as to increase the amount of bleeding will frequently prevent infection, by blood actually washing out the wound. This should always be carried out after perforation of the skin by nails, rusty metal, splinters, insect bites, etc.

Procedure for Profuse Bleeding

If bleeding is profuse, first expose the wound by cutting away clothing, then determine its exact site of origin. There are various sources from which bleeding occurs: 1st, from arteries; 2nd, from veins; 3rd from the very small vein vessels known as capillaries. In arterial bleeding, the blood is bright red and is expelled in jerks. In bleeding from veins, the blood is a dark blue color and escapes in a steady flow. In capillary bleeding the blood is dark red and oozes out gradually.

The temporary treatment for bleeding from arteries, the blood flowing from the heart into arteries and outward toward ends of extremities, should consist of forcibly applying direct pressure with the thumb along the course of the blood vessel, between the bleeding point and the heart and a short distance above the site of bleeding; pressing this area very firmly against the underlying bone. While it is thus held have some one else apply a tourniquet.

A tourniquet must be applied very tightly, otherwise it is of absolutely no value. The most effective type of tourniquet is made of rubber tubing on elastic, and in their absence use anything available such as a handkerchief, necktie, bandage, or cord. A small pad, preferably of folded gauze, (a pencil or other solid object may also be used), is placed directly over the artery a short distance above the bleeding point and the tourniquet is wrapped tightly about the object, making certain that pressure is sufficient to compress the artery and thereby stop the flow of blood.

Where bleeding is from a vein remove all bands such as collars, belts, garters, etc., as slight pressure only increases bleeding by preventing circulation. The limb should be elevated and direct pressure applied

over the wound by means of a finger covered by a small pad of gauze. Bandage should then be firmly applied.

If bleeding is capillary, and the blood simply oozes from the wound, pressure applied directly over site of incision by means of a gauze pad, will generally cause it to cease within several minutes.

Injuries to Bones and Soft Tissues

The third condition to be considered is injury to bones or soft tissues in which skin remains unbroken. There are several essential points to be remembered in differentiating the various types of injuries that may be sustained. These may be classified into four divisions: 1st, bruises; 2nd, strains; 3rd, dislocations; and 4th, fractures.

A bruise only involves the skin and tissues immediately beneath it, and is characterized by localized pain, discoloration of skin and swelling; but it does not produce any interference with the normal function of the limb.

Strains affect the muscles and are recognized by the pain complained of upon attempted motion, but the extent of motion remains normal. The skin is not discolored or swollen.

Dislocations affect the joints and are diagnosed by the presence of deformity, the entire contour of the joint being changed; there is severe pain complained of at the site of the deformity, with a total loss of voluntary motion at the joint. All attempts at manipulating joint are strenuously resisted by the contraction of the muscles in the area affected. Examination reveals an increase in motion at the joint in abnormal directions, and a marked decrease in motion in normal directions.

With fractures, usually very severe pain is manifested upon attempting to use the limb: there is marked discoloration of the skin and swelling appears very rapidly. Upon the application of direct pressure, a distinct point of severe tenderness can be located. If fracture is incomplete, that is, if it simply consists of a crack through the bone structure, the chief symptoms consist of pain complained of upon attempted motion, with swelling and discoloration of the skin. If the fracture is complete and the fragments are in perfect apposition, the above signs are noted, but with them a sign called "crepitus" is found; this consists of a grating sound that is produced when the fragments are manipulated against each other. Motion is also found to exist at an abnormal site. If the fragments are displaced all the above signs are found, but to a very exaggerated degree; especially, the fact that free motion occurs at an abnormal site. The limb becomes soft and bends like a hinge at site of fracture.

The first aid treatment as applied to the foregoing should consist of the following:

For simple bruises or contusions, expose the part affected and devote attention to the relief of pain. This is best brought about by the appli-

cation of extremes of temperature, either cold or hot, preferably cold, such as ice applications.

For muscle strain, keep the part at total rest. Heat applied locally followed by a thorough massage is of distinct value. Alcohol, witch-hazel, chloroform, liniment or the like may be used as they frequently relieve pain. The part should be kept at rest for several days and active motion then resumed.

Treatment for Dislocations and Fractures

For dislocations, the head of a bone having slipped out of its socket, it must, therefore, be replaced. Dislocated fingers can usually be replaced by firmly grasping the finger and pulling directly forward. For the larger joints, have the patient lie down at complete rest and send for a physician. If patient must be moved, apply splint to the limb as in case of fractures, so as to keep the limb at rest, until medical aid can be provided.

For fractures to long bones, as in the arm or leg, apply a splint made of wood, cardboard in several layers, wire gauze, tin, etc.; these splints should be very well padded with cotton or anything soft available and the injured part bandaged firmly to improvised splint so as to prevent motion at the site of fracture; then obtain medical aid. There are a few sites of fractures that require special consideration.

The treatment for fractures to the clavicle, commonly known as collar bone, is as follows: a pad made of cotton or folded handkerchiefs should be placed in the arm pit on affected side, then bring the elbow firmly against the side of the body, bringing it backward as far as possible; bandage securely to side of body. The hand should be elevated on the front of the chest, palm lying flat on chest, and kept in this position by applying a bandage over the uninjured shoulder thereby supporting the elbow on the affected side at the same time, and preventing the injured shoulder from drooping. This will overcome any overriding of the fragments.

For fracture of skull, the patient should be kept at absolute rest, lying flat on back with head elevated. Treat as for shock. Apply ice bag or cold application to the head and obtain the services of a physician as soon as possible.

For fracture of spine, patient must be kept lying flat on back. It is very essential to remember that when any attempt at moving the injured individual is made, the body should not be raised from the level surface in order to be placed on stretcher or bed, but improvise a stretcher and slip under the body; then move very gently, being extremely careful not to bend the spine.

For fractured ribs, a long towel about eight or ten inches wide should be bound very tightly and securely around the chest.

The fourth type of injuries to be considered are those in which the skin is actually broken. These may be divided into three groups: 1st, incised; 2nd, lacerated; and 3rd, punctured wounds.

Incised wounds are those produced by sharp instruments, such as knives, glass, ax, chisel, etc.

Lacerated wounds are those in which the tissues are torn or crushed; as in fingers caught in machinery, cuts by various types of saws, grooving machines, etc.

Punctured wounds are usually deep, the entrance into the skin being of small size, and are produced by splinters, bullets, stab wounds, nails, etc.

To Control Excessive Bleeding and Infection

In injuries of this type there are two things to be considered: 1st, the control of excessive bleeding, and 2nd, the prevention of infection.

The wound should be thoroughly exposed immediately after being sustained. If bleeding is severe, control the flow of blood by methods previously mentioned. If merely oozing, disregard bleeding entirely and cleanse the injured part very thoroughly. I prefer doing this by first immersing a piece of sterile cotton or gauze in benzine or gasoline and rubbing this sufficiently over the wound and the entire surrounding area to remove all accumulated dirt; this is then followed by washing thoroughly with soap and hot water. Do not hesitate to allow soap, benzine or gasoline into an open wound. The majority of infections can be prevented if wounds and surrounding skin are thoroughly cleansed as soon as injuries are sustained.

For incised wounds, after thorough cleansing of the external surface apply a solution of the tincture of iodine that has been diluted with an equal amount of alcohol into the wound, and pull edges together by means of a very narrow but long strip of adhesive plaster placed across the wound; apply a sterile gauze dressing and bandage. Refer to a physician for subsequent care. If medical services are not obtainable and the injured part becomes very painful, red and swollen, it is indicative of an early infection.

The ideal treatment for this condition is to immerse limb in a basin of hot water for a period of at least a half hour, hot water being added from time to time so as to keep the temperature of water constant; repeat this procedure at frequent intervals. In my opinion bathing the limb in hot water as described has accomplished more toward localizing infection, that is, preventing its spread, than any other method tried by me in the care of thousands of wounds. When there is evidence of infection, by all means obtain the services of a physician.

For lacerated wounds in which there is an actual destruction of tissue, first cleanse very thoroughly as previously described, and then apply a sterile dressing saturated with a mild antiseptic solution such as boric acid, and keep dressing constantly saturated with this solution for at least 48 hours. Strong solutions such as peroxide, bichloride of mercury, pure tincture of iodine are not only of no value but are detrimental toward healing, as they actually destroy the cells exposed to their con-

tinued action. After experimenting in the care of a great many wounds over a period of several years, I am firmly of the opinion that my best results were obtained through the use of wet dressings. These wounds appeared to heal more rapidly and produced the least amount of permanent defects, such as contracted scars, etc.

There is one other extremely important feature that I want to impress upon you and that is, to make certain that a fresh preparation of Tetanus antitoxin is obtainable at all times, and that its administration is called to the attention of the attending physician within a very short time after deep perforated wounds are sustained. I can recall several occasions where failure to administer the antitoxin has been the direct cause of a fatal result.

Splinters, and Foreign Bodies in the Eye

For removal of splinters, use pincers provided in first aid kits, or in their absence use a needle, after having first passed it through a flame. After removing splinter, soak limb very thoroughly in hot water, cleanse, and apply bandage. If splinter is deeply embedded in tissue, apply a wet dressing and refer to a physician, as meddling at site of splinter will frequently cause it to become deeply embedded in the tissues, making it very much more difficult to be removed. Do not under any circumstances seal a perforated wound with collodium, new skin, etc., because if infection appears it will spread rapidly, if there is no proper drainage.

For foreign bodies in eye use an eye cup, filled with warm boric acid solution; wash the eye, do not rub, as it only serves to embed the foreign matter more deeply into the eye ball. If this fails, grasp the eye lash of the upper eye lid by means of two fingers, using the thumb and index finger, pull the upper lid over the lower one, repeat several times. If foreign matter is still present after these attempts to remove same have failed, apply a wet pad over eye, tie with a bandage or handkerchief and obtain medical aid. Do not under any circumstances allow anyone but a physician to introduce an instrument of any kind into the eye, as it will undoubtedly produce disastrous effects.

For poison ivy: wash the limb thoroughly with soap and water and apply a large strip of gauze soaked in a saturated solution of epsom salts. Keep the dressing constantly wet with the solution.

This discourse could be continued to cover many other varieties of injuries, but in a limited paper it is impossible to discuss them all. I shall feel particularly grateful if I have been able to impress upon you the importance of the following:

First: Having at least one intelligent individual in each office who is qualified to administer first aid, by having carefully studied the subject.

Second: Supplying yourselves with a completely equipped first aid outfit.

Third: The treatment of shock and the controlling of excessive bleeding.

Fourth: The cleansing of the wound and the entire limb by use of soap and hot water, also benzine or gasoline, immediately after injury is sustained.

Fifth: Soaking an infected wound, for prolonged periods, in hot water, repeating this procedure very frequently.

Sixth: The extreme importance of using Tetanus antitoxin for all perforated wounds.

In conclusion, gentlemen, remember that first aid applied at the time the injury is sustained, is, as its name implies, purely in preparation for all treatment that must be subsequently instituted by a regularly licensed physician. Do not take the responsibility upon yourselves to treat the injured individual after your initial services have been rendered.

CHAIRMAN WIBERG: I think that Dr. Shapiro has brought out several valuable points. I know on the question of hot water treatment, I have had a couple of cases of minor infections in my own family, and the doctor that we had did just what was recommended by Dr. Shapiro.

Yesterday, we had the moving picture given by Mr. Northrup of the State Labor Department of New York. That moving picture was based on some 300 accidents that were reported to Mr. Reid of the Labor Department. This morning we will have a paper by Mr. Reid.

ACCIDENTS IN WOODWORKING

Herbert L. Reid, Safety Inspector, New York State Department of Labor

The safety inspectors of the New York State Department of Labor are engaged in investigating recent accidents in the different industries, after which an analysis of the accidents with suggestions as to their prevention is issued and sent to the manufacturers in these industries.

Last year I made an analysis of 300 accidents in woodworking factories, each one of which occurred in a different factory. These accidents were personally investigated by myself and another safety inspector.

The compensation statistics in our state show that the ratio of accidents to the number of employees in the woodworking industry is not as high as in some of the other industries yet the percentage of permanent injuries is higher in woodworking than in any other industry. The circular saw still maintains its place as the great accident producer. Over \$700,000 was paid in compensation during one year in New York for accidents occurring on circular saws (about 1,000 accidents): the total compensation for that year for accidents on all woodworking machinery was about \$1,100,000. There is only one machine in industry on which more accidents occur than the circular saw and that is the power press.

The operation of woodworking machinery is very dangerous owing to the degree of sharpness at which the tools must be kept, and the high speed at which the machines are required to be run, if a well finished article is to be produced.

Among circular saw accidents the one due to pieces of stock "kicking back" is very prevalent. Of 113 accidents which occurred on circular saws, 32 were caused in this manner. Many persons are of the opinion that all "kickback" accidents injure the operator's body, but this is not a fact, for of the above number, 12 injured the body and 20 caused injuries to the fingers or hands. Twenty-two of these accidents occurred during the operation of ripping or cross-cutting. Twelve occurred while ripping and two while cross-cutting pieces of wood, caused by the wood binding between the saw and gauge, or by the wood pinching and riding up on the back portion of the saw. Three occurred when the waste piece which had been cut off the end of the board caught on the back of the saw and was thrown back striking the operator's body. Three occurred when the operator was pushing the stock past the back of the saw after the cut was finished, in one case striking the operator over the heart and causing his death; in another the saw struck a knot in the board causing it to break and kick back; and in the third the operator picked up a piece of stock and while passing it over the saw dropped it on top of the latter.

Many Contributing Factors to Accidents

Contributing factors to this type of accident may be as follows: improperly seasoned or damp wood which tends to pinch the saw; cracks or knots in the wood which cause the boards to break when the saw strikes them; a dull saw or one that has been improperly filed or set.

The hazard of a dull saw or one not properly filed or set can not be too strongly emphasized, for during the investigation of these accidents I noted that many of the saws were in this condition; so it is safe to say that the primary cause of many accidents on saws is due to lack of knowledge how properly to file and set a saw. Other causes of accidents on circular saws include placing the stock down on top of the saw to cut a blind "kerf" or slot, when the board catches on the saw and kicks back. This type of accident could be prevented if a stop were provided on the gauge or table against which to hold the stock. Another unsafe practice is using the hand to remove waste pieces of stock lying on the saw table when the saw is not protected by a guard.

Then there is the unsafe practice of the operator keeping his left hand on a narrow waste piece of stock as the cut is about finished. Accidents of this type occur even when the saw is guarded and to workers who have had many years experience around woodworking machines.

Accidents are also due to using a removable plate or throat piece which has a slot much wider than the thickness of the saw blade; thin pieces of stock are liable to become caught between the edge of the slot and the saw.

The question of safety in the operation of the circular saw has prob-

ably caused more discussion than in the case of any other machine, and often the question is asked, what has it accomplished?

The reason more accidents have not been prevented by guarding circular saws, is that practical saw guards have only recently been manufactured. Numerous types of saw guards have been made, both commercial and by individual employers, but hardly 10 per cent of them were used after they were installed. For in the past not enough thought has been given to seeing whether the guard afforded adequate protection to the operator, or if it was the proper type for the kind of work to be performed.

A practical saw guard must be substantial and rigid enough to protect it from a rubbing contact with the saw, but still preserve sufficient lightness to permit of easy handling.

Guards which give a good view of the saw are to be preferred to the solid type, and those made of the softer metals are recommended as savers of good saw steel, eliminating much of the breakage experienced when harder metals meet the blade through accident.

Make the Guard as Fool Proof as Possible

Some steps should be taken to make the guard as fool-proof and as automatic as possible. It should adjust itself to the varying thickness of stock and the supports should be made so as not to interfere with the work.

When circular saw blades are not in use they should be placed in such a position that the teeth are protected against accidental contact. Serious accidents have been caused by workmen striking saws hung on a post where the teeth projected beyond the post edge.

It is important that the person in charge instruct new employees in the proper operation of circular saws, especially the necessity of close attention to their work and the proper manner in which to hold the stock being sawed.

It is dangerous to allow pieces of stock to remain on the saw table where they may be brought in contact with the saw and thrown back. Also it is important to keep the space about the machine free from loose material which might cause tripping and falling.

The spreader or splitter is a very essential part of circular saw guarding, and if proper spreaders were provided and used whenever practicable many accidents would be prevented. The spreader must be rigid, set in true alignment with the saw, and slightly thicker than the saw blade. It should be set not over one-half inch back from the saw.

Where different diameter saws, or those of varying thicknesses, are used on the same machine, an equal number of spreaders can readily be set up in different throat pieces which may be inserted in the saw table for each size saw. A "kick back" pawl should be provided on all guards. Many of the standard makes of guards have pawls attached to them, but they are not very effective except on automatic guards, for the operator does not adjust the other guards close enough to the stock to bring the pawl in contact with the stock.

Saw guards that are not automatic should always be so adjusted that there is only working clearance between stock and bottom of guard.

Accidents on handsaws as a rule are either caused by dull saws or are due to an unsafe practice, such as cutting the end off a round piece of stock without first attaching a strip of wood to prevent it from turning, adjusting the guide with a saw in motion, or removing waste pieces of stock while the saw is in motion.

The swing saw is probably the safest type there is to operate, yet accidents occur on it, due in the majority of cases to the unsafe practice of straddling the saw while making the cut, i. e. holding the stock on one side of the saw and pulling the saw across with the other hand on the opposite side of the saw from which the hand holding the stock is located.

The machine causing the second largest number of accidents however is the jointer. There should not be such a large number of accidents on jointers and they could be reduced if proper guards were provided and kept in working condition, and if safe practices were observed.

The "kicking back" of stock occurs on the jointer almost as frequently as it does on the circular saw and in the main is due either to attempting to joint or face short pieces of stock or having the table set for too deep a cut.

Guards will not prevent accidents if the workman persists in doing his work in an unsafe manner.

A Push Block to Make the Jointer Safer

The planing of short pieces of wood on a jointer is dangerous and should be avoided as much as possible. Where it is necessary to do such work a push block or some other suitable device should be provided and used. Such a device would eliminate the danger of the stock being thrown from the operator's grasp and his hands caught by the cutter head.

Another unsafe practice of workmen is putting a pin through the guard. This pin passes down along the edge of the jointer table and in this manner the guard is held away from the stock, thus creating a condition the same as if the guard was not attached to the machine. Other unsafe practices are keeping the hand on the end of the stock when it is passed over the cutter head, or holding the fingers over the edge of the stock while doing a facing operation.

Many persons are of the opinion that since the cylindrical cutter head has been installed that an accident on the jointer will result in only a laceration and will not cause the amputation of the fingers, but this is not a fact. Accidents have been investigated where the back of the operator's fingers have come in contact with the cutter head and the knuckle or bone of the finger was gouged out, resulting in amputation at the first or second joint. In one case the operator had a small

portion of the knuckle of the first joint of four fingers gouged out and they had to amputate the first joint of each of these fingers.

When jointing short pieces of wood it is a safe practice to note the direction of the grain of the wood (this is called graining the stock) and always push it over the cutters with the grain. This would prevent many accidents that are caused by wood "kicking back" when it is pushed over the cutters against the grain.

It is an unsafe practice to hold the hands on front end of stock when starting cut; also, when finishing cut, the hands should not be on end of stock while it is being pushed over cutter head.

In some shops it is a practice to put cutters on the jointer head to make mouldings. Often this is done by removing the arc pieces from two sides of the jointer head and then attaching cutters. To provide clearance for the cutters they move back both the front and back tables of jointer which causes a very great hazard.

Then they leave the jointer set up this way after the special operation has been finished. This is a very unsafe practice for another employee is apt to start the jointer and, thinking it is in regular operating condition, injure himself severely.

Jointer guards should be so constructed and set that the point of contact of the guard and gauge will be directly over the cutter head at all times, no matter in what position the gauge is on the table.

The front and back tables of the jointer should be set as close to the cutter head as possible, leaving only proper clearance for cutters and shavings.

The Shaper Always Considered Very Dangerous

The shaper, or what is commonly called the variety machine, has always been considered very dangerous but the percentage of accidents on this machine is not as large as is generally supposed. Here again many of the accidents are due to the stock "kicking back."

There are several ways in which this type of accident occurs, such as pushing the piece of stock against the cutters too suddenly; not holding the stock securely when the cut is nearly finished; making too deep a cut at one time, especially when cutting a groove or sinking a panel. Also starting the cut against the grain of the wood. Other causes of accidents on shapers are backing pieces of stock against cutter head, not using a form or jig to hold small pieces, also having fingers over edge of stock on the side where the cut is being made.

Before starting to shape a piece it is a safe practice to note the direction in which the grain of the wood runs and to start the cut with the grain and not against it. Of course this is not always practicable.

When a circular saw is used on the spindle of a shaper, even if a fence or gauge is used to hold the stock against while doing the operation, there should be a cover over that part of the saw which is exposed at the back of the fence or gauge.

Guards for shapers should not only cover the cutter head, but also provide a certain amount of tension on the stock.

Accidents on sandpaper machines are either due to unsafe practice or not keeping the equipment in proper working condition.

Self-feed circular saws have caused accidents due to pieces of the stock breaking off and being thrown back when caught on the back of the saw blade; this could be prevented by equipping the saw table with a spreader.

Accidents on speed lathes are caused by the operator not having the spur center properly inserted in the end of the stock or holding the stock in such a manner as to catch the operator's finger between the stock and tool rest.

Some of the causes of accidents with hand tools, are, not using the proper tool for the operation to be performed, a dull tool, one not in proper condition, or not held in the proper manner.

In one case a workman was injured while using a chisel to remove glue instead of a glue scraper. In another instance a workman was holding a piece of wood in his hands while cutting it with a chisel which slipped; a dull chisel will slip easier than a sharp one.

We have all heard of persons injured by flying nails. I recall an accident in a factory manufacturing packing boxes. A workman was struck in the eye by a nail he was driving into a box, and lost the sight of the eye. I inspected the hammers and hatchets used by the workmen in this factory and found that every one had the head either chipped off or badly mushroomed.

CHAIRMAN WIBERG: On behalf of the Section, I want to thank Messrs. Reid and Northrup for coming and giving their papers and the pictures. I also wish them to convey to the State Labor Department our thanks.

Mr. Fuller mentioned in the paper that he read that the operator isn't always the one that is hurt, and Mr. Reid brought out the same thought.

We are going to have the pleasure of seeing a film made by the American Car & Foundry Company. This film was made for the benefit of the personnel of the Berwick plant at Pennsylvania. You are going to receive the usual holiday wishes for the first time this winter season in connection with this picture. We will now have the picture.

(Pictures were then shown of the American Car & Foundry plant at Berwick.)

ADJOURNMENT

Joint Meeting Woodworking and Paper and Pulp Sections

October 28, 1926

HERBERT G. WIBERG, Chairman, Woodworking Section
Chief Engineer, Lumber Mutual Casualty Insurance Co.,
New York City

W. J. PEACOCK, Chairman, Paper and Pulp Section
Head, Department of Personnel, Northern Paper Mills Co.,
Green Bay, Wis.

THE Joint Meeting of the Woodworking and Paper & Pulp Sections convened at 9:30 o'clock at the Tuller Hotel, Detroit, Michigan, Mr. Herbert G. Wiberg, presiding.

CHAIRMAN WIBERG: The session this morning is a combination of the Woodworking and the Paper and Pulp Sections. The first paper will be by Mr. Hartley of the J. J. Newman Lumber Company, which company conducts lumbering and logging operations very extensively.

SAFETY IN THE WOODS

L. H. Hartley, Safety and Welfare Department, J. J. Newman Lumber Company, Homochitto Lumber Company, Hattiesburg, Sumrall and Bude, Mississippi

"Safety in the Woods" presupposes the idea that there is a need for an organized safety effort in the logging industry. The fact that you gentlemen are present proves that you are believers in the results that safety can obtain.

Before going into a discussion of the actual methods of placing safety in the woods, it will be necessary for us to discuss first the different hazards and conditions peculiar to the logging industry.

Down in the sunny south, where unskilled labor is about 60 per cent colored and 40 per cent white, this produces a little different condition from that in other parts of the country where the matter of "Race" has little or nothing to do with the work in industrial organizations. The colored race in the south is largely an ignorant class of people. The majority of them can neither read nor write their own names.

The white people living in logging camps are usually a class of people whose education is mostly confined to the meager opportunities of the camp school, which is in session approximately six months of each year. When the boys reach the age of 14 to 16 they are taken out of school and are put to work driving an ox team, sawing logs or other unskilled labor found in the logging business.

The logging operations, as a general rule, (and such is the case with the J. J. Newman and Homochitto Lumber Companies) are from 15 to 50 miles from the plant where the raw material is manufactured into its finished product. The logs are hauled from the woods over a railroad known as a "dummy line." The workmen are transported from the camps to their place of employment by an engine coupled to one or more cabooses and over tracks on which the ordinary common carrier would not even run a work train. The same precautions in building logging railroads can not be taken as in building railroads such as you and I are accustomed to riding on, because the dummy lines are thrown on top of the ground in a hurry and seldom remain over a period of 60 or 90 days until they are torn up and placed in another location. As soon as one tract of timber is cut out, teams, skidders, loaders and employees are quickly transferred to another location. Therefore the railroads in the logging industry are merely temporary propositions. Wrecks are not at all infrequent, but the shay engines, which are gear locomotives, unlike the rod engines, and sound like they are traveling from 60 to 80 miles an hour, run so slowly that when a wreck does occur there is seldom anyone injured.

The Rail Laying Machine Described

In building our road-bed a machine known as a "rail-laying machine" is employed. It is a form of flat car with an arm at either side running to about eight inches above the surface of the ground. On either side of this flat car runs a set of chains and they continue down the two arms and underneath the car. These chains are operated by an engine at the rear of the flat car. Ties are loaded onto this flat car and are carried by the movement of the chains and dropped to the ground, getting their proper distance by the use of a shay engine which pulls the rail laying machine. Workmen then follow the machine and lay the steel, and in this way the building of track is greatly expedited, but additional hazards are created against which few protective devices are available. Brain work is the greatest factor in preventing accidents in this kind of labor.

The log sawyers are placed in a position where the human brain is practically their only safeguard. The trees have to be felled where they grow, whether it be in a swamp, on a hillside or on the level. Constant care alone prevents the men from being injured. We were at one time confronted with a number of injuries caused by what is known as "kick-backs." After the sawyers had felled their tree, the butt end of the tree would frequently kick-back over the stump and cause an injury. This has been practically overcome by first "gapping the tree." This is nothing

more than cutting a notch in the tree, on the side towards which it is intended to fall, and below where they intend to saw; then when the tree falls it will break off where it has been gapped, leaving an offset, and the butt end of the tree will lodge against the stump, thus avoiding the kick-back. Our log sawyers work on a contract basis. They furnish their own saws, axes, etc., and are paid by the thousand feet of lumber cut. They oftentimes let their tools get in a bad state of repair; however, we endeavor to impress upon them the necessity of keeping their tools in good condition; and through this means the sawyers hazards are materially reduced.

After the trees have been felled, the next in line is the skidder operation. This is where the greatest danger in logging lies. Oftentimes the skidder is located a quarter or half-mile from the log it skids to the track.

The Skidder Takes Everything In Its Way

The skidder is merely a high powered machine, operating from two to four lines, with a drum man in control of each line. The lines are carried to the woods, generally by a mule, but in thick timber or exceptionally hilly country, (as is the case in the Homochitto woods), a mechanical rehaul line is used. We have four skidders in operation. After the skidder line is carried to the woods an employee, known as the "tonger," hooks the line to the log, and a whistle signal is then given to a drum man to pull in his log.

Everything in the way of the line and log goes with it, whether it be human being, beast or reptile. Its power is so great that it has been known to tear out embankments and break down other trees; and with the tonger oftentimes out of sight of the drum man, the workmen have to depend entirely upon the accuracy of their signals in order to prevent injury.

Accidents, however, have been very materially reduced on the skidders. We have not had a skidder accident in over nine months. This has been accomplished by constant drilling of the proper signals and by extreme care upon the part of every one of the score or more men employed. One foreman, who felt his inability to cope with the accident evil, adopted what is known as his "Morning Prayer and Safety Service" which usually takes about 15 to 20 minutes; and his skidder has had but one slight injury in the last two and one-half years.

After the logs have been skidded to the track and roughly piled into what are known as "log decks," the skidder then moves on to another location and is followed by the loader. We have from two to three loaders to each logging operation. The loader is somewhat similar to the steam shovel used by railroads, only in place of the shovel there is a set of tongs which are hooked onto the log, and the loaderman then lifts the log onto the log car. The log car is merely an unbedded flat car, and on this car is an employee known as the "top loader," who places the logs in the proper place and unhooks the tongs. The loaders employ approximately 25 men. Tongs frequently slip from the log when

the bark slips off, or when the tongs are allowed to become dull they sometimes fail to hold. If the tonger becomes careless and fails to fasten the tongs securely to the log, the log will invariably slip. Here extreme care must be taken, because if a log ever slips from the tongs it places the top loader in grave danger. We had had one or two deaths and several serious injuries because of a log falling from the loader boom. The loader employees are carefully instructed, and instructions repeated at proper intervals, how to stand on and about the cars and decks in order to avoid all possible danger in the event of such a mishap. Loader accidents have been reduced during the past two years approximately 75 per cent, and we have put on numerous "No Accident Month" campaigns with good results.

After the logs are loaded they are then hauled from the spur tracks onto the main line, where they are carried to the plant and unloaded into the log pond, ready for the mill to cut the next day.

Cooperation Between Men to Avoid Accidents

We have a number of section and bridge crews at work in each woods operation building and keeping up tracks, bridges and clearing away wrecks; and as generally is the case, we have been confronted with the usual type of section accidents, such as strains and "the other fellow letting his end of the rail or tie down too soon," thus bringing about a mashed toe or foot, and other similar needless accidents. We worked with these men, endeavoring to teach them to work together, especially in lifting heavy steel and bridge stringers; also how to lift in order to run less risk of straining themselves; and section accidents have practically been eliminated.

Besides the crews I have just mentioned, we have the teams, grade crews, right-of-way crews and numerous other departments in the woods, in which accidents frequently occur.

Now that we have described our logging operations, in that we have built our railroads, cut the trees, skidded the logs to the track, loaded them onto the flat cars, carried them into the plant and dumped them into the pond, I shall endeavor to tell something of the safety campaign we have waged and of the department known as the "Safety and Welfare Department."

It is needless to say that the management of our companies are thoroughly sold on the work of the safety and welfare department, otherwise our efforts would all be in vain; our management is strictly in accord with our movements, and next to be considered is our foreman.

The foreman is the key-man in the logging industry, just as he is the key-man in any industry. He is the point of contact between the management and the men. By his attitude he can materially affect the morale of the men under him. The foreman, in the eyes of the workmen, is the company. If the foreman believes in safety and practices his belief and talks it among his employees, his men will soon catch the spirit. Our experience has been that it is the foreman one must first interest and sell the safety idea to.

There are many different ways of engaging the foreman's attention and enlisting his support in the safety work. No foreman would wilfully injure one of his workers. All good foremen are vitally interested in keeping production figures high and cost figures low. Through safety measures all of these highly desirable ends may be accomplished. By frankly letting our foremen in on our plans we have gained their wholehearted support.

The biggest task of all is that of selling the safety idea to the men themselves. We have gone about this in two ways: first, by correcting all the hazards we could find; and second, by trying to educate and encourage our men into the *habit* of being careful. We first made a careful survey to determine what injury hazards might be corrected through mechanical measures and then proceeded accordingly. We covered up all exposed gears on shay locomotives, skidders, loaders, rail-laying machines and motor cars. We built cabooses, or "dog houses," for the men to ride in, instead of allowing them to ride on the open flat cars, and we insisted upon them riding in them. We devised a special link knife, and make our switchmen use it or a stick in making couplings. We provided our motor cars with safety railings and see to the proper piling of tools thereon, so they will not fall off; we devised a special crank for our motor cars, one that does not place the employee, while cranking the car, in danger of being injured by the crank kicking him.

Posters Help in Preventing Unsafe Practices

We belong to the National Safety Council and get from it many posters which are placed at different points on the works. We also put up posters, signs and warnings of our own designing.

We bought a lot of cloth caps and had the words "New (Safety) Man" or "Homo (Safety) Chitto" printed on them, and every member of the crew going through a given month without a lost-time accident was given one of those caps. Putting it on a crew basis made each member of that crew watch out for his fellow-worker's safety as well as his own. Our entire campaign has been from the standpoint of educating our men to look out for others as well as for themselves.

We issue a little plant publication known as the "*Safetygram*" and in it the employees find comparative accident records, safety suggestions, safety editorials, local items of interest and other news items that are of interest to them, at all time stressing the spirit of "Safety." We find that our little plant publication is one of the best safety advertising mediums we have yet employed.

Quite a bit of enthusiasm and interest were aroused by putting on safety contests between different departments of our logging operations, the losing side giving the winners a banquet. You can easily imagine the "*ragging*" the losers receive at these banquets. In case of a tie, if both departments went through a given period without an injury, then the safety and welfare department entertained both departments with a banquet.

We hold safety meetings, provide "movie" entertainments in our log camps, and in various ways do our best to keep the subject of safety always before our men.

We are trying to do one of the hardest things in the world to do. We are trying to re-educate our people. We are trying to help them form entirely new habits. We are trying to help them eradicate the chance-taking habit, and in its stead cultivate the habit of being careful. This takes lots of thought, planning, talk, signs, pictures, movies, everything.

It may be interesting to you to know that in our three woods operations, where we employ from 600 to 750 workmen in the most hazardous of occupations, we had only 111 lost-time injuries during 1925, as against 263 in 1923 when we first started our safety work. This decrease of 152 accidents is 56 per cent. A wonderful reduction has so far been made during the year 1926.

We feel we have made a record of which to be proud, one that has benefitted our employees, their families, our company, and that we have placed the literal fulfillment of the Golden Rule into effect with our workmen.

The Skidder Not So Bad As It Is Painted

MR. HARTLEY: At practically every meeting something is said about the skidder operations and wanting to do away with skidders on account of the devastation wrought upon young timber. I have touched on that briefly, as to the power of the skidder to tear down young timber.

I was disappointed in that I didn't get to bring one or two sketches of the skidder trails which I had prepared, showing the condition of the woods within a period of six months after the skidder had been moved down.

When the skidder is in operation it cuts a particular swath and it does take practically everything in its way. There is less opportunity for fire through the use of skidders than through any other method of getting your logs to the track. The skidders are not by any means as bad as the average body of people think, when you consider the force and power with which the logs are carried through the woods.

I would like to hear from the other members here who have had experience in this branch of the business.

OLIVER F. W. CROMWELL (Central Pennsylvania Lumber Company, Ridgway, Pennsylvania): I want to ask how many employees you have in the woods and in the mill together?

MR. HARTLEY: We have around 225 at one time in one place.

MR. CROMWELL: Do you take the soft pine?

MR. HARTLEY: No, we use the industrial pine.

MR. WALLACE: Mr. Wiberg, on Monday there was some discussion here, or rather some inquiry made, as to the susceptibility of the colored help in the logging operations and I suggested then that when Mr. Hartley made his talk here that he could tell us how they reached their negro

help and how they responded to the safety effort. I am sure Mr. Hartley can tell us about that.

CHAIRMAN WISBERG: The question came up at one of our other meetings as to whether the colored man took hold of the safety proposition as well as the white man and the opinions given by several representatives of employers that used large quantities of negro labor was that the negro responded more readily. How do you interest them, Mr. Hartley?

MR. HARTLEY: You remember I stated that our labor is approximately 60 per cent colored and 40 per cent white. You gentlemen from the south know the colored man.

The southern negro is the most religious man on the face of the earth. He will get down on his knees and shout all night long in one of his religious meetings and on his way home will rob your chicken roost, but nevertheless, he is extremely religious. Any time you can succeed in showing the negro that safety work is in line with his religion you have solved the problem and sold him on that idea.

First the Negro Preacher Was Interested

That was the angle through which we started our safety campaign with the negroes. It took us some little time to get them together to talk to them. First we got the negro preacher lined up. Their negro preacher is just as big a man as the President of the United States. We got him to preach a sermon or two on the subject of being my brother's keeper and other passages in the Bible that to them refer specifically to life. They like to refer to that verse in Romans where Paul says, "I beseech thee, brethren, to present your bodies a living sacrifice," etc. They stress on that *living* through their church. The negroes are really the biggest safety boosters we have in the south.

Another thing, if you pin a badge on a negro he is on top of the world. He doesn't care for the money. He wants something with which to decorate himself, something that makes him an outstanding figure before other people. We have used that a great deal. The cloth caps went over big with them. One crew had a slight injury and we had worse than a lost time injury because every member of that crew insisted on going to the doctor's office with him to see if the injured man was going to get well. It paralyzed that particular crew for that morning's work. But they do respond to our safety campaigns.

W. J. PEACOCK (Green Bay, Wisconsin): I would like to ask the speaker what rate of compensation they carry, what insurance rate do they carry?

MR. HARTLEY: We do not have a compensation law in Mississippi from the outside standpoint, that is from the standpoint of outside insurance. Two years ago we assumed our own liability. I am not able to speak from the insurance companies' standpoint because I do not know. We carry our own insurance but we operated during 1924 on approximately three per cent of the pay roll. In 1925 it was 2.60 per cent, and so far in 1926 the combined operations have been around 2.65 for the first nine months.

MR. CROMWELL: May I ask the speaker what kind of country they have in Mississippi? Do you have a rolling country down there or is it more of a flat territory?

MR. HARTLEY: The country down there is extremely rough. It is hard to tell just how rough it is. I can give you a pretty good idea of our hills when I tell you that from our pine mill to our hardwood mill it is approximately 36 miles by rail, but by road where they dodge a few bridges and cut in and out it is 46 miles. It is a regular mountainous country filled with underbrush. That is the point I brought out about the skidders, where the mules are used to carry the line back to the woods after the logs have been skidded to the track.

MR. CROMWELL: How about your underbrush and shrubs? Do you have any accidents with axes catching in the brush?

MR. HARTLEY: Yes, once in awhile.

MR. CROMWELL: Don't you have accidents from rolling logs suddenly released when they roll down and roll over one of your men?

MR. HARTLEY: We haven't had that trouble for quite awhile with rolling logs. They jack their logs up as soon as they are cut. They used to have a number of them before they started jacking and blocking the logs. We do have lots of injuries as a result of the right of way crew cutting themselves through an ax catching in the underbrush. You can't overcome this feature in the underbrush. You have just got to try to use means of constant watching all the time. Brain work prevents that kind of accident to a large degree.

Dropping Limbs and Splinters Accident Causes

MR. CROMWELL: Do you have accidents from dropping limbs?

MR. HARTLEY: No, I do not recall any.

MR. CROMWELL: Do you peel your hemlock bark?

MR. HARTLEY: Yes, we peel it.

CHAIRMAN WIERG: Do you cut both hard and soft wood?

MR. HARTLEY: Yes.

CHAIRMAN WIERG: There is a pronounced difference in the hazards of hard and soft wood.

MR. HARTLEY: We haven't noticed any difference.

MR. CROMWELL: We have about 2,500 employees, but we have more of the hemlock timber. In spotting, peeling and turning timber over to get the bark off, it gets slippery and pretty hard to handle. The saw will fall on their fingers or something of that kind.

MR. HARTLEY: In our hardwood ours is mostly the oak, gum, ash and poplar. I do not recall having seen very much hemlock in the woods. Most of our operation is in southern pine. We have one hardwood mill that takes care of the others mentioned.

CHAIRMAN WIERG: We have rather large lumber operations. One crew cuts over the tract of timber, taking out the soft wood and the other crew comes through later and takes out the hard wood. There is a dif-

ference of about 75 per cent in accident cost on those operations. The soft wood cutters always had very good experiences, whereas the fellows cutting hard wood had very bad experiences and the secretary of the company always claimed that there should be a differential for the cutting of soft wood. He said that was very much less hazardous because the limbs were much shorter and not nearly so large and stiff, so that when a tree came down there was much less liability of anybody being struck. And his contention seemed to be borne out by his accident record. Of course he got credit for it through a rating on the basis of his accident record.

MONT HENEGHAN (Standard Accident Insurance Company, Detroit, Michigan): What was the relative sizes of the two characters of timber?

CHAIRMAN WIBERG: The soft wood was a little smaller but not very much. They had hemlock as large as two and two and one-half feet in diameter, and the ash and maple ran about the same.

Wouldn't it make it somewhat easier for the hardwood people if the soft wood had been cut out?

Conditions in Felling Timber Are Discussed

MR. HOYMAN: It would all depend on how thick the soft wood was. It would make it hard in felling the trees. You would have more stumps for your rolling logs.

MR. CROMWELL: We had some 28 by 28 50-foot logs. We had some trees 54 feet long and while they were cutting I happened to be in the woods and I noticed particularly in that big timber that the brush was heavier than it was in the other sections, just in that particular spot where they cut that big timber.

MR. HOYMAN: Naturally it would be for those big trees were up in the air and had more room.

MR. CROMWELL: That brush is what increases the hazards in mechanical skidding. You frequently have somebody get hurt who may be 100 yards away, by the skidder line picking up a man outside of the area.

CHAIRMAN WIBERG: There is one phase of the proposition in the woods that Mr. Hartley doesn't touch on in his paper. Mr. Hartley, perhaps you could give us some information as to how you take care of the man who is hurt in the woods?

MR. HARTLEY: In our woods we have regular camp surgeons and we pay them a salary and the employees pay them so much to do their private practice. We have operations that are quite a distance from the camp, as much as five or 10 miles from the camp and there we have first aid kits. We have tried as much as possible to keep away from first aid kits because everybody tries to mess with them and very few know how to handle them.

Our camp doctor has a motor car, a one man car and we have a little telephone system through our woods and different ways of getting messages through. In an urgent case the doctor will go to the patient if he is not able to be brought in. At the plant which is about 25 miles from

the woods we have a regular X-ray and clinical laboratory, where a doctor is employed to take care of the men who are brought in from the woods as well as the camp. Our camp surgeon is pretty actively engaged in going from place to place.

CHAIRMAN WIBERG: You have someone in each camp, I suppose, who is sufficiently intelligent to be a first aid man?

MR. HARTLEY: We have gotten our foremen together and had our surgeon drill them on first aid. In an ordinary case of a cut or a bruise he has a pretty well-equipped kit for that purpose. In case of bleeding arteries, they are pretty well lined up on how to handle a situation of that kind but broken bones or sprains have to be treated more carefully. They do not try to do anything in cases of that kind, they leave that entirely to the camp surgeon.

AL KROES (Director Safety Education, Employers' Mutual Liability Insurance Company of Wausau, Wisconsin, Milwaukee, Wisconsin): What is your experience in the men getting infection from minor injuries?

Some Points About Infection from Splinters

MR. HARTLEY: We haven't found many cases of infection in our woods operations. We were just discussing the difference in infection cases in the woods and the plant. There seems to be something in the woods that isn't in the camp. I don't know what it is, but I don't recall having an infection case in the woods since I have been there and that has been two and one-half years. Sometimes we have an employee get a splinter in his finger and keep on working and not let anyone know anything about it and then sometimes we have a case of infection but that does not happen often.

MR. CROMWELL: Speaking of first aid, do you find any difficulty in getting the men to go to the doctor after they have been given first aid? You said you were trying to get away from first aid as much as possible. I apprehend that if the man gets the first aid treatment he has a disinclination to go to the doctor.

MR. HARTLEY: Especially is that true among the negroes, and all our woods laborers are negroes. They think the first aid is all they need.

MR. CROMWELL: Don't you think perhaps the reason that you have more infection cases around the mill is the difference in the cleanliness of the two locations? In the woods, if there is a cut it is with a keen ax that is perfectly clean or a keen saw that is perfectly clean or even a splinter, whereas in the mill operation you have got more or less grease and dirt and trash in that kind of place and it is more likely to get into the wound and thereby become hazardous. That has been my observation.

B. M. ALMON (Memphis, Tennessee): On the splinter proposition, don't you find this difference in the woods and in the plant? The lumber is kiln dried and that process creates a kind of acid that forms in the wood; when a splinter gets into the flesh from that wood there is a big difference to the splinter in the woods. Don't you think it creates a

tannic acid and the infection therefore is more dangerous than if it were straight out of the woods? We have found it to be so.

A. W. HOFFMAN (Superintendent Groundwood Pulp Mill, Kimberly-Clark Company, Niagara, Wisconsin): How about your dressed lumber, do you have more splinters from the dressed lumber?

MR. HARTLEY: We have more from the finished lumber than from the rough lumber. We take the splinters out of the men from the yards where they stack the lumber on the trucks. Their wounds are very seldom as bad as those in the mill when the lumber has gone through the kiln process.

MR. KROES: Do you have any accidents to the men carrying saws?

MR. HARTLEY: Yes, we have had several accidents in the woods. The log sawyers are practically the only ones who carry saws in the woods. They also carry their axes and measuring poles, their dinner pails and Lord knows what else they carry; but going through the heavy brush we find they are eternally letting their saws drop and cutting themselves in that way. We have a wood guard that we are using now that we hope will eliminate most of those accidents.

Sawdust Blowing in the Eyes is Troublesome

MR. HOFFMAN: Is that wood guard just a little clamp that clamps over the saw teeth?

MR. HARTLEY: Yes.

MR. HOFFMAN: Have you had the experience of having sawdust blow into the eyes of your mill men and cause abscess? We have had that experience.

MR. HARTLEY: We have had a lot of men get sawdust in their eyes but nothing serious has resulted from it.

MR. CROMWELL: Do you have any trouble getting the men to wear goggles?

MR. HARTLEY: Yes.

MR. CROMWELL: What is their objection to wearing them?

MR. HARTLEY: Steam and perspiration and dust will collect and form a regular little mop of sawdust.

MR. CROMWELL: The other day while I was attending the safety exhibit I ran across the goggles department and in talking to them about the different forms of goggles I asked them if there was any way to control the sweat or mist forming on the goggles and they stated only by using a little glycerine on a cloth.

CHAIRMAN WIBERG: What does the man do who wears ordinary glasses?

MR. HARTLEY: He is continually wiping them off.

CHAIRMAN WIBERG: The thing I want to bring out is that there isn't any more trouble to wearing them than there is in wearing ordinary glasses. The fellow who has to wear glasses in order to see has the same trouble.

MR. HARTLEY: As I have observed around the saw mill, I don't believe I have seen more than three or four men wearing glasses. But in the

summer time in the south you can't wear a pair of goggles, it is too hot. Of course, the less weight they carry the better they are.

MR. HOFFMAN: I believe the fiber goggle is better than the celluloid because it is not inflammable and it is about half as heavy as the metal goggle.

MR. HARTLEY: Bringing up the question of eyes, reminds me of the first aid and particularly why we objected to it in some operations. We had a negro that got a foreign body in his eye and it became imbedded in his eyeball. The doctor administered cocain in order to relieve all possible pain and placed a little iodine over the wound. Of course the cocain took away the feeling and the iodine didn't burn at all. The doctor was busy with other cases and the negro asked him, "Doctor, what was that you done put in my eye?" And the doctor told him it was iodine. The negro went back to the plant.

That afternoon another negro got something in his eye and he wanted to go to the doctor and this first negro said, "Shucks, nigger, I can fix that eye for you," and he persuaded the second negro to let him pour iodine in his eye, and we haven't seen that negro since. That proves that very few know how to mess with a first aid kit and every person who comes along is trying to.

CHAIRMAN WIBERG: It is better to appoint someone to take care of the first aid kit.

MR. CROMWELL: Do you give the men water while they are working?

The Water Boy Carried a First Aid Kit

MR. HARTLEY: Yes, we have water boys who go the rounds continually from the water wagon with water for the men. We have work trains who take it out to them every morning and from there it is distributed by barrels to the men.

MR. KROES: I saw a water boy carrying a first aid kit strapped to his back and he knew how to use it.

MR. HARTLEY: That would be a good combination.

CHAIRMAN WIBERG: That would be an excellent idea, if they were given proper instructions as to how to handle the kit.

We have another very interesting paper. We can resume this discussion after Mr. White has given his paper. We had better get that going and come back to this later.

As I said before, this is a combination of the Pulp and Paper and Wood-working sections. The next speaker comes from the Pulp and Paper Section and I am going to turn this meeting over to Mr. Peacock, who is chairman of the Pulp and Paper Section.

(Chairman Wiberg retired and Mr. W. J. Peacock took the chair.)

CHAIRMAN PEACOCK: It is a very great pleasure for us, gentlemen, to enjoy this joint meeting with you. I believe the proposal for the joint meeting came from our Section. Last year we had a presentation of the problem of the work at our Section by Mr. White who will speak to us again this morning and we were impressed by the discovery of a rather neglected phase of our own pulp wood hazards.

Because we wanted more light on the matter of the woods and also because we desired, with you, to emphasize these hazards, we proposed a joint meeting for this morning.

It is my pleasure and privilege to introduce to you at this time Mr. Alexander R. White, Chief Sanitary Inspector, Province of Ontario, Toronto, Canada.

THE WOODS AS A PROBLEM IN OVERHEAD

Alexander R. White, Chief Sanitary Inspector, Province of Ontario,
Canada

I must confess the title given me by your Program Committee rather startled me at first, and while I have at times attempted to deal with an occasional factor in overhead cost, I am still doubtful whether I am able to do justice to this extremely important question.

In treating with this subject I do not expect to be able to offer a positive solution for the many ills that contribute to abnormal overhead costs. I am rather actuated by the desire to place before you such facts as have come to my attention, which appear to bear upon this question, and which I have studied at some length while carrying on my regular work of improving the sanitary conditions under which workmen labor and the control of disability from preventable diseases.

Accident prevention and the multitude of contributory factors that make for high accident cost is, of course, the general theme which we shall discuss; it may be that the points raised may not appear to be sufficiently applicable to the whole of North America to be practicable; and in this event I would ask that the doubtful points be thoroughly debated in order that as much good as possible be derived from our discussion.

Previous to the enactment of the Workmen's Compensation Act in the Province of Ontario, and indeed until the present year 1926, the bulk of woods operations, including the 900 logging camps which operate annually, were classed for insurance purposes as general lumbering. This term included the cutting of saw logs, the cutting of cordwood, the manufacture of railway ties and the cutting of pulpwood for consumption in our pulp and paper mills.

Apparently there was no noticeable difference in accident cost in the minds of those who framed this act as between these various operations. This situation may have been influenced by the absence of dependable statistics, as no regular methods for a complete study were available and accident prevention associations had not yet come into being. We have, however, within the last two years, made a rather remarkable discovery in that we are now sure that accident cost in heavy pine timber is almost twice as high as compared with operations in small spruce pulpwood; and this knowledge has led to the establishment of a new rating for pulpwood camps situated upon pulp and paper timber limits, which is to apply to contractors and jobbers as well as company camps, the new

rate being \$1.75 per \$100 of pay-roll as against the \$3.25 and five per cent previously paid by these industries before the reclassification.

You will see at a glance that this revision is of first importance to the pulp and paper industry and means the saving of thousands of dollars annually without further expenditure in capital cost. The position in Ontario is now therefore this: industries in Class Number One (General Lumbering) pay from \$3.25 to \$5 per hundred dollars of pay-roll dependent upon the size of the camp, while the industries in Class Number Two (Pulp and Paper Making) pay a flat rate of \$1.75 for all camps big and little.

In going into the various details that brought about this change in rating the question of accident prevention is, of course, very much involved, and the following are some of the points which I think bear very closely upon the situation:

Points in the Accident Prevention Problem

1. There are few fatalities, but those that do occur are the occasional man lost by drowning while driving timber to the mills.
2. As compared with general lumbering in heavy timber, there are fewer cases of fractures or broken bones, the type of case which is, of course, the most expensive and usually contributes some form of permanent disability.
3. Infection of wounds is much less than in general lumbering.
4. Labor turnover is much less in Class Two, largely because of piece work and a higher rate of wages paid.
5. Because of the excellent medical and hospital service provided by the pulp and paper companies, great headway is being made in reducing accident severity and in keeping the men healthy.
6. A very much alive accident prevention association, composed for the most part of responsible officials, among whom may be numbered presidents, vice-presidents and general managers who are interesting themselves in the movement.

After this explanation let us return and deal, in detail, with some of the main causes which contribute to excessive overhead cost. Let us, therefore, study the first great question which affects all pioneer industries alike but which is perhaps more seriously affecting the two industries which we are discussing than any other at the present moment. This is the question of labor turnover, said by many students of industrial economy to be a form of waste that has assisted many companies into the bankruptcy courts that otherwise might be prosperous and happy.

Labor turnover may be caused by distasteful working conditions, such as long hours, low wages and undesirable physical surroundings, and may easily be lowered by systematic effort to improve the conditions under which men live and labor, and also if some wholehearted effort is made to teach the new employee to carry on his work more skillfully and thus more intelligently.

It does not appear possible to estimate correctly just exactly what percentage of turnover actually exists among lumberjacks in Ontario today.

Camps drawing their quota of men from a farming community nearby seem to have succeeded in stabilizing their labor to a remarkable degree, while others far removed from the railway and from settled territory have a turnover of easily 200 per cent or even higher.

There are many reasons for this enormous turnover or waste. A sufficient supply of skilled woodsmen is no longer available and it would appear needless to recite what most of you who have studied this question must already know, that there is not now a sufficient supply of good woodsmen to meet the needs of present day employers.

This same state of affairs obtains in most of our building trades. There are practically no more apprenticed carpenters, stonemasons or bricklayers, and as I see it, little is being done to induce the young man starting out in life to apprentice himself to any of these trades. Thus we find such occupations filled with what is known as the "handy-man" who is able to carry on well enough at rough work, but who falls down badly when something out of the ordinary is to be accomplished.

A Low Class of Labor Goes to the Woods

There is this advantage with the building trades, however, that once the handy-man becomes proficient with the tools of his craft, you find him back on the work year after year. This is not the case with the men employed in the lumber woods. The men hired by agents in our large cities come to the camp from necessity, not from choice, and apparently leave for good at the first available opportunity. Thus we find that in Ontario we are depending much more than is now being appreciated upon a remnant of the old guard of experienced woodsmen which can not be more than one-quarter of the men required to act as a leaven among the 30,000 men required each winter.

Your new employee comes to his job with insufficient training and in many instances has no knowledge of the use of edged tools, viz., the axe, saw, etc. He therefore makes mistakes which eventuate in accidents so that he is himself injured or is the cause of some one else being injured, perhaps fatally.

Herbert Hoover, in his book on "Sources and Causes of Waste in Industry," states that one of the four great causes of waste is lost production caused by ill health, physical defects and industrial accidents.

Here are some remarkable facts to show how green unskilled men boost your accident record and of course add to your overhead. Here is an industrial physician who specializes in treating men employed by lumber companies whether from accident or sickness. He has under his control some 16 small companies who employ roughly 1,608 men. He states that the great proportion of new men cut themselves or are injured in some manner during the first two weeks of their employment. He further states that there can be no doubt of this, since most of these men are either foreigners from central Europe or are illiterate, and this particular physician has to assist in making out the men's compensation report. This fact presented by a recognized authority, while disturbing, is by

no means new. Professor Collis in his book, "Labor Turnover and Lost Time," says "Employers suffer because newly engaged workers experience more accidents and suffer more sickness than the more permanent staff and that they are also less productive units."

Such items as have been mentioned in the foregoing should be studied by the business executive, and particularly by company foremen who seem to have forgotten that the standard of perfection set by them as to the qualities to be possessed by a lumberjack, is almost unattainable today, and in his zeal to keep only the best sent to him by the employment agent he discharges regularly half of the quota, forgetting altogether, seemingly, that there may be a \$15 fare plus a \$5 van account against this man who has not yet earned a fraction of this amount in wages.

Here is a little incident that may help to illustrate my point. I remember one camp in particular which had been built to house 125 men, as complete and comfortable and good as a camp should be but which had a crew of eight men only. In addition to the cook, cookee, chore boy, burn boss, clerk, etc., so that sufficient overhead was being carried to have taken care of a full crew. I had of course often visited camps where only half a crew were at work, oftentimes due to labor shortage, but never a case as bad as this. I therefore made inquiry of the doctor who was with me the cause of this obvious bad management; who replied that the foreman had belonged to the old school of efficient lumbermen and had set such a high standard for his men that few of the lumberjacks available could please him, so that they either quit from being bullied or he fired them. I wonder if this man, although an efficient lumberman, was a really good foreman? And might it not be well to look into an item such as this when studying production costs?

The Injured Workman Commonly Paid Off at Once

Now before leaving the question of turnover there is another point which I think is worthy of mention and this is the common practice of discharging or paying off the injured workman when he goes to the hospital or to see the doctor. This practice, to my mind, is poor business economy and must stop, and even if the injured man requests a settlement, some effort should be made to have him return to work when cured. Surely in these days of a tremendous shortage in skilled men, a full appreciation should be placed upon the fact that it has cost the company good money to train this man who is now injured, and that if he does not return, a green unskilled man is to take his place; the fact that he has been injured, if he is not habitually careless, should, in my judgment, actually make him a better risk than before.

Some one has said that if you really want to reduce your accident frequency then reduce your labor turnover, and if your number of new employees could possibly be reduced to zero, then your accidents would probably be reduced by 75 per cent.

Now if this is correct or even reasonably so, our forest product industry in Ontario, by stabilizing its labor, would save annually upwards of

half a million dollars from accidents alone. Here, then, is perhaps the most outstanding question before your accident prevention associations and the employers of labor at the present time.

Now if, as I have already stated, a sufficient supply of skilled labor is not available, where then do we get the hosts of men who now fill our camps? The great percentage, I believe, is being recruited by agents in our large cities, who know very little about the character of work to be undertaken or the qualities the applicant should possess to be suitable for the work; and as there is no standard of perfection set up by the industries almost any one who presents himself is sent to the woods; with the result that many possess diseases which, while not always communicable, are very often of such chronic character as absolutely to prevent these men from engaging in strenuous labor, with the result that they soon break down and are discovered by the company doctor who sends them to the hospital where they become a charge upon the industry.

My contention is that your forest product industries, by reason of the extremely low rate of wages paid to workers in the woods, the seasonal nature of the occupation and the absence of any prospects of better life after working hours, are being forced to accept the kind of labor that has already been rejected by the other more favorably situated industries of the country.

The Mitigation of Accident Severity

We now come to one of the most important points of our discussion, namely, the prevention of accidents with the mitigation of accident severity and rehabilitation. At your Christmas dinner last year I dealt with this question from the standpoint of accident reduction by a comprehensive first aid plan and by the early return of the workman to some light job until strong enough to assume his old duties. As I told you last year, I am as great an enthusiast for preventing injuries as anyone can be, but how I am going to make a success of this idealistic job in view of what I have said in the preceding paragraphs rather stamps me. It seems to me that as long as labor turnover remains as great as it is, and you are given no opportunity to select your labor, and the bulk of your men are unskilled, how can you possibly expect to cut down your frequency rate? You will have to try, of course, and resort to every trick in your repertoire to do so, but until a radical change in labor policy is inaugurated by the employer himself your success will be small in comparison to the effort put forward.

In dealing with the cost of the accidents or severity, which is of course overhead cost, we have every reason to feel optimistic, but we must approach this angle of the situation from an entirely different direction for we can not deal effectively with severity without effecting a partnership. We must join forces with the doctor who can make all the difference in the world between success and failure from the standpoint of accident cost. Almost any good physician who has a liking for economics, and in whom the pioneering instinct is strong, can easily reduce your accident cost, and of this we have conclusive proof.

We have in the Province of Ontario, of course, a physician connected with each camp whose duty it is to supervise the sanitary conditions in and around the operations, and also to treat and to hospitalize any men who may become sick. The doctor in such cases has a sworn responsibility which is set out under the law as well as specified in an agreement of which the government forms a part. This plan works admirably, as our disability statistics from preventive disease will bear witness.

Disability arising out of accident cases is quite another matter, however, because in such cases the doctor has no responsibility save such as commonly exists between doctor and patient. Under the arrangements existing today the employer is held responsible for such first aid as may be practiced and which is a half-hearted effort, for lack of direction, if it exists at all, and the physician does not seem to come into the case until the injured man arrives at his office or at the hospital when treatment commences, and in due time the patient is discharged and either returns to his former job or goes in search of another.

The Problem of Further Cost Reduction

Now as I see it this is all that is being expected from the industrial physician today with respect to accident cases, and if we leave matters just as they are then there will be little or no reduction even in accident cost. Now what can we do further? We can not expect the doctor to assume our responsibilities or the responsibilities of the employer, or even to assist us in this matter if he has not been invited or arranged with to do so. I have spoken with a great many industrial physicians upon this point and I am sure they are ready to help. Few doctors desire to see small trifling minor cuts come to them infected, when the simple but effective treatment of the wound with iodine when the accident happened would have prevented perhaps the amputation of a hand or saved a leg; and many doctors of my acquaintance would be glad to have the manager call at the office to know why John Jones was being kept so long in the hospital.

To be brief a new arrangement must be made with your doctor. He is the proper official to train your first aid crews, since he is to take the responsibility for the cases after the first aid man has done his part. He is the right person to show you how to deal with infection which runs as high as 70 per cent among open wounds in some camps; and he should also show you how to put up a simple fracture to prevent it from becoming a permanent disability case. If it could be possible to pay your industrial physician a premium for low accident cost instead of for extended disability, as we now pay, what a difference it would make!

The question of rehabilitating your injured workman is another matter with which the industry must soon begin to grapple, and it is just possible that after mature consideration is given this question, some way may be found to reabsorb these permanent disability cases, who can still perform certain kinds of work, that will be much more economical as

well as more satisfactory than the mere payment of pensions; but in this instance as above, the services of your industrial physician are of paramount importance if you are to do justice to yourself as well as your handicapped employees.

MR. WHITE: You will see at the outset that I am not what you might call a real dyed in the wool accident prevention man. I am for the general improvement of the condition. I am speaking about the accident end from the point of an observer in part at least.

If it could be possible (I don't say it is) to pay your industrial physician a premium for low accident cost instead of for an extended disability as we now pay him, what a difference it would make!

Of course, I have given you the conditions in my paper as they exist in Ontario.

Discussion Following Mr. White's Paper

CHAIRMAN PEACOCK: Inasmuch as Mr. White is dealing directly with matters more generally under the experience of Mr. Wiberg, I am going to ask Mr. Wiberg to resume the chair and conduct the discussion.

(Mr. Wiberg took the chair.)

CHAIRMAN WIBERG: I thought I was going to have the pleasure of listening. I want to ask Mr. White a question regarding the state of rehabilitated workmen being a different matter. In the case where you repeated that statement did you mean that we should induce the industrial surgeon to follow up his cases much better and much more closely so as to prevent permanent injuries or permanent impairment of functions, and that the rehabilitation proposition goes on after the injury has become a settled fact?

MR. WHITE: Yes. Perhaps I might clear up the atmosphere and give you a better chance to discuss it if I went a little further back on some of my last year's proposition. Looking at this question of cost without going into the question of the injuries themselves, perhaps is not quite fair to you but I felt that my partner was dealing with injuries and that I might keep off that question.

I will tell you about another side of the question. I will tell you why I am so strong on this question of severity, why I am so strong on rehabilitation, though I haven't a plan at all for rehabilitating. This is just a question forming within my own mind.

As I said today, we have a physician in connection with every camp that we have in the Province of Ontario. It makes no difference as to distance, we try to have the same service that we would have if the camp were a mile away. We have a hospital in connection with the camp that will give the same service as it gives the man who is injured in the mill. In other words, the thing has got down to such a scientific arrangement that (this is for health purposes, not for accidents) between the employees and the physician, we have succeeded in changing some of the evils that we have had to contend with from sickness and so forth. I

mean by that, typhoid fever and such diseases are no longer a problem with us. Smallpox is a thing that bothers us very little, and these two things used to be the major killers but are fast becoming last on the list.

These things have been growing less and less frequent and we have gradually gotten rid of them. If you maintain a large group of men who have to be examined, you have not only aggravated the employer but you have created a lot of expense so we do not regard the physician as a man who merely helps the sick. That idea isn't worth anything to the industry. A healer is a valuable man but it is the fellow who prevents the accident who is really most valuable.

We have tried to make of our physician a man who is not only fair in the healing line but a man who is interested in the preventive line. He has had to study prevention, has had to study transmission of smallpox, pneumonia, and work at these things and be found fault with if he wasn't making good on the job. In addition to that pressure and the desire to do better he is also paid on time the man is well. He gets nothing when the man is ill so it is not a very profitable thing for him to have sick men. Just so long as you put a premium on disability you will never reach your objective, but if you offer a premium or a price of some kind for good work I think it would make all the difference in the world for a low accident record, and then make it so that if there is a high accident record the man loses his job.

Hold the First Aid Man Responsible

The percentage of accidents in Ontario would run about 60 or 65 per cent, I believe. That, of course, is an appalling cost to pay for carelessness. That includes a great many of these permanent disability cases that your industry has to pay for if you don't pay them off in a lump sum. These are the things that are contributing to your high rate.

My idea in dealing with that phase of the thing is not to let Tom, Dick and Harry deal with the first aid kit, nor is it my idea to nominate some particular person and let him get his education where he may and carry on his opinions and dictate just as he pleases.

Physicians are rather peculiar men to work with and I am not sure that they would be wholeheartedly in favor of your first aid methods if you used something they didn't like for sterilizing. We are going to hold these first aid agents responsible for their work. I don't care what ideas he uses just so they are effective. I don't care whether he puts splints on or not just so long as he hasn't any compound fracture and he is going to be treated very generously if he can deliver the goods; if he can not deliver the goods he is not going to be treated well at all. That is justice to the company and justice to the physician himself.

MR. KROES: I would like to ask Mr. White if that question of putting a premium on the well man does not include getting the man back to work after he is well?

MR. WHITE: Yes.

MR. KROES: Don't you think there is a little bit of danger in that method for the reason that he perhaps may try to get the man back to work too soon?

MR. WHITE: Not a danger in the world.

CHAIRMAN WIBERG: It is not probable if you have the right kind of doctor. I don't know whether any of you were at the Health Service session yesterday or not. The president of the American Medical Association talked on health and he propounded the proposition that the doctor should exert all his efforts in taking care of the families so that they would not become ill rather than to taking care of them after they came down sick, and he said if we could get 50 per cent of the country working on that basis that we would add at least seven years to the average life. He said that we had added 15 years to the average length of life in the last 50 years and that in 10 years more we could add another seven years by this method. I am wondering what Mr. Keown has to say on this proposition?

Cooperation from Employers is Enjoyed

MR. KEOWN: This is along another line of our work. I don't have anything to do with that branch of it, that is the accident end. We have not been able to do very much with the woods accident problem. Our staff is very small. We have only two men in it, two men in the logging part of the state and they have to take care of all the factory inspections as well as investigation of accidents that occur. I feel that we are very lame on that part of the work.

We have, however, very good cooperation from employers but I feel that there is a very great deal to be done along the line of accident prevention in the woods. The sawmill end of it is very well taken care of.

MR. KROES: Mr. White, I don't want you to think I am against the idea brought out in your paper; I think it is a very splendid idea, and while I am up I want to compliment you on your very able paper. When the transactions get out in book form, it is the first one I am going to read.

MR. BLACK: I presume that Mr. White handles the pulp proposition. With your permission, Mr. White, and with the permission of the meeting, I would like to read a few lines.

(Mr. Black read from booklet, "Industrial Medicine, being addresses and reports of the annual symposium Committee of Industrial Medicine of the Ontario Medical Association, Toronto, Canada.)

CHAIRMAN WIBERG: There is one thing in both of these papers by Mr. White and Mr. Black that interest me very much. They both brought up the question of labor turnover; Mr. White mentioned the fact that when a man is injured he asks for a settlement, and Mr. Black touched on that point, too.

Our experience has been that when the man is injured he wants his money with the usual intention of going home. In New York the logging

is done adjacent to Canada and a lot of lumber jacks come from Canada. If they get hurt, the first thought is to get back home as soon as possible. We give them the first two or three treatments and they disappear and maybe a month later they come back in far worse condition than when they left. We would like to get hold of some method of keeping in touch with them until the injury has been cleaned up.

We have another difficulty in New York with these jobbers. That difficulty with the jobbers is making the rate situation on the logging operations somewhat the situation of the old dog chasing his own tail. The jobber gets a contract and he gets an insurance policy. He cleans up that job in a month and he gets another contract. He has had no accidents, we get the premium on that and we keep in close touch with him and he gets another job. He may run there two or three weeks and he don't have any accidents and we don't know a darn thing about the premium on that but if he has an accident there is \$4,000 or \$5,000 and we hear of it immediately and we have to pay it.

Employers Are Responsible for the Jobber

MR. BLACK: In Ontario under the compensation law all employers are responsible for the jobber. When we make a contract with the jobber the first thing is to give the estimated amount of what he is to be paid and the board makes that assessment and we make a charge against his operations. It is obligatory upon us to be responsible to our jobbers under the act. The law is there and we can't get beyond it.

CHAIRMAN WIBERG: Another very interesting point brought out by both you gentlemen is the fact that the small operation pays a much higher rate than the larger operation.

MR. BLACK: That is based on the accident record. The smaller plant has not the safeguards that the larger one has. We have very strict rules and regulations laid down. First aid of course is given and then they are immediately brought to where they get proper medical care.

MR. HOFFMAN: Where do you draw the line between the small and large jobber?

MR. BLACK: The board sets that. The small operator is one whose income is \$10,000 or less and the large operator's income goes over \$10,000.

CHAIRMAN WIBERG: Do you employ all your men from your neighboring provinces?

MR. BLACK: They come from other provinces as well as our own. I may say 70 per cent of our woods employees (we are right on the border) come from Quebec and up until last year we were liable for compensation under the two provinces; but the situation in that respect was so ridiculous that we applied for an amendment to the act, and the act has been further amended in Quebec. There was a new act to be passed the first of April and I am afraid it is going to work a hardship until we can devise some means of offsetting it. It is going to be hard on the employers.

I am talking about logging camps. The small jobber doesn't take the same interest as the larger companies do.

CHAIRMAN WIBERG: He hasn't the machinery for operation either, you see. When he gets through with one job he may be through with it for the year. Next year he is with some other man, anybody who may hire him and he may never be back.

There is one other idea that I am wondering if we should take up. I would like information on it myself. I don't know just what the wage scale is in Canada but I know, since the war, the lumber jacks in New York state are fairly well paid. They are pretty well paid when you take into consideration that their monthly wages of \$80 or \$100 is clear money, that is, they are given that plus their board and lodging so that they haven't any expenses. I think their pay compares very well to the sawmill operator in the same locality. He is getting \$4 a day but out of that he has to pay quite a bit, whereas the man in the woods gets his \$80 or \$100 and it is clear money.

MR. WHITE: Our lumber jacks get from \$30 to \$35 and their board, which would be \$70 including his board, and compensation and disability awards are based on \$70 a month board and pay.

That is why I argued so strongly that one of the cardinal sins of the industry is paying too much for this lost time. Perhaps I shouldn't say this, but I have a faculty for saying what I think and it is usually reached by fair argument. I think as long as we are only paying \$30 or \$35 a month you will not get men except those who can not do any better. That will finally be exploded or agreed with, that is my opinion. You will not get a man for that money, in the absence of city comforts or home life or social hours after work.

The Problem of Labor Turnover a Serious One

MR. WALLACE: Do you have the same condition with respect to constantly changing labor in your logging camps? We have a very large turnover. I understand this condition exists in Canada only during certain seasons of the year while ours continues for 12 months in the year. The climatic conditions are vastly different, of course. We work in the sawmill and the logging operations for one continuous year. We have a good deal of trouble from labor turnover. Our camps are permanent. It is 52 miles between mills at the two extremities. Our main logging camp is located just about half way between the two points. That is a permanent camp. We have a hospital at one of the operations but it is easily accessible from any one of the others so that the labor situation is quite different from our standpoint than it is with you, though Lord knows we have enough trouble and it is a very fruitful cause of accident, particularly in the woods.

MR. WHITE: We have practically 75 per cent new or different men in the woods all the time and that increases your accident hazards, of course. I should think with your permanent conditions there would be more chance for you to secure stable workmen.

MR. WALLACE: The man in the woods is a fleeting, transient sort of chap. He is here today and gone tomorrow. I find that is true in all the logging camps throughout the south. They are just going about from place to place where the pickings are the best. If a fellow finds he can get a little better supply of liquor at another place he will go there. Of course we have one class of them who are rather permanent, and who stick but a large percentage is transient.

MR. KROES: I had the opportunity of spending some time in the coal docks of Wisconsin. At that particular time the class of labor there was very low. The conditions were scandalous. It was a bad risk, nobody wanted them and when I was going from one dock to another I found the same condition. The scum of labor came to the coal docks and when you asked a coal dock man in the office why this was so, he said that was all he could get.

When you looked at the condition of those coal docks it was terrible (that was in 1918 and 1920), but since that time there have been some changes and conditions have become better. They used to say that fellows that never made good at anything else went to the coal docks, but now by better wages and better conditions the coal dock crew of today is a better class of men than it ever was before and the conditions are so much better the men often say that they had just as soon work in the coal docks as at the mills, that they get their hands dirty in either place. Mr. Black and Mr. White, won't that alleviate the condition, when you make the working conditions better it attracts good men, is that not true?

A Labor Shortage in the Woods Always Imminent

MR. WHITE: I believe that can be done but we are unfortunately not in a very favorable position as regards labor. The industry is expanding, of course, and we have a rather small population. Today we are getting, as I said before, so many men from other sections. I am sure of this, because I have taken the time to go through the employment office records and find out all they had to tell about it, and I reached my own conclusions. I haven't left anything unturned to find out what ails us because I feel the situation affects me to an alarming extent.

I know very well by the men who apply for work something of the conditions. I know by reason of the doctor, the little hub-bub and kickup between the company and doctor after the man falls sick that he had this disability before he went there. I have some knowledge of the time these chronic ailments take to develop before they come to the surface. They are developed sufficiently clinically for the doctor to be able to make a diagnosis. If we could get away from that completely what would we do? We would still have a labor shortage on our hands, perhaps next year or the year after that, when some of those big new mills start operations and naturally when the woods operations follow to supply the raw material we will need 15,000 men that are not in the country today. That is something of a problem. Cut out this seasonable

business as you can until you have a sufficient crowd that will remain with you to easily absorb the green men when they come in.

CHAIRMAN WIBERG: We have the same proposition in New York. After the logs are cut, the drive is made and the logging crew goes out of existence.

MR. KROES: The first five years of my experience were spent in the states where they conducted these employment offices. The small ones don't cause any trouble, it is the larger ones like Chicago and the other large cities that cause all the trouble. They don't care who they send out. If they could pick up 25 fellows with syphilis they would send them, they don't care what they send to a camp.

CHAIRMAN WIBERG: It has been a question of getting men to take hold of a pick and shovel or canthook and be able to do some work.

MR. WALLACE: In the south we are going through the same thing that Florida went through, with so many big buildings going up all over the states, big hotels, big golf links and so forth and no sooner do we get men than along comes someone willing to pay bigger wages and our men are gone. We have them one day and they have them the next day.

Saw Mills Are Frequently Short of Men

CHAIRMAN WIBERG: We have those conditions in New York as the summer comes on and the road work begins. These fellows who get \$8 and \$10 a day leave the mills and go to the roads, then it is a very hard thing to get sufficient men to run the sawmills.

With your logging proposition you will always have, it seems to me, a very difficult situation because you have got to take these men and throw them out in the wilderness. They work hard all day and in about a week or 10 days, very naturally, they are full of health and energy and they want to get out and have a good time. It is only natural. It always has been natural for these lumber jacks to grab the most pay they could get and beat it for the bright lights and never think about anything else until the last cent is gone.

MR. WALLACE: At one time we couldn't get the logs out of the woods and we went down to New Orleans and got a bunch of sailors as log cutters and you can imagine how much they liked it and how long they stayed on the job.

MR. BLACK: Evidently the small wages Mr. White referred to has a great deal to do with that condition. We were paying \$35 and \$40 a month and the production was lamentable. Naturally you would say we deserved it on account of low wages. We put the men on piece work and of course they made a lot of money but that didn't hold them. They would go to the timekeeper and ask how much they had made and he would tell them \$150 and then it was the bright lights for them. We had three gangs, one going, one working and one coming.

MR. WALLACE: We pay our men eight cents a log and they get a house for \$1 a month. They cut 600 or 800 a day. We pay them about 11 cents and they board themselves and we give them a team free of charge to do the skidding.

MR. HARTLEY: Here a few years ago we adopted one thing (I wish, Mr. Wallace, I could give you the figures), but still we have our labor troubles, too. We took out a form of group insurance, life insurance. As he stays with the company it increases in value. We have found that has been a great help to us in holding labor. Of course we have a labor turnover. But we have found that has held the men to a large extent.

DR. BARNHARDT: I don't think there is much that I can add to this meeting or to this discussion. It has been pretty well covered on general principles and I don't think there is any necessity of going into details of first aid.

I think we should realize that the first aim is prevention of accidents by the use of safeguards. By education, methods of different kinds, we do what we can to help the man, giving him immediate first aid, and it has been found that if the open wound is treated within one hour by proper first aid methods, as a rule there will be no infection.

The Workmen's Compensation Board in Ontario recognizes the efforts that any company makes in placing these men back at employment where they will earn a fairly good wage and instead of paying the man the full amount of his compensation there is an adjustment made so the company shares for its effort: that is, the man is perhaps placed in a position where he can earn 100 per cent of the wage he was getting before and the refund goes back to the credit of the industry. If the man leaves the industry, of course, he is provided for by the board.

All these major accidents are capitalized and in that way provision made for all cases.

CHAIRMAN WIBERG: One point brought out by Mr. White is of especial interest to me; I had an example of that kind in the paper mill. The doctor we had at that particular paper mill was seemingly more than an ordinary M. D. He had a number of cases and after he had been there two or three months he had me come up and he made a special point of going over some of these cases, pointing out the fact that they were repeaters and that there should be stress laid on some of them due to the fact that they did not recover because of some previous disease.

I am wondering if you have made a definite effort to link up on accident prevention the possible use of the doctor as he gets these cases before him with the safety man in the association? I think all industries could very profitably do that.

ADJOURNMENT

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Public Safety and Education

(General Session)

October 26, 1926

HOWARD BROWN, Chairman
Attorney, Detroit Automobile Club, Detroit, Mich.

THE Public Safety Education session convened at 2:20 o'clock, Mr. Howard Brown of Detroit, presiding.

CHAIRMAN BROWN: Ladies and Gentlemen: This afternoon's session is devoted to public safety education. There is no more important subject before the American people today than this. In 1924 Mr. Herbert Hoover called a conference to consider ways and means for the reduction of accidents in this country. In the year 1925 there were 23,900 persons killed and over 600,000 injured in automobile and other traffic accidents. The situation had become so grave that conferences were called to consider the reduction of these accidents.

This afternoon the speakers on this program will talk on the various phases of public safety and education. It appears to me that each of us could carry back to our own communities a great deal of good that will be derived from these speeches. Personally I think that there is no better way to get at this accident situation than to have it carefully analyzed and have the problem isolated. We create laboratories to run down and isolate certain disease germs, and yet day after day we are killing hundreds of people over this country recklessly and through carelessness. In the state of Michigan, up to September 1, there were over 657 people killed through automobile, railway and street railway accidents. Think of that situation a moment and you can see how grave it is. There are various phases to this question and this afternoon we are going to have the pleasure of listening to various speakers who will present the different sides of the problem.

The first speaker is Mr. Frederick J. Haynes, Chairman of the Board of Dodge Brothers. It will be interesting to hear what Mr. Haynes has to say as coming from the manufacturing side.

SAFETY—A NECESSITY OF THE MOTOR AGE

Frederick J. Haynes, Chairman of the Board, Dodge Bros. Inc.,
Detroit, Mich.

It is most gratifying and impressive and indicative of a true and real advancement in society, when a large group of men and women are assembled, all vitally interested in and studying the problem of how to secure 100 per cent safety for all.

The cause for which we have come together is one incapable of criticism. We may never achieve the ultimate goal we are seeking, but any advancement, no matter how small, can only work for good and is most commendable.

Having in mind the improvement of conditions for others, also improves our own conditions because it is absolutely impossible for one to work for a worthy cause and not be improved and happier himself.

Were I asked for a "panacea" or "cure all" for the accidents happening every day throughout our land, I should say that courtesy and education would come nearest to accomplishing the result desired—and the keynote of this paper will be—"Courtesy and Education."

To some, courtesy and education may not seem to be sufficient, but I believe that in some form or other they practically cover the entire field.

The motor car industry is today the greatest single industry in the United States, and hence in the world. It has achieved that position because of deserved merit. The present splendid industrial position of the United States, the greatest country in the world, has been attained largely because of the motor vehicle. It marks an epoch in the world's advancement. Like all improvements, it has caused changes, and a readjustment of many things is necessary.

Among others it has caused an enormous increase in the use of all highways. This increased use has directly and indirectly caused many accidents. It is the thought of some to blame entirely the motor car, but this is decidedly unfair, as I think all will agree.

I have even seen printed articles which stated that the automobile manufacturer himself was to blame as the cause of all traffic accidents. Were that argument to prevail, then every manufacturer of every commodity made would be included in the same category; no one would be exempt, for knives made to cut bread with have been used to kill, croquet mallet heads have flown off and inflicted injuries, babies have choked on buttons and safety pins, books and papers have transmitted disease after being used by sick persons, water has caused colds and deaths.

All the things mentioned are necessities—knives, buttons, pins, books, papers, motor cars, water to drink—but they can all be provocative of accidents when improperly used.

Obviously this is either the result of ignorance or inexperience on the

part of the user. He must be educated—the article itself should not be blamed.

The automobile of today is a wonderfully perfect mechanical creation. It is extremely durable and reliable as regards materials and workmanship—it can be promptly started, easily controlled in action, and abruptly stopped. There, one might say, the manufacturer could consistently stop, but neither he nor I would agree to that. As a good member of the community he must go farther and join with others for still greater results.

According to records taken from "Facts and Figures" edited and published by the National Automobile Chamber of Commerce, it appears that in 1917 there were 9,097 automobile fatalities. This mounts steadily year by year until 1925 when the total reached is given as 19,828. These figures do not include cases of collision between an automobile and a railroad train or street car.

This is indeed startling, but after close study it is revealed as very much better than at first appears.

It seems to me that the only proper basis on which to compare progress or retrogression in accidents is to consider them in relation to population and number of motor cars in use.

In 1917 the population of the United States was 102,000,000. In 1925 it was approximately 110,000,000—an eight per cent increase.

In 1917 there were 5,104,000 motor vehicles registered, with a fatality list of 9,097, or—178 per 100,000 vehicles registered.

In 1925 there were 19,900,000 vehicles registered with 19,828 fatalities, or 100 per 100,000 registered vehicles.

Encouragement for Those Who Work for Safety

Had the rate in 1925 been the same as in 1917, then 35,422 fatalities would have resulted instead of 19,828; but instead there is a reduction of 15,594, or 44 per cent. Forty-four per cent reduction in the face of an eight per cent increase in population and a 300 per cent increase in the number of motor vehicles—that's a measure of the general result of the work done in the United States for more complete safety.

Therefore, I believe that every one who has worked in the interest of safety—organizations, cities, towns and villages—should be warmly commended and encouraged to give still further of their splendid thought and action. You are gaining and winning—there is no question about it; and you have great cause to congratulate yourselves on the results accomplished.

The fatalities which have resulted in different cities show an astonishing divergency. Take for instance the cities of Philadelphia, Baltimore, New York, Boston, Chicago, San Francisco, Buffalo, Cleveland, St. Louis, Detroit, Pittsburgh, Los Angeles—named in the order in which the per cent of fatalities per 100,000 population occurred. Philadelphia for the

year 1925 had the lowest rate, 15.6 persons per 100,000. Los Angeles, California, had the highest rate, 41.1 persons per 100,000.

My understanding is that Los Angeles has since these figures were compiled gone to great extremes in the matter of protecting the public, and that later figures which I do not have show a very splendid reduction, for which Los Angeles deserves commendation.

Quoting from the NATIONAL SAFETY NEWS of July, 1926: "One encouraging aspect of the situation however is that deaths of children less than 15 years of age increased only about three and one-half per cent in 1925 over 1924—whereas the fatalities among the grown-ups increased about 14 per cent. These facts seem to indicate that safety education in the schools is having an effect, a result abundantly corroborated by the individual experience of cities in which such work is being carried on."

Right here I would suggest that safety education and drill be made a very distinct and prominent part of the school curriculum. It should not be lightly touched upon—that is only now and then—but it should be drilled into the pupils for a certain time each day, until it becomes part and parcel of them, especially since children's minds are most receptive and retentive.

The Human Factor Responsible for Most Accidents

What is the cause of all these fatalities? From personal experience and observation extending over a period of more than 22 years, I am inclined to believe that approximately 95 per cent of them are due entirely to the human factor, and are caused by ignorance, selfishness and carelessness. In fact they could practically all have been averted had there been knowledge or use of courtesy and education.

Everywhere you hear the statement, "Protect the pedestrian." I agree with this fully, and yet do not know that it is entirely the correct principle, because, primarily you can not think for some one else, you can not act for some one else. If one is not interested enough to act for himself, it is a hard task to do it for him.

In 22 years I have driven somewhere between 250,000 and 300,000 miles. I have been fortunate in inflicting no human injuries. But time and time again, when using my best endeavor to protect, I have been extremely exasperated by the heedlessness and indifference of the pedestrian—likewise the discourtesy of many motorists.

I once saw a woman standing on the curb talking to another lady. She deliberately proceeded to back right out into the street. A friend of mine was coming along in his automobile—in those days there weren't so many—and he saw her and stopped his machine. Later he killed the engine. She never knew there was such a thing as an automobile until she backed into the radiator and then she proceeded to trim him for being such a poor driver.

The other day, probably two months ago, when coming from Syracuse to Buffalo our train had just stopped at Batavia. I turned to look out of the window and I noticed that a fast freight train was grinding its brakes and coming to a stop just as fast as it could. That freight train running on a parallel track was probably not more than a few seconds behind us and yet during that period an automobile driver had thought—mind you, the train was in plain sight and had a bright headlight—he could cross and get beyond that train. What was the result? The train hit the automobile. It rolled it up into a ball between the two trains and threw the man who was driving it under the wheels at the front end of the rear pullman and then they disconnected that while the coroner extricated what was left of him.

One Automobile Encounters a Street Car

Some time ago I was driving up Oakland Avenue in Detroit. I saw a big vacant lot on the corner and I saw a street car coming south and a Ford car going east. The street car was giving ample evidence of its approach—its gong was ringing. Having had some experience, I figured that the automobile wasn't going to stop and if I went on I would probably get to the corner just in time to have that automobile landed on me so I pulled up to the curb about 150 feet from the corner and waited. The automobile did pretty well. It got almost across and then the street car hit it, caught it right on the rear wheel, turned it around three or four times and landed it up in a drug store window. The man fell out as the car was going over the sidewalk.

If you picked up the paper here in Detroit a short time ago you would have read a sad story about a father who was taking his ten-year-old boy, his wife and little daughter out on the occasion of the son's going away to school. The father, in order to be particularly nice to the boy, said he could drive. They got down here in the western part of the town and the boy got confused at a railroad crossing and the car went into the ditch. The boy was killed, The mother was killed, as was the sister, and the man was badly hurt.

I do not believe the time will come when there are no accidents until human nature shall have changed, and people shall have acquired some education, some courtesy, and some discrimination of judgment.

I feel entirely different toward children and elderly people. Children are spontaneous and irresponsible; we would not have them otherwise; if they were not so, much of the beauty of child life would disappear. It is because of this that I would be very thorough in my plan to educate them to protect themselves. I would go to any length to protect them. As children we have all "hitched rides" and done the hundred and one things which mature judgment later in life tells us are dangerous.

But children are susceptible to education, and quoting again from your own record,—the fact that only three and one-half per cent of children were injured, as opposed to an increase of about 14 per cent in the fatali-

ties of the grown-ups, shows that you are making splendid progress along that line.

I want to congratulate the schools of this land, not alone the school officials, but the janitors in overalls and the school children themselves. I always get an intense thrill when I see the "janitor traffic officer" with a handmade semaphore aiding the children across the street, also the serious minded school boy who sometimes is delegated to the task. They are splendid and doing wonderful work.

As a help in educating children, the automobile manufacturers through their trade organization, the National Automobile Chamber of Commerce, for years have annually spent thousands of dollars in an endeavor to promote greater safety, or rather, to educate the public.

The National Automobile Chamber of Commerce is giving \$6,500 in prizes annually for the best essays and lessons on highway safety.

These awards are divided into more than 500 prizes to be competed for by grade school children all over the United States.

There are three national prizes for the children, of which the first is a trip to Washington and a gold watch..

There are three national prizes for teachers, the first of which is \$500 in cash and a trip to Washington.

These prizes are given every year, and approximately half a million children and 60,000 teachers enter the competition.

In the contests to date the President of the United States has received the winning pupil and presented the award.

Interstate Traffic Is the Minor Problem

Mr. Alvan Macauley, President of the Packard Motor Car Co., estimates that 94 per cent of accidents occur in the home state of the car; that 53 per cent are in the home town, while only six per cent occur because of foreign state cars involving interstate traffic.

That would seem to show that the great bulk of your problem is at home, fortunately where it can have the greatest thought and effort. It would also mean that the greater part of the work falls first upon cities, towns and villages, and then upon the state as a whole.

Complete protection of the motorist and pedestrian does not always fit in with their inclinations. Street crossings could be made 100 per cent safe if pedestrians would cross in tunnels which are possible of installation, but that many times would conflict with their personal inclination.

Most, or all, grade crossing accidents would be avoided if people would only be educated to "Stop, Look and Listen," as exhorted to do by the railroads themselves. That alone would have prevented the 2,206 automobile fatalities at grade crossings in 1925, as reported by the American Railway Association.

The legal department of the Grand Trunk Railway declares "that 20 per cent of all crossing accidents along this road in the state of Michigan

are caused by motorists striking trains, and not trains striking motorists."

It is not right or fair for any one person to be so selfish as to want exclusive protection for himself alone. We all have responsibilities—the motorist—the pedestrian. Neither has less than the other. The motorist is in duty bound to protect the pedestrian; likewise the pedestrian must protect the motorist. The pedestrian can not selfishly claim that he alone has all the rights and the motorist none, and vice versa.

As another cause, I would include most if not all city fire departments. Personally, I do not believe there is any perceptible gain in fire apparatus running at full speed with clamoring gong through crowded streets, and ignoring all street signals unless there is a traffic officer at the intersection to assure them that the way is clear. These engine companies are located in and cover limited districts, which in the main require only a short run.

Quick Thinking Often Prevents Auto Accidents

I once saw a near-accident which would have been terrific. From my home near the corner I could see a heavy hook-and-ladder truck drive at a high speed westward, and a heavily laden double-deck bus was traveling north. Neither could see the other, due to houses being near the corner, and there was no time for me to warn them. Suddenly both came into view. Quick right and left hand turns were made—the sides of the vehicles scraped—the accident was averted.

Afterwards both drivers were as white as sheets. Had the two vehicles come together, I have no doubt that between 40 and 50 people would have been injured, perhaps killed.

By observing street regulations this fire apparatus probably would not have been more than a minute or a minute and a half later in getting to the fire. As it was they lost over 10 minutes in getting straightened up and away again.

Now, what is the remedy? What can be done to overcome completely or partially this appalling loss of human effort?

As I stated in the beginning, the greatest remedying factors are education and courtesy. There is no discounting this statement.

Do you realize how important courtesy is, and how dangerous is discourtesy?

Were complete courtesy—which is the absence of selfishness—to prevail, practically all the accidents which you deplore would be eliminated. Courtesy, would—

Prevent right angle crossing accidents, saving life and property.

Keep motorists in line and prevent accidents caused by getting out and then trying to crowd in line.

Never pass another car near the top of a hill, or on a curve, where the possible oncoming car can not be seen.

Save pedestrians, on right and left hand turns.

Always operate their vehicles with a keen regard and consideration for the rights of others.

Work with the Traffic officer instead of against him, thus causing a smile to replace the serious face necessary when many are trying to outwit him.

These are but a few of the things which courtesy will do. Education promotes courtesy, since discourtesy is mainly due to ignorance and selfishness.

Very comprehensive plans should now be laid along the lines of promoting education and courtesy, and should be most completely and fully carried out. The result of this work will begin to show an increase in results as the years go by.

In the meantime also, I would suggest the following for your consideration:

Additional Safeguards and Uniform Traffic Laws

A uniform system of traffic laws for the entire United States.

Widening of streets wherever possible, and to the greatest extent.

Removing all bottle necks in all arteries.

Removal of shrubbery and hedges where they tend to obscure a crossing.

Abolishment of grade crossings wherever possible, within reason. (Railroads could do much to help if they would change the land contour at various crossings. Many such places have come to my notice where a day's work with a steam shovel would give an unobstructed view and be as good as an overhead crossing).

A drastic enforcement of traffic laws, including in cities the use of plain clothes men instead of uniformed officers to detect violators.

Prohibition of parking within 50 feet of street intersections.

Many playgrounds for children, located in all parts of the city or town.

Safeguarded street crossings and safety zones to the greatest extent possible.

Express routes around towns and villages, relieving traffic congestion in these places.

Through routes—well marked—through cities avoiding heavy traffic for touring motorists not desirous of stopping in cities.

Removal of all bill-boards or roadside signs where they obstruct in any way the view of the motorist.

Non-use of wood block paving material as being very slippery in wet weather.

Rapid sanding of streets in icy and slippery weather.

Better lighting of streets by municipalities.

Splendid lighting at street intersections.

Overhead or one side traffic signals as opposed to center street

installment. (Every time a signal is erected in the center of a thoroughfare a possible accident promoter has been put up).

The publications of the country can be of invaluable assistance if they will hammer continuously along safety lines.

The aid of all merchants and manufacturers operating one or a fleet of commercial cars. (All drivers should be most carefully selected, and before they have driven a foot the value of human life and limb and property should be impressed upon them. This should also be regularly continued at set times.)

Manufacturers can well afford to pay as a reward a regular bonus to their drivers, say every three or four months, based upon their freedom from accidents and the condition in which they keep the vehicles. This would not be a loss but rather a saving, because if the vehicle is carefully driven and the upkeep reduced, that saving should be shared with the employee because he is directly responsible for it.

The saving in freedom from accidents is tremendous, both in thought and worry, and the time consumed in settling the matter.

Along this line the following was taken from a recent issue of the Detroit News:

"Reward for Careful—An insurance and benefit association, which employs a number of salesmen, recently announced that \$50 will be given to each salesman who refrains from violating the traffic rules from September 1, this year, to January 22, 1927. 'It is a good idea, I wish other concerns would do the same,' said James Spratt, superintendent of police, when informed of the plan."

This line of action has been followed for some years by the Yellow Cab Company of Chicago, with very splendid results. Besides saving life it is good business, because it instills a feeling of confidence in patrons.

Three Safety Rules for the Careful Driver

It may interest you to know three rules which I have followed consistently and which have given me good results. They are:

1. Never drive at a speed in which you can not stop in a clear space ahead of you.
2. When passing parked vehicles watch the ground under the vehicles for feet. If there are no feet no one can step out on you unawares. If there are feet you must be ready for any emergency.
3. When passing trucks or commercial vehicles watch out for possible children catching a ride.

Now how can we get results?

First. Start with ourselves. Let each one vow that for the next year he will always be courteous to the other fellow—vow to keep your temper, no matter what the other fellow does, for he will do some exasperating things.

Second. Get a convert every day to the cause of courtesy, and pledge him to do the same, thus starting an endless chain working for Courtesy. By doing that you will at once have started Education.

As a closing suggestion, would it not be advisable to issue some national emblematic award for Safety? This might be splendidly and beautifully designed, and issued by the authority of some standard organization, perhaps the Red Cross Society.

It should be issued to those who have not inflicted human injury, and be given upon proper proof, to be bestowed only after the applicant has driven 25,000 miles, and revokable on the occasion of the first accident. Such an emblem would be given universal standing so that the persons carrying it on their cars would be recognized by traffic officers in every state.

It should be given much the same importance which the Red Cross life saving emblem carries when it is seen on the bathing suit of a swimmer. It is known that that emblem can never be obtained until a certain proficiency in swimming has been attained.

CHAIRMAN BROWN: I feel that we are all deeply indebted to Mr. Haynes' clear analysis of this situation.

The next address on the program will be by Dr. Zenos E. Scott of Springfield, Massachusetts. Springfield has become nationally known for its system of teaching safety in the schools. I know we will be delighted to hear from Mr. Scott, who will tell us about the plan in Springfield.

SAFETY EDUCATION AND CITIZENSHIP

Dr. Zenos E. Scott, Superintendent of Schools, Springfield, Massachusetts

Democracy demands that practice in the acts of good citizenship should keep approximately close to the theory of good citizenship.

It is never easy to make the theory underlying any movement or truth advance at such a pace that the practice may keep abreast. The general tendency is for theory to far outstrip practice. The thinker, for example, wants to advance far ahead of the doer; the idealist wants to keep a great distance ahead of the man who is supposed to put the ideals into practice.

Our democracy has reached such a stage that at present the average man possesses a suitable task at which to work, a house in which to live, means by which to pay for the education of his children, money with which to travel, opportunities for recreation. These conditions make it necessary and possible for the average man to develop new habits and new skills.

If there were but a few of the hundred and twenty millions subjected to dangerous situations each day, there would be little need for the remaining millions to be so concerned with the acts of the small group. However, when conditions are reached in which the lives of a great number of the hundred and twenty millions are in possible danger each

day, it is time for all to learn how to make adjustments to meet this new situation.

These new adjustments are as essential for the present and future good of our citizens as are interest in public affairs and participation in community endeavor.

"Citizenship and safety education," therefore, but represent the application of well known principles to new conditions and new needs.

The program of public education must be directed toward preparing children to take their place in the life of the world. It must develop knowledge and technique to meet immediate situations. It must also develop insight into the problems of life in general.

Safety education in the industries began with providing protection for the workman against the dangers of high powered machinery by caging the machines, or placing high power belts overhead, or creating safety zones, so to speak, in the machine areas.

Teaching Safety in Schools Involves New Problems

An advance step was the education of the workman, teaching him not only to adjust himself to the dangers of the situation in such a way as to prevent accident, but giving an insight into the problem and teaching him to assume individual and collective responsibility for the safety of all. Such assumption of responsibility is an obligation of the citizen within the industry. In this respect the various industries have served very definitely in citizenship training.

Within the school we face new problems. We know the need for safety education, for safe adjustment to immediate situations. There is just as great need for the solution of that larger question, that of developing insights into the whole problem in its relation to life in general, and of teaching children to assume greater responsibility for the safety of all.

There are in the field of safety education two types of outcomes: the successful adaptation to immediate situations, a definite and immediate result; and those ultimate and more remote outcomes manifesting themselves in social and moral life.

In education, present-day interpretation conceives citizenship to be qualities of behavior guided by an appreciation of all the factors that enter into a group situation.

No classroom or school unit is without innumerable opportunities for such training. For whenever a group of individuals gather together for a common purpose, such problems as those which involve the rights of others, recognition of another's contribution, harmonious agreement or disagreement where there is conflict of opinion, are bound to be present.

The quality of behavior desired in such situations must be developed by an insight into the problems presented and a clear understanding of the types of behavior which make for sympathetic cooperative living. The ultimate outcome reaching into adult life must be knowledge and attitudes acquired in and through such procedure.

We are not here raising the question of the cost of accident. We are concerned with bringing about conditions which may reduce losses to a minimum, with the thought that the by-product—*citizenship*—is the thing which in the long run will most probably reduce accident, losses of money and property; and which will eliminate suffering, prolong life, and increase happiness.

In terms of safety education, who is the good citizen? What is citizenship? What is it which shows growth in citizenship? Can this new aspect of community life be taught? Must we, the members of corporations, schools, and private individuals, teach this aspect of good citizenship? Must we make over many of our old habits in order that there shall develop higher types of activities which consider the interest and welfare of all?

The man who removes the danger when he sees a board with a rusty nail has a chance to be a good citizen. The clerk who double checks himself when labelling a can containing gasoline is a good citizen. The boy who never points a fire-cracker or a toy gun at another is a good young citizen. The boy who never "catches or hooks on" is a good citizen. The driver who signals and slows down at each turn in the road is a good citizen. The pedestrian who guides himself across the street as carefully as he would want the driver of a car to steer is a good citizen. The parent who keeps his child isolated because of contagious disease is a good citizen.

Characteristics of the Good Citizen

In all situations there is implied, first, intelligence upon the part of the individual; second, a training of intelligence in safety; third, willingness of the individual to see his own act and its possible result; fourth, a willingness to have a care both for his own safety and for the safety of others; fifth, a determination to make himself obey the higher motives in life and listen to what public opinion says as well as his own conscience.

Can such aspects of citizenship be taught? The question answers itself. Circumstances alone teach men and women, boys and girls to behave successfully under difficult conditions. Let me draw some illustrations from the schools of Springfield:

The pupils in one of our large elementary buildings were in the habit of skating to and from school. The walk leading to the street is on a sharp incline.

At a meeting of the children's council one afternoon, the statement was made that children who skated to the corner frequently found that they could not stop and were forced to skate into the street. The children decided that since this was dangerous it would be wise to forbid the putting on of roller skates within two blocks of the school. A motion to this effect was carried out. When the council adjourned, the dismissal of school was in progress. Members who assisted in the dismissal took their places in hallways and yard. One boy who had assumed the full responsibility of his office took his place at the busy corner.

Two older children skating toward the corner were stopped and informed in regard to the new ruling. The children objected to removing their skates at first, since they had not been officially notified. The younger lad explained the reasons for the ruling and after some little argument first the older lad and then the girl unstrapped their skates and walked down the street, law abiding citizens of their school community.

This illustration shows that individuals do learn how to act under varying circumstances of danger. They are taught by their own thinking, experiences, circumstances, the sayings and teachings of others, the examples of others, and also by that intangible public opinion which indicates somewhat indefinitely but persistently what things are demanded of a good citizen.

The first important contribution to ask is that a better understanding take place among all who are participants in any line of work.

"Fire Prevention Week" Began the Safety Program

When the matter of traffic hazards, fire, water, explosions, and similar dangers are understood and appreciated an important step will have been made. The following example shows how understanding takes place:

The observance of "Fire Prevention Week" was the beginning of a safety program in one of our schools. The children and firemen talked together about the best ways of working for the safety of the school and community. The children constructed an engine house, fire alarm box, and made equipment modeled after that which had been seen in a nearby fire station. When any question arose on which help was needed the children consulted the firemen as well as the teachers.

The entire building made a study of what to do in case of fire at home or at school. In each fire drill the children formed the habit of thinking and acting as if there were a real fire. Rules made by children and teachers were obeyed to the letter.

A few weeks ago a room in this school began to fill with smoke. Teachers and children discovered the smoke and flames and turned in the signal immediately. The custodian's bell and the fire bell rang simultaneously.

The children vacated the rooms and the building under strict drill orders. In less than two minutes the building was empty. For 20 minutes the children kept in their assigned places at some distance from the building, and when the "all-out" signal was given by the firemen, they returned to the building without disorder or undue excitement. The results of study and practice in adequate fire drill were all that could have been asked. The way in which this difficult and dangerous situation was met showed how necessary it was to prepare for such an emergency. The results were great enough to pay fully for all the precaution made by fire drills throughout the city.

We know that a program in safety education will really influence life to a great extent; that through persistent practice in school, at home,

in industry, and on the street the result of cooperative thinking and cooperative acting will reach such a point that all will learn better how to act wisely and safely. The results are citizenship products.

How did the Springfield public school system find its part, and what has been the spirit on which that part has been played? A page from the yearbook of the National Society for the Study of Education approximates the answer to this question:

"The first step in the Springfield program was a study of such activities as might be helpful in reducing accidents among the children of congested areas, and a consideration of a program of general safety for the entire city.

"It was soon evident that these activities should be organized in a city-wide program. To this end, a committee made up of teachers, principals, and supervisors was selected to formulate a course which could be used in the elementary schools.

A Special Committee Studied Local Conditions

"This committee studied local conditions and examined all available courses of study in use in other cities. Conferences were held with members of the Springfield Safety Council and the National Safety Council.

"The committee had several meetings at which the general ideas underlying safety education were developed. The committee was then so organized that special phases of the program could be prepared for each grade. Teachers and principals who had contributions to make were organized as sub-committees and were called upon to work for consecutive days upon the subject matter, method of presenting, etc. The materials presented covered physical education and health as well as so-called safety ideas. Almost one year was spent in perfecting the program and in trying out the materials.

"When the program was ready for use meetings of teachers were called for the distribution of the tentative course. Supervisors of special subjects discussed the relation of safety education to the work of their respective departments. Plans for the use of this material were presented by the general supervisors, under whose direction this work was to be carried on."

Those who were active in developing the program of safety education considered the course of study and methods from two points of view: first, the more immediate development of better and safer behavior in the pupils themselves in order that they might meet the hazards of life more effectively; second, the development of appreciation of the organizations at work in the community at large for the protection of life and property, with the hope of developing a consciousness of the duties and obligations which rest upon each citizen to be familiar with such organizations and to ally himself helpfully with them.

Consequently, in the kindergarten and primary grades, the selection of subject matter was made from family life and the home, and from the more immediate situations involving potential hazards of any kind.

In the upper grades the subject matter was selected from the organized agencies for public safety. Such selection was intended to provide for continuous growth in right habits of thinking and acting. The course of study illustrates definitely that objectives and materials of safety education may be so organized as to become an integral part of the curriculum, not a unit isolated from other subjects of that curriculum.

How significant is this program of safety education in the public schools? I am not detracting from other specific purposes or accomplishments when I say, that in my judgment what is being done in safety education is equal in importance to any other accomplishment. The work lies within the experiences of children. It is making them more thoughtful, more painstaking in their efforts to protect life and property. In every school visited at any time throughout the year, there is constant evidence in recitations, on posters, in attitudes and habits of pupils in class rooms about the buildings, and on playgrounds, that safety education pays big dividends.

May I again quote from the yearbook? "However well organized a public school system is, a full program in safety education can not be adequately carried on without cooperation with other important agencies.

"At all times the Springfield Safety Council has furnished constant inspiration to us. Springfield is fortunate in having many of the more able business men of the city interested enough to give careful attention to an industrial safety program in our city. In addition, the interest of these men goes much beyond that of industrial education. It is carried over into that type of safety education which goes on in the school. These men have spared neither time nor effort in their willingness to study and assist in the program.

Cooperation of Many City Agencies of Large Value

"The Safety Council has also furnished an abundance of valuable statistical and teaching materials. The Council has given much help by the way of wholesome and sane publicity in the general safety program.

"The Department of Streets and Engineering has aided materially in the enrichment of our program and in making it possible for this program to be carried out.

"The Police and Fire Departments have also been a source of great encouragement in the development and in the carrying out of safety education in Springfield. Equal in importance has been the spirit manifested by the men of these two departments in making it possible to secure the right attitude on the part of the school children. The slogan 'each fireman and policeman is the friend of the children' has become a meaningful slogan with us."

We are not asserting that Springfield has solved the problem of full citizenship training in regard to safety education. We believe that the problem has been fully realized by those in school and community life. The progress that has been made indicates that it is only by a carefully planned program of education for both children and adults that the solution will be reached.

The present conditions are encouraging throughout the entire country. The illustrations which I have used from my own city are but indicative. They show that thinking people in school, in industry, and in communities are earnestly making efforts to lessen these dangers of everyday life. We may look forward soon to a time when even with the increased difficulties, greater progress toward the solution of our problems will be made.

Years ago, plays and games, sports and general athletic life affected us but little. At that time there were few rules to the games and even these rules were not always lived up to. The present development shows a situation quite different. We now have elaborate rules and regulations. All of those participating are quite willing to obey the rules. The spectators numbered by the millions (football, baseball, basketball, golf, tennis, soccer, swimming, etc.) have learned enough of the rules and regulations to understand the games and to appreciate the skill, the technique, the sportsmanship of the players.

Sport May Often Be Enlisted in the Cause of Safety

The spectators are the supporting public who help definitely to set the standards of behavior for both the players and the spectators. The combined groups make one of the great socializing agencies in American life. Sport is a new factor in our democratic society. We may call this factor whatever we will, it contributes one of the sane and wholesome aspects of public life today.

The way in which the Boy Scouts of America conduct their games, plan their programs, and carry out their activities with the slogan "on my honor" uppermost in their hearts illustrates what citizenship attitude is being developed in this great organization.

When Bobby Jones lost the golf championship a few weeks ago there was universal regret that he was defeated. There was, however, nationwide admiration, for he played his best and in defeat showed the highest type of sportsmanship. The public appreciated his efforts.

The millions of people listening in and watching score boards wanted Alexander to win in the final game, when he stepped into the box in that hectic seventh inning. There was still the splendid fighting spirit in the team. Alexander has been a national figure in baseball for years. The public support was his. Through his pitching, and under Hornsby's leadership, the Cardinals won and the millions of people felt a bit prouder of American sportsmanship.

All will agree that these illustrations show growth in sportsmanship. They represent new aspects of life which we have learned within the last generation. All have learned sportsmanship ideals through the observance of games and recreational activities. The rules are observed by participants and millions of spectators. No richer field is offered for the development of proper citizenship ideals and attitudes.

There is a lesson here for us interested in safety education. It is now in its mere beginnings. There are but a few rules. These are not fully

understood, neither are they obeyed willingly, nor is compulsion yet used to any great extent. There are not yet millions of cooperative spectators eager to support the work and to aid in carrying out the rules. This situation is comparable to the beginnings of sport as we now use that term.

With constant effort and adequate enthusiasm we may make our program of such importance that the majority of our citizens will be willing to cooperate. Safety education will compel all of us to live up to the rules of the game of life.

When each one acts with reason and care in whatever he does, his action will look toward his own protection and happiness and in addition it will consider and include the protection, happiness and safety of friends and neighbors. In this sense, citizenship will have a new meaning, and it may even be placed on a higher plane.

CHAIRMAN BROWN: I am sure there is plenty of food for thought in Dr. Scott's address.

Many of us who have been unfortunate enough to have been involved in accidents have wondered how they did happen. This afternoon we are going to be told how accidents happen. Dr. Louis I. Dublin, chairman of the Statistics Committee of the National Safety Council and statistician of the Metropolitan Life Insurance Company, of New York City, will now address us on that subject.

HOW ACCIDENTS HAPPEN

**Dr. Louis I. Dublin, Chairman, Statistics Committee, National Safety Council, and Statistician, Metropolitan Life Insurance Co.,
New York City.**

This is the fifth report which this committee of the National Safety Council has rendered to the association. What I shall say to you will be less in the nature of a paper of my own than the report prepared as the result of work done by a group of loyal members of the association in and out of season, year in and year out.

As is usually the custom, I shall give you a few words with regard to the situation throughout the country on the score of public accidents and of accidents in general.

You should know, for example, that there were in 1925 a total of approximately 90,000 fatal accidents in continental United States and that those 90,000 fatal accidents represent a total of at least 5,000,000 to 6,000,000 accidents of all kinds. The total losses sustained by the country as the result of these millions of accidents and these 90,000 fatalities are simply enormous. I, who am in the habit of conjuring up large figures, hesitate to attempt to calculate the total loss involved. It would be almost impossible to do so, so great are these losses.

It is also most interesting to observe that the accident rate during the last few years has shown very little tendency toward improvement. I shall show you some figures in a moment indicating that from year to year during the last five years the figures have been vacillating up and down without any regular tendency. During that same time the improvement in general health conditions has been enormous and there has been a marked decline in the mortality from various preventable diseases. We must think in similar terms of a series of preventable accidents which can be controlled, just as diptheria and tuberculosis and typhoid fever can and are being controlled. But these accidents are not being controlled.

TABLE NO. 1

Estimated Fatal Accidents in Continental United States, 1925 and Prior Years—Principal Causes

Cause of Accidental Death.....	Estimated Deaths In:				
	1925*	1924	1923	1922	1911
All fatal accidents.....	89,880	86,579	85,351	76,255	79,255
Accidental burns	7,615	7,840	7,495	6,992	7,214
Accidental drowning	6,807	7,499	6,935	6,992	8,306
Accidental falls	15,922	14,884	14,318	13,219	14,052
Traumatism of machines	2,423	2,386	2,573	2,185	1,967
Railroad accidents	7,269	7,385	8,168	6,664	12,179
Street car accidents.....	1,385	1,813	2,014	1,748	2,998
Automobile accidents†	19,037**	17,725	16,555	13,656	2,061

*Provisional estimates from experience of Metropolitan Life Ins. Co. Figures for 1924 and prior years based upon U. S. Registration Area data, Bureau of the Census.

**Estimate of 19,800 automobile accident fatalities by E. E. Robinson for 1925 should be accepted in place of this one.

†Does not include deaths in collisions between automobiles and heavier vehicles.

If we look over the period of 15 years we find a slight rate of decline, a decline of less than 10 per cent. During that same period there has been a decline of 20 per cent in the mortality of the general population. So you see there is a field full of promise justifying the activity of the National Safety Council. In fact, the very situation which I now describe is the greatest justification of this association of ours and explains its great progress.

The valuable lives of men and women included in this total could hardly be evaluated and the promising children who are killed by one kind or another of these accidents which we have been discussing could not be evaluated. But it is most interesting to observe that these accidents of ours are occurring at a rate very much higher than seems to be necessary in any other part of the world. If we turn to the European countries, and especially such countries as great Britain, we find that

our fatal accidents are at a rate two and one-quarter times as high. If we take industrial Belgium, a bee hive of activity, a country in which almost everybody is actively engaged in industry, we find that our accident rate runs nearly three times as high as theirs. I am now thinking in terms of all accidents, not merely vehicular or mining or any other species of accidents.

TABLE NO. 2

Death Rate per 100,000 Population for Specified Accidents in Certain Countries

Country: year	Total accidents	Falls	Burns	Drownings	Steam railroads	Automobiles	Street cars
U. S. Reg. States—							
1924	76.2	13.1	6.9	6.6	6.5	15.6	1.6
1911	84.6	15.0	7.7	9.4	13.0	2.2	3.2
England & Wales—							
1924	34.1	7.1	4.0	4.0	1.5	6.5	0.2
1911	45.5	7.8	6.3	7.3	2.3	1.8	0.1
Scotland—							
1924	45.2	4.5	*6.8	6.3	1.7	4.9	0.4
1911	55.2	5.2	**8.5	10.6	3.1	0.8	0.3
Belgium—							
1922	28.3	3.6	3.1	3.8	2.6	2.4	+
1911	34.7	6.6	4.4	9.5	3.6	+	+
New Zealand—							
1923	46.1	2.8	**2.0	13.1	5.4	4.6	1.1
1911	46.4	2.2	**6.3	16.0	+	+	+
Australia—							
1924	48.0	5.9	5.0	7.4	3.5	6.6	0.9
1911	66.1	7.8	7.0	16.0	+	+	+
Canada—							
1923	56.5	6.7	4.2	9.9	4.3	5.4	0.5
1911	+	+	+	+	+	+	+
Norway—							
1922	39.6	4.9	1.6	20.4	+	+	+
1911	47.1	3.8	1.8	30.2	+	+	+

*Includes conflagration.

**Includes scalds.

+Data not available.

Now, these 90,000 fatal accidents that we are talking about—how are they caused? You will be surprised to learn that half of them, 48 per cent, in fact, are of the variety which we call public accidents; a sixth are strictly industrial accidents; a fifth are domestic accidents; and the remainder comprise a series of odds and ends which are hard to classify. The outstanding group is the public accidents.

Please realize that with regard to industrial accidents, a concerted effort through 15 or more years has been accumulating momentum and doing big things. In fact, it was against the growth of the industrial accident that the National Safety Council was first organized and has found its largest opportunity for service.

The domestic accidents, numbering almost as many as the industrial accidents and perhaps even more, have scarcely been touched as a field for preventive work. But the field of public accidents is now beginning to receive attention. There are 43,000 or 44,000 fatalities a year and several million accidents involving injury and loss of property. These demand attention. And of these public accidents those which concern us especially, and which concern my committee especially, are the accidents on the highways.

In the last year 19,000 and some hundreds of fatalities occurred as the direct result of the automobile on our highways. These do not include the several thousand fatal accidents which resulted from the collision of an automobile and a heavier vehicle, such as a train or trolley. If we combine these two, and I think they should be combined, we get a total of 22,500 as the probable total number of automobile fatalities in the year 1925.

That represents a total of about 65 fatalities a day. This number has been increasing from year to year from almost nothing 15 years ago until today this group of accidents is of first importance leading all other groups.

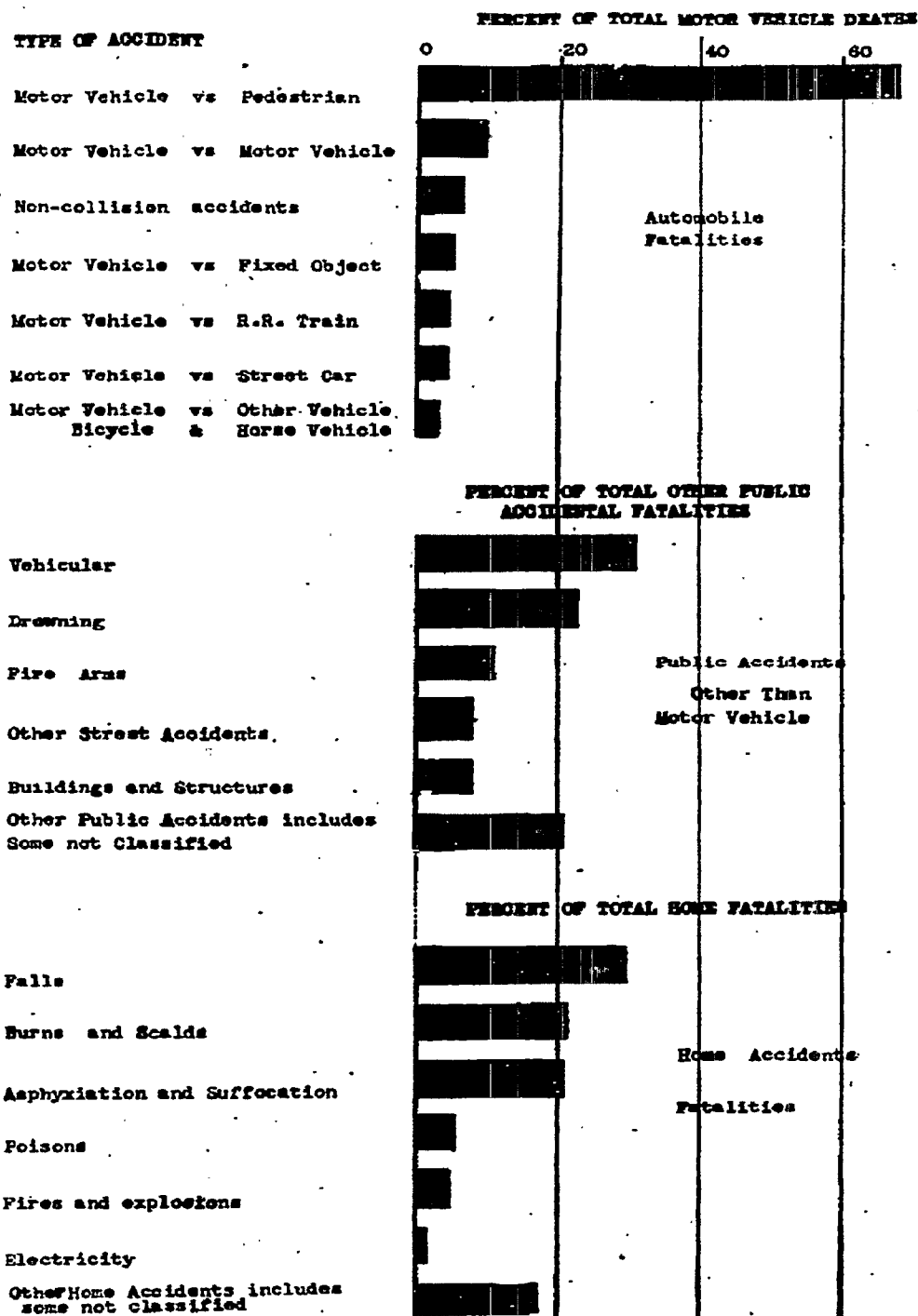
The Fatality Rate is Apparently Dropping Back

You will be interested in knowing that the figure for 1925 is only slightly in excess of the year 1924 and that the figure for 1926 to date—that is, the first eight or nine months on which we have data available—indicates that there has been a staying of the rate of increase. In fact, the figures for the fatalities in my company show that there has been a slight decline among these 17,000,000 people whom we have insured. For the first time in the history of our record keeping we have gotten somewhere. We seem to see the light. These activities that have been described in Springfield and other places are beginning to bear fruit. Heretofore we were prepared from month to month to see a rising curve. We are now looking for a decline. We seem to reach the crest. Let us hope that is true and that from now on, as this splendid work is multiplied from city to city, we shall actually see a declining tendency from this, the largest, the most expensive, of our forms of fatality.

These figures which I am quoting, this decline to which I refer, is largely the result of the efforts of a few organizations and I think pre-eminently the result of the work of the National Safety Council. In recent years other organizations have taken up the cue. The Hoover Conference, the Automobile clubs and Automobile Chamber of Commerce, and the Chambers of Commerce affiliated with the United States Chamber of Commerce have a splendid program and I believe they will cooperate and coordinate their efforts with ours and so these results may grow and become more and more important.

But it is my function this afternoon to tell you about the work of the committee, the work that is carried on from day to day through the

Figure I. Distribution of Major Fatalities.



office of the National Safety Council in Chicago. A few years ago it occurred to us that perhaps the most important thing we could do was to develop a system of record keeping which could be made the basis of the program of those who were actively engaged in the prevention of vehicular accidents.

We realized perfectly well that we were just a spoke in the wheel, that we couldn't ourselves prevent accidents, but we also realized our primary position in making it possible for constituted authorities and for those others who are engaged in the prevention of accidents to do

TABLE NO. 3

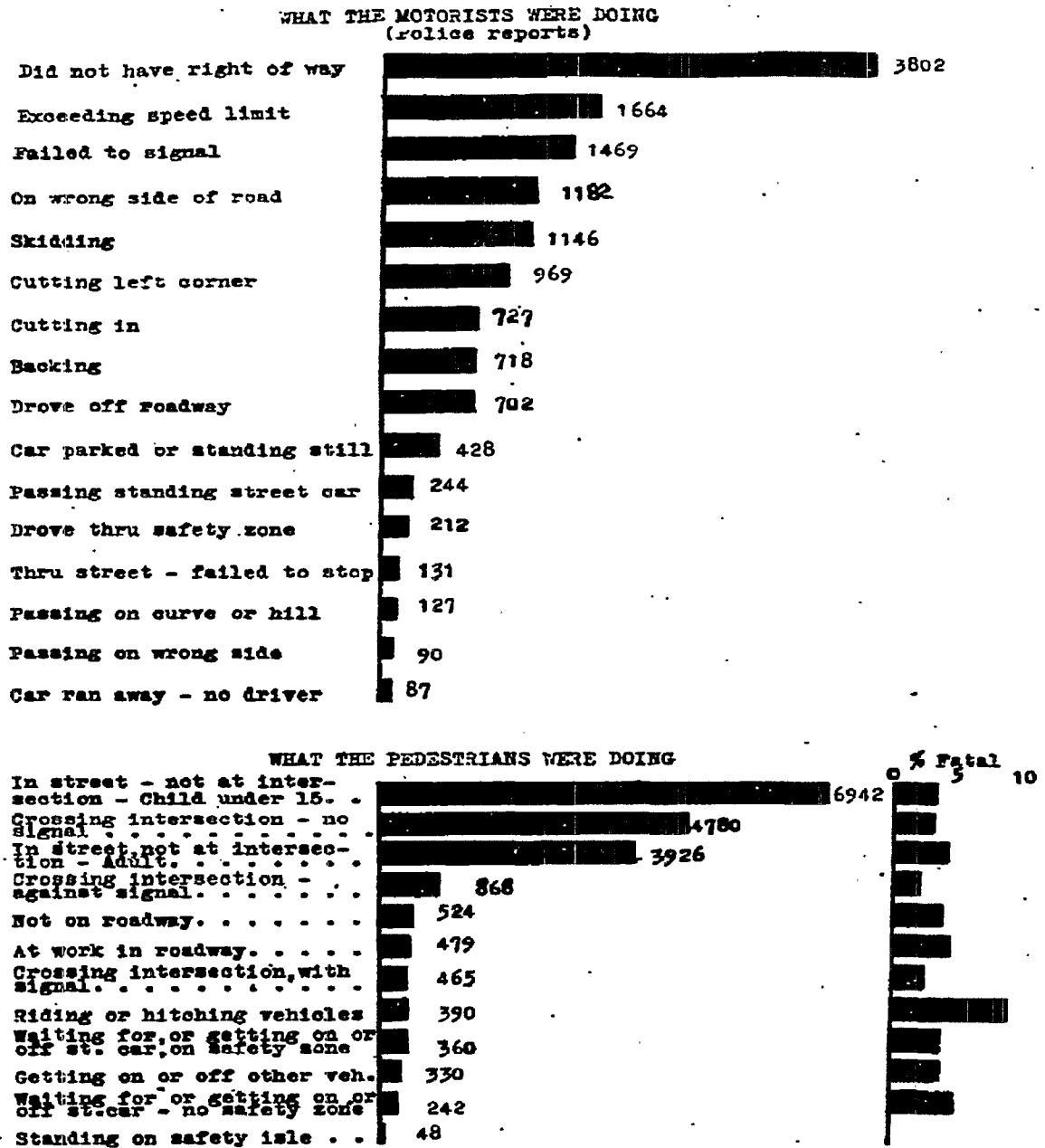
Percentage Distribution of Fatal Accidents in 1925, According to Origin of Hazard. Metropolitan Life Insurance Company, Industrial Dept.

Origin or type of hazard	All ages		Under 15		Ages 15 to 64	
	Number	Percent of total	Number	Percent of total	Number	Percent of total
All accidents—total	10,656	100.0	3,299	100.0	6,355	100.0
Industrial	1,582	14.8	13	.4	1,478	23.3
Public	4,917	46.1	1,805	54.7	2,782	43.9
Transportation	1,069	9.5	173	5.2	808	12.8
Sports & recreation	494	4.6	214	6.5	276	4.4
Pedestrian use of streets	2,020	19.0	942	28.6	850	13.4
Use of public buildings	99	.9	16	.5	70	1.1
Others in this class	1,295	12.2	460	13.9	778	12.3
Domestic	2,328	21.8	1,018	30.9	959	15.1
Misc. and not specified	1,829	17.2	463	14.0	1,116	17.6

their work better. There are those, like the state and municipal officers, whose business it is to control accidents—the city planners, the traffic and safety engineers, the automobile manufacturers, the parents and teachers and that whole list of other people whose business it is to try to prevent accidents. It was our purpose to put into their hands that information without which they couldn't function. That was the goal we set for ourselves, that we should work out a system of obtaining basic information so that the work of these people would not be merely sentimental but effective.

The system that was worked out was essentially this: we realized that first of all there must be knowledge of every accident that occurs—every accident on the roads and on the highways. That meant a card on which a record could be made, which card should be so simple and so effective that it would be accepted by the constituted authorities as the official card on which records should be made. Let me tell you, my good friends, this was no easy matter. It took five years to work out this system of record keeping. I have this small card in my hand, a 4 by 6 card, which is now in operation. You will hardly believe it but this or some very similar form of card is being used in nearly 100 of the large cities of the country and in one entire state of the Union, largely due to the efforts of the National Safety Council in Chicago.

This card (most of you are familiar with it) calls for a statement

Figure II. How Motor Vehicle Accidents Occur.

of the outstanding facts with regard to the accident. It is intended to be made out by the officer in the location. In some communities it is supplemented by the participants in the accident; in fact, that is the

requirement of the state of New York. It calls for an investigation later, made when the smoke has blown away, when the facts can be gathered. It calls for a statement as to what the drivers were doing, what part the pedestrian played in the accident. It brings out the facts. It does not attempt to place the responsibility upon either driver or pedestrian. It attempts only to gather the facts together, from which a judgment can later be made and upon which conclusions can be drawn, not from one accident alone but from the thousands that occur, indicating what communities can do in order to prevent the recurrence of these accidents.

TABLE NO. 4**Albany Street Accidents in 1924**

- 76% occurred during clear weather.
 - 75% occurred on dry streets or roads.
 - 62% occurred during daylight.
 - 46% occurred on street levels or roads between intersections.
 - 43% of motorists involved in accidents were reported as being inattentive.
 - 22% of these motorists were reported as violating traffic rules.
 - 42% of pedestrians involved in accidents were reported as walking, running or playing in the streets.
 - 17% of these pedestrians were crossing streets between intersections.
-

It seems to us that after the development of these forms over a period of years we have a system that works, we have a system which has been rather enthusiastically received by those who know of it, who are recommending it from one community to another as a means which is helping to control the situation locally.

Let me call your attention especially to such communities as Albany, where this record system has played a most important part in controlling the situation there. I would call your attention to the situation in Grand Rapids where, under the direction of Col. Sinke, this record system has resulted in a splendid improvement in the situation. If only other police officials would follow his lead!

On the basis of the returns from this record system he prepared a report, the like of which I know not. It is a splendid document analyzing the accidents which occurred in his community. He knows where those accidents occurred. He has a spot map. He knows when they have occurred, in relation to school time, in relation to fatigue, in relation to the morning and afternoon and evening. He knows how those accidents have occurred, whether they are between pedestrians and automobiles or between cars by collision. He knows where these accidents oc-

curred, whether they are at intersections or between intersections. He knows the condition of the car and whether it was the fault of the driver or the fault of the car itself. He knows a thousand and one things with regard to those underlying conditions which resulted in the accident, with the result that in having this information he can and he has applied common sense in the removal of the causes.

What do you suppose is the result? Whereas, in Grand Rapids there were 41 fatalities due to automobile accidents in the first eight months of 1925, there were only 18 in the first eight months of 1926. The same situation occurred in Albany, and in Providence, Rhode Island, where this system was used; and it will occur in any city which seriously takes up the recording of every accident, the tabulation of the facts and the analysis of the facts and which is willing to do the right thing after the facts are at hand.

An Appeal for Cooperation in Statistical Work

My appeal to you this afternoon is a simple one. I ask you, ladies and gentlemen, to forward the work that Mr. Williams and Mr. Robb of the National Safety Council have so splendidly started in 100 cities of the country. What we want is not one-third of the population of the United States under the protection of this record system, but 100 per cent. This can be done if each one of you will go back to your own community and find out whether the police officials, and those others who are entrusted with the safety program, are using this system or a similar system and are reporting monthly to the central office in Chicago. The reports which you send in, which could be sent in by your police officials or your local safety council or your local chamber of commerce, would be tabulated in the Chicago office and the returns made available to you very shortly thereafter. If more of you will follow this clue and cooperate with the National Safety Council office in Chicago, I have no doubt at all that in the years to come, as we come to these meetings annually, we shall see the record for automobile fatalities and injuries go down as rapidly as we who have followed the industrial situation have seen it improve there.

All of these figures I have quoted and many more are available in tables and charts published in the report of our committee, which may be had upon request to the National Safety Council.

CHAIRMAN BROWN: I feel that none of us could do a better work than to cooperate with Dr. Duplin and see that each home city adopts this system of keeping accident statistics and forwarding them to the National Safety Council.

We are now going to hear from a gentleman who very early in life learned something about the decimal system and recently in Detroit has been attempting to teach others that system. He usually starts in somewhere with about 30 and then jumps to 60 and then usually to 90, and he adds days at the end of it.

I take great pleasure in introducing Judge Charles L. Bartlett, who will speak to you on "What are Laws for?"

WHAT ARE LAWS FOR?

Judge Charles L. Bartlett, Recorder's Court, Detroit, Mich.

I am of the firm belief, after years of experience on the bench and after the practice of law for nearly a quarter of a century before that, that these educational campaigns, this wonderful work carried on by these great safety organizations, the National Safety Council, the Detroit Automobile Club and other safety organizations, is of great value. I want to mention only a few of them: Capt. Galbraith and Mr. Brown here. From early morning till late night he is working on your problems. Then there is Mr. Van Schoick who goes throughout the state of Michigan and puts on these safety drives.

Recently in a small city of 40,000 inhabitants I witnessed a safety parade such as I have never seen in my life, which Mr. Van Schoick and the safety committee put on there. It was at that meeting that I spoke to over 16,000 people. Now if people in a city the size of Battle Creek will turn out 16,000 strong, you can see the interest that is being taken in this safety work throughout the United States.

Then there is Sergeant Brown, who has charge of the automobile school, and his instruction of green drivers on how to operate a motor car; our Commissioner of Police, Mr. Rutledge, who has taken a great interest in safety work; the newspapers that have kept down accidents by reporting the causes thereof and giving the public the true facts; the inspector of the Traffic Department, Inspector Sheehan and his splendid officers.

So, friends, if they tell you that these organizations are not cooperative and are not getting big results along safety lines, I want to say to you that it is untrue. Of course, they must have the assistance of the courts. They should have the assistance not only of the police department but of the court.

The situation has become a public calamity. I am informed that last year there were more than 676,000 people injured by automobiles. Of that number, 257,000 children were injured. I imagine that a line from Chicago to New York packed with those people would about cover the area. So we are confronted with this problem and confronted with this question, "Who are those who are causing these accidents?"

If any of you ladies and gentlemen have time tomorrow morning and will come over to court room No. 6 I will show you who are causing these accidents. I will show you that the men of this country are causing these accidents to a large extent. I will show you that the women are very seldom involved in serious accidents because they drive carefully, because they are more unselfish than men are.

To be sure, once in a while we have a woman driver before us, but very seldom, so I fully coincide with what Mr. Haynes says, that it is largely a matter of selfishness on the part of many drivers that causes accidents.

Those men are selfish in their own homes. They are men who care nothing for life or property. They care not for your rights or for mine.

And who are they? Many of them are morons. Many of them are epileptics. Many of them are confirmed drunkards. I have had many cases where men received operators' licenses, for instance, who had a criminal record, and that class of men is put upon the streets of every city in the Union to strike down innocent people.

Now, dealing with the subject of pedestrians, they are at fault in many cases. The carelessness of the pedestrian undoubtedly causes many accidents. Pedestrians must be educated to go with the traffic and not to cross in between streets and to remember that every eighth or tenth driver is either a reckless or a drunken driver.

Many people have asked me how I happened to start sentencing drunken and reckless drivers to jail? How is it that I take these men to hospitals and morgues? I will tell you just why. I think that those men should pay the penalty for their crime. I think they should be obliged to witness the havoc they have wrought and the lives they have taken, especially of little children. As long as I sit upon the bench in the city of Detroit I shall deal out the same punishment to them because I believe no man should escape who has struck down a beautiful child or torn to pieces an aged man or woman, who are incapable of protecting themselves.

Tracing the History of the Law of the Land

What laws are for, the subject assigned to me by your own body, is a most comprehensive and technical one and volumes could be written regarding it. In order to fully understand what law is, I will give you an approved definition from Holland's Jurisprudence, which is as follows: "Law is a rule of action prescribed and enforceable by recognized authority." The common law was brought to this country and became a part of our system of jurisprudence long before the time of Blackstone. Blackstone codified and made a complete and thorough analysis of the English common law and today Blackstone's definitions are recognized by every court in this country.

It was found that the common law which came to us from England in many cases was not adapted to our system of jurisprudence. Therefore the statutes were enacted which changed the common law into statute law, as, for instance, the laws of inheritance, etc.

Statutes were oftentimes cumbersome and are amended from time to time so that with the passing by each state in the Union of hundreds of statutes, a study of the law became most difficult and intricate. Especially was this true in criminal procedure which I shall discuss mostly this afternoon. Then, to add to the confusion, many legislators had their particular hobby and attempted to have laws enacted that would benefit their own section instead of the entire community. Thus each state enacted some laws, many of them in direct conflict with the laws of the United States. Oftentimes the interpretation of such a law became most difficult, even to the painstaking and studious practitioner.

Briefly, the result of these statutory enactments caused a partial breakdown of all laws. Therefore a general disrespect for all laws has been noticeable in the last decade at least.

Why this general disrespect for law and order? First, because the minority in many cases enacted unfair laws which control the majority. Second, because the authority of judges is limited to such an extent that the technical criminal lawyer can raise complex objections upon the record that will cause a mis-trial or reversal. Third, because a certain class of attorneys are continually looking for a technical advantage to secure the acquittal of clients whom they know to be guilty. Fourth, because judges are victims, oftentimes, of political adventurers who attempt to coerce judges and nullify their work. Fifth, because judges are not appointed for life.

A Criticism of the Profession of Law

Noticeable advance has been made in almost every profession except that of the law. Law colleges are graduating annually thousands who are prepared from the outset of their careers as attorneys in raising every possible legal technicality and thus secure an unfair advantage.

The traffic laws of this country are considered a huge joke by hundreds of thousands of citizens in the United States who openly boast of their ability to evade them and of their influence with the police departments and courts.

I am making these observations, friends, after years on the bench listening to thousands of felony and traffic cases and after nearly a quarter of a century in the practice of law before going on the bench.

I have not the exact figures but I have been informed that I have handled over 280,000 cases, some of them repeaters. In other words, I have had the opportunity of looking into the eyes of over 200,000 people.

Eighty-seven years ago England recognized the fact that in order to secure speedy and certain justice a complete change in this system of administration of justice was necessary. They thereupon erased entirely the old procedure and enacted laws which did away almost entirely with technical objections by attorneys, giving the judges far greater authority.

The result was that criminal cases which theretofore had been pending for years were disposed of expeditiously before the witnesses died or left the jurisdiction of the court. Therefore the innocent were acquitted and the guilty were punished and made to pay the penalty for their criminal conduct. Appeals were unheard of and granted only when the trial judge so ordered. The trial judge in charging the jury really made an argument for or against the defendant—for the defendant if the evidence showed that he was guiltless and against the defendant if his guilt was proven to the court beyond a reasonable doubt.

Arguments of counsel were reduced to a minimum being brief and reciting and calling the jury's attention to salient facts only in the

evidence. Prosecutors were appointed from the list of attorneys or barristers, as they call them there. No case in England is prosecuted by a prosecuting attorney, if I am informed correctly. In every instance a reputable member of the bar is chosen to prosecute each criminal case.

Today England is recognized as having the ideal system for the administration of real justice. They have judges who are always appointed for life and attorneys who have the respect of the entire community. No one can practice law there unless his character is of the highest. The people respect laws and obey them.

After 87 years, during which time England has lived under this complete change and the codification of its laws, the entire laws today are respected and commended throughout the civilized world.

Remedial suggestions, which I suggest for our own country are the following:

1. Codification and uniformity of all criminal laws patterned after the English system.
2. Stricter requirements relative to admission to the bar, making character as well as scholarship a prerequisite.
3. Appointment of judges for life.

Therefore, answering the question assigned to me, only laws should be enacted which can and will be enforced.

CHAIRMAN BROWN: Judge Bartlett, on behalf of the assembly I want to thank you for taking your time from the bench to come and talk to us.

The next subject on the program is "Safety as a Community Problem." Mr. Charles E. Hill, Vice President of the National Safety Council and General Safety Agent of the New York Central Lines, New York City, will speak to us on that subject.

SAFETY AS A COMMUNITY PROBLEM

Chas. E. Hill, General Safety Agent, New York Central Lines

In discussing "Safety as a Community Problem" we must necessarily approach the subject from a broad standpoint, having in mind not only the problems with which we are confronted today but the conditions we may reasonably expect to exist in the future. This subject is a vital one, of tremendous importance in any plan we may adopt in our efforts to check the wanton waste of human life and property due to the thoughtlessness, carelessness, indifference and recklessness that have such a hold on a small minority of the citizens of this country.

We must approach the subject from a national viewpoint, for it is one that deeply concerns every man, woman and child of America and registers its wants and its needs into the very fabric of our civil life.

The enormous loss of life, due to accidents, as a result of a lack of carefulness on the part of our citizens is appalling, and is evidenced by the fact that during last year in the United States, there were 89,000

people killed and more than two and one-half million injured, representing a casualty toll of 244 deaths and 7,000 injuries for each day of the year. This was more than 20 times the daily casualty toll to the American soldiers during the World War. Yes, the tragedies of war take their toll in frightful numbers, but the tragedies of peace register a toll beyond the comprehension of the average citizen. The direct economic loss, alone, from accidents is estimated to be at least four billion dollars per year. If these accidents could be wiped out over night our economic adjustment from this cause alone would be sufficient to dispose of our public debt in less than five years.

If these appalling losses are not sufficient to arouse the consciences of the citizenry of this country, they may be stirred to action when they realize that 21,000 boys and girls under 15 years of age went to their death as a result of accidents last year. Is there not sufficient human interest in that fact to divert public attention from matters of less moment?

Our casualty record, as astounding as it is, is made up of a large number of accidents occurring in a great many places. They do not attract the publicity of a Lusitania or a Titanic disaster and, therefore, public attention is not focused upon them. Publicity properly applied is a valuable adjunct in any well regulated safety program.

America is the Most Reckless Nation in the World

America is the most reckless nation in the world. Our fatal accident rate is nearly two and one-half times as high as that of England and Wales, and three times higher when automobile fatalities alone are considered. Yet while our country is the most reckless nation in the world, her people respond more quickly than the citizens of any other nation to appeals for aid made necessary by reason of some disaster, whether it falls on our own citizens or those on a foreign soil. This is one of the many traits that make for good citizenship, and since safety and good citizenship go hand in hand we may rest assured that the bulwark of safety is on solid footing, and may take courage in the belief that in the future we shall see a realization of progress in the development of safety far beyond our dreams of a few years ago.

There has been a gradual awakening of public sentiment which found expression through the two conferences on Street and Highway Safety under the able direction of Secretary Hoover. The carrying out of the recommendations of these conferences will do much toward the curtailment of accidents occurring in our streets and highways. A great deal of credit is due those who so generously gave of their time and energy to this very important work.

We have in the United States 120 million people, all of whom are subject to varying hazards that serve to form the basis of our casualty record. The deaths and injuries resulting from accidents to which reference has been made can quite properly be placed in four classifications, namely,—

Traffic, Industrial, Home and Other public accidents, each of these constituting about one-fourth of the problem when we consider fatalities alone.

To carry on accident prevention work successfully we must proceed along orderly lines following a pre-conceived definite program. We must not only know how many people are being killed and injured each year but we must know where they occur and how they occur. We must know the causes of accidents, having in mind that a careful analysis always precedes an intelligent remedy.

Quite successful safety performances are being made by the railroads of the country today, due to the systematized manner in which safety is being conducted in an organized form.

The Steam Railroads Were Pioneers in Safety Work

The steam railroads of this country were among the prime movers in the inauguration and promotion of organized safety in the United States, and what have been the results? Railway employment today is less than one-third as hazardous as it was 20 years ago. Employees and passenger fatalities during the past 13 years have been reduced nearly 60 per cent—this in the face of a large increase in the number of employees and also in the volume of passenger traffic. I merely cite these facts to show what can be accomplished as a result of an organized effort, for these achievements have been due to the application of constructive safety methods plus a cooperative spirit as between employer and employee.

The problem of industrial accidents, generally speaking, is one that has been recognized for several years. A careful study has been made as to the causes of accidents and remedies have been applied. However, these plants have certain limitations, particularly in the small plant where safety has not been given much consideration. Furthermore, the small plant management seldom has the technical safety engineering advice and does not ordinarily conduct as progressive a safety campaign as the larger plants. However, regardless as to how effective accident prevention work may be carried on within the plant, the safety performances are frequently imperiled by the constant addition of untrained employees. These conditions have led us to the discovery that industrial safety is not only a plant problem but a community problem as well and must be attacked on this basis. The local safety councils, therefore, are equipped to serve as a clearing house for ideas and constructive suggestions, so that the plant executives are better enabled to carry on real safety work.

The casualties falling under the classification of home accidents, of course, need our attention, since 20,000 people were killed in the homes last year through accident. The major portion of these occurred in the most poorly housed parts of the population, which emphasizes the necessity of handling this problem also on a community basis.

Until about 12 years ago the center of gravity of accidental deaths and injuries was situated in the industries, but since that time it has grad-

ually found its way to the field of public accidents. This has been due to two things: first, the effectiveness of the safety movement in industries; second, the increase in the number of automobiles.

The advent of the automobile has brought with it a new and perplexing safety problem. The number of automobiles in this country increased from two and one-half million in 1915 to twenty million in 1925. The number of automobile fatalities, alone, during the same period increased from 6,000 to 21,000. The United States has 77 per cent of all the automobiles of the entire world. New York State, alone, has more than France, Germany, Italy and Russia combined. The automobile today is an absolute necessity in the conduct of the business of this country and progress will demand not only its continued use but a greater extension of its services. Therefore, it is here to stay and the saturation point is far distant for it has been estimated that in another seven years we will have 33 million cars—one machine for every four persons.

It is by reason of this situation that it becomes imperative that we, in our attempt to provide a remedy, not only endeavor to take care of our present day needs, but of the future as well; and this will include a regulation of the use of the motor vehicle so that it will serve the purposes for which it was intended. We must not overlook the fact that if automobile fatalities increase at the same ratio during the next 10 years as they have during the past decade there will be 50,000 persons killed in this manner during 1935, and more than 300,000 of our men, women and children will have entered the dome of eternal silence as a result of automobile accidents, alone, during a brief period of ten years.

Cost of Highway Traffic Accidents 600 Millions Annually

The cost of highway traffic accidents in the United States is now at least 600 million dollars per year, and this does not include the cost incident to traffic congestion. Upon the same basis as heretofore predicted, this cost will soar to one and one-half billion dollars for 1935, and for the next 10 years will amount to the staggering sum of more than 10 billion dollars. I am stating cold facts based upon the experiences of the past. Ought not this startling sacrifice of human life be sufficient to insure to our safety program the most loyal and wholehearted support of every man and woman in this country? Is it fair that the innocent suffer due to lack of concerted movement on our part?

Traffic accidents present a comparatively new problem, but we must remember we are living in a country of progress where we have problems to solve and where we never stop until we solve them. To do so we must have a complete mobilization of community forces. We must have the full cooperation of all organizations and agencies, civic, political and otherwise coordinating one with the other, having one purpose only—the conservation of human life.

In considering the entire matter—accidents of all kinds—we get more and more to the point where we recognize the problem as one for the

community. Industries are doing great work individually—yes—but they can not succeed alone. They need the aid of the public.

Accidents that come in the other classifications are automatically a problem for the community. Therefore, the entire scheme ought to be considered in an intelligent, comprehensive manner following a definite plan of procedure.

To carry out such a plan, consideration should be given to three fundamentals:

1. Engineering; 2. Education; 3. Enforcement.

Engineering is used broadly to include—

- a. The scientific study of accidents and their causes, etc.
- b. Establishing of safe conditions and determining what constitutes safe practices, etc.

Education includes—

- a. Information showing causes of accidents.
- b. Arousing them as to need for personal carefulness.

The Public Can Be Educated to Prevent Accidents

Enforcement means compelling the heedless minority to observe safe practices, which the greater majority have adopted voluntarily through education.

I have only given a brief statement of the program that should be carried on to combat accidents successfully. This program can be elaborated upon to suit the situation.

In industrial safety our experience teaches us that after our engineering work has been done, after we have ascertained the causes and corrected the conditions, our problem is then one primarily of education. This experience should better fit the National Safety Council to meet the growing problem of public accidents. Since education is the real fundamental upon which effective safety work can be based we must learn how the public can be educated, and this brings us back again to a full realization of the fact that this is essentially a problem for the community, just as industrial safety is primarily a problem for the individual plant. Of course, individual owners of taxi cabs, motor trucks, etc., can accomplish a great deal through instruction and supervision. This is being done quite effectively by certain companies, showing after all what training, through educational methods, will accomplish. However, the most of our difficulty is with individual owners who are not directly answerable to anyone. This is the fellow we have to reach through a community safety program.

The responsibility here rests with the citizens in their individual and official capacities, both civil and political. This includes the schools, the churches, the homes, the traffic courts and other officials. It also includes the various fraternal and civic organizations and the public press. A school superintendent can accomplish much with the children under his charge. The minister can occasionally admonish his flock as to their individual responsibilities to protect life and limb, to realize "I am my

brother's keeper" in the true sense of the word. The preaching of safety is as old as the Bible. Solomon, the wisest of Kings, recognized the necessity of care when he says in Proverbs 3-23. "Then shalt thou walk in thy way safely and thy foot shall not stumble." He must also have foreseen the recklessness that infests the highways of this country and therefore invoked the admonition that is found in Proverbs 27-12, wherein he says, "A prudent man foreseeth the evil and hideth himself, but the simple pass on and are punished;" which paraphrased to meet present day conditions means, "A careful man sees the danger and stops but the reckless pass on and are killed."

We must have laws requiring a proper standard of qualifications so that operators of motor vehicles will be required to meet a mental and physical test. We must have rules of conduct governing the operation of motor cars to insure reasonable safety on our highways.

The traffic courts, through a conscientious enforcement of the law, can create in the mind of the individual a proper regard for the rights of others.

The Community Safety Campaign Must Be Thoroughly Organized

The newspapers of the country have done much to educate the public as to the causes of accidents. They have a very important part in this work for publicity properly applied wields a tremendous influence in the community by directing the attention of the public to the enormity of the human wastage and by arousing them to a realization of their responsibilities.

This community safety campaign can not be conducted successfully unless it is thoroughly organized. Back of this organization must be a group of men whose sincerity is unchallenged—men who enjoy the utmost confidence of their fellow citizens—men whose real devotion to the cause of safety is unquestioned, having as their objective the prevention of human suffering through accidents.

The cost of traffic accidents, alone, justifies the formation of a local safety council—one that is non-partisan and non-commercial—an organization such as I have described—in every sizable city of the United States.

The duty is ours to carry on this great work and it must be pursued with greater zeal than ever before. Where cooperation is greater accidents are fewer. When every individual who has a responsibility in this program, whether it be of a minor or an important nature, has finally come to a full realization of such responsibility and when his innermost consciousness is aroused to the extent that he will perform his duty as it relates to accident prevention, then we will witness an era of unprecedented accomplishments in the cause of safety.

We must face the opportunity of service with patience, courage, hope and faith, with the knowledge that our cause is just, believing that the great American people will ultimately recognize safety as their friend and benefactor.

When this situation obtains we shall see a cooperative spirit and possibilities transcending any previous accomplishments. We shall then have enmeshed in the hearts and minds of our fellowmen the knowledge that avoidable accidents are unnecessary. When this is realized we shall then have established for ourselves and our posterity a safe place in which to live.

CHAIRMAN BROWN: I think that Mr. Hill has discovered the Ethiopian in the kindling when he says, this is a community problem.

I might state that the state of Michigan has realized that it is up to each community to solve its own problems and that it has called a conference on street and highway safety for November 15 at the Hotel Statler and the program will last for two days, at which time we are going to consider certain phases of this question taken up at the Hoover Conference to see if we can improve conditions here.

ADJOURNMENT

State Officials' Session

October 27, 1926

D. C. FENNER, Chairman

Chairman, Motor Vehicle Conference Committee, New York City

THE Public Safety Division at the fifteenth Annual Congress of the National Safety Council, convened at 9:30 o'clock in the large banquet room of the Statler Hotel, Mr. D. C. Fenner, chairman, Motor Vehicle Conference Committee, New York City, presiding.

CHAIRMAN FENNER: Mr. Frank Milhollan, president of the Board of Railroad Commissioners of North Dakota, has been detained at the last minute by illness in his family and he sincerely regrets his inability to be present and preside at this meeting, as stated in our program.

The National Safety Council recognizes that the principal responsibility for public safety rests on the shoulders of the duly constituted public authorities. The functions of the National Safety Council, local councils and other influential organizations are to assist and uphold these public officials in the performance of their duties. Today there is a general realization that the public accident problem is shifting from the cities to the rural districts. Cities still have their problem, and a tremendous one, but motor vehicle accidents are increasing more rapidly in the rural districts and small towns than in the large cities. This realization is reflected in such developments as the preparation of the uniform vehicle code by the Hoover conference, the holding of state conferences and the forming of state safety organizations.

In line with this tendency there has been included in the program of this safety Congress, this special session for state officials and others interested in the state wide aspects of the public accident problem. To me it seems quite fitting that the first paper this morning should be on the administration of a state motor vehicle act and should be presented by Mr. Robbins B. Stoeckel, Commissioner of Motor Vehicles, of Connecticut. Mr. Stoeckel is nationally known as an able and fearless administrator of the very excellent law of the state of Connecticut, and also for his appreciation of the importance of public education. To those states which are contemplating the enactment of a drivers' license law as well

as to those which already have such laws Mr. Stoeckel's outline of his administrative methods will be most valuable:

ADMINISTRATION OF A MOTOR VEHICLE LAW

**Robbins B. Stoeckel, Commissioner of Motor Vehicles for the
State of Connecticut, Hartford, Conn.**

Generally speaking, effective administration of a motor vehicle law is an expression of existing public sentiment by a representative. While it is undoubtedly true that an administrator, owing to his better knowledge of conditions and appreciation of problems, often leads and possibly creates sentiment, yet the principle holds good that he can not go faster or farther than those whom he represents will allow him.

He needs support for success, and it is not enough that such support be general but it must be specific and extend to details, for every action of every person who comes under a motor vehicle law is so intimately affected by it, that each soon arrives at the attitude of mind where administration concerns him personally. He is usually not loath to undertake his part. It is a principle that government, at least as we understand it in the United States, depends upon the consent of those governed. Motor vehicle laws are more intimate than other laws, so the consent is more specific on better knowledge of provisions and is sometimes grudgingly granted with a mental reservation that the individual is himself a sort of secondary administrator, who will take his due part in daily management to what extent he can with the brains God has given him plus the learning and experience he has acquired.

So it is surely obvious that administration of this type of law, to be successful, must go into strong hands and be strongly supported.

In the old days, not so long ago, it was not uncommon to hear an administrator criticized as an "autocrat" or "Czar." But development of administration consequent to pressing problems, instead of taking power from him, has given him more and more. The trend of motor vehicle administration, more than in any other public activity, has been away from political control.

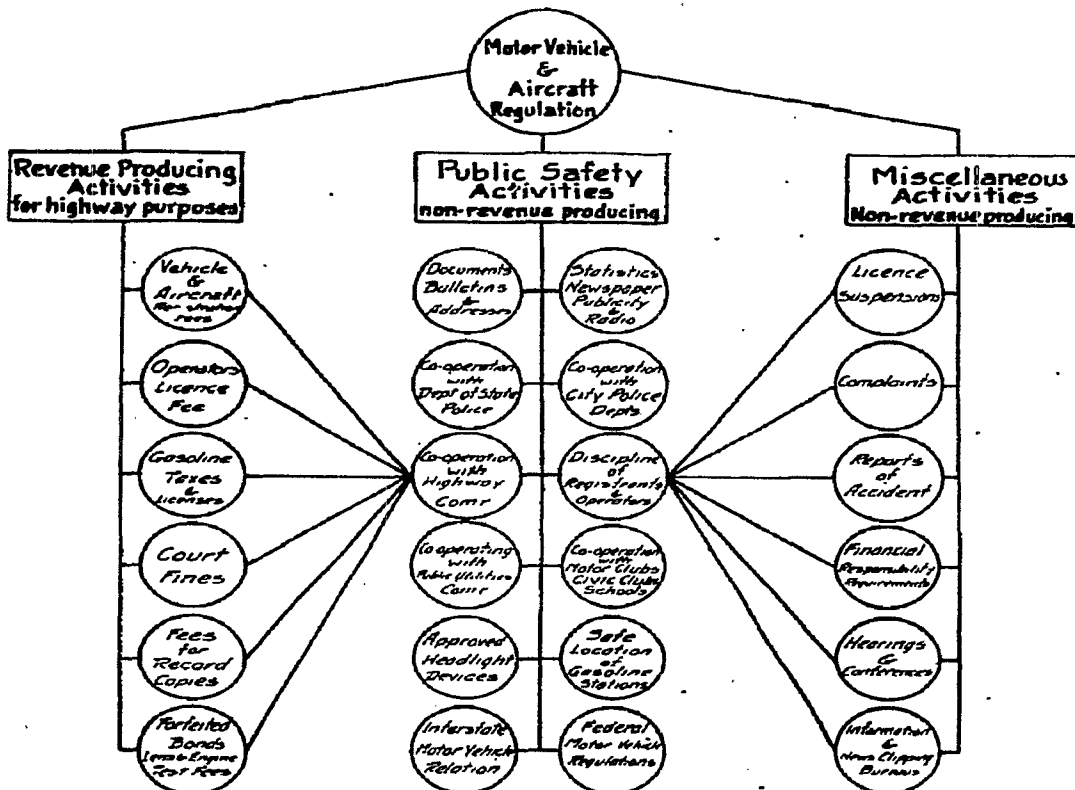
Properly to administer a motor vehicle law is a practical accomplishment. It has become a major public activity in each state and an essentially important factor in its proper government. It must be done right. The public can not afford to have it done wrong.

Set Up of Administration Office

So it perhaps goes without saying that the set up of each administration must be of the best. An enabling law might provide for an administrative head, preferably an individual, to center responsibility; for a long term, so that there will be no danger of losing him just as he learns his job; for his adequate pay; for a second in command

and such assistants as are reasonable; and finally to give, through legislative enactment, all the authority and strength which can be devised. There is no danger of over authorization, for any legislature can be relied upon to promptly dampen the ardor of an over enthusiast.

Each motor vehicle law has for objective, usually, probably invariably, two distinct and far different purposes. One is to gather taxes and the



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other to insure safety for everybody. The safety objective is the more important of the two, but in the inception of the problems created by the use of the motor vehicle as a medium of transportation taxation had primary attention.

So perhaps it may not be out of place to outline to some extent the means and methods of taxation employed.

As a preface, a cardinal principle needs to be stated. *Motor vehicle handling is a state proposition.* The federal government has never taken and probably never will take active steps for enforcement of motor vehicle laws, except to the extent of giving advice. Advisory participation of the kind referred to is exemplified by the so-called "Hoover Conference." Such participation is essential and most helpful.

One has but to realize the range of an automobile, that practically every car travels from state to state frequently, to realize the complications which laws that are not uniform, at least in spirit, can create.

It is generally conceded that all such difficulties can be readily met in each state by adoption of uniform provisions and that there is no need for central management by the United States Government.

Under existing laws we have the method uniformly followed that each state taxes its own motor vehicles and prescribes its own regulations.

This is as it should be, for the problems of taxation and of safety differ widely in states and what is absolutely necessary in one state would possibly be a hardship in another.

A Fundamental Principle in Taxation of Motor Vehicles

As a premise to this head let it be stated that every tax taken from the motor vehicle ought, and in most instances does go to the "road." It ought to be an equitable principle that taxes taken ought to be used for the benefit of those taxed. This is almost invariably true of motor vehicle taxation which goes in about every instance for building and maintenance, repairs or construction (including reconstruction) of highways and streets, and for administration of safety laws and for policing. All of these are proper purposes within the construction and interpretation of taxing laws generally and founded upon equity and justice. That is probably the main reason why the taxpayers in this class are not heard in objection more frequently. They are "satisfied taxpayers" and it is rarely that any one of them becomes provoked or upset over a motor vehicle tax except possibly as to the individual whose duty it is to collect it.

In many attempts to discover what objections, if any, there may be to this class of taxation the main response has been, "Give us the roads and we will pay." But there are often complaints about a tax on motor vehicles if it is inequitable in the sense that one is taxed out of proportion to others. And here we arrive at the first duty of the administrator. He should see that his state taxes on that basis which is the most equitable, that his tax is as easy of collection as it can be, not discriminatory, and that the expense of collection is low. If it be generally stated that an archangel could probably not do this to the satisfaction of everybody, at least without his flaming sword, it will be no exaggeration.

Automobile tax methods have always included a registration tax, evidenced usually in the hands of the person taxed by a certificate of registration and numbers for his car, later followed by an operator's license tax, intended, and legally defensible only, as an administration tax. More lately the fuel or gas tax has come in as a prime way to get money at low cost without annoyance to the taxpayer.

The registration tax was originally based on "horsepower." The inequality of this basis became apparent when in automobile construc-

tion the cylinder was lengthened, making length of stroke an essential factor. This caused adaptation and in some states the discard of this basis for weight or value. In some instances the substitute was "cubic inch displacement." It is not the purpose here to discuss these bases, nor in fact to go into this matter further than to suggest that each has its prominent defects, either in administrative expense or in annoyance to the taxpayer and that it is the duty of the administrator constantly to study the situation in his own state with a view to meeting it. Progress along these lines of study and adaptation has been rapid. The most advanced thought seems to have supplied a flat rate for pleasure cars, weight for commercials and the fuel tax to raise the bulk of the money. But there is another thought, not yet to the fore, that it is possible to tax all motor vehicles alike on a basis of "gross weight."

After an extended investigation conducted by the Bureau of Standards at the request of and with the cooperation of the Department of Motor Vehicles and Highways of Connecticut, this method is reported on as the best and most thorough, providing alike the funds to be drawn from those taxed, equality among them and ease of collection at low expense. Its theory, briefly described, is to tax pleasure cars as "gross" by weight of car and maximum load. For example, a five passenger car at "weight of car plus five passengers at 150 lbs. each;" commercials at weight of car plus registered authorized load, etc. The system provides a basis applicable to all cars throughout. It makes no distinctions. It can be formulated to raise any desired amount of money. Tested by "wear and tear on highways" it is well nigh perfect in its possibilities of adjustment.

Fuel Tax

The fuel tax is well known, both in theory and in administration. It offers as its main feature collection through the great distributors. This is extremely advantageous and unusual in a tax; that the state taxing has the advantage of accurate bookkeeping by others before payment. The big oil companies which, as distributors, cooperate in making returns, perforce have accurate books. As a result there is little escape from collection. Collection expense is so low and the return to a state so high, and the basis so sound that it is now adopted in all but four states, and bids fair to be adopted in those.

Both the registration and operator's taxes offer valuable by-products in providing identification, the one of cars, the other of operators, so there is no chance that either, if once in effect in a state, will be discarded; but the tendency is now evidencing itself to lower these taxes gradually and to rely more and more upon the fuel tax for producing money.

For the present and pending some great change in production of fuels it seems logical to support the fuel tax as the best money producer, with the registration tax a good second, if the more modern methods of its collection are in effect. The operator's tax is mainly an identification

and police aid tax and should not be relied upon as a producing tax beyond costs of its administration for discipline.

To sum up, the duties of a state administrator in connection with taxation are to keep up with the times, to provide for his state a method which will, on a pay-as-you-go plan, maintain its highways and possibly extend them and to see that such a system has public sentiment behind it. If it has not then there is something the matter with it.

He must also keep his safety duties in mind and make a selection of whichever form of tax will aid him the most in their management.

None of the three methods of taxation described can be discarded and the whole taxing problem before administrators is to get a combination of all three which will lend itself, with the most elasticity, to the enforcement of the whole law. In other words get the money and also the help which can be had from tax laws for safety.

Safety Administration

In the early stages of motor vehicle laws, an administrator usually had few, if any safety duties. The early problem was almost entirely to issue registrations and numbers. But the registration law, and later the operator's license law, have provided such an excellent foundation upon which to base police supervision and such good identification of cars and operators that it has been natural for each lawmaking body, from time to time, as necessity for control and discipline arose, to make safety laws founded upon and enforceable through these two systems.

Each registration certificate and its accompanying number plates furnish for the police of a state a perfect method of identification of the car owner. Suspension or revocation of registration is probably the most forceful means at hand for discipline. It seems logical that it should always be used to punish offenses relating to the automobile, as for example, operating a car not in good mechanical condition. Action based on suspension of registration will have an immediate and far reaching effect on condition. This is as true for every other offense which has to do with a car.

The Operator's License Law as a Police Law

The operator's license law is the necessary foundation for control of operators by a state. It is legal (in the light of court decisions, which determine that an operator's license is a privilege granted by a state) to enforce discipline through suspension and revocation of operator's license to any extreme which conditions demand. There is no more perfect disciplinary action possible than that by which a state exercises its right to take away, temporarily or finally, an operator's license from a person who has proven himself unfit to have it. Such action is salutary.

There are many methods used to accomplish this result and there is a good deal of variance in the character of offenses for which this dis-

discipline is exercised and in the length of terms of suspensions imposed. As time goes on, terms of suspension are getting more nearly uniform, until for the worst offenses, nowadays, a permanent suspension or revocation is universally had. It has seemed in some states to be the best plan to have the actual term of suspension upon conviction stated in the law and not left to discretion. Such laws have been most effective.

In other states the administrator has had discretion and has usually been able to exercise it in such a way that there has been little or no fault found. Suspensions and revocations should be imposed in each case where any offense against the law has been committed which is other than a technical violation, so that no possibly grave offense can fail to be noted and punished. But the idea of punishment is secondary. The principle is to bring the person who has committed an offense before a state authority to determine whether his character and general attributes, in the light of his most recent action as compared with his past record, make him a desirable person to have upon the highway.

The Suspension Power a Perfect Method of Discipline

The suspension power may either be on initiative or as supplementary and based on court conviction, or the occurrence of accidents or on complaints. It is in every way a perfect method for handling discipline. Its exercise will eventually arrive at a point where every operator involved in an accident or convicted of any offense is scrutinized from the standpoint of desirability on the highway, and the state department which determines this will necessarily compare each such occurrence with former records, if any, and base its action accordingly.

Founded on these two basic laws, the registration law and the operator's license law, there are possibly a number of other disciplinary actions which can be taken by an administrator. Both of them together, and an additional requirement for the reporting of accidents, will bring to a state ample data upon which to found a statistical section. In this section there should be a bureau for newspaper clippings and for tabulation. The suspension section and the complaint section will also furnish data. All these activities together will give a statistician all necessary information to work out into daily and weekly reports to show the safety condition of every highway and street as to accidents and cover registrants and operators as to discipline. When such an activity is actually arrived at by any state, it seems proper to form a state organization section which will put out the statistical material and demand action upon it.

If it is possible, as it now is in states which have such systems, to determine why accidents recur at any location, there is no reason why the state should not be given power to call upon the municipality in which the location is, to take such remedial measures as appear to be necessary, whether by physical change in traffic surroundings or by traffic regulation, signals, etc. This is a future step in administration

of the law. It has not actually been reached except that advice is furnished in a few of the states. It needs more than advice to actually produce results. Each law must be so drafted that the administrator, with this material at hand, and with the obvious remedies in his department, can demand actual performance from the organizations whose duty it is to supervise and correct.

Compulsory Insurance

In several states the so-called "compulsory insurance" law has been praised as being a certain way to secure financial responsibility and consequently more care. For various reasons, but principally on account of the fact that public sentiment is still not widely enough aroused to compel it, such a law has never been passed in complete form, except in Massachusetts. The law which obtains there has not yet actually been administered. It becomes effective January 1st, 1927. The subject has been carefully studied there and there is an excellent report on it by a state committee. The administrator in that state, the Registrar of Motor Vehicles, is prepared to put it into effect and expects it to be useful and efficient. Just how much trouble it will make for registrants in the first year it is hard to estimate but, however that may be, should it succeed in any measure it will be copied and followed in almost every state, just as the gas tax law has spread all over the United States.

In Connecticut it has not yet been found possible to agree upon a compulsory insurance law and a compromise was arrived at, known as the "Financial Responsibility Law," which has been under actual administration since January 1st, 1926. This law differs from compulsory insurance in that nobody comes under its jurisdiction until, on account of his own offense (defined in the law as an accident for which he is held responsible, resulting in the death or injury of any person or in damage to property to the extent of at least \$100 or as a conviction for reckless driving, operating while intoxicated, or evasion of responsibility) he is required to file a certificate of financial responsibility which shows that he had either taken out a policy of insurance or bond, or filed cash or securities acceptable to the commissioner in the amount of \$10,000, covering liability for personal injury, and \$1,000, covering liability for property damage.

The Motor Vehicle Department in Connecticut has in the administration of this law taken jurisdiction over some 6,000 registrants and has qualified them. It has taken away many registrations for failure to qualify and refused to allow registration. There has been no difficulty about the administration of this law. It has unquestionably brought the percentage of insured in Connecticut, which originally was much higher than that of any other state—being around 42 per cent—to an even higher rate, and its whole tendency is toward making the most dangerous people financially responsible. It is a law tending toward a compulsory insurance law but not involving its hardships, either in

universal application or in administration all at once. Whether Connecticut is ready to follow the example of Massachusetts or not will unquestionably be determined in the next legislature, but eventually there will be compulsory financial responsibility for every one, so that each person on the highway must be financially able, either through the guaranty of a protecting company or on his own certified responsibility, to answer judgments for damage or injury done.

The making of such an insurance or financial responsibility law is an experiment. The great objection to it in legislatures has been that it may compel a state to go into the insurance business, for it would hardly be fair for a state to require something which it can not itself furnish. This particular law, in one or the other of these phases, is bound to be considered as a safety law and each administrator ought to determine from time to time whether his state is ready for a portion or the whole of it.

Complaints

In each administrator's business there are a large number of complaints relating to safety. In this particular phase of his work it has to be remembered that the observer is sometimes unskilled and that there is sometimes prejudice, but there is no reason why an administrator can not handle complaints carefully and thoroughly if these two points are kept in mind and every complaint should be welcome. It is a part of the safety business of each office to investigate and care for these as fast as they come in and where discipline is indicated, to supply it.

If the license of an operator is suspended it is fair that he have a chance to be heard as to his side of the story. The hearing authority, whoever he is, ought to have the complete case of each person before him. It should be possible for anyone to obtain a hearing in a reasonable time, for then each administrator will feel free to take licenses on any well founded rumor or complaint. This is as it should be, for a person about whom a rumor is circulating may by operation of an automobile do untold damage or the person about whom a complaint has been made may commit a crime, in the absence of prompt action by an administrator. If, as a part of an organization, there is a hearing section where any person may appear and tell his side of the story, and especially if there is an appeal provided to a high court, then no person has any excuse for making a claim that he has been unduly deprived of his rights.

A license suspension section ought to be run as a business office; all similar offenses ought to be treated alike, and so far as the actual suspending power goes, no discretion whatever ought to be exercised as to definite time or method of suspension. That part of it ought to go like clock work and the hearing section be the one where adjustments and careful investigation can be had. This again seems proper because, should there be an apparently bad actor on the highway the

first thing to do is to take away his license as quickly as possible and thereafter consider the question as to whether he is or is not so bad as to need further discipline.

Each administrator has to make a large number of rulings and interpretations of law. He should have good legal advice readily available, for many of these rulings and interpretations are as to exact meaning of words and on intent and spirit of legislation. This function ought to be under the direct management of the head. He should also conduct all relations with other state departments and take care of interstate and Federal relations. These are all now so important and so bound up with the welfare of everyone that expert advice is often needed. The administrator must have that ready at hand. Sometimes it is legal advice, sometimes it is political advice in that he needs to know what is going on in other state legislatures.

No ordinary management of routine affairs needs to be under the immediate direction of the head, but it should always be possible for any person who claims to be aggrieved or has any complaint to make, to go to the head of the department and have a conference on any subject. In other words, there should be an appeal to the head of the department on every question in connection with its management and its touch with the public.

Summary

To sum up, safety administration is woven into general administration to such an extent that an administrator needs to know every detail of possibility. He is the one who must push on into the new fields of endeavor wherever possible. He either has, in his basic laws which give him control over registrants and operators, or can get by legislative action, whatever he needs for the furtherance of his safety plans.

Every administrator constantly strives along these lines of expansion and if he has not yet received what he needs for his most effective work, it is hardly because he has not asked for it. No person is closer than he to the safety question. No public official has a more sacred duty than his. On motor vehicle safety, traffic problems both of direction and supervision, he must more and more become a specialist to an extent where he is a leader. It is not enough to mean well. The public demands that he foresee and do. If he must sometimes do unpopular things, he must not shrink. Even at this time, when the motor vehicle safety problem is yet new and unsolved in the sense of actual prevention, his work is already receiving public recognition everywhere. He, through the exercise of his powers—perhaps augmented—is the best hope for solution.

To be trusted to exercise great powers in a just manner, with full knowledge of their extent and effectiveness, is an honor second to none in the power of a state to give. It does not fall to the lot of everyone to be permitted to work for the safety of his fellow men. So the administrator will always, above all else, be an enthusiast.

CHAIRMAN FENNER: We are greatly indebted to you, Mr. Stoeckel, for your very able presentation.

One of the real problems of administration of motor vehicle laws is the proper relation between the state and the cities. Mr. Benjamin C. Eynon, Registrar of Motor Vehicles in the State of Pennsylvania, is another of the leaders among state administrators and will discuss this very important subject. At the conclusion of his address we will invite discussion by any city officials present on this particular subject, and also general discussion on any of the items covered either by Mr. Stoeckel or Mr. Eynon. I take great pleasure in presenting Mr. Eynon of Pennsylvania.

RELATION OF STATE AND CITY DEPARTMENTS IN ADMINISTRATION OF MOTOR VEHICLE LAWS

Benj. G. Eynon, Registrar of Motor Vehicles for Pennsylvania,
Harrisburg, Pa.

There is an increasing tendency on the part of Americans to think that all our economic and social problems can be solved by regulation, and to throw the responsibility for their solution on the government, whether it be municipal, state or Federal.

Nowhere is this more apparent than in the public attitude toward a problem which has, within a few years, become national in its extent—that of motor traffic regulation and the promotion of safety to users of the streets and highways. This is perhaps due to the fact that the magnitude of the problem has only recently been more fully recognized.

If there is any one thing you can not regulate by law, it is the state of mind of the driver behind the wheel of a motor vehicle. Driving is not a mechanical process, but on the other hand, calls for continued conscientiousness on the part of the operator, and his adaptability to conditions constitutes the greatest element in safety.

Any state of affairs constituting an ever-present menace to every individual requires organized effort, and the complete cooperation of all existing agencies to combat it.

The burden of responsibility would, therefore, seem to rest upon the legislative bodies and administrative officers—traffic court judges, police officials, state highway commissioners and motor vehicle administrators, and unless the power of public authority is properly brought to bear on this problem, little can be accomplished.

It is concerning the relations of some of these agencies that I have been asked to speak, and if my remarks appear to be tinged with an over-emphasis of the part the state should play, that can be ascribed to the fact that I am a state official, and is not an attempt to disparage the splendid cooperation we enjoy from local authorities. In fact, in Pennsylvania, we feel that we have developed this important contact to a high degree.

In this connection, it is interesting to note the outline of state and

municipal responsibilities presented by the Committee on Public Relations to the first National Conference on Street and Highway Safety, generally known as the Hoover Conference.

State responsibility is quoted as follows: "A state department or bureau should administer the laws applying to motor vehicles, including the issuing and revocation of licenses for both cars and drivers and also the enforcement of regulations on the highway. This may be either a separate department or a division of some existing state department. The motor department or bureau should have an adequate staff not only to handle licenses, but to examine drivers, police the highways and investigate accidents"

"Regulatory legislation should be for adoption by states and not by cities. The state enforcement division must have sufficiently broad powers to formulate the regulatory provisions necessary to the detailed control of traffic, leaving, however, to municipal authorities the formulation and enforcement of ordinances covering local conditions such as the establishment of parking areas, etc."

Municipal functions are summarized briefly in that: "There should be an adequately manned traffic division in the police department with traffic safety a major function of such bureau. In cities the common practice of enforcement by the police department is recognized and the police should enforce the state law within the city limits."

No Conflict Between State and Municipal Regulations

A comparison of these seems to leave the major division to the state authorities, and rightly so, because the state department, if sufficiently alive to the situation, is in position to attain a broad general viewpoint often impossible when local expediences are viewed individually.

There should be no conflict between state and municipal regulations governing the use of motor vehicles and, in fact, state laws should prohibit the enactment or enforcement of ordinances along these lines, with the exceptions noted above.

It is appreciated that local physical characteristics may make certain regulations necessary, but it is expecting too much to assume that the motorist from some other community in the state will be acquainted with all of the freak regulations that some city councils try to enforce.

If all municipal ordinances dealing with traffic regulation, aside from those indicating one-way streets, limiting certain streets to the use of certain kinds of vehicles, lighting and zone systems and the parking and non-parking of vehicles, were submitted for review and approval by state authorities, the result would unquestionably be a uniformity of regulation of traffic conditions, and we would not be faced with the possibility of eventually having to stop every motorist on the outskirts of each city or town and attempting to make a traveling legal encyclopedia out of him.

Much of the legislation now in effect is such a source of harassment and bedevilment to the car owner as almost to disgust him with such

ownership, and the resort to more restrictive laws will undoubtedly be met with considerable protest.

The solution is not in loading the statute books with more laws, but in proper and adequate enforcement of those we now have. For some unknown reason, state motor vehicle laws are never very generally enforced in cities, unless undertaken by the state authorities, which always gives rise to certain antagonism.

Motor vehicle enforcement and traffic regulation should be separate and distinct from ordinary police duties, and officers qualifying for such positions should be policemen only in the sense that they should have police powers.

This is not to say that in municipalities they should not be attached to the public safety division, but they should be an independent unit, and in state organizations, they should be directly under the jurisdiction of the motor vehicle administrator.

Motorists Are Usually Not in the Criminal Class

It is particularly hard for your average policeman, trained as he is to apprehend criminals and protect property, to get the viewpoint that motorists, except in isolated cases, are not in the criminal class.

Enforcement experience shows that 95 per cent of the motorists are willing and anxious to obey the laws, and in a great many instances the violations are technical, or what might be called violations where the spirit or intention to violate is not present. Nevertheless, many of them do need disciplining, which usually takes the form of a "bawling-out" by the officer. The ineffectiveness of this method is so apparent as to need no discussion.

In Pennsylvania we have a State Police force, but we have also a State Highway Patrol for the enforcement of motor vehicle laws, handling of traffic, examination of drivers and investigation, and they are specially trained in these duties.

When it is realized that it takes from six to eight weeks of intensive instruction along these lines alone, what chance has the average "rookie" on a municipal police force, who is suddenly put on a traffic post with a semaphore in one hand and a whistle in the other? Even if he is an experienced and intelligent officer, he isn't necessarily a traffic man.

Municipal police departments have assumed charge of, or have had thrust upon them, the growing traffic problems with which the cities are confronted, and while much commendable ingenuity and patience have been displayed by police officials, the prevailing theory seems to be that as traffic congestion increases, all that is needed is simply more laws, more traffic men—and more and bigger traffic courts.

Not until these cases are placed in specialized hands for diagnosis and treatment will the cure be found, and mutual cooperation between state and local authorities be evident.

The establishment of traffic courts is a popular movement at present and again the necessity for state supervision is emphasized. Special

traffic courts under that supervision should be established to insure uniformity of administration and interpretation of the law in handling traffic violations, both rural and city. There should be the closest possible contact between these courts and the state department, since in that way only can the authorities remove from the highways wilful or habitual violators, by withdrawing the driving privileges.

Experience has shown this to be the most effective form of punishment—in many instances fines mean nothing. They are rather something to be hoisted of.

Too often the dockets of local magistrates and police courts are filled with such a multiplicity of cases that the true perspective of the continuous flow of motor vehicle violators before the bar is lost sight of, so far as it relates to any other than local application, and even then, in the absence of any specialized agency for the consideration and relief of the situation, to whom is the already over-worked magistrate to turn?

The suggested elimination of the minor judiciary, so far as motor vehicle cases are concerned, is no reflection upon their honesty or integrity, and many of them have done and are doing wonderful work, but the greater proportion are not "learned in the law" to the extent that they are skilled enough to meet the problems arising from present conditions.

The state department can become, and should be, a valuable clearing house not merely to administer the motor vehicle laws justly and to perform the daily routine of collecting fees and fines, but to educate the public to a realization of how far this subject goes beyond the mere enactment of laws and their enforcement.

This state agency must be readily accessible at all times to the people who created it, and must make an effective appeal for cooperation between the individual and the administration of the law.

Many Local Communities Doing Fine Statistical Work

Many local communities are doing wonderful work in the collection of reports and statistics on traffic accidents, and these efforts should by no means be discontinued or scrapped in favor of a state-wide accident reporting system, but nevertheless, the same condition often holds true in this connection as is prevalent in the minor courts. The very people who should have the data for disciplinary action or comparative purposes often never see it, and when it is published at the end of certain periods, it is then perhaps too late to take action towards withdrawing the driving privileges of the persons responsible.

At the risk of repeating, I say again that nothing is so successfully deterrent to reckless or careless driving as the suspension of licenses, and unless the data necessary for this action are available to the state department, either through a uniform accident reporting law, or by close cooperation with local agencies, this "big stick" is little more than a toothpick.

In states having large registrations of motor vehicles and operators,

the administration of such a law presents its own problem of detail and routine, and yet unless the leading factors contributing to accidents can be determined, little progress in reducing the annual toll can be made; and unless the results can be summarized in a central bureau, the experiences and corrective measures of one locality are not available for any others.

On the particular points mentioned where the state and local interests touch or overlap, the state should assume a paternalistic attitude, and while the questions of "home rule" and "decentralization" may be raised, the local interests must be subservient to proper standardization of traffic laws and proper administration of motor vehicle regulation.

I can close with no better paragraph than a quotation from an address delivered by Mr. John D. Hertz, one of the present day pioneers of motor transportation, to the Hoover Conference, in which he says:

"No one can tell which is the most important, regulation by law, regulation through a sense of sportsmanship or regulation through common sense. We would attach equal importance to all of them. But we just as surely must have the education of the public. We must educate ourselves up to the point where we know how to use automobiles and use them with safety to human lives. We must have a motor age education, and a motor age sense of responsibility toward our fellow men and the protection of their lives."

Constitutional Questions Would Be Decided by Courts

CHAIRMAN FENNER: As announced we will now throw this meeting open for discussion on anything that was brought out by Mr. Stoeckel or Mr. Eynon.

H. O. ROUNDS (Bureau of Public Safety, Detroit, Mich.): Is it constitutional to forbid any one a driver's license, and is it constitutional to take it away from him and forbid him the use of the road? In other words, if this question was taken to the highest court could he beat us to it?

CHAIRMAN FENNER: Mr. Eynon, have you had any experience along those lines?

MR. EYNON: Never; that is the first I have heard of it. I would imagine if that came up, the court, regardless of law, would use its own good judgment. If the person who made the application was a careless and reckless driver, as shown by the motor vehicle law of the state, it would probably uphold the state authorities.

CHAIRMAN FENNER: Are there any other questions? If not, the next item on our program is the brief review of progress during the year in state legislation and also in safety organization. We all realize this past year has seen a great development in organized safety educational campaigns, including public legislation on a state wide basis, and the names of some of the states in which such work has been undertaken are printed in our program. We will now call for reports from persons present representing each of these states, and also from any other states

that are not listed. To conserve time we will ask each speaker to limit himself to three minutes, if possible, and to report actual developments along one or both of these two specific lines: first, the improvement in motor vehicle legislation in a state; and, secondly, actual progress made toward a state safety organization and a continuous educational campaign. I will call first on Mr. Louis E. MacBayne, of Massachusetts.

Massachusetts and New York Report Year's Activities

MR. MACBAYNE (General Manager of Massachusetts Safety Council): Speaking first generally on the question of legislation we have in force 85 per cent of the recommendations of the Hoover Conference. We have the examination of applicants and control by the registrar; so I don't know that legislation is necessary under the general recommendations. Through the year we have passed 13 acts in the motor vehicle law; some of which are minor and are referred to briefly; others refer to punishment for certain motor vehicle crimes, the stealing of autos, and operating after suspension or revocation of a license. The penalty is state prison, not more than 10 years, or jail or house of correction not more than two and one-half years.

Also division of highways to designate through ways and regulate traffic at intersection of such way. Motor vehicles used in the commission of certain crimes are reported forthwith to the registrar. I might say that the position of the registrar of motor vehicles on the Compulsory Insurance Law, is that it should result in a reduction of serious accidents next year by the elimination from the highway of drivers who, after two accidents, are found to have been responsible for them. There is a reduction of accidents in the state as compared with a year ago up to September first.

In May the governor of the state called a state conference on highway safety as a follow up to the Hoover Conference in Washington, that was attended by delegates from 34 cities and towns; some 520 persons; and as a follow up to the recommendations made at that conference it offered six specific recommendations by resolution. The governor has appointed a permanent committee on state and highway safety. The chairman of that committee is present and also one of the members of the committee. In the state are three fully organized safety councils with paid staffs who are geographically situated so that they influence practically the entire state. There have been, as a result of the Hoover Conference, many local campaigns undertaken by mayors and police departments, and there is a gradual coordination of such activities which will be tied up under this committee recently appointed by the governor.

CHAIRMAN FENNER: The next is the state of New York. Mr. Leon Aronowitz of the State Motor Vehicle Bureau!

MR. ARONOWITZ: During the past year New York state held its first Safety Conference. For the first nine months of 1926 New York state shows 22 fewer fatal accidents than the corresponding period a year ago.

This decrease is remarkable in view of the fact that the state has shown an additional registration of automobiles over 200,000, and shows an additional number of licensed operators numbering 150,000.

In addition to the educational phase of the work, New York state has been planning traffic surveys of the cities, the preparation of spot maps and increased care for examinations to drive. Applicants for drivers' license now are required to pass an eye test in addition to being able to operate a motor vehicle. This test is being conducted by the inspector as part of the regular examination. The following specific recommendations are going to be made by the commissioner for legislative consideration during the coming years. First, to enforce the driving law which does away with the distinction between chauffeur and operator. The present provision acts as an occupational tax, and for that reason is unfair. Second, the issuance of a license for three years, which will eliminate the burden of handling and filing approximately 2,000,000 applications a year. Third, the granting of power to the commissioner to create traffic courts in the more populous counties to handle traffic violators. Fourth, plates to be designed so that they will be easily readable both in the day and at night.

CHAIRMAN FENNER: Next is Ohio. Mr. Norman Anderson of the Ohio Belle Telephone Company, active in the Cleveland Safety Council, also in the Ohio State Safety Council!

Report by Norman Anderson, for Ohio

Our efforts in Ohio this year are being confined to the adoption of a drivers' license law. Preparatory to introducing this bill this fall in our legislature a state safety council was organized. The membership of this Council is confined to associations. In other words, it is an association of associations. The sponsors of the state council and the members are composed of representatives of the following groups:

Ohio Farm Bureau Federation	Ohio Society of Safety Engrs.
Ohio State Grange	Ohio Automobile Association
Ohio Railroads	Ohio Committee on Public Utilities
Ohio Good Roads Federation	Ohio State Chamber of Commerce
Toledo Safety Council	Ohio Council of Automobile Dealers
Cleveland Safety Council	Ohio Council Retail Merchants
Ohio Federation of Labor	Assn.
Ohio Manufacturers Association	

It is felt that through the cooperation of this group this law will be passed. I shall not go into the details of our proposed law because that will be covered by Judge Lee E. Skeel, chairman of our legislation and law enforcement committee of the Cleveland Safety Council, who is also the author of the bill.

I believe there is a great deal of value to be had through the organization of a state safety council. The object of the Ohio State Safety Council is to create an atmosphere of safety throughout the state; to carry on

activities, through the member organizations, which will reduce highway, industrial, school, home, rural, and other accidents; to promote the avoidance of danger and waste from fires, and to act as a clearing house for the correlation of safety activities of the member groups. The organization consists of members subscribing to the objects of the state council.

The following are some of the things accomplished during the past year through the Cleveland Safety Council:

1. Published a textbook on the question of School Safety for teachers and distributed 6,000 copies to public and parochial schools in Cuyahoga County.

2. Published each month a set of loose leaf safety lessons by grades for the teachers covering a definite hazard for the month. For instance, in October the subject covered was "Fire Prevention" and for November it will be "Street Accidents" and December "Home Accidents," and so on. Six thousand copies of these lessons will be distributed each month. Approximately 36,000 boys and girls make up the membership of the Junior Safety Councils in our 258 schools.

Details of the Regular Safety Program

3. Our Home Safety Program is carried on through the Federation of Women's Clubs. We are featuring a series of bulletins on the various hazards in the homes to be distributed through the safety committees of the various women's clubs belonging to the federation. These bulletins deal with such subjects as burns, scalds, electrical hazards in the homes, vacation hazards, and so on.

4. Each month we mail to our entire membership a bulletin regarding the accident situation. The list includes 650 factories and business houses in addition to the other members of the Council.

5. We have featured a series of radio talks furnished by the National Safety Council and revised by our radio committee for local broadcasting. These have been broadcasted each day as a part of the noonday program.

6. Fire prevention is a big part of our work and in addition to our observance of Fire Prevention Week, home inspection campaign through the children, the committee is constantly active.

7. We hold a drivers' school for the education of commercial vehicle drivers and these meetings are held each month and are attended by 1,500 drivers.

8. Our committee on public education from time to time issues special pamphlets on carbon monoxide gas and other hazards including those of traffic for the information of the public.

9. Our churches' committee has distributed material on the subject of safety and fire prevention to some 500 ministers in our city.

10. Our industrial activities are under the supervision of a special committee of 54 men. These consist of monthly mass meetings for foremen and superintendents, special school for safety supervisors and safety engineers of plants, fire prevention course, and other lectures. Other

activities include safety surveys made through our engineering department, information on safety standards and practices, meetings and conferences of our members, distribution of five-word-slogan posters throughout the city on the question of public accidents, safety campaigns to help fleet owners, taxicab companies and firms employing a number of truck operators. Public safety meetings, and other such items comprise our program.

11. The staff of the Safety Council consists of seven people and our annual budget is about \$40,000. It is really but nine months old, having been reorganized the first of this year. We operate as a branch of the National Safety Council, affiliating with the Chamber of Commerce as a bureau, and are a non-profit-making organization of public spirited citizens, interested solely in the promotion of accident prevention to human life and limb.

Safety Organization for Every County in North Dakota

FRANK MILHOLLAN (President North Dakota Safety Council): I am pleased to bring to you greetings from the great state of North Dakota. One of the purposes of this meeting is to advise you of the progress made in state legislation and safety organization. You already know that North Dakota leads the Nation in the production of small grains, and we are here to tell you that we are among the leaders in the safety movement.

Following the Second Hoover Conference, the Governor of North Dakota called a state safety conference which was attended by representatives from practically every county in the state. Two days were devoted to a consideration of the Uniform Vehicle Code adopted by the Hoover Conference, and consideration was given to the entire problem of safety. At its conclusion the Conference resolved itself into the "North Dakota Safety Council" and selected officers and an executive committee. The executive committee subsequently adopted by-laws and authorized the appointment of committees on legislative, finance, membership, public education, statistics, and railroad grade crossings.

We have thus far been successful in arousing public sentiment in favor of such an organization, and the spirit in which the committee chairmen are assuming their responsibilities is most gratifying. We will, of course, concentrate on a legislative program during the next few months, endeavoring to have enacted into law the principles embodied in the Uniform Vehicle Code.

It is the plan of the North Dakota Safety Council, when thoroughly organized and functioning, to have a local organization in each county. With this in view, the membership committee consists of a chairman and one member from each of the 53 counties. The members of this committee will be designated as "county representatives" of the Safety Council.

We find no adequate machinery established for the purpose of ascer-

tafning the nature and causes of accidents. The statistical committee of the organization will have some interesting data to present at the next annual meeting of the State Safety Council, which will be held in May, 1927.

The matter of financing an organization of this kind has its difficulties. Our finance committee has three plans to propose to the executive committee at a meeting to be held about the middle of November, at which time the chairmen of all committees will meet with the executive committee. We estimate that it will require at least \$25,000 annually to carry on the activities of the organization, and our finance committee is confident that it can raise this amount.

While our safety council is still in the process of formation, we are determined to go forward. We assure you of our desire to cooperate in every way.

CHAIRMAN FENNER: State of Michigan. Mr. L. J. Van Schoick, Detroit Automobile Club!

Detroit Safety Work From an Educational Standpoint

MR. VAN SCHOICK: I am going to touch very lightly on what is being done through our state. I might say that through developing a spirit of cooperation between the state, city and county officials we hold conferences; we held two last year and we will meet again on the 15th of next month. At the last conference held in October, we had over 50 per cent of the municipalities in the state of Michigan driving under one ordinance or one uniform driving rule.

Along the lines of safety work from an educational standpoint, we have a cooperation between our state department of police and our Michigan state police, which details 23 men in charge of our good Lieutenant Arnst which is carrying a safety message into practically every school in the state of Michigan. These boys visit about 112 schools per day. We plan on visiting these schools every 90 days with a safety message, posters and safety literature. We have what we want, an organization of junior state police made up of the boys, and this is a new angle that we are taking. We started out by organizing junior state police from the best boys in the schools; but now we are taking the rough-necks, the boy that has the poorest standing in his studies and deportment, and we are putting them as leaders in their schools, and the development is wonderful. We had several cases of boys that the teacher could do nothing with, who were just unruly little tyrants; and one of them was put in as captain of his patrol and his department standing was 100 last month. We have in our other schools 13,000 school boy patrolmen, making a total of 29,000 on duty in the state of Michigan. That work is carried on directly through our department and the department of state police.

In connection with that we are visiting every theatre, whether in a small town or city, with a two reel picture developed and

for the purpose of giving direct lessons in safe driving. It shows the principle of ~~safe~~ driving, and then the results of driving and noticing cars on ~~curves~~ ~~etc.~~, and so on. This picture is accompanied by a uniformed ~~state~~ ~~police~~ man and a lecture is given. This is being done as an educational ~~project~~ ~~subject~~ to the citizen of the state, and the first of the year we are giving an intense drive on reckless driving, because we feel that ~~by~~ ~~giving~~ we will have reached enough people so that they will ~~know~~ ~~why~~ and how they are expected to drive. That will give you just a ~~small~~ ~~outline~~ of what we have accomplished in Michigan so far.

~~CHAIRMAN~~ FENNER: We would like to hear from Mr. F. W. Matson, Commissioner, Minnesota Railway and Warehouse Commission.

The Stop Crossing Law in Minnesota

~~MR.~~ MATSON: Motor vehicle registrations of Minnesota are increasing at a rate of over 100,000 a year. Many are tourists, coming from every state in the Union to see our 7,000 lakes, and we have a real ~~problem~~ ~~up~~ there. The last legislature passed a very comprehensive traffic law for the use of the highways. We found, after the ~~former~~ ~~conference~~ committee reported; that we were in line with most of their recommendations, but not meeting all of them. We have a committee composed of representatives of our leaders of Minnesota municipalities, a very active organization made up of the representatives of all the towns of the state, representatives of the Governor's office, and state highway department, the legal department, and all of the safety bureaus, who are drawing new uniform laws in line with the Hoover recommendations. Our governor has called a state wide safety conference to be held on the 19th and 20th of November, at which these proposed laws will be discussed, and some plan prepared to meet the situation.

The last legislature passed the stop-crossing law. I think that is a very unique law. The only other state that has anything like it that I know of is North Dakota. This law gives the Warehouse and Railroad Commission the authority to designate certain railroad crossings in the state as stop crossings and requiring every driver to come to a full stop before crossing. We have only marked about 10 per cent of the crossings where the conditions were dangerous. We prepared a pamphlet that we put in with every state license plate that goes out. We distributed almost a million of these warning cards in the state. We have perceptibly reduced the number of accidents at railroad grade crossings. We have very good records in our state on account of the principal cities showing a marked reduction in the number of fatalities in 1925 over 1924; so far in 1926 over 1925. We have three very active branches of the National Safety Council in our principal cities working constantly along educational lines, having schools for drivers, fire prevention weeks, and other activities of that sort. I think those are the outstanding

features that we have had in Minnesota in the ~~past~~ year. We are doing everything that we can and following every ~~good~~ example that we can follow as set by the other states.

J. H. HARVEY (Kansas City Safety Council): In the state of Missouri our program today is largely of a legislative ~~nature~~. Immediately after the National Conference on State and ~~Highway~~ Safety last March, Governor Baker called together the ~~delegates~~ and discussed with them the principles of a state wide conference. ~~The~~ conference was held in the state capital in May and during its ~~deliberations~~ was attended by 100 per cent representatives of every ~~geographic~~ district in the state and every organization within the state. ~~By~~ that conference reports were submitted on the various legislative ~~measures~~ of the modern law and adopted.

Missouri and Kansas Programs During the Year

Another recommendation of the ~~conference~~ unanimously adopted was the creation of a permanent organization ~~to~~ be known as the "Missouri Association for Street and Highway ~~Safety~~". That body has acquainted itself with various phases of the ~~problem~~ and its activity today has been largely concerned with the ~~preparation~~ and final form of the legislative bill which will be ~~submitted~~ to the next state legislature in 1927. We are therefore fortunate in ~~having~~ a chairman of that particular committee, and ex-secretary of ~~state~~ who in the eight years in which he served in that capacity, has ~~given~~ a great deal of study to this particular problem. We are now ~~ready~~ to put up in form to be printed: the proposed law in one column ~~and~~ the present law in another. In the average state legislature, ~~particularly~~ in those states where your problem has not been so intense, ~~you~~ find a great deal of opposition to certain phases of the program ~~and~~ we feel that if we can furnish the legislature with exact knowledge ~~of~~ the changes and the additions in the legislation, it might ~~beat~~ some of the opposition we would otherwise have. It is our ~~purpose~~ as time goes on, of course, to carry on a definite educational ~~program~~. As a means of building up public sentiment in our passage of ~~the~~ ~~law~~ we sent to 350 newspapers throughout the state, educational ~~material~~ which we believe will aid most materially in affecting the ~~decision~~ when it comes before the state legislature.

JESSE GREENLEAF (Railroad ~~Commission~~, Topeka, Kansas): Early in July the governor of ~~Kansas~~ invited the heads of about 50 state wide organizations in Kansas ~~for a~~ conference. We had the president of the farm bureau, the president ~~of~~ the bankers' association, the head of the American Legion, and ~~all~~ the line. We had no program. Mr. Sidney J. Williams of the ~~Legislative~~ Council was present and a great help to us. Mr. Harvey, our ~~representative~~ from Missouri, was in attendance. As a result of that meeting ~~we~~ called a safety rally nine weeks later, the 9th and 10th of September. ~~We~~ had a program and a banquet the first evening. We were ~~fortunate~~ in having Mr. Julian Harvey, who

has had a good deal of experience in safety work, and we used him to the limit. We had him give us an address in the morning. At noon the rotary club had a safety program; he addressed that; and in the evening we had him speak at the banquet.

We were very highly gratified at the enthusiasm with which the safety movement was received. We had asked each of the presidents of the state wide organizations to send us in the names of 10 men whom they would recommend we invite. That made us a list to start with of about 600 or 700. We also invited the mayors of our cities and representatives and senators. We had the meeting in the house of representatives. We had a registration booth on the first floor. We did not stress the registration, but there were 462 registered from all over our state, and we probably had 600 or 700 in attendance. We had four very enthusiastic sessions. Now, we organized a safety council; we passed resolutions endorsing the recommendation of the Hoover Conference, which we hope to enact substantially as recommended at our next legislature in January. We are encouraging the organization of local safety councils, and several of our cities have the matter under consideration now and one of them is forming a local council.

CHAIRMAN FENNER: State of Oregon, H. P. Coffin!

Compulsory to Report Every Accident in Oregon

MR. COFFIN: Gentlemen, I am from the great state of Oregon out on the Pacific Coast. You might know that we are on the map. We have one road that is 1,765 miles long, and it is paved the entire distance, except 60 miles in the mountains, and this is being closed up as quickly as possible. In conjunction with the chairman of the State Highways Committee and the chairman of the House of Representatives we were appointed by the governor to draw up the first state automobile law, and in that law we made it compulsory on every person having an accident to report that accident, and any injury or property damage to the nearest sheriff within 12 hours, and we put that immediately in force. All convictions under this law have to be reported to the secretary of state, and they are on record. We have also a list of all convictions in the Municipal courts.

When a man is called into court his record is looked up to see if he has had a form of conviction, and that is placed on the judge's desk for his consideration. We also are now putting into effect a system of three cards. The first is a white card, issued to the driver, and is his license. If he is convicted of traffic violation, or has a serious accident, he is given a green card by the secretary of state; and on further violation is given a third card, which is red; that is his last fall. If he has another one the card is taken away from him and he can't drive for the balance of the year. He can start again the first of the year with a new card, but there is an endorsement, made on the card, of his former convictions or violations, or accidents. So that we have a complete check of automobile accidents and convictions. I might say that we are fol-

lowing are the up-to-date regulations, rules of the safety conventions and meetings and we are on the map and doing good work.

Details of the Texas Program for Safety

W. E. JAMES (Director of the Texas Council of Safety): I am submitting with a report concerning the activities of the Texas Council of Safety which gives a brief account of the work done the first six months of active operation. The report also gives a suggestion as to future activities and a statement relative to the financial situation of the organization. We shall be pleased to have you look over the report and offer any criticism or suggestion that you feel might aid us in our work.

We have met with considerable difficulty in our efforts to get the message across, to the extent of arousing the people to action in accident prevention, we feel that much progress has been made. Development is but substantial. We are convinced that, with adequate help in the form of money and with sufficient funds, much greater progress could be made.

Queries concerning our organization and its work are coming to us daily and we believe that the outlook for the organized safety movement is more promising than ever before. We are entering upon the second six months of our task with increased faith in the gospel of safety and with renewed determination to spread this gospel to every community possible for us to reach.

Activities of the Council

Addresses delivered by the director before civic organizations, churches, automobile clubs, student bodies, institutes, associations, conventions, picnics, safety meetings, etc.....	28
Approximate number of people addressed.....	10,000
Number of typewritten letters sent out by director.....	325
Number of mimeograph letters mailed.....	6,000
Pieces of literature, safety folders, booklets, accident report blanks, program sheets, outlines, safety stickers, etc.....	43,000
Number of safety articles, reports on safety addresses, and other statements concerning the work of the organization that appeared in papers.....	20
Local safety councils organized.....	4
Cities and towns now seriously considering organizing local safety councils.....	5

Future Activities Planned

- Continue safety addresses.
- Distribution of safety literature, stickers, posters, etc.
- Organization of community safety councils where possible.
- Organization of junior safety councils in the schools.
- Propose and work for safety legislation in the next legislature.
- Increased newspaper publicity.
- Introduction of safety instruction in the schools. Outlines for this work are now being prepared.

Propose safety rallies for a number of the towns and cities.

CHAIRMAN FENNER: Gentlemen, the session in this same room this afternoon will be practically a continuation of this morning's session, and at that time representatives from other states will be given an opportunity to report progress in their various communities. This room is required for a luncheon and we will now proceed with a very interesting paper on head light regulations and enforcement by Mr. J. H. Hunt, General Motors Corporation, Detroit, Michigan.

HEADLIGHT REGULATIONS AND ENFORCEMENT

J. H. Hunt, General Motors Corporation, Detroit, Mich.

(Accompanied by Lantern Slides)

Although I have been announced as being affiliated with a certain corporation I want to tell you that I am not presenting an official viewpoint of that corporation. I am also very closely allied with the automobile industry, but I can't speak for that industry. The viewpoint then of your speaker is simply that of an engineer who is in contact with the industry and who is very much interested in this problem, who would like to do something in it, if possible, and finds himself confronted by an exceedingly confused situation.

I want to take this opportunity to say that as far as I have been able to find out in my contact with men of the industry, all of the responsible heads in the automobile industry look at the headlight problem as an exceedingly important safety problem. Regardless of what is said about them, they do feel, however, in a great many cases that they are in a very hopeless mess at the present time. They hardly know which way to turn; and what I am going to attempt to do today is try to make you see some of the situation that the industry finds itself in.

I will frankly admit at the start that the industry has been careless on the lighting question in the past. We have not paid the attention to that question, possibly that we should have; but you must remember that we started out with the question of how we could make something that would get you home a reasonable number of times without being hung up for major repairs, and we have gradually progressed, making our machines better and better, making them good enough so that people are willing to drive them at night. You didn't dare take those early machines out at night. You were afraid to take a lantern around them with the kind of gasoline we had in those days. Now, we have got the machines so that they run at night, and we have put on lights.

We started out without knowing very much about the lighting question. We have learned a lot of the difficulties of the lighting question today and find that we haven't learned much about the lights yet. Now, on account of the intolerable situation that very soon came about, the very large number of cars on the road at night, regulations came about;

state laws were passed which usually specified that substantial objects on the roadway should be visible a certain number of feet ahead of the car; the usual distance was 200 feet; the law usually went further and said that these lights should not be glaring. Sometimes a law specified what a glaring light would be. Where some specific law regarding a glaring light was made it was usually stated that the bottom of the light should not rise more than a certain distance above the roadway. Some were set 42 inches; some 36 inches; some said about the level of the head lamps. Now, most of the states still have laws that are somewhat indefinite the same as these statements I have just made. Other states have much more definite laws to guide the administrators who felt the need of assistance. The Illuminating Engineering Society drew up a set of specifications.

But those specifications are a compromise. No compromise is very satisfactory to the majority of the people and sometimes it isn't satisfactory to very many of them. That was the compromise of the man behind the lamps. It was where he was going and what he had to avoid to meet the objection of the men in front of the lamp who didn't want to be blinded so that they couldn't see anything at all. There has been more or less complaint. The complaint was more active with respect to glaring than it was with respect to inability to see. Furthermore, a car is not an object, as you all know, possibly to your grief, that travels always on an even keel without any variation whatever. A car shows a tendency to bob along on the highways. With even the best of them the result is that this high candle power light (while it specifies 7,200 minimum, the S. A. E. recommendation calls for 25,000 candle power—three times as much) may be thrown into and out of the eyes of the man coming along the road.

Three Important Changes Affecting the Light:

Since these specifications were adopted there have been three important changes affecting the light. One is the tendency to put the passenger down closer to the road. We have been compelled to lower our cars, because the public wants that kind of a car. The public wants a lower car, and all our cars have been made progressively lower so that the eyes of the driver are coming down nearer and nearer to the ground. The public also wants a better road than they used to have. The roads are getting better; we don't have a springy car and severe shocks. The springs are softer; as the result, the average five passenger car today will rock only a small degree. Motor vehicle commissions have made an attempt to enforce laws requiring that the light be pointed down one degree. It is a fact that cars are being driven very much more with only part of the load than they are with the full load, and I sometimes think that is particularly true of these cars that go out at night. As a result they drive along with a very bad spot in front of the car, which is more or less difficult to see, and they haven't got a safe light.

It is my personal opinion that the original S. A. E. specifications are just powerful enough for an alert driver on a good road; they are not enough on roads where road conditions are bad like wet surfaced roads, rainy conditions, and they are not enough particularly with people whose adjustment is a little bit slow. You have all had experience, I think, with the driver who lurches in front of you and then discovers something close to the edge of the road which he tries to dodge in his excitement.

Now, that is the situation so far as the regulations are concerned on the type of lamps we had up to about a year and a half ago. At that time, it was felt that there was need of improvement and that there should be an opportunity to get better light on the road. More and more people were driving, and with this increase in the number of people there were more and more people driving who needed a longer time to plan out a course of action than the average driver. It may be that some day we will sort individuals and limit some of them as to when they can drive. People that might be perfectly safe to drive under certain conditions are very likely to do very erratic things under stress. But in any event it was felt that the lighting problem was not being satisfactorily met; and the so-called double filament lamp came along, which provided a means of depressing the beam on meeting another person. That gave an opportunity to have a real driving light; also to change the lighting conditions when meeting some one, so as to give the other fellow a chance to get by. Now, we have had that for about two years. But the thing was nearly four years in getting across.

ADJOURNMENT

Drivers' License Laws

October 27, 1926

ERNEST N. SMITH, Chairman

General Manager, American Automobile Association, Washington, D. C.

The second session of the Public Safety Division convened at 2:15 o'clock in the large banquet room, Statler Hotel, Detroit, Michigan, Mr. Ernest N. Smith, general manager, American Automobile Association, Washington, D. C., presiding.

CHAIRMAN SMITH: I suppose there are more individuals in the United States interested in the possibilities and development of a driver's license law than perhaps any other general law referring to general conduct.

As a background for the meeting this afternoon, I am going to point out one or two very brief features before introducing the first speaker, in order to give you an idea of the situation that is confronting the United States.

In a recent survey made by the American Automobile Association, we found that in 18 states and the District of Columbia, all drivers of automobiles were required to have licenses. In the remaining 30 states there were no such provisions.

In connection with this investigation we also inquired into the provisions in the various states covering the examination of drivers as a prerequisite to licensing. The results showed that in nine states and the District of Columbia examination is compulsory; in six states it is optional with the motor vehicle officials, and in 33 states examination is not required, except of operators of public vehicles or vehicles for hire.

In our investigation we also inquired into the practices in the various states of suspending or revoking automobile licenses. We found that each of the 18 states and the District of Columbia requiring licenses, except Virginia, permitted either the suspension or revocation of licenses, or both, for cause. Under the Virginia law a license is automatically given when a vehicle is registered. This license entitles not only the registrant to operate the vehicle but anybody in his family, or anybody employed by him, to operate the vehicle registered. We also found that in 15 states which have no provision for the issuance of licenses, any driver of a motor vehicle who has shown himself to be reckless or who

has been involved in a serious accident may be deprived of the right of driving on the highways.

The Committee on Traffic Control of the First National Conference on Street and Highway Safety recommended that there be both the examination and licensing of all automobile drivers, that new drivers be required to undergo a probationary or instruction period of 30 days or more, and that there be provision in every license law for suspension or revocation of the license where the driver was shown to be dangerous, incompetent, indifferent, or reckless.

The report of the Committee on Traffic Control was adopted by the general sessions of the Conference, and the report of the First Conference contains references to licensing and examination of drivers which I shall read at a more appropriate time this afternoon.

The exigencies of politics have made necessary a slight change in the program for this afternoon. According to the printed program, Mr. David Fenner was to speak first on the developments of the past year, to be followed by Mr. L. B. Palmer, and then by Judge Skeel, of Cleveland. We are placing Judge Skeel first on the program. I think I ought to say in behalf of the Judge that he is not anxious to leave this meeting were it not for the fact that a political campaign is on in Cleveland.

In order to insure his attendance at a meeting before some veterans tonight, Judge Skeel is trying to cover two places. I take pleasure in presenting Judge Skeel, chairman, Legislative and Law Enforcement Committee, Cleveland Safety Council, Cleveland, Ohio.

A PRACTICAL LICENSE LAW FOR AN AGRICULTURAL STATE

Judge Lee F. Skeel, Chairman Legislation and Law Enforcement Committee, Cleveland Safety Council, Cleveland, Ohio

All life is a response to a stimulating urge to do more, to get there faster, to secure more of the comforts of life and its luxuries: in short, a desire to move more swiftly and more easily in the direction of personal progress.

The equipment and accessories you see on the 1927 model automobile are all collateral pacemakers; they are designed to convey their cargoes with greater speed, greater comfort and greater safety.

This unprecedented haste of men and machines constitutes what we now know as our "traffic problem."

But just as in all things, this speed tends to become extreme; hence traffic signals for humans and four wheel brakes for engines.

Yet mere cautions seem not enough for humans nor mere accessories for machines. Intelligence and education must carefully adjust people and automobiles to the new conditions.

We must understand that safety is not to be applied by means of brakes; it must be used mentally by bipeds.

After all, traffic rules are not meant to retard progress but to conserve and assist it; not to impede it but to speed it on when the danger is past; not to restrain but to guide it. What are the problems that confront us today? As Grover Cleveland once remarked, "We are confronted by a condition, not a theory."

The advent of motor transportation has revolutionized the economic fiber of our daily life to a greater degree than the industrial revolution of England or the French revolution changed the daily life and habits of the inhabitants of those countries. The life of the average person has been made bigger and fuller and the average man is now able to take his family into the country to enjoy and appreciate the grandeur of nature when 20 years ago this would have been impossible. People are able to go from one locality to another and their breadth of vision is increased by a knowledge of how things are done in other places.

The automobile industry in 1923 became the largest industry in this country. In fact it is now the largest industry in the world, surpassing even the steel industry. The National Automobile Chamber of Commerce in its report of 1925 states that for the year 1925 there were 3,445,682 employed directly or indirectly in the automobile business. This represents approximately one-tenth of all the people employed in gainful occupation in this country.

The Extreme Importance of Motor Transportation

Nineteen million nine hundred fifty-four thousand three hundred forty-seven cars were registered in the various states of the United States last year, representing an investment of over six billion dollars, or a sum half again as large as the total indebtedness of the United States Government at the close of the Civil War. Approximately one out of every five people in the United States owns an automobile, and the amount of taxes paid last year amounted to \$666,944,340.98. On January 1, 1926, \$258,136,775 was paid in insurance premiums and \$972,000,000 in negotiable paper was outstanding on motor vehicles; 9,362,094,000 gallons of gasoline were consumed and \$1,002,000,000 was expended on highways. A prominent economist of the University of Iowa estimates that "about ten billion dollars a year covers the operating cost of the country's twenty million motor vehicles. This is based on the average figures of ten cents per mile and 5,000 miles per year. The country's annual highway expenditures amount to about one billion dollars a year; motor vehicle transportation involves an annual cost of about eleven billion dollars."

A rough perusal of these figures will give a general idea of the extreme importance of motor transportation.

It has been said that one of the greatest difficulties to be found in the pacification of Europe is due to the tariff walls between these countries and the lack of commercial and social intercourse between the peoples. We have never been troubled with tariff barriers in this country and the intercourse between people in the city and in the country

and between the citizens of various states has grown to such an extent that our people now understand the peoples of other states much better than ever before. The city, county and state lines have been eradicated in so far as the motorist is concerned. The inhabitants of the eastern states no longer have the popular conception that all of the men west of the Mississippi River are cowboys and the people of the west now realize that something good can come out of New York after all. Even the inhabitants of the Dominion of Canada now fraternize and treat as relations our citizens who travel into that great country on their annual vacations. It has been estimated by the Statistical Bureau of the American Automobile Association that approximately nine million automobiles were touring at some time this year, representing 36 million people who have been able to enjoy the beauties and advantages of their localities.

The extensive use of the automobile has been in a large measure responsible for the eradication of our social unrest. Seventy-five per cent of our cars are purchased with time payments. The average owner of an automobile does not desire a revolution or great economic change until his automobile is paid for. Private ownership makes an universal appeal.

City People and Country People Are Obsolete Terms

Country people no longer look askance at city people and city people are no longer accustomed to look at country people other than with an eye of envy. The hardships of the country in the old sense of the word no longer exist, and in nearly every state of this union a person living in the country is only a few hours distant from all the advantages of the city. These people are no longer country folks but suburbanites.

In view of the very extensive intercourse between country people and city people, the tendency of the country people to motor into the large cities and the practice of the city folks to spend their vacations in the country, the day of community legislation has passed. As has so often been remarked, the automobile has ceased to be a plaything of the rich man, it is now an article of necessity with the farmer and with the urbanite.

Local legislation with which visitors are not familiar causes great hardships. Different municipal regulations are becoming increasingly unpopular. The tendency is to have uniform laws and uniform rules whereby a motorist may be able to know and to abide by the law, no matter where he goes.

With the advent of extensive travel comes the necessity for personal regulation in order that the maximum of safety may be had and the maximum use obtained from our highways. Since the foundation of this country it has been instilled into all of us that a minimum amount of regulation for the individual is desirable. This is a great principle and should be preserved and cherished by us, but in every body politic there comes a point where there must be a certain amount of personal regulation in order to secure the greatest good for the greatest number. There

is a twilight zone where regulation may or may not be offensive but there can be no question that the need of the regulation of the operators of motor vehicles is imperative if the greatest benefits are to be derived by the greatest number.

It has been reported by the National Safety Council that 22,500 people were killed last year and 675,000 were injured through the operation of automobiles. Of course the number killed can not be reduced to a zero, but steps can be taken to reduce this amazing sacrifice of human life. The right to drive an automobile is now a question of public concern. Safety on a highway largely depends on three things: first, how well drivers are informed as to the rules of the road; second, with what degree of care they abide by and live up to such rules; and third, the capacity or lack of capacity of a driver to operate a motor vehicle.

While on the traffic bench at various intervals for a period of over three years, I frequently asked defendants when they had last read the book of traffic rules, and in about 50 per cent of the cases they very frankly stated that they had never read the rules at all and many did not know that books of traffic rules could be had. It could only be deduced that a great number of drivers learn what they know about the rules of the road by watching the other fellow. This, at least, is a most dangerous way to obtain correct information.

Few Laws and Made as Simple as Possible

It has been the purpose of legislative bodies having to do with the enactment of laws and rules regulating the use of the public streets and highways by motor vehicles to make such laws and rules as simple and as few as is consistent with public safety. This being so, no especial burden is placed upon drivers to know just what these rules are. Every driver, in fairness to himself as well as to others who are compelled to drive upon the public streets, should first inform himself as to just what the rules of the road are and then do his utmost to live up to them.

In addition to a lack of knowledge of the rules of the road and a somewhat inattentive observance of them by those who are informed, one of the most frequent causes for accidents is congestion. Police records show that about 30 per cent of all accidents occur between the hours of 5 and 6 p. m. This is the hour when traffic congestion is at its peak. It is at this hour that the most vehicles are upon our streets, and to this must be added the fact that the mental alertness of the driver is undoubtedly at its lowest point. At this hour the homeward bound traffic crowds our streets. The drivers, being impatient of delay, fight over places of advantage, drive at as many rates of speed as they are able, and weave in and out of the regular lines of traffic with the inevitable result of thousands of accidents. In the direction of this great volume of traffic, traffic departments of our large cities are seeking to keep vehicles moving at a universal speed and to insist upon slow moving vehicles moving near the curb.

Much has been done to make our streets safe, such as the installation

of signal lights and adoption of the boulevard stop laws. Both of these laws have been important factors in reducing accident hazards. The boulevard stop law should be enforced to the letter. There is only one way to comply with this law and that is to make a full and complete stop so that one's entire attention can be directed to the condition of traffic on the main thoroughfare. Anything short of this should be a violation of the law. It is desirable to form the habit of making a full and complete stop. The habit is a good one. Police records show conclusively that these two factors, together with the elimination of parking during the rush hours on main thoroughfares, have directly caused the reduction of accidents more than 25 per cent.

One more thing, and a very important one, is needed to help make the streets safe; that is the universal enactment by the various states of a driver's license law. So far all efforts made in the interest of such a law in our state have resulted in failure because of the feeling very prevalent in rural communities that the automobile driver has already been over-regulated, and that this additional burden should not be imposed upon the operators of cars, and especially upon the younger members of the family who have to run errands and drive the children to school. It is hoped that these people in rural communities can be made to appreciate the necessity to sacrifice a little of their freedom to the universal desire to save life, limb and property. To close observers of the traffic problem, a drivers license law must be enacted and enforced if we would do all within our power to make life and property safe upon our streets.

All Right Thinking People Will Support Public Safety

Every American citizen abhors unnecessary restriction upon what he believes to be his inalienable right to the pursuit of happiness, but the right to use the highway is not an unrestricted one and the right to avail yourself of the use of our thoroughfares can not be obtained without making some sacrifice. When it becomes apparent that an unrestricted right is abused by a few to the detriment of many, police power of the state must step in to preserve public safety. This is now true of the right to operate a motor vehicle. All right-thinking people who are familiar with the problem are agreed upon this, the only question being to what extent the right should be restricted and the method by which it should be done.

A driver's license law should be made as simple as possible with no greater restrictions than are absolutely necessary to accomplish the purpose intended. The law should provide that everyone be issued a license to operate a motor vehicle as a matter of right, except those who by reason of serious impairment, either mental or physical, are apparently incapable of operating a machine. It would be impractical to require a rigid mental or physical examination of every applicant for four reasons. It would be impossible to examine every person who is now operating a car within many months, the expense of such an examination would be unpopular, the examination would place an unnecessary burden upon

the great majority of careful drivers and the force required to make such examinations would constitute another undesirable and powerful bureau in our state governments.

Require every applicant for a license to fill out an affidavit in which he swears among other things to the presence or absence of physical defects and the number and character of convictions for violation of the traffic laws. Every statement in the application should be made a material allegation for the purpose of a prosecution for perjury. If the affidavit does not disclose any defects that might make the applicant incapable of driving, and there are no apparent defects, the applicant should be granted a license. If the appearance of the applicant or his affidavit disclose physical defects that would put in doubt the question of his ability to drive, or the record discloses a conviction for a serious traffic offense, the applicant should be required to demonstrate to authorities appointed for that purpose that he is capable of operating a car. In the event of a refusal to issue a license, an appeal should be open to the courts to review the decision. An age limit is desirable. A provision should be inserted permitting children in the country under the required age to drive to school and perform similar duties.

Make It Easy to Get and Easy to Lose Your License

In other words, make it an easy matter, comparatively speaking, to get a driver's license and then make it just as easy, if not easier, to lose it.

The power to suspend or revoke the driver's license should be in the Judge or Court of record having jurisdiction to enforce and punish violations of motor vehicle laws. Make the traffic court responsible for the restricting of the right to drive of those who by their actual driving record show that they are unfit and unwilling to curb carelessness. You restrict, by this simple method, only those who by their actual driving record, unnecessarily and thoughtlessly, or by reason of unfitness, cause damage or injury to others. They have demonstrated that they are unfit to be entrusted with the great privilege of operating a motor vehicle. The right to suspend or revoke licenses should be permitted only upon conviction of the operator for the violation of one of the five principal motor vehicle rules, which I conceive to be speeding, careless driving, driving while intoxicated, passing a standing street car while passengers are getting on or off, and failing to stop after an accident.

The great majority of drivers do their utmost to abide by the accepted rules of the road and drive with that margin of safety which will insure against accident even when an unusual emergency arises. Those who take greater privileges upon the streets than are consistent with safety are a very small minority. These drivers must be eliminated for the good of the overwhelming majority. The license law as herein outlined and suggested is a most effective, positive and economic means of placing in operation this much needed restriction without placing a burden or undue inconvenience upon the great body of sincere law-abiding motorists.

The time is now here, with regard to motor vehicle driving, when

incompetency and willful recklessness must be stopped. Our streets are so busy, the loss of life so great and the injury and damage to property so costly, that those who drive vehicles must be competent. Ignorance and thoughtlessness can no longer be accepted as an excuse. Safety and utility are now the underlying factors upon which must be founded the right to use a motor vehicle upon our public streets.

The last question which I wish to discuss is the traffic court itself. It is here that good or evil may result by virtue of the conduct of the judge. Law enforcement has been and always will be a very difficult and troublesome problem. This is particularly true of the traffic court because the great majority of those who, for one reason or another, find their way into this court are not criminals, nor was the mistake which caused them to be called before the court the result of criminal intent. For the first part I would say that they are there because of thoughtlessness, perhaps better described as lack of attention to the operation of their motor vehicles. The court, it is true, must impose penalties that are commensurate with the offense, in so far as this can be done within the realm of human judgment.

Certainty of Punishment a Sure Deterrent of Crime

Certainty of punishment for violations of the law is an absolute deterrent, and is the only means known to protect society from the wrongful acts of the individual. But fear of the court should never be the reason for right-thinking persons obeying the law. Observance of the law ought to be by desire of the individual. The traffic judge should therefore not only strictly enforce the rules of the road without fear or favor, impose appropriate penalties for their violation to the end that the streets shall be made safe, but he should also, with all his strength and vigor, sell traffic safety to all that come before him. When they go out from their experience in court it will then be with a better understanding of the need for observance of the rules of the road, with a solemn resolve thereafter to become exponents of traffic law observance and to hold in contempt those who, by their carelessness and disregard for the rights of others, make our streets unsafe.

I have attempted to point out to you the tremendous growth of the automobile industry and the revolution that it has brought about in our way of thinking and in our way of living. Sectional lines have been eradicated. The country has been brought to the front doors of the city and the city has brought itself to the back doors of the country. Like the Colonel's lady and Judy O'Grady, we are all motorists under the skin. The price which we are paying is too great, the toll in human life is too heavy. A spirit of personal responsibility, the idea of individual competency must be our goal. Success is to be achieved not by working from the top to the bottom but by working with the individual—from the bottom up. Those of us who preach must practice. You are not performing a great service to the community when you preach from the street corners, like the Pharisees of old, about safety and then impose upon your friendship with the court and ask him to be lenient with your

friends. A driver's license law, simple in its requirements and effective in its application, enforced by an independent, intelligent and courageous judiciary, will achieve in a large measure the desired results.

CHAIRMAN SMITH: I think we are particularly indebted to the Judge for his able discussion. I was greatly interested in it because I knew that he had been chief counsel for the Cleveland Automobile Club for a number of years and did such a good job there that he was elected to the bench and is now fining a lot of people who used to help pay his salary. Does anybody want to tell the Judge what he thinks of him?

New York Is Making Laws More Severe Each Year

LEON ARONOWITZ (New York State Motor Vehicle Department): The tendency in New York state is becoming such that we are having more severe license laws than we have had in the past. We are making requirements more drastic each year. We have found from our experience that more public accidents are due to inexperienced driving than from experienced. The great percentage of new drivers have more accidents than those who have driven over two or three years.

In New York, in addition to making a man pass a test to operate the motor vehicle, he has to pass a sight test. The examiners are now devoting more time to the examination. We license approximately half a million each year and have been able to accomplish that with about 100 inspectors.

CHAIRMAN SMITH: There we have testimony from one of the largest states in the Union. I understood Judge Skeel to say that if some people had been injured or were deformed or had some infirmities that possibly they ought not to be licensed. That calls to mind the fact that the head of the department in Pennsylvania had to meet the problem of licensing deaf people and had to decide whether or not they should be given licenses. His experience told him that people who were deaf seemed to have another sense: that their eyesight was more acute. He solved the problem by appointing a committee from the deaf school to pass upon the licenses of other deaf people. That board which he set up was much more active in its examination than any official board of the state.

I am mentioning these points to bring out discussion. I recall not long ago in the state of Iowa a legislator said he was going to introduce compulsory state liability insurance because there were altogether too many accidents in his state for which no compensation was given to the injured person. I prolonged the discussion for a little while, and then asked him if they were going to introduce the drivers' license law.

"Not at all," he said. "We farmers don't like it. The farmer doesn't want to take out a license for his three daughters and four sons, hired men, so they may take the car to town. The farmer doesn't want to bother with a license law."

I then asked him if his solution, as far as his state was concerned,

meant he would let all unregulated traffic go over the state. The only compensating feature he could offer to a person was that if injured he would be paid a lot of money, but he didn't make any provision to first prevent the injury.

After I finished he said that put a little different angle to the situation.

I have had the same discussion in other parts of the Union. Possibly some of you people may have had the same experience. I bring up the question of compulsory liability insurance here because I think it is linked up with the question of a drivers' law. I do know from our experience over the country that many people are advocating liability insurance for the protection of motorists, but they don't want to adopt any law which would make it hard for a motorist to get his license in the first place.

H. P. COFFIN (Portland, Ore.): I don't altogether agree with Judge Skeel in regard to calling attention to violations of the driver. This woman should have been called down. If the man had been a careful driver himself and had called attention to this woman's violation, I think he was doing nothing more than his public duty. If many more citizens would take upon themselves the task of calling down careless drivers it would tend to assist the police department.

One Driver Who Violated Five Rules Rounding a Corner

I remember one day in Portland that a driver violated five of our rules in turning the corner. He failed to put out his hand and several other things. I was in my car and called him on it. He told me to go where it is nice and warm. I followed him down the street and asked him to stop at the curb and said, "Now tell me that again." And I showed him my authority.

He said, "I will take my hat off to an officer."

I told him that he was making a mistake, that I might have been a private citizen who was simply warning him of what he was doing. He thanked me very much and said he was a stranger in town and did not know the rules. I promptly handed him one of our traffic books and he was happy.

As I say, the public citizens ought to take upon themselves the duty of helping the public officials, for it might help out some of our bad situation.

MR. POWELL (Buffalo): In New York state there is a very simple way of handling the situation. All that would be necessary would be to take the number of the car that was offending the rules, report it to the local police authorities and it would be recorded against the car, would result in a summons being issued against the owner in the locality, or the revocation of the driver's license in the state. It is a very simple matter to handle.

CHAIRMAN SMITH: I know that in some places the cities have secret committees of 200 or 300 business men to watch for infractions of the law. On the other hand, that has the aspect of an espionage system.

I can't say as far as our experience and observation go that it has been a satisfactory solution. I think it is better to reinforce the public officers, but there is no reason in the world why an infraction shouldn't be called to the attention of the proper officials.

In Washington we have had nine recent calls for emergency road service. Our service men reported in almost every instance that the man had been drinking and that the car had been seriously damaged. That man's membership was cancelled because we didn't want to have him on our roll. In addition we reported the incident to the police, and his license was withdrawn.

It has been said that a man who has one arm or a wooden leg or only one eye shouldn't be permitted to drive. Very well, what will you do with several thousand veterans of the war who sacrificed themselves for their country who in other respects may be in perfect health? If they can pass the tests should they be penalized and never be permitted to drive because they have lost an arm or a leg or an eye?

CARL SMITH (Cleveland Safety Council): I should like to say to those who are interested in the drivers' license law (particularly what is being contemplated in Ohio in the way of a law), that copies of this proposed bill for introduction in the legislature this fall are on file at the National Safety Council office. So anybody who desires can get complete information, particularly in relation to Judge Skeel's idea on a drivers' license law.

The Problem of Cincinnati and Kentucky Licenses

A. E. MITTENDORF (Cincinnati): I might add that the state of Ohio is now engaged through its Legislative Committee in trying to suggest and have a proper drivers' license law enacted. I agree with the chairman in stating that the drivers' license law should not be tied up with a compulsory insurance law. In other words, I should hate to see compulsory insurance a part of the law. Compulsory insurance does not make for safety. It has nothing to do with safety. Rather, in a measure it makes the driver feel more secure in taking chances.

In Cincinnati we have 250,000 people across the river who get their licenses in Kentucky and take their pleasure in the city of Cincinnati. Their cars are on our streets all the time. What are we going to do about it? I should like to know the possibility of having some sort of national instead of state license law.

CHAIRMAN SMITH: In answer to Mr. Mittendorf, I will again take up this report from which I made some quotations earlier in the afternoon and state for your information that the Committee on Traffic Control of the Hoover Safety Conference adopted some resolutions. The first paragraph of the report is as follows:

"No unlicensed person should be permitted to operate a motor vehicle. A reasonable length of time after the passage of the law requiring operators to be licensed should be granted operators already qualified in which to secure licenses without examination. The de-

partment or division administering the motor vehicle law should have full authority to refuse an operator's license to any persons and to suspend or revoke a license already issued for any reason deemed sufficient."

The second paragraph reads:

"Before granting an operator's license, the department or division should determine the applicant's ability to operate a motor vehicle safely by ascertaining his physical and mental fitness and his knowledge of the laws, and by requiring an actual demonstration of his ability to operate a motor vehicle. It is recommended that all states designate the minimum age limit, but that no person under sixteen years of age, and no person who can not read English, should be permitted to operate, drive, or direct a motor vehicle."

States That Now Require a Drivers' License

Speaking of the drivers' license, I had an examination made for this Conference of the number of states that required a driver's license, which I read. In addition to that, we had a list made of the states in which an examination is required of operators not for hire. Briefly, let me read to you the states in which drivers (not for hire) are required to have licenses. These are the states in which a license is compulsory:

Arizona, California, Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, Washington and West Virginia.

That constitutes 18 states and the District of Columbia.

Now let me read the names of the states in which an examination is required of operators (not for hire):

Connecticut, District of Columbia, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, Pennsylvania, Rhode Island and Vermont.

That constitutes nine states and the District of Columbia. Just one-half of the group that issues licenses require examination before issuance. The list which I am now going to read is one of six states in which examination is optional with designated officials:

California, Delaware, Maine, New York, Washington and West Virginia.

If there are any representatives here who want to take issue with this report, I should be glad to have you call any discrepancies to our attention if there be any.

MR. ARONOWITZ: New York State requires an examination for both operators and chauffeurs. That requirement has been in effect since 1924.

HOWARD BROWN (Detroit Automobile Club): The examination is required in Michigan but it is optional as to what examination is given. In other words, there are certain officers in the state that can give an examination to secure an operator's license, but there is no provision in the state law requiring a certain examination to be given by those officers. It results in very good examinations being given in Detroit and in sev-

eral other cities, like Grand Rapids, and some of the large cities. But in some of the smaller cities, sheriffs and deputy sheriffs give the examination. They are not uniform. We have reason to feel that there are parts of the state in which operators' licenses may be secured very easily.

CHAIRMAN SMITH: With respect to refusing to grant licenses unless the operators can speak English, I was driving in Canada last year and I came to a section of the country where all the road direction signs were in French, and there was practically no English spoken. I don't suppose I could have traveled very far if I had been a resident and couldn't speak French. I proceeded further and came to a section where the French flag still flew and there were very few English flags. As I went along the road directions and danger signs were given in both French and English. There I had the feeling that it was perfectly safe to go on my way, and I entered a small town which was mainly of French population. A street car stopped in front of me suddenly and 14 laborers got off on the left-hand side and I was in the midst of a crowd that was jumping and shoving in every direction. I heard the cry, "Let's go and call the police." So, you see, there are some difficulties in traveling on this continent.

Courtesy Extended the Driver From Another State

MR. COFFIN: What is the attitude assumed by those states requiring examination for drivers of machines toward states where there is no examination?

F. F. GILMORE (Louisville Safety Council): In making a study of drivers' license laws a year and a half ago, we found that generally speaking the driver of a car from the state not requiring a license was given the liberty of driving within that state if he had his own car and could show ownership of the car for a period of anywhere from 30 to 60 days, but any length of residence in the state requiring a license required him to take out a special license.

CHAIRMAN SMITH: The situation may be a little bit complicated in that respect. Eventually there probably will be complete reciprocity all over the states so that a license from one state will be accredited in all others for as long as they choose to remain there. Then again we will have a little complication.

Miss R. H. Brooks (Patterson, N. J., Safety Council): I know that in New Jersey anybody who remains in the state longer than 60 or 90 days has to go through all the process of getting a new license. He has to take all the examinations of a new driver who has never driven a motor car before to get out a license plate for his car.

JAMES KELLY (Trenton, N. J.): There is a 15-day reciprocity stipulation in the Jersey Act as long as you comply with the laws of your own state while in Jersey.

FRANKLIN ZELLHOEFER (Milwaukee, Wis.): I just want to endorse the remarks made by the gentleman from Ohio. It seems to me that this

discussion brought out very strongly the one big point that we are all going to bump up against when we try to fix up our respective state laws: the matter of drivers' licenses from one state to the other. We, like the state of Ohio, have been working on our drivers' license law. We had it through the legislature two years ago and the governor didn't like it. But we are going back with it. The biggest problem we had in all the discussion was: what sort of tolerance are we going to allow the fellow from Illinois who comes up to Wisconsin to catch our fish and hunt our game? We like to have them come, but how are we going to control them if we have one sort of drivers' license or law in Ohio or Illinois and another in our own state? Therefore, I agree with the man from Ohio: let us attack the problem as a national issue.

CHAIRMAN SMITH: I should like to say with respect to this proposed law as drafted by the Hoover Safety Conference, that there are 42 state legislatures meeting in the United States this winter. This model code drafted by the Hoover Safety Conference will be introduced into those 42 state legislatures, I think. An attempt will be made, at least, and I feel safe in saying the bill itself will be put before all the state legislatures, or at least the principles incorporated in that model code will be placed before the state legislatures either for adoption as a whole or for the adoption of such parts as are not already contained in the existing code. I believe this winter will see us further on the road of progress with respect to unification of our motor vehicle laws than at any time within the last 25 years. I think that it reflects a sane opinion when I say that many people will make great progress this winter. If we can't get the code adopted as a whole in 42 states, we will make very substantial progress, and then in the succeeding state legislatures we will be able to iron out some of the wrinkles left as a result of the action of legislation in 1926 and 1927.

Minnesota's Lakes Draw the Summer Motorist

B. N. WHEELER (Commissioner of Public Safety, Duluth, Minn.): Up in Minnesota we got in touch with the Hoover Conference and we discussed back and forth these various problems we are discussing today: and we now have a committee that has been with us for more than six months working with the various departments of the state in order to make our state law in harmony with the Hoover Conference law. If the other states will do the same thing, we will get together without any difficulty.

We have 10,000 lakes in Minnesota, and it makes a wonderful short drive from Duluth to Canada, and we expect automobiles by the thousands next summer, as they were up there this summer. But first we have got to have reciprocity. The Hoover Conference proposition takes that into consideration. If we all get together we won't have any trouble at all.

CHAIRMAN SMITH: Mr. David Penner, who is chairman of the Motor Vehicle Conference Committee, which comprises a group including the

National Automobile Chamber of Commerce, representing the manufacturers, the American Automobile Association representing the owners, the Rubber Association of America, and one or two other groups, is greatly concerned with uniform acts as carried out all over the United States. Mr. Fenner is going to talk about the developments of the past year. I am curious to hear that speech myself, because I recall that Mr. Fenner spent quite a bit of time during the past year heading a most distinguished delegation of Americans who toured South America. I understand that he was involved in numerous accidents owing to the fact that he turned to the right and the rest turned to the left. I take pleasure in presenting Mr. Fenner.

DRIVERS' LICENSES AND EXAMINATION LAWS

D. C. Fenner, Chairman, Motor Vehicle Conference Committee,
New York City

In any discussion of the drivers' license system one must bear in mind, first, its origin and purposes; second, the form of such laws to date and their accomplishments, and, third, having in mind the experience gained from those laws already enacted, the form in which such new laws should be adopted.

Michigan was the pioneer state in the enactment of drivers' license and examination laws, "blazing the trail" toward the adoption of operators' regulatory measures in 1919.

At that time, with but some eight and one-half or nine million motor vehicles registered in the United States and some four hundred thousand of these in the State of Michigan, it had become apparent that if automobiles were to increase in number in the future as rapidly as they were then increasing, immediate steps must be taken to regulate their operation to promote public safety.

This idea of public safety has always been the motive behind all legislation regulating the automobile and its use, and with this in view, it may safely be said that all operators' license and examination laws have been enacted for three main reasons:

- (a) To insure that those who drive automobiles will be eminently fitted for that responsibility.
- (b) To insure that, once the proper parties to operate them are found, automobiles will be properly operated.
- (c) To determine the right to operate an automobile and to enable the state, through its police power to govern and control such operation.

With these needs in mind, from 1919 to date, 33 states have incorporated in their motor vehicle laws some form of operators' license law. These states are Arizona, California, Connecticut, Delaware, Illinois, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Tennessee, Washington, West Virginia, and the District of Columbia.

The form of these laws must not be confused. They are by no means uniform, but as a whole they have brought about a change in the operation of the automobile and in the personnel of the operators in the direction desired. The main variance in these laws is not in the regulation of the operators, once they are determined, but in the determination of who they shall be. A survey of these various laws shows that in the states of California, Connecticut, Delaware, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, Pennsylvania, Rhode Island, Vermont, New York, and the District of Columbia, all applicants for an operator's license must take and successfully pass an examination before receiving such license. In the other states it is left discretionary with the enforcing authorities whether an examination is required; and in the states of California, Delaware, Maine, Michigan, Oregon, and West Virginia they do not require such an examination except of those who are manifestly physically or mentally deficient. The state of Utah does not require an examination in any instance.

In all states, however, the operation of the law is practically uniform in that all operators must obtain a license, and once having obtained this license, must comply with the law or the authorities may and will avail themselves of their powers of suspension and revocation, which powers are the "teeth" of these laws, in the endeavor to so regulate these operators that only those who are fitted for, and who continue to prove themselves worthy of, the privilege conferred upon them when a license is issued, may be the ones who operate motor vehicles.

There is again a marked lack of uniformity in respect to the term for which a license is issued.

A One or Two-Year Period for the Driver's License

The chief obstacle to the issuance of an annual license is the great burden it places on the State Motor Vehicle Departments and the great amount of time necessary in getting approved licenses into the hands of all applicants by a given date in the more thickly populated states. The Motor Vehicle Department of the state of New York is now considering a recommendation to the state legislature that the license period be extended from one year to two years because of the great task of licensing two million or more drivers each year.

To just what extent the public has been benefitted by these laws is impossible to determine, in view of the fact that no complete data can be obtained. Accurate records are not kept of accidents with a view of showing the responsibility of the operator in most states. In the few states where such records are kept one is hampered in obtaining data from which an accurate survey can be made because of the form in which these records are kept. There must, however, be some benefit from simply knowing who are operating automobiles, and there must be still more benefit derived through the ability in the beginning to weed out those manifestly unfit and suspend or revoke the licenses of those who later prove themselves unworthy of the privilege to drive.

Developments along this line have been slow, due, no doubt in most

instances, to the fact that the public is always averse to any law which in any way hampers its freedom. The whim of the individual must be considered. It would seem, nevertheless, that when the public understands this problem it is solidly behind such a movement. This is evidenced by the stand taken by the American Automobile Association, made up of individual motorists, which has gone on record as favoring the enactment of these laws in all states.

In the past year no new developments have taken place and no new enactments along these lines have been made. Only 12 state legislatures convened this year and none of these touched upon the operators' license and examination law, except to amend slightly laws already existent.

The attitude of the automobile industry is perhaps best shown by the part it took at the National Conference on Street and Highway Safety, commonly known as the "Hoover Conference," which met in Washington in 1924, representing there the entire country as a unit, in an endeavor to promote legislation which will make for safety in the operation of automobiles. At that meeting the automotive interests along with the other groups favored the adoption of a uniform drivers' license and examination law. Again in 1926 these same interests assisted in drafting a uniform law, which has become part of the Hoover Code.

What Can Be Done to Perfect Legislation

So much for what has been done. And now, what can be done in an effort to perfect legislation along this line?

It is but common sense that the greatest variable factor in the problem of safe operation of motor vehicles is the ego, the personality, the individualism of each operator. Just how far our laws should go in the selection and regulation of this operation is a question, and since there has not been devised any method by which all applicants may be examined and their exact individual ability accurately and unfailingly determined, the best that can be done is to devise an examination which will, at the outset, determine from those applying for a license, who are best fitted to receive the same, and, through the powers of suspension and revocation, weed out, from those to whom licenses are issued, the ones who prove themselves unfit to continue to enjoy this privilege.

Such an examination should, therefore, determine as to each applicant.

- a. His mechanical ability to drive.
- b. His mental qualifications.
- c. His physical qualifications.
- d. His moral qualifications.
- e. His age.
- f. His reactionary ability.

By "mechanical ability to drive" is meant the ability of the driver to operate a motor vehicle under ordinary conditions—his ability to turn the same in limited space; to drive in heavy traffic; properly to handle the vehicle on steep hills and to handle it at a reasonably rapid rate of speed.

"Mental qualifications" would include a knowledge of the law pertaining to automobile operation and the ability to determine right from wrong, coupled with the ability to respect the rights of others.

To ascertain "physical qualifications" would mean learning whether the applicant had control of all his limbs or of sufficient of them to enable him to operate a vehicle safely.

Under the heading "moral qualifications" we would determine whether the applicant is a habitual drunkard, a drug addict, or has some other vice which will numb his sensibilities and make him unfit to be allowed control of an automobile.

The question of "age" is a mooted one. There are no figures, based upon experience, by which we can determine at what age a person is best qualified to drive an automobile. There are many in their 'teens who can and do drive better than those of mature age, and vice versa. The consensus of opinion seems to be, however, that no license should be issued to those under 16 or 18 years of age.

Coupled with the foregoing, and particularly with the mechanical ability and mental, moral and physical qualifications, enters the additional test of the applicant's reactionary ability.

There are those who advocate a psychological examination, having principally in mind the fact that, while a person may be of apparent sound mentality and perfect physically, there may be lacking that inherent something which enables some of us to react immediately to a certain situation, while others cannot. This is one of the particular questions to be considered in a discussion of this subject. Just how it is possible to determine and weed out those whose reactionary instincts are such that they do not and can not act immediately in a case where split-second judgment is demanded, it is hard to say, and, perhaps, it is impossible, but in any case, whatever mode of examination is adopted it should be such as to indicate those best fitted, as an average, to drive under conditions as we have them at present.

Two Operators Use Every Automobile in the Country

There are today undoubtedly two operators for every licensed automobile in the country. This means there are some 40 millions driving automobiles. To examine and license these, even taking into consideration the large number of licensed operators in those states having license laws, is a colossal undertaking. The time which would be consumed must be considered. At best we can probably only hope to issue licenses to all those now operating automobiles without examinations, and trust to the powers of suspension and revocation to weed out those who should not have been licensed in the first place.

The expense in connection with such examinations and licenses is a controlling factor in winning or losing public approval. At the present time the rates charged vary from no fee and 50 cents for duplicate licenses in the state of California, to \$1 or a perpetual license in Oregon, and \$3 annually or a license and \$2 for each examination in the state

of Connecticut. West Virginia issued a license good until revoked for a fee of \$1. It has always been the contention of those most interested in this question that the motorist is now paying sufficient for the privilege of operating an automobile, and should not be taxed more than will cover the expenses involved in issuing the license. This plan has not been favorably looked upon by the state authorities. At any rate the lower these fees can be kept, the sooner the public may be won over to favor such laws.

In the enforcement of these laws lies the ability to restrict operating privileges only to those who should be so privileged. In the case of those proven careless, reckless or heedless of the responsibility of the task and unimpressed with the duty which rests upon their conduct, the state, through the proper authorities, should be empowered to suspend licenses, as a warning, and in the case of repeated misconduct, to revoke their licenses altogether. This phase of the subject has met with, and will always meet with, strong opposition because there are always individuals who insist upon doing as they please regardless of the other fellow's rights or privileges.

The Wolves in Sheep's Clothing Among Drivers

If a driver's license and examination law is to be worthy of the name of a "safety measure," enacted to protect pedestrians from automobilist, and automobilist from pedestrian, other automobilists and himself, there must be some method by which those "sheep in wolves' clothing" may be culled from the operators' fold.

There should be the power of suspension placed in the hands of competent authorities to punish those, otherwise capable, who carelessly commit minor violations of the law. In most instances a warning is sufficient for this class and for those who will not heed a warning the power of suspension is effective. After a suspension the license may be returned to the driver and he may be given another chance to prove himself worthy of having the same.

Statistics showing the number of suspensions and revocations during the year 1925 in those states having operators' license and examination laws are interesting, even astonishing, in that the numbers are so large.

Connecticut shows a total of 8,434; New York, 10,899; Pennsylvania, 2,571; Michigan, 1,819; Massachusetts, 16,249; and New Jersey and California, 2,886 and 444, respectively. California authorities state most violations of its laws takes place in cities where the civil authorities impose fines instead of revoking licenses.

Figures for the first six months of this year for these same states show a marked increase in the number of both suspensions and revocations.

An analysis of the reasons for these suspensions and revocations reveals that at least 75 per cent of them occurred for the four following reasons:

1. Driving while intoxicated.
2. Reckless driving.
3. Leaving scene of accident without revealing identity.
4. Speeding.

If this condition now prevails in those states where drivers are first selected and where the shadow of suspension and revocation always hovers over their heads, it must be more serious in the states having no such laws.

The thought is surely not consoling to those of us who take this matter seriously and are willing to forego a minimum of convenience to attain a maximum of safety, but it should prove conducive in bringing about, in so far as is humanly possible, the removal from our highways of the driver who now flagrantly violates not only our laws but the rules of common courtesy and decency as well.

Tests of Drivers Determine Liability to Accident

CHAIRMAN SMITH: We have in Mr. Fenner's paper specific evidence of the variety of laws which we have in the various states. I will now turn the meeting over for discussion. Has anyone anything to add?

E. C. HAZELTON (Federal Mutual Liability Insurance Co., Boston): I want to ask if you have had any experience with psychological tests on operators which might be helpful to the rest of us?

CHAIRMAN SMITH: Dr. Cattell, that is perhaps a question you can answer. The speaker wants to know whether you have used any psychological tests for the issuance of drivers' licenses.

DR. CATTELL: In the taxicab companies in Chicago, those who pass the tests are three times less liable to accident than those who do not. We hope to carry on the experiments, of course, and ultimately be able to make a really valid examination. At present it is only a statistical possibility.

MR. HAZELTON: If you develop it to the point where it is practical, what is the nature of the test?

DR. CATTELL: In our report to the Hoover Conference we recommended that we thought it was pretty difficult to test everybody for a license, but we thought that professional drivers, drivers of buses, public service drivers, etc., should be tested. We also thought those involved in accidents should be tested and that those who had special disabilities, such as the loss of an arm or a leg should have tests. We took these three groups and tested them. That was as much as we could possibly do at the time.

CHAIRMAN SMITH: I might say further that a number of taxicab companies in the United States have made some rather exhaustive tests with their own drivers which might in some respect go into the realm of psychology. Also Professor Moss of Washington has made some such tests.

DR. CATTELL: Also in Philadelphia and Pittsburgh.

C. E. ROBB (National Safety Council): I should like to call attention to the splendid record made in Massachusetts and Connecticut over the past four or five years. I know more about their records than some of the other states where there are license laws. Their death rate in the past year, 1926, as compared with the same months of 1925, has shown an actual reduction in the number of deaths. We attribute that largely to the efficient administration of the motor vehicle laws of those states.

CHAIRMAN SMITH: I have heard it said that one reason for our difficulty in controlling accidents is that with the great extension of credit facilities in this country it has enabled many people to drive automobiles who under ordinary circumstances might not be able to acquire one for some considerable period of time. I refer more especially to the foreigners who come to this country, who speak English very slightly, and who upon an investment of as low as \$25 can secure an automobile and start driving. I think perhaps that might interest you and be worthy of some discussion.

Also, on the question of whether drivers' licenses should be taken away, it has been said that in the case of speeding, in order to secure convictions, they would have to have specific speed limits and then arrest a man for exceeding those speed limits. A superintendent of police of New York state told me a year or two ago that his motor police did not have speedometers. What they arrested a man for was reckless driving. He said that his officers might not touch a man who went 40 or 45 miles an hour in the open country, while on the other hand several minutes later the police would pick up that man for driving 25 miles an hour past a schoolhouse at recess time. Perhaps some of you may want to discuss that side of the situation.

Peculiarities of South American Traffic

MR. FENNER: Since Mr. Smith has mentioned my trip to South America, I might make a few statements in that regard. I might explain that this was a trip of delegates to the first Pan-American Highway Congress in the Argentine. We started early in order that we might gain a little knowledge of some of the countries on the way to the Conference, so instead of going direct to Buenos Aires, we went down the west coast of South America. Actually, our first stop was in the Canal Zone and in the City of Panama, in the Republic of Panama. There we found a national law that vehicles must pass to the right. But as a matter of fact, there are so many vehicles, especially taxicabs and buses upon the streets of Panama that are driven by men who come over from Kingston, in the island of Jamaica, where the English pass to the left, that in Panama they actually pass to the left, although the law says they must pass to the right.

In Peru vehicles pass to the right. In Chile they pass to the left. In Argentine they also pass to the left. In Brazil they pass to the right. So we were very glad to drive as much as possible in hired cars with

native drivers and not try to figure out the regulations for ourselves. There seemed to be absolutely no limitations as to speed. Everyone drove as fast as he could, and drove to beat the other fellow at the intersection.

A peculiar thing I might mention is that in the cities many of the streets are paved with sheet asphalt. Much of this was laid at the height of the summer season, when the temperature runs very high. Cars passed over this soft green asphalt with tire chains on and left an imprint of the chain on the pavement, so that the authorities immediately secured ordinances in the cities prohibiting the use of tire chains. Most of the automobile drivers were hired chauffeurs. It is beneath the dignity of the average South American to drive his own machine. He doesn't get a car unless he can get a man to drive it for him. Since they couldn't use chains in the city, they argued what was the use of having them at all? Perhaps they could use them in the country but they would have to take them off when they got to the city limits, so they might as well not have them. So it got to the point where chains were rarely used. We happened to be down there in the rainy season, and half a dozen times we were stalled because there wasn't a single machine in the whole country that had a chain that would enable us to get up the hill.

How Will the Criminal Driver Be Prohibited From Driving?

MR. HAZELTON: I should like to ask if there has been any attempt in the other states, such as we have tried in Massachusetts, to ascertain how many unlicensed operators there are on the road. Mr. Goodwin, our registrar, estimates there are 25,000 such operators in Massachusetts. On two occasions, I believe, during the past year he has endeavored to line up every man who is driving a car simultaneously on one given day, with the assistance of the local police. Is that true in other states, and what measures have been taken to combat that situation?

MR. MITTENDORF: I want to ask one question that might probably be considered foolish or carrying this discussion to a point where it is unnecessary. But Mr. Fenner's paper has interested me. In framing a law which has as its outcome the revocation of licenses, I should like to know just how the framers of that law figure they will actually prohibit the driver of a car whose license has been revoked from driving? In other words, I have in mind the criminal driver; I have in mind the undesirable citizen. I have in mind the reckless driver, the drunken driver, the bootlegger, the law violator. Is the revocation of a license going to prohibit them from driving?

In brief, we have evidences today of people jumping into cars and running away with them—boy joyriders and all that sort of thing. They have no license to drive. How are we actually going to prohibit the criminal and the undesirable citizen from driving by simply revoking his license? If he is a law violator he is not going to hesitate on that account one moment.

CHAIRMAN SMITH: That is perfectly true. If the license is revoked in Cincinnati the culprit may try to take out a license under a different law or go across into Kentucky. So far as I know, it is purely a question of police follow-up and the infliction of an unusually severe penalty if the man is ever caught driving again. We know that of necessity there must be a thousand cases of licenses revoked in which the operators were caught driving again. I think possibly the representatives from New York state have had some experience on that. I am going to ask how they handle the situation there.

MR. POWELL: Of course, we come in contact with that every little while. When we catch anyone who violates that regulation, he gets a pretty severe penalty in consequence. In other words, we put him in jail.

The Attitude of the Farmer Toward the License

CHAIRMAN SMITH: I am interested in knowing whether any severe penalty is made if a man gives a false name originally when he takes out his license.

MR. POWELL: That is included as a misdemeanor.

CHAIRMAN SMITH: I can see where a culprit might go to different parts of New York state and take out a driver's license under four or five different names. It would seem to me that that is not an impossible situation at all. He could be like a cat with nine lives. He could lose several licenses and keep on driving. Again, I think it is a matter of police control.

MR. MITTENDORF: In Ohio he is subject to perjury. When he takes out his license he swears that he has given his proper name and residence and that all the facts he has given are true. If he is caught at this game he can be brought up for perjury.

CHAIRMAN SMITH: We will now proceed to the last part of the set program. The next paper is going to be upon the attitude of the farmer with respect to a farmers' license, which has been of considerable interest to the governing bodies and the Hoover Conference. In the eastern states, where there are many thousands in the congested district, the farmer's voice has not been quite so prominent as in the middle west and far west where the states are largely made up of farming communities. I know that some of our own clubs have reported in the middle west that it would be impossible to get a drivers' license law through because of the opposition of the farmers. Yet we know in the last two or three years that the feeling the farmers have against a drivers' license law seems to be abating. I feel safe in saying that farmers seem to be coming to an appreciation of the fact that a drivers' law is needed. I am not trying to seek a support for an argument of my own, but am giving facts as reported to us around the country. However, the matter of the farmers' viewpoint is naturally of great importance in a gathering of this kind.

When we decided to have a speaker on this subject, we asked for the next speaker, Mr. L. B. Palmer, president of the Ohio Farm Bureau Federation. I now take pleasure in presenting Mr. Palmer.

THE FARMERS' VIEWPOINT

L. B. Palmer, President, The Ohio Farm Bureau Federation, Columbus, O.

I realize fully the importance of the subject under discussion. All of us are so constituted that we think just a little bit more seriously about problems which deal directly with the saving of human life than we do about those which at times seem important but in which no actual saving of life or prevention of permanently crippling accidents is at stake.

At the same time, it is important that we do not allow sentiment to call us too far from the practical application of any suggestions we may make for the prevention of accidents through regulation of motor traffic or examination and selection of those who place themselves in its stream.

I well realize the almost impossible task placed upon me of giving you the farmers' viewpoint. Most of you are well acquainted with the fact that farmers as a group are not as well organized as other groups here represented. We have not had the opportunity of getting the expression from as many states as we desired.

It is to be regretted that the agricultural population has tended to remain, economically, socially and politically, a group apart and relatively unorganized in both its thought and active role in national life. Through the Farm Bureau units, township, county, state and national, we are endeavoring to unite the leaders in all lines of agricultural pursuits in one large organization through which we can get sentiment expressed and can better cooperate with other groups in the formation of legislation and other policies essential to progress and development of our national life.

Right here I would like to say that I have behind me no official action of the organization with which I am identified to support the things I have to say. While automobile traffic, road building and allied subjects have formed an important part of the discussion at many of our meetings, the particular subject assigned to me has never been discussed nor acted upon formally.

The opinions I am giving this afternoon have been secured largely through correspondence and contact. I am aided in this by having talked during the past month with a representative group of mid-western farm leaders at Chicago. This, with the special effort I have made to get in touch with farm leaders on this subject by mail, forms the basis of the ideas I am bringing to you.

May I first call your attention to the fact that the rapid industrial and commercial development of the United States during the past quarter of a century has tended to obscure somewhat the changes in the position of American agriculture, to divert public attention from its problems and to make their importance less clearly and generally understood?

I am glad today for this opportunity to represent agriculture. It has many times truly been called our basic industry. On the purchasing power of its products and the relation of its land values to values in other lines depends much of our national prosperity. Agriculture normally exerts a purchasing power of two billion dollars worth of goods and services annually. It purchases each year about one-tenth of the value of the products of our manufacturing industries. It supplies materials upon which depend industries giving employment to half our industrial workers. It pays indirectly about two and one-half billion dollars in wages to urban workers.

Agriculture supplies about one-eighth of the total tonnage of freight carried by our railroads with its products and much more in supplies carried out to its farming units. Its products constitute nearly half the value of our exports. It pays in taxes one-fifth of the total cost of Government. The capital invested in it in 1919 more than equaled that invested in our manufacturing industries, mines and railroads combined. It represents about one-fifth of our national wealth and normally contributes about one-sixth of the national income.

Thirty Per Cent of Total Population is Rural

The farm population forms about 30 per cent of our total population and constitutes a reservoir from which must be drawn a large part of our future citizenship. The standards of living and social welfare of this group can not but have an important effect upon the national quality of our people. The population of our cities is renewed every fourth generation from the farms of America.

I am just calling to your attention a few of these important facts in leading up to why the farmers' viewpoint is essential in considering the adoption of any license law. It will be more greatly affected than other groups since the percentage increase in transportation during the past two years has been greater in rural sections than it has been in cities. This is due largely to the fact that we are spending billions of dollars in the improvement of our main highways.

With the improvement of these trunk lines in our highway system new forms of transportation, such as busses and trucks, as well as the increased uses of privately owned automobiles, is greater in the rural sections than anywhere else.

Probably the most detailed and complete traffic survey ever made was recently completed in Ohio. It showed that only 12 per cent of the traffic on our state highway system was contributed by farmers. In any direct state tax levy those farmers would pay 28 per cent of the costs, and during the past we have paid nearly 60 per cent of the cost of building that system. So, in Ohio at least, you city automobile owners owe quite a bit to the farmers.

This bears out the point that while the large portion of the traffic comes from cities, the rural population is continuously endangered, not so much by its own traffic as by that of the traffic which comes from

cities. This traffic problem then is one in which our rural people are vitally interested.

Statistics show that on December 31, 1925, there were in the United States, 4,332,482 farm owned motors as compared with a total of 19,954,347. This includes trucks and pleasure vehicles. While this shows one-fifth owned in rural sections, the mileage traveled by these is not as great as that traveled by the other four-fifths.

The compulsory licensing of all members of the farmer's family who are eligible to drive would meet with objection on the part of our rural folks. I have asked the leaders in different states for an expression as to what they felt the viewpoint of the rural population would be as to the application of compulsory licensing of all drivers. While I have not heard from all states everyone that has replied has expressed this same viewpoint. At the same time all of these leaders have expressed themselves as desirous of cooperating in whatever traffic regulations and policies could be enacted to assure safety on our highways.

Many have said that compulsory insurance, which would carry proper liability, would be more preferable than compulsory licensing of drivers. This, they believe, would provide protection and financial assistance in case of accident, and if no one was allowed to drive on our highways except those who could obtain liability insurance, that would tend to relieve the danger of those who would not be permitted under a license law to obtain licenses.

More Children Are Driving Cars in the Country

It is true in rural sections that more children are drivers of automobiles than in the city, because they are active participants in farm operations at a younger age than the average child in the city. In driving cream trucks and delivery of produce to nearby towns, as well as in transporting themselves over rural roads to schools, it would be a decided disadvantage to eliminate children between the ages of 16 and 18, as is proposed in some license bills.

One survey of motor accidents showed the rate per thousand vehicles to be 2.06, due to faulty operation by driver. Of this percentage 1.43 was due to recklessness and carelessness, which would be controlled by licensing only to a very small degree. Only one one-hundredth of this 2.06 rate per thousand vehicles was due to children drivers.

Our rural folks also feel it essential to maintain a strong highway police system for patrol on roads. Several states already have such systems. Improvement of highways has thrown open the farming country not only to the professional criminal but to the property damaging trespasser.

But from the angle of public safety on the road our rural folks feel that a system of rural police furnishing proper patrol of the roads will add much to the safety of all drivers. Unless proper provisions are made for enforcement it would be of no advantage to have the drivers' license law, and farm folks put this need for policing ahead of that for licensing.

More could be done for the protection of automobile drivers and for public safety in general by enforcing present rules of the road than by adding another law without provision for enforcing it.

We are very much interested in the formation of our State Safety Councils, and feel that through this agency and with the cooperation of all groups, we will be able to work out satisfactory laws to safeguard the public. There are two purposes raised in the licensing program. One is for the purpose of regulation in the interest of public welfare, and courts have held quite generally that Legislatures have the right to impose reasonable restrictions upon those following out occupations or performing certain acts such as the driving of a vehicle upon public thoroughfares. This may be done as a safety measure. The other purpose is to raise revenue, and I feel that our rural folks would be opposed to this as a revenue raising measure. Of course, we recognize that in the administration of this department a certain fund must be provided to which no one would object if the overhead of the organization would not be too great.

Points of View as Gathered in Several Localities

In a reply from a president of one of the states, he reports the sentiment of the farmer representatives at a meeting held to discuss the question of the drivers' license law, that it seemed to be the general opinion that we should have a drivers' license law of some sort, but that it should provide for a nominal fee, if any, and that there should be no examination requirements for the issuance of the license. The main object of the drivers' license law would be to give police officials power to revoke the license of anyone who is extremely careless or in the habit of driving while intoxicated or otherwise incapacitated as a driver. He further stated that it was his opinion that the farmers would stand for a license law along those lines, and it will probably call for some stringent regulations in regard to railroad crossing signals, as it seems a large percentage of accidents occur at railroad crossings.

We received information from another state to the effect that they would oppose the licensing of drivers because many would contend that licensing of drivers would not make a poor driver a good one, nor an intoxicated driver sober. He emphasized the need for restricting the privilege of driving to exclude those who had physical or mental defects, and also the need of eliminating grade crossings and passing stringent laws which would protect folks from many accidents now occurring. He also expressed himself as feeling that a better system should be adopted before any of these measures could be properly enforced.

Another state representative makes this statement: "Whether the licensing of drivers has proven to be practical and helpful, I am not able to say. If, however, experience has demonstrated this to be a successful device I shall of course urge that this be favored. In short, I will say that whatever is practical in the increasing of safety on our public thoroughfares should be favored. I realize that there is some objection to

the licensing of drivers on the score of difficulty and experience of administration."

From another state this reply came: "I think we should be very careful in giving approval to licensing of auto drivers which would require each member of the farmer's family to take out a license. I think all reasonable precaution should be taken to safeguard the interests of the public, but it should not be a system that would work an undue hardship on the very class of people who are the most careful and considerate of drivers."

Farmers Usually Support the Public Interest

CHAIRMAN SMITH: I think we will all agree we have had a very frank expression of the farmers' viewpoint with respect to these various matters.

One of the things that has attracted my attention during the years I have been interested in automobile work is the fact that in the final analysis the farmers have nearly always voted upon motor vehicle matters in the way that is most to the public interest. You will recall many, many years ago the farmers were generally considered and actually were against good roads. They had the feeling that they were being taxed to permit the city people to speed past their territory. I don't suppose there is any part of the country now where you will find a very pronounced opposition from the average American farmer against good roads. There are instances in the far west in which there is opposition against good roads. It has come in some instances from sectional railroad interests. It has come in others, such as Montana, from the sheep and cattle men, so it is reported, who feel that tourists and road travelers are not wanted in that part of the country because they will interfere with the great domain over which they rule with their stocks.

Many years ago those same people went up against the movement of the American public to such an extent that they had to give up their great ranges and the land suitable only for grazing and divide it up into farms, upon which now live hundreds of thousands of contented people. I believe the opposition which the farmer has had to the drivers' license is gradually being stamped out, because the farmer is being educated, or, rather, he is educating himself to the necessity for certain safety measures. It seems to me from our experience that he is coming more to an acceptance of some measure of caution in the issuing of licenses generally.

Mr. Palmer, if I heard him right, came out in favor of compulsory insurance—which is another very interesting viewpoint to be presented. I should like to throw the meeting open for discussion. Has anyone anything to say?

HOWARD BROWN (Detroit): Mr. Palmer made some comment on connecting up the amount of compulsory insurance with an operators' license law. There has been a great deal of comment on this compulsory liabil-

ity, and I believe one state has enacted such a law, to go into effect January 1.

I think there is a great deal of bunk being spread around about compulsory liability insurance. I happen to represent an automobile insurance company, and we have found out that the man having such coverage isn't likely to be so careful as to whether or not he might bump another machine. He becomes a little irritated. He knows he is not going to pay the bill, and he may be a little more careless than he would otherwise be. If he doesn't endanger his life, he is taking the chance.

It depends upon what we want to accomplish by compulsory insurance. If we want to protect the public and make the public more safe and reduce the great accident toll that everybody is talking about, due to automobiles, then we have to take such measures as will tend to reduce the accident hazard. In other words, is our problem one of protecting the public or is it one of compensating the injured party? If we take the attitude of compensating the injured party, then we have to abide by all the rules of negligence as they may go into effect in the various states.

Contributory Negligence on the Part of Both Parties

My experience has been that in a great many cases with pedestrians and also the occupants of either car being injured, that there is contributory negligence or neglect on the part of both parties. Following that out logically, neither party can recover. Now, if we want to compensate the injured party, is it not the logical thing to carry an accident policy?

I carry an accident policy, also a liability policy, on my car. We have found out that in the state of Michigan every man, woman, and child could carry an accident policy for approximately \$1 a year or a little more. It would amount to about \$4,000,000 for the accident insurance companies. If you are going to compel every automobile driver to carry liability insurance, it will cost approximately \$20,000,000. We figured that out on the basis of the cars that are insured.

In other words, if a man has an accident and carries an accident policy, there is no question of negligence. It is a contract between him and the insurance company. If he is killed, the maximum amount of coverage is paid to his beneficiary. So I think that we are confusing the issue when we talk about compulsory liability insurance. We are not going to protect the public any more than we do now. If we want to compensate the public for injuries received, then let's attack the question on the other hand and require every man, woman, and child in the state to carry an accident policy. To my way of thinking it is a blame sight more logical if that is what we want to do.

MR. PALMER: In presenting that as I did, I tried to make clear the viewpoint of a lot of people, bringing out the need the way some people look at it. I would not for a moment want to be quoted as saying that compulsory insurance would take the place of licensing. I think that we ought to get back to the idea and arrive at an understanding of what

those things mean. The president of the automobile insurance company knows something of the record brought out. In connection with those who have made offenses in licensing, if the insurance companies would be more careful to whom they give insurance, I think there would be fewer accidents committed.

CHAIRMAN SMITH: Do insurance companies get reports from the state departments showing whose licenses have been taken away and showing those who have had accidents?

MR. PALMER: To a certain extent, yes. Do you think it has been the practice of insurance companies to refuse to renew policies to the average person who has had an accident?

MR. BROWN: Not in the past.

CHAIRMAN SMITH: The impression I had was that too many insurance companies will issue the policies anyway. I remember a safety man who was president of the Safety Council in his town and was also the general counsel of one of the large railroads in our region, who became exceedingly exorcised when he met an insurance friend and asked him to join in the movement, and the friend did not appear to be particularly interested. When the gentleman in question taxed him on his reluctance to join, the other responded, "It's a darn good thing we pay an accident policy once in awhile. It helps build our business."

A Misunderstanding of Compulsory Insurance

MR. PALMER: I should like to say that in a meeting in Chicago last week representatives of the midwestern states were discussing this question. I want to give their expression to you, and I want to say that the officials from Michigan, in which state you are having the license law, spoke favorably for it. The expression came from those other officials and some of those which I quoted saying that they wanted to give that as an expression, that they wanted to get in on the program in an educational, constructive way and to carry it back to the membership, that is, to bring out the thing that needs to be emphasized.

CHAIRMAN SMITH: Would you agree that it is vitally important to present to the farmers both sides of the compulsory insurance matter? Don't you think there has been some misunderstanding as to what is to be accomplished by a compulsory insurance provision?

MR. PALMER: I think there is a complete lack of understanding.

CHAIRMAN SMITH: For instance, I believe there is a failure to understand the difference between compensation and liability insurance. As Mr. Brown said, you can provide your own insurance accident policy for approximately \$1, but an accident policy against the other man will cost approximately \$20.

MR. BROWN: Mr. Chairman, I think that would be determined considerably according to what territory you live in.

MR. FENNER: Have you seen the schedule of rates to be enacted in Massachusetts on the first of January?

CHAIRMAN SMITH: Yes, that is one reason I live in the District of Columbia.

J. M. CLANCOY (St. Paul): I should like to ask if any of the states that have compulsory insurance as one of their features of a licensing law would give us some information on that?

CHAIRMAN SMITH: There is only one state in the country that has that provision, and that is Massachusetts. There it has not yet gone into effect.

MR. CLANCOY: I should like to ask if they have done anything regarding the fixing of the insurance rates?

CHAIRMAN SMITH: State insurance is not involved. My understanding is that the commissioners have power to reduce rates over the states, and have announced that the rates of the insurance companies will be approximately 16 per cent less than before. It remains to be seen whether a state insurance commissioner has that power.

MR. FENNER: That schedule is merely a guess and will be revised at the end of a year's experience.

Compensation Insurance Quite a Different Matter

MR. HAZELTON: I am from Massachusetts, and I am not here to defend the insurance law. In fact, I have some doubt as to the working out of the scheme. But in principle it seems to me it is something we have got to come to. It is on the same principle as the workmen's compensation act, that a man who is injured has the right and may fairly expect to be compensated by the man who causes his injury. The same doubts and very much the same arguments were used at the inception of the workmen's compensation act, and yet that act has spread until now I think it covers all but three or four states.

I think that the same thing is going to take place with regard to compulsory insurance. Our Massachusetts law is far from perfect. I haven't seen anybody who claims it is perfect. My particular company thinks so much of it that we are a little hesitant about accepting new business. We want to see how it works out. But I do believe that most of us feel we are working along the right line, that if I am a poor fellow walking along the road and am struck by an irresponsible driver I should certainly expect him to provide some property or some money with which to pay my doctor bill and hospital bills; just as if I am working in an industry and am injured, I may fairly expect my employer to compensate me. I should like Mr. Brown's opinion in that regard.

MR. BROWN: There isn't any comparison, because in the workmen's compensation act, I believe, in most states the matter is taken care of by the fact that the workman employed in a certain factory if injured is paid on a certain schedule of payments which the statute gives. For instance, so much is given for the loss of an arm, so much for the loss of a hand, and so much for the loss of an eye—according to the injury.

You have removed entirely the question of negligence. If you are going to create a state fund and have every injured party paid when he is

injured, then you are going to have an entirely different compulsory insurance law than is advocated at the present time. I have tried to follow this question as closely as possible to see if there has been such a law advocated any place. In other words, what you are going to do is to put the thing on an accident policy basis, the same as your accident policies are written. You are going to pay a man when he is injured. How he was injured or who was at fault is not a pertinent question. The mere fact he was injured and what was his injury are the issues at stake. But I do not think that the advocates of the compulsory insurance law are recommending any such measure as that.

MR. WHEELER: It seems to me as though we are getting away a little bit from the question. The drivers' license law, to my mind, is the one thing we are almost unanimously in favor of. If we tie up the drivers' license law with the compulsory insurance law, we are likely to lose both. Wouldn't it be sound sense to go straight ahead with the drivers' license law and then take a little more time and consideration on the other issue until Massachusetts really works it out?

CHAIRMAN SMITH: I think Mr. Wheeler's statements are really very pertinent. We are not here to discuss compulsory insurance. Your chairman brought that in himself and is somewhat responsible for it, because the matter is being discussed all over the country and I thought that no harm would be done in discussing it, particularly when Mr. Palmer brought it forward.

It shows that people are thinking of two things.

The Junior Patrol an Adjunct of the Police Department

Mr. Palmer also brought up another matter which you might say was not strictly on the program, and that was the matter of additional police protection. He pointed out the necessity for it. It immediately recalled to my mind the fact that in many parts of the country the police forces are being supplemented by school boy patrols. The National Safety Council in various parts of the country is setting up most valuable aids in this way. In that connection, I recall some figures which I got just yesterday in Detroit and which might interest you. The Detroit Automobile Club has many thousands of boys, I think approximately 20,000, in the schools who are protected by school boy patrol. Wherever that patrol has existed, there were only two children injured during the time that school boy patrol has been in effect.

You spoke particularly about the farm distribution and the highways outside of the cities. I understand that every country school has a junior state policeman on the buses where they are driving buses and collecting for schools and that those boys who are going to the schools will constitute the junior police force, ride these busses, and will not permit the bus to cross the railroad tracks without getting out and going ahead.

I also ascertained that in one Detroit school where one child was killed

and seven injured in three months' time, the school boy patrol was established and 15 boys were made that particular patrol. No accident ensued for 13 school months thereafter.

In Watervliet in southern Michigan I discovered two accidents occurred at one school. The ministers of the community asked that the school-boy patrol be instituted, and since March, 1925, which was the date of the inception there have been no accidents whatever in that school.

ADJOURNMENT.

Police and City Officials' Session

October 28, 1926

**MORGAN A. COLLINS, Chairman
Superintendent of Police, Chicago, Ill.**

The meeting of the Police and City Officials' Session of the Public Safety Section convened at 10:00 o'clock in the Large Banquet Hall, Statler Hotel, Detroit, Michigan, Mr. Morgan A. Collins, Superintendent of Police, Chicago, Illinois, presiding.

CHAIRMAN COLLINS: It is well that we understand just what is meant by the term Safety Council, or rather Community Safety Council. It is the getting together of the local civic organizations, public utilities, schools, trade organizations, and others interested in good government, that they may stand at the back of the constituted authorities. The Safety Council must be understood as an educational project in safety.

There is a growing interest in traffic accidents as a municipal and community problem, one that city officials and all good citizens must get together on. A meeting of this kind was held last year for the first time, with a large and representative attendance.

Accidents are so numerous, especially in highly congested sections, that next to the prevention of accidents and the means to prevent them comes the necessity of properly tabulating accidents when they occur.

In the City of Chicago, through the aid of the National Safety Council, we have recently adopted what we believe is the most complete form of tabulating accidents that has ever been gotten together anywhere in the United States. I don't know that Chicago was the first place to adopt this form, but I understand that many other communities have adopted it. We are able to show from day to day just how many accidents occurred, where they occurred, why they occurred; and from this analysis we are able to learn the things that we should know in order to adopt means to prevent accidents.

The part that the courts play in traffic violations is so important that unless they function 100 per cent, the other law-enforcing agencies, such as the police force, highway commissioners, etc., have their work nullified; and later on we will discuss in open meeting the relation of the courts to motor vehicle accidents.

In order that we have uniform ordinances in all of our cities which suffer from congestion of their thoroughfares, the Hoover Conference, a national organization called together at the instigation of the Secretary of Commerce, Herbert Hoover, turned out what is known as a model motor vehicle act, one that we are going to ask every state in the Union to adopt.

In Chicago the Association of Commerce spent \$50,000 in making a survey of our rules and traffic conditions, and that survey was based upon the recommendations of the Hoover Conference.

I understand that this model motor vehicle act is now ready, copies of it are now ready for distribution, and it is an excellent guide for us to follow in our efforts to make uniform city ordinances, in regulating the movement of vehicles on our city streets. We will also discuss speed limits and enforcement.

At the different gatherings that I have attended I have always introduced the subject that if we are to prevent accidents, we must curb speed. Experiments have shown that speed is the prime factor in at least three-fourths of all accidents. If the operator of the machine were able to control his vehicle when the occasion for the accident opens in front of him, there would be no accident. The motor vehicle operator is the first to discover that an accident is imminent. The momentum of his machine is so great he is unable to stop, and the result is that accidents happen, serious accidents happen.

We will do the best we can at this meeting to devise some way of controlling the speed of motor vehicles, especially in congested sections. That is, we will do the best we can in making recommendations and in adopting resolutions relative to that point.

We will hear first from Superintendent of Police William F. O'Neil of Providence, Rhode Island.

A PRACTICAL SYSTEM FOR REPORTING AND TABULATING ACCIDENTS

William F. O'Neil, Superintendent of Police, Providence, R. I.

We have listened to many an interesting and instructive talk on the relation of the police department to community safety councils. My remarks will point out perhaps a little more in detail one phase of cooperation between our organizations in Providence which has proved especially helpful to all concerned.

I like the phraseology of the subject assigned to me because I believe that the method which we now use is a practical one for any police department. In order that I may properly present the feeling of our department in regard to automobile accident statistics, I should like to sketch briefly the history of our experience, in hope that it may be helpful to those of you who have not as yet undertaken any standard method of classifying your traffic accidents.

One of the first steps taken by the Providence Safety Council, in the fall of 1923, was to extract periodically from our police blotters informa-

tion regarding automobile accidents. The amount of detail that was available on any one accident case varied decidedly with type of patrolman who made the original report. This meant that the facts which could be summarized from such a digest of our reports were extremely meagre. They did, however, serve to give us an idea of the size of our problem in the prevention of traffic accidents.

In the summer of 1925 our safety council officials called to our attention the standard reporting system advocated by the Statistics Committee of the National Safety Council. We believed, after study of the system, that it could be applied to our situation, and with the assistance of the safety council developed a report form for our local use which embodied all of the essential elements of the card suggested by the National Safety Council. Our reporting system was put into effect on September 1, 1925, and each month finds it working more smoothly and more effectively.

Statistics Are Useless Unless They Promote Action

And now that we have them, what do we do with them? Statistics whether they relate to accidents or what not are useless unless analyzed and action taken to correct the conditions found.

Each month the information from the several hundred reports received is summarized on the report form provided by the National Safety Council. The facts developed by these summaries form the background for the preventive work being carried on by both the Providence Safety Council and our own department. Knowledge of facts lends a business-like aspect to this work of accident prevention that commends it to the citizens of any locality. For example, we *know* that during the first nine months of 1926 we have had a 33.4 per cent reduction in the total number of accidents, a 20.3 per cent reduction in personal injuries and a 46.5 per cent reduction in fatal cases as compared with the same period last year. We do not have to *guess* at it.

As a basis for our constructive work we know that 68 per cent of all automobile injuries in Providence involve pedestrians—that 57.5 per cent of these pedestrian injuries are sustained by adults and that 67 per cent of all pedestrian injuries occur between intersections. I could cite you endless figures which would at once appeal to you as being necessary for a proper understanding of the public accident situation in which we are all so much interested.

So much for the general use of the statistics made possible through our reporting system. We have another specific use for these statistics which, to our minds, is as important as the general application I have just outlined to you. I refer to our spot maps.

I do not believe that there is anything which presents a more striking picture of the automobile accident problem than a well-prepared spot map. We have standardized on our spot maps after a series of experiments as to just what procedure would best suit our requirements. At the present time the following maps are prepared:

- 1st: A monthly map of the entire city showing—
 - A. The number of property damage accidents.
 - B. The number of personal injury accidents.
 - C. The number of fatal accidents.
- 2nd: An enlarged monthly map of the congested area showing the same information as the city map.
- 3rd: A yearly map of the city (size 4 by 5 feet) which shows the following:
 - A. Child pedestrians killed.
 - B. Adult pedestrians killed.
 - C. Riders killed.
 - D. Child pedestrians injured.
 - E. Adult pedestrians injured.
 - F. Riders injured.
 - G. Considerable property damage accidents.

We have studied the several requirements of a good spot map, such as type, the size and color of pin, etc., keeping in mind the difficulty in the photographing of spot maps for permanent records.

Making Good Use of the Spot Map

Now as to the use of these spot maps. Each month as the maps are prepared they are analyzed to determine the trend of our accident experience and to locate any sore spots which may be appearing in new locations. When we find that the accidents in any particular location are increasing, a study is made of the situation. We can readily tell from our permanent spot maps the number and type of accidents that have occurred at any particular location. If we want to supplement that information by further detail, for example to determine whether or not there is a similarity in the causes of accidents at any particular location, we have but to go back to the original records. In order that the records for any particular location be readily available we have adopted the system of filing these cases by arterial streets. For this purpose we have selected 38 streets which cover 90 percent of the important intersections in the city. The records are then filed by street number for these arteries, making reference almost instantaneous.

Let me cite you one specific instance which illustrates the purpose to which the spot maps may be put. When the spot map covering the experience for the year 1925 was completed the Traffic Committee of the Providence Safety Council found from study of it that accidents on our traffic arteries and in our outlying sections were increasing in the face of a splendid decrease in our congested area. After considerable study it was concluded that additional motor patrol was necessary on these arteries. Six weeks after the Traffic Committee recommended the change the men were on the job and the condition has been much improved. Without statistics and our spot maps with which to back up the request of the Board of Police Commissioners to our City Council, I doubt if the men would have been forthcoming—certainly the action would have been delayed.

I do not want you gentlemen to misunderstand me. The introduction of our present system was not without certain discouraging incidents; but in the months that have passed our card has graduated from the status of a bugbear to that of a piece of real equipment. At first, the policemen, with pudgy fingers, mostly thumbs, looked upon this accident card as "Another piece of imposition", another burden without apparent necessity for its existence.

You must bear in mind that our subordinates were men of varying educational capacities. Some had no schooling, some had primary school training, some had been through grammar grades and a few had been through high schools. They were not clerically inclined: that is one reason why they went into police service. We had men who were in service when there were no automobiles; a great many more entered police work when there were fewer than 15,000 cars registered in the state of Rhode Island. Our younger men have come into the department since the total in the state of Rhode Island has mounted to more than 100,000.

All this, in the smallest state in the Union, where your after-supper-ride may take you clear around the entire state. We have come to believe that 50,000 to 75,000 cars daily pass in and through the jurisdiction of our police department. This volume of machines, repeatedly nudging each other, has brought to the department a vast amount of clerical work, with which we have no adequate force of trained men to deal.

Our department records suffered continually. The information which our own city solicitors or our captains and lieutenants needed in the preparation of evidence seemed, repeatedly, to be sadly lacking. It brought embarrassment to us as much as to outsiders. Patrolmen, on the scenes of accidents, without knowing what to watch for, failed to observe crucial facts and, neglecting to record them, showed faulty memories on the witness stand.

Endorses Card Reporting System of the Council

We have found in our card just the thing we wanted. It showed the men on posts, the sergeants, and even lieutenants and captains a catalogue of things to be observed. Men with a stock of cards in their pockets came to learn that they were handy, even handier than note books. After they came to memorize the questions, which happened soon after they were "caught" without cards once or twice, they were inclined to look upon the procedure more favorably. It has given us a basis for instruction in our police school which has proved of incalculable value and we have applied the same principle to reports on stolen cars. Our men do not now say that they forgot to look for this or that. We have the information. It is fixed on the card and in the police witness' memory.

I can heartily endorse the accident reporting system advocated by the National Safety Council. I can go even farther; I can say that its instal-

lation in our department has reached the same heights of satisfaction that have all of our dealings with the Providence Safety Council, with whom we work in perfect harmony.

CHAIRMAN COLLINS: You have heard a splendid paper by Chief O'Neil of Providence on the tabulation of accidents. Its many good points should be well dwelled upon by delegates in attendance.

I would like to ask Mr. Robb to take one of the accident reporting cards and go over it, dwelling upon each question asked by the reporting card, what it means, and explaining how, after the information is compiled, it is tabulated in the general office and our report of the accidents made at the conclusion of each month.

Detailed Description of Accident Reporting Card

C. E. ROBB (National Safety Council, Chicago): The Standard Accident Report System is composed of three forms. First, the accident report card, which is filled out by the patrolman, either at the scene of the accident or immediately following the accident; second, the accident tally sheet upon which is tallied the information obtained by the patrolman on his report card; and third, a summary or monthly report form giving all the details of all accidents which have occurred during the month.

The Accident Report Card was designed to give all the important information concerning any accident in logical form with the minimum of writing required. Provisions have been made for reporting, by means of check marks, as much information as possible.

The accompanying illustrations (Figures I and II) show the front and reverse sides of the accident report card. The first two lines give the date and location of accident. The next section "Vehicle 1" gives essential information concerning the vehicle, owner and driver of car involved in the accident. Provisions are made to check mark the classification into which the accident falls as "Pedestrian," "Motor Vehicle with Motor Vehicle," "Motor Vehicle with Railroad Train," etc. The next section "Vehicle 2" provides for the information concerning Vehicle 2. In this section may be entered the information concerning the railroad train, street car, horse vehicle or whatever other vehicle was involved.

Spaces for names, addresses and other information concerning the injured persons and the witnesses are also provided on the front side of the card.

The reverse side of the card is given over exclusively to description of the accident. By selecting the proper items for check marking, the accident may be quite accurately described. However, in some cases it is necessary to supplement the check marks with further data. Additional lines have been provided for further details.

The arrangement of the items on the tally sheet (the large form) simplifies the combining of information obtained on the report cards.

FIGURE 1

Vehicular Accident Report		Date.....	At.....	At.....	A. M. P. M.
No.	Reg. No.	Owned by.....	At.....	At.....	
Vehicle 1	Driven by..... Operator's License No.....	Age..... Sex..... Experience.....	Direction Yrs. of Travel.....		
Did Accident Involve: Pedestrian..... ☐ Railroad Train..... ☐ Bicycle..... ☐ Other Vehicle..... ☐ Non-Collision..... ☐ (Check X which) Automobile..... ☐ Street Car..... ☐ HorseDwn.Veh..... ☐ Fired Object..... ☐ (Describe Under Rem.)					
IF ANOTHER VEHICLE WAS INVOLVED, GIVE FOLLOWING INFORMATION FOR VEHICLE 2:					
Vehicle 2	Driven by..... Operator's License No.....	Age..... Sex..... Experience.....	Direction Yrs. of Travel.....		
Names and Addresses of Persons Injured or Killed					
1.					
2.					
3.					
Injured Were Taken To.....					
Names and Addresses of Witnesses				Age	Phone No.
1.					
2.					
3.					

At the end of the month, the tally marks in each space are counted and placed in the corresponding space on the monthly report form.

It is intended that one copy of this monthly report form shall be sent to the National Safety Council for inclusion in their combined monthly report showing the experience of all cities reporting.

FIGURE II

WHAT WAS EACH DRIVER DOING? (Check items with X)	Vehicle 1	Vehicle 2	CONDITION OF VEHICLE	Vehicle 1	Vehicle 2	ROAD CONDITION	
1. Turning right			1. Defective brakes			1. Defect in roadway	
2. Turning left			2. Improper lights			2. Road under repair	
3. Going straight through			3. Defect steering mech.			3. Obstruction not lighted	
4. Slowing down or stopping			4. Other defects—describe				
5. Backing			WHAT WAS THE PEDESTRIAN DOING?				
6. Skidding			1. Cross at intersection with sig.			1. Dry	
7. Parked or standing still			2. Same—against signal			2. Wet	
1. Exceeding speed limit			3. Same—no signal			3. Muddy	
2. On wrong side of road			4. Same—diagonally			4. Snowy	
3. Did not have right of way			5. Crossing between intersect's			5. Icy	
4. Cutting in			6. Playing in street			WEATHER CONDITIONS	
5. Passing stand. street car			7. Riding or hitching on vehicle			1. Clear	
6. Passing on curve or hill			8. Waiting for or getting on or off street car at safety zone			2. Cloudy	
7. Passing on wrong side			9. Same—no safety zone			3. Fog or mist	
8. Failed to signal			10. Getting on or off other vehicle			4. Rain	
9. Improper turning			11. At work in roadway			5. Snow	
10. Thru street — failed to stop			12. Not in roadway			LIGHT CONDITIONS	
11. Disregarded officer or signal			13. Other actions—describe			1. Daylight	
12. Drove off roadway						2. Dusk	
13. Drove thru safety zone						3. Artificial light—good	
14. Double or prohibited parking						4. Artificial light—poor	
						5. Darkness	
1. Driver was intoxicated						RAILROAD CROSSINGS	
2. Had physical defect						1. Unguarded crossing	
						2. Watchman or gate	
						3. Automatic signal	
If arrest was made, state:							
			Name of person arrested		Charge	Disposition	

Describe Further

What Property Was Damaged

Estimate of Property Damage \$

Date of Report

Name of Officer

Rank and Shield No.

National Safety Council, 1927

Because of certain local conditions, ideas and wishes, certain changes have been made by some cities in drawing up forms for use of their local police departments; but the information on these cards is practically identical with this standard form.

The logical method of filing criminal records seems to be by serial

number. Finger prints, photographs, and other features of information concerning criminals may be most efficiently handled by serially filing. However, for best results accident reports must be studied to determine what conditions exist at particular locations that the appropriate remedies may be applied. In order to obtain quickly and easily the information concerning conditions at any particular location, it has been found that filing accident reports by location produces the best results.

Much of the success of the Grand Rapids and Providence Police Departments is due to their studies of accidents at particular locations. The best picture of the conditions existing at any location can be obtained from a study of the original reports of the accidents which have occurred there. Filing of the original reports by location makes such studies possible.

Getting as Complete a Picture as Possible

CHAIRMAN COLLINS: In compiling this information we had in mind getting as complete a picture of what happened when the accident occurred as is humanly possible to get. In many instances these reports point out exactly who is to blame and give the law-enforcing authorities an opportunity to correct the things that bring about accidents of that kind.

ALEXANDER K. GAGE (Assistant Prosecuting Attorney, Detroit, Mich.): Mr. Chairman, I would like to ask two questions: first, whether every patrolman, every man on duty on the streets, is given a package of these cards; and, second, what instructions are given to him in the use of those cards in case an accident occurs?

WM. H. KILLEEN (Captain of Police, Chicago, Ill.): The officers in Chicago are furnished with loose-leaf books. These take care of any sort of reports the men are required to write. In the accident form of the loose-leaf book we have the same information we use on our accident form that comes from the district headquarters. All the classifications are there. The officer turns his form over and makes his check mark. On the front of the book there is a sheet of instructions explaining to him the use of every form on that book.

If an officer appears on the scene of an accident, all he has to do is fill in the same form as this form here, only in smaller size, turning the page over and making his check marks under the classification. He turns that in to the desk lieutenant, who from that information makes out this form in triplicate.

The original and duplicate come to my office and the triplicate copy is kept by the district station for their records. When we get it we can tabulate it in the card system and run it through the tabulating machines and make our own analysis.

From our analysis we make these charts and graphs and it gives a picture of what transpires during a certain period. The ordinary report has a lot of figures and is dry reading, so we put our analysis in the chart form, by monthly periods, three and six-month periods.

CHAIRMAN COLLINS: As the Captain explained, on the inside cover of

the loose-leaf volume are printed full instructions relative to every form in that binder. That binder contains arrest notifications, accident reports, and other violation reports. We have five reports in that loose-leaf volume. That serves the purpose of getting them all in the one book so the officer has only that one book to carry and can report any of five different things; in fact, everything he comes in contact with during the day can be reported from that loose-leaf volume.

The Private Citizen Might Help a Great Deal

MR. GAGE: I take it from that there is no specific instruction from the officers in reference to his duty in case of accident other than the instructions given in the book. No training is accorded the average patrolman, for instance, in connection with this information?

CHAIRMAN COLLINS: Of course, this training occurs from day to day.

MR. GAGE: It seems to me a great deal of the difficulty we encounter in the matter of law-enforcing comes from the fact of inadequacy of the initial investigation. It is the patrolman on the beat, and the man in the street, who fail to give us the information that makes it possible to carry through the proper enforcement of the law, and which these cards represent to the patrolman and the man on the street.

If every citizen carried a pack of cards in his pocket and felt the duty resting upon him to give this information, we would soon have the information we want; but without that information, the enforcement officers really are at a loss for the necessary evidence.

CHAIRMAN COLLINS: I clearly understand you now. Of course, when an accident occurs there is no previous announcement, and they just happen. Then, of course, everyone who witnessed the accident or who is around the locality in which the accident occurs is interested and will give as best he can his version.

Now then, in order that no detail be overlooked, we have compiled these cards that embrace every conceivable question that can be asked of the person from whom we seek information. You must bear in mind that the police officer seldom witnesses the accident. He comes upon the scene after the accident has happened, and the picture he draws on this card is the picture from the person who witnessed it.

It is true that we don't get as useful information as we should, but we never will be able to do that, because if we knew an accident was going to happen, it wouldn't happen.

MR. GAGE: May I ask the Commissioner of Rhode Island to answer my question, as to whether or not each man carries cards?

MR. O'NEIL: I will say that every patrolman has what we call his own memorandum, and in that memorandum book he has one of these cards, and when he comes upon an accident, he checks up from the people around him on this card, and he also makes out a report that comes to headquarters. They also put it upon what we call a record-book in the station. He takes this card and makes out his report, a regular report, and turns it in to his superior, which is checked up by the clerk in the station

from his original card. There are three cards, one retained in the precinct where the accident happened, one on file in headquarters, and another sent to the Providence Safety Council.

H. P. COFFIN (Safety Council, Portland, Oregon): In addition to these reports we have a blank form of street intersection attached to the report, so the investigator or the policeman that arrives on the scene can fill out at that intersection just how that accident occurred, the position of the car, machine or street car, and the distance from the point of contact. We find in studying the problem that that is of great assistance to us, so we have a double form instead of a single form.

T. B. WILLIAMS (New York): Having just come from the direction of an extensive traffic survey in Providence, the information the Chief has given is of particular interest to me. One of the things was the fact that it was used in the study of traffic systems which lead finally to the recommendation of a \$40,000,000 program.

These charts were analyzed by sections. You see what the cause of the accident was, why sustained, whether there was too much traffic, whether it was a case of intersection being blinded or whatever the cause. The basis thereby laid was used as a design for devising the system.

Suggestions in the Training of Police Officials

I would like to submit two suggestions in reference to such maps as that and the training of the police officials in making observations. Most communities which have had some experience start on a given date, wipe off all the lines, and build up from month to month thereafter. It makes a complete study from the time things are entirely wiped off throughout the year. The suggestion is that only those things be removed which correspond with the date and periods. For example, if you are tabulating day by day, if you find an accident on the 17th of October, remove those of last year according to your records of the previous 17th of October. If you are tabulating the whole month of October, remove those of the previous October and you will have a complete record of all accidents for 12 months.

Having been called in on several occasions to analyze photographs of accidents, it occurred to me that the training given in the police schools should be carried out in a movie, or large photographs of an accident should be shown. Certain individuals would be trained to answer questions, representing the driver, the person who is involved in an accident, and each member of the school actually would make an examination of the picture and question these witnesses.

MR. GAGE: At the end of last year I had some experience with the Police Department in the city of New York. We didn't use the same type of cards as distributed here, although we did have a card of similar characteristics, but not containing so much detailed information.

We issued a general notice to all precincts, outlining some 15 or 20 specific accident headings that had been developed through our analysis

of accident records for the previous year, and patrolmen were instructed specifically to see that every accident they investigated included in the report full information as to whether any of these specific causes contributed to this particular accident.

We then felt that, although these men under Police Department regulations would receive these instructions and do the best they could to compile them, yet they would perhaps be more efficient in making out the reports if they would be better sold on the idea that was back of getting the information, and if we would call them together and explain more in detail.

Education of the Police Officer in New York

So the Police Commissioner of New York arranged for a number of large mass meetings, where they were called together in groups of 800 or 900. At these meetings I was present and explained in detail that the reason back of the idea of obtaining all this detailed information was to conduct a campaign of safety investigation along scientific lines, in order that we might acquaint the children from the school and drivers of automobiles and pedestrians as to the things they were doing to contribute to accidents. I think that educated the patrolmen in getting this detailed information, because we found that immediately accident reports began to come in in a much more intelligent way than before.

Now on the question of spot maps, we found it very advantageous to draw red boundary lines on the maps that would indicate the boundaries of the school districts, and from these maps the monthly report was sent to the principal of each school, showing the number of accidents actually occurring within the school district month by month, and frequent delegations were sent to the police headquarters from various schools to study these spot maps, and we got a great deal of valuable assistance from the school and a great deal of benefit by indicating the location by school districts.

CHAIRMAN COLLINS: The principal information that the gentleman from Detroit was seeking was what information or what instruction we gave to the members of the police department in relation to the collection of this information.

I must explain that police officers in Chicago are given a 30-day intensive, instructive course in the things that they should know when they are to become regular police patrolmen. They are taught the laws and ordinances coming within police jurisdiction, the rules and regulations of the police department, and laws and ordinances relative to traffic. They are taught military maneuvers; they are taught how to handle their revolvers; they are given instruction in honesty, sobriety and obedience, and that they are to apply themselves strictly to their business.

Whenever we make a change in tabulating forms, that change is forwarded to the members of the department in a letter of instruction. This letter contains everything that we can think of that the police officers should know in relation to the new form. When this card was adopted,

that letter of instruction was given out to the members of the police department at least two weeks before the card was introduced.

I want to say that for nine years I was a desk sergeant. (We call that position desk lieutenant now.) It was the duty of the sergeant to take reports of accidents from the patrolmen or sergeants that were out on the street doing duty. You would be surprised to learn the degree of efficiency that the police officers obtain in the collection of evidence, in the collection of information.

The training of a patrolman or sergeant or other member of the department in the collection of information relative to an accident is one that must come upon him gradually. You could not take a desk book and say, "Now here are all the things that you should know," and have him read them. After he finished he would go out and do the thing his own way anyhow. So the training can only be drilled into him day by day, and as each new accident happens he learns something new, so that police officers, as a matter of fact, are especially well trained to gather this evidence.

True, reports do not show exactly what happened. They seldom do, because nobody knew what was going to happen, and nobody analyzed it right on the spot with a clear mind. I am free to say that many of the things that are reported as the cause of an accident might be a contributing factor, but the real reason behind it all is speed. When a man operating a machine is unfortunate enough to have an accident, and is asked how fast he was going, he says, "Fifteen or 18 miles an hour."

Nobody Ever Drives Faster Than 18 Miles An Hour—?

A newspaper man from New York City was sitting in one time at a coroner's inquest in Chicago and the deputy coroner took him to two or three other inquests where fatality occurred by a motor vehicle. At the conclusion of his day's investigation, he asked the deputy coroner, "What kind of a machine do they use in Chicago?"

He said, "They use all kinds of motor vehicles."

The newspaper man said, "They must be different from those they use everywhere else. In the three or four cases reported here today not one of the motor vehicle operators would acknowledge going faster than 18 miles an hour."

As a matter of fact, if one measured the speed of that automobile, he would find that it was decidedly in excess of 18 miles an hour.

So those are the things we have to contend with in the gathering of information. I am frank to admit the information is not complete. The true picture is not painted. But it is the best we can get under the circumstances, and if that is the best we can get, that is all we can expect.

MR. GAGE: Mr. Chairman, at the risk of wearying the delegates present, I want to be quite plain on the proposition that I am not making any inference in reference to neglect in the preparation of this matter. I realize, as you have stated, that the whole proposition is a flash-back of memory, but I realize also that special training is necessary in the gathering of this kind of evidence.

There is no one in this room who has a higher regard for the capacity and ability of the police officer in the collection of evidence in other classes of matter, cases that are brought into the law-enforcing officers, than I. I yield to no one in my estimation of their capacity and ability in that particular, but here is a particular class of evidence that requires special training, it seems to me, to gather it, because nobody is prepared to know that the accident is going to happen. There is no preparation for it, and from a very limited study of this problem, I have come to the conclusion that the great difficulty in the proper enforcement of these regulations is due to the inadequacy of initial investigation, and we must, it seems to me, face that problem. There must be devised some means by which that situation can be met, and this conference is for the purpose of bringing out some idea, some method by which that situation may be met.

Methods Employed in the City of Cleveland.

I have raised the question here at this time, because it seemed to me that the Commissioner might answer it so we could perhaps get some constructive suggestion as to how this initial investigation might be carried out.

I had the great pleasure not long ago of going to the city of Cleveland. I don't know whether there is anyone here representing the department down there, but they have a most excellent method of supplementary and almost instantaneous investigation. Besides the necessary help available to take the injured party to the hospital and bring the party involved to headquarters for questioning, they immediately send out to the scene of the accident a man who is trained especially for that kind of work, who asks these questions in reference to speed. If there is any evidence available, he finds it out and brings in a report. The driver says he was driving 15 or 18 miles an hour, and here are two witnesses who say where and how fast he was going. They have that evidence and they can use it without delay. They get the measurements which afterwards become obliterated. They are there within a few minutes after the accident and find out what the facts are, and those facts are presented to the law-enforcing officers, and something can be done.

Then if the law-enforcing officers fail in their duty, it is easy to put the responsibility where it belongs. It seems to me some definite suggestion might come which would help us all in getting the facts of this situation, because on account of the manner in which it takes place, it is very difficult to get at the truth, and that is what we want.

CHAIRMAN COLLINS: I want to say that I have attended court in many instances where someone was being sued for damages, and if there was anything left uncovered by either side, it was something that I couldn't see could be covered.

As a matter of fact, immediately upon an accident happening, in our city at least, we go right to the bottom and try to get all the information we possibly can.

In answer to the question, "What is the cause of accidents?" a well-

known damage attorney in Chicago, who probably handles 75 per cent of the cases, stated to me, "In 75 per cent of the cases I handle, speed is the cause."

MR. O'NEIL: I would like to answer this gentleman. He says the law-enforcing officers should have the full amount of information to choose from.

You know and I know that when an accident happens it is always confusing on the highway. There is always a different story to tell. That confusion makes a thorough investigation difficult. If the parties were taken to the station the same as in crime, we would have a better investigation.

We have a little city in population but large in area. Sometimes accidents happen when there isn't anybody around, so we have followed this simple plan: Every time there is an accident we send two of our plain-clothes men out, and they get information.

MR. COFFIN: We have trained investigators out in Portland. The minute we have a call that there is a bad accident where a person is injured, this investigator is sent out, but in going over the records for the last two or three years, we do not find that speed enters into it.

Eight per cent of the accidents are caused by speed, but it is the reckless driver. Eight miles an hour in one section might be speed, or it might be 12 miles an hour or 15, and out in the outskirts a man might drive 30 miles in safety, although he may be violating a law. We find that most of our accidents are due to carelessness, not to speed.

UNIFORM CITY ORDINANCES AND REGULATIONS

H. O. Rounds, Supervisor, Bureau of Public Safety, Police Department,
Detroit

The reports from available sources show that 77,000 citizens were killed in traffic accidents in five years. What are the causes of these terrible accidents? Well, Mr. Robb, statistician of the National Safety Council, made an analysis of the accidents reported from 71 cities with a population of over 32,000,000, and he gives us the following result.

The first and chief cause of accidents is, taking the right of way from the other fellow.

Second. Failure to give signal of intent to stop or turn.

Fourth. Cutting in ahead—not waiting until well past the other car before turning, and so driving him into the curb or ditch or into parked cars.

Of course, we could say all these are just a lack of courtesy; but if I did you would not know what I mean, for "Courtesy" is a word that has been dropped from the vocabulary of the average driver.

The third cause of accidents is exceeding the speed limit.

As I understand it, this does not necessarily mean driving 50 or 60 miles per hour. In fact, when driving on a country highway with no other automobiles in sight, if you desire to drive 100 miles per hour, it

is all right with me. It is your car, and your hands steering it, and if it skids and runs up a telegraph pole, that's your business, not mine; you got what you were looking for, and as long as you are satisfied, the rest of us should not complain. Only, I think such an occurrence should not be charged up to accidents—it should be classified as suicide.

But in the cities where cross streets are only 300 to 500 feet apart, the conditions are different.

No driver ever left home in the morning with the firm intention of killing or injuring some one during the day. All accidents happen in emergencies; therefore, I maintain, any man who drives so fast he can not stop in time to prevent taking a life, when that emergency arises, is "exceeding the speed limit," I don't care if it is but 10 miles per hour.

Difficulties of the Motorist With Parked Cars

In the residence districts where cars are parked both sides of the street, and children are playing on the sidewalk or lawn in front of their homes, any man who drives so fast that he can not stop in time to prevent killing one of them if he should run out from between cars is exceeding the speed limit, even though he may be traveling only five miles per hour. When children are present anywhere on the landscape, take that foot off the accelerator and put it on the brake—don't blame the child!

Fifth. Driving while drunk.

It is often difficult to prove a man is drunk. We have 10 judges in our Municipal Court, and no two of them agree as to just what condition a driver shall be in, to find him "Drunk" under the law. Those who are found drunk, you can better believe are DRUNK. But you and I will agree that if a driver is in such condition that an approaching car looks like two cars, and he tries to drive between them, he is sufficiently drunk to be a menace on the streets and should be removed.

This stuff sold in bottles bearing wonderful labels, showing it is the regular goods (and, of course, there can be no mistake about it, as it was purchased from an honorable, upright law-abiding bootlegger who would not stoop to crooked ways) I say, this stuff is so poisonous that one drink often will so daze a driver that when the emergency arises his mind is not in a condition to function properly, and an accident occurs, a life is taken. But we can not prove to the satisfaction of the court he was drunk—it is therefore charged up to one of the former causes.

Well, what will help to alleviate this sad condition?

If all drivers were compelled to become as familiar with the rules of driving as they are with the rules of their lodge, club, society or church, before allowing them to drive a car, and if they would then obey them, 50 per cent of our troubles would be over.

One of the obstacles in the way of carrying this plan into full operation has been the numerous and conflicting rules thought to be necessary by each individual municipality and state. Although one became thoroughly familiar with the ordinances in his own town and drove accordingly, and was recognized as a careful law-abiding citizen, he fre-

quently became a violator when he drove in a neighboring municipality. Thirty years ago each municipality had a few rules governing the acts of horse and ox-drawn vehicles, and that was all that was necessary; for roads were poor, almost impassable in the spring, and a 50-mile trip was an event in almost any man's life. Then the automobile appeared. Roads were improved—a 50-mile trip became just around the corner, and we began to run afoul of each other's rules of driving. We started out on a pleasure trip to wind up in some station house, our car impounded if we didn't happen to have \$25.00 on our person.

We are a long suffering people, and we have stood this condition about 25 years longer than we should, but now that we have put our shoulder to the wheel, let us "carry on."

The Hoover Conventions are familiar subjects to all; it is needless to go into detail. There was handed to us, as a result of careful painstaking work of the committees over the course of a year, a set of fundamentals in traffic control, which was entrusted to all present to take back into their own states and weave into law, so that tourists from far distant points would not run afoul of a strange regulation for driving in every state they entered.

Keynote Should Be "Uniform Traffic Laws"

It is my opinion that the key note of the Public Safety Division of this conference should be, "uniform traffic laws in every state."

Michigan has stepped out in front and blazed a path, and I know other states will take up the work and carry it through.

Through efforts of the Detroit Automobile Club two conferences were held, following the first National Conference on Street and Highway Safety, which were attended by a representative from nearly every village, town and city in Michigan; a set of rules was edited that could be adopted by all of the municipalities represented, and at last report 150 had so adopted them. And it may be of interest to you to know just how we went about this.

The Safety and Traffic Division of the Detroit Automobile Club, with Mr. L. J. Van Schoick, director, took over the arduous task of getting the representation together.

A meeting room in the General Motors Building was secured for a certain date, then letters were sent to the Mayor, Chief of Police of every municipality, and Sheriff of every county in the state, stating the reason of the meeting, and inviting them to attend.

A tentative draft of the desired uniform ordinance was made, and when the 250 delegates assembled and organized for business the tentative draft was read item by item. Those items that met with unanimous approval were adopted, and those that met with an argument were referred to a drafting committee appointed by the chairman, which committee acting on suggestions brought out in the argument, went to work to redraft those sections; and the first meeting was adjourned after partaking of a banquet as guests of the Auto Club.

On invitation from Grand Rapids the adjourned meeting was called at

the Hotel Pantlind there three months later, with a larger attendance than we had at Detroit.

At this meeting the disputed items were taken up one by one and disposed of; then a two-hour recess was taken to enable the drafting committee to whip it into shape and during this period we were guests of the Grand Rapids Motor Club at a splendid luncheon.

When the meeting was called together after luncheon the completed draft was read, section by section, and a vote taken on each section; and at the end the chairman called a short recess while the representatives from each municipality could caucus and select a chairman to cast the vote for that municipality.

The Pedestrian Has Rights in the Streets

Then the meeting was called to order, and roll call made, each town having but one vote. This roll call showed the uniform ordinance adopted unanimously, and we adjourned feeling we had taken one step forward.

The Detroit Automobile Club had the ordinance printed and sent every official in the state a copy.

A trip made by me through the state during the summer convinced me that all the principal towns and cities had adopted it and were enforcing its provisions, and it was a great help to traffic. But of what use are traffic laws, if the law-enforcing bodies are lax or indifferent?

Sidney J. Williams, director of the Public Safety Division of the National Safety Council, has well said, "There must be a definite continuous effort to mobilize and organize and mould public opinion, and to support those police departments and those courts that are doing their duty, and to stimulate those that are not."

No truer word was spoken, for public sentiment, after all, is the ruling force in the enforcement of law. The people can have just what they demand, if the demand is made strong enough.

Then how about the pedestrian? He has rights on the streets, of course, but in many cities he has been given to understand that his rights are paramount. While a few have educated their pedestrians to make it 50-50, and while the Conference on Street and Highway Safety did not give us a positive recommendation, I believe some uniform law on this subject would save us embarrassment when in some other municipality.

Now, we have left that small percentage of people who are indifferent or reckless and who care nothing for you or your rights on the street.

I believe there is but one thing that will cause them to change their ways, and that is the assurance of swift, ample punishment without quibbling on technicalities when they are brought before a court.

I am firm in the belief that the record of the city of Detroit proves this.

From 1916 to 1926 the traffic killings in our city increased each year from 25 to 55 more than the previous year, with the exception of two years, 1921 and 1922.

In 1920 there were 240 killed; 1921 there were 134 killed; 1922 there were 185 killed; 1923 there were 266 killed.

During a large part of 1921 and part of 1922 we had a traffic court, and a judge who won international fame for the severity of his sentences; and again the same judge was persuaded to take over a traffic court this year, assuming his duties May 15.

Let us look at our record for this year.

Killed in January, 17; February, 16; March, 24; April, 36; May, 19; June, 22.

Many cities have had the same experience; and once again I state, let us have uniform state laws, and insist they be effectively enforced, and the years to come will not leave a trail of blood, dead and the dying from traffic accidents from coast to coast.

The Citizens of St. Paul Are Proud of Junior Police

CHAIRMAN COLLINS: I am going to ask Mr. Clancey of St. Paul to put on the pictures.

MR. CLANCEY (St. Paul): I wish to say just a word or two. A year ago I was at Cleveland, seeking information as to how to take care of the unsafe conditions on the streets in St. Paul, just like you are here today.

The question of the schools came up and I explained in a few brief words our organization. I took the question up with the secretary of the National Safety Council of showing those pictures at this convention. He listed them for the Junior Safety Meeting, Friday, but I felt that the pictures should be shown before the police chiefs and the city officials, and he agreed with me. So this morning those pictures are here.

Lieutenant Hetznecker, who is in charge of school police work, will explain those pictures as he goes on, and when the pictures are over I want you to ask him all kinds of questions, because he has been with the school police since 1920 when they were first organized under Commissioner Smith; this work was then carried on by Commissioner Matson, who succeeded Commissioner Smith, and who was here yesterday representing the railroad commission, and the work is now being further carried on by myself.

I want to say that the citizens of St. Paul are proud of their school police, are backing them up to the limit, and these pictures will be at the disposal of the National Safety Council to be used wherever they may want to use them after this convention.

LIEUTENANT E. J. HETZNECKER (Director of School Police, St. Paul, Minn.): I am never going to get old, as I have been working with children for the last few years. I find there is no more essential work in solving the problem of safety among school children than that of teaching and acting as director of safety in the various schools.

To bring this about, it might be explained that in inaugurating the school system we started out with 750 school police. This organization

carried on for a year. In fact it took a year to make up the activities of this organization.

The following year I had taken it up with Colonel Matson, at that time Commissioner of Public Safety, and explained to him the needs of the organization in order to carry on the safety work to the last letter. In doing this, we passed an ordinance making it just as effective for school police to handle traffic as for an ordinary police officer.

At that time I had no idea how to stop them, how to warn the people. You oftentimes see children out in the streets, boys with their hands up in the air, begging rides. How are we going to get away from that?

When visiting one of the schools, an educator mentioned to me we ought to have something to let the drivers know the business end of this organization. He mentioned the flag. I didn't think a flag would show very well on a rainy day. I had a long conference with that educator. In leaving that school I had to cross a railroad track at which place they had a man stationed holding up the stop sign. That gave me the idea of this sign which we use.

(Lieutenant Hetznecker exhibited the sign carried by the school police in St. Paul.)

It Is a Serious Matter to Disobey the Stop Sign

Today this sign, I believe, is being used in numerous cities of the United States. If anyone is caught disobeying it in St. Paul, I am telling you, gentlemen, he gets the limit. His fee at the present time is \$25, and his fine and punishment may be \$25. There hasn't been a case this year where a man hasn't been fined \$25 for violating this rule.

I want to say, gentlemen, that this organization is a business from start to finish. It isn't only traffic, it is everything in the line of a boy's life in bringing up that boy to become a good citizen.

The children are taken care of in the same way going to school as coming from school. It isn't only for a block or two. I get out in the communities and make arrangements with the parents in certain districts, and we have school crossings at a distance of eight blocks from school, and these streets are crossed in the same fashion as your children march into the lobby or hallway of your respective schools.

This is all done without the eyes of the principal or teacher or police officer watching them. The only guide is that little director of safety, the police officer.

We have 1,475 members among these junior police officers at the present time. They are all recognized by this star. It is the same star that the members of the regular police department have, with the exception that it is a trifle smaller. This star is a captain's star. Each school has its own captain.

It is interesting to see on election days at various schools, the interest school children take in selecting their leaders to become guardians of that school. This star signifies leadership.

Now, gentlemen, don't let me impress upon you that we give these

boys the same star we have, expecting them to be out at night looking for trouble. The authority of this star is for school police work only, and that is from the time they go to school until they reach home. In some schools it may be from 8:00 o'clock in the morning until 4:00. Again it may be from 7:30 to 4:00.

This star is also used on various occasions where there happens to be an entertainment of some kind for the education of children, if it happens to be a school day or holiday or during vacation time. These boys are sacrificing their time and are willingly doing it to help their friends along. They are doing this gratis for safety.

I have seen these pictures twice. They were snapped in St. Paul without my knowing it. As to the pictures of the children themselves, I want to say they did not pose for one of them, with the exception of one part, and that is where we wanted a violation of a boy explained in these pictures. The children themselves are all acquainted with the rules of the school police and know that if they break such a rule they are apt to be brought to court.

Disciplining the Child for Traffic Carelessness

As I explained before, it is a business organization. They have everything for themselves. They have their own courts. This court session is held once a week after school hours. They receive punishment in this court from the judge. That judge is usually the captain of the school police. I wish police courts would get the same action. I haven't found a case yet in school police court where the party was not found guilty.

This punishment is carried on in such a way that it is going to be a lesson for the boy as long as he goes to school. It is carried on with the punishment of missing his recess time, with the punishment of compelling that boy to write the bad effects of breaking whatever rule it may happen to be. After this is made up it is given to the judge. The judge has a copy and the boy has a copy. This is checked up, and a copy is taken home to the parents. Oftentimes parents don't hear of these things until after court proceedings. Parents put their signature on this punishment, and see that it is returned to the school court. Oftentimes I notice in going along to these various courts that the parents themselves take an interest in the case and are a part of the audience.

I don't want to take up much more time. I would like to have the operator prepare the films and we will go on with the picture.

The interesting feature of this organization is how the city of St. Paul has benefited by it. Since it was inaugurated the parents actually call up the Police Department and ask, "Have you got school police at this school? If you have, all right. I am going to send my child to that school."

(Moving pictures were then shown of the school police in action.)

LIEUTENANT HETZNECKER: We brought two of our boys with us today. Will they please come forward.

(The two boys from St. Paul came forward.)

I want to say regarding these boys, they have set a rule that every time they are called upon to do something, the first thing they do is stand up straight so they can be seen; next, talk loud so they can be heard; and third, shut up so you will like them.

I wish to introduce Leonard Hazelman, captain of the parochial schools.

LEONARD HAZELMAN (Captain of School Police, Parochial Schools, St. Paul, Minn.): Mr. Chairman and Delegates: I did not come here to make a speech, but to listen, observe and learn. As a representative of the 26 parochial schools of St. Paul, I am proud to be permitted to greet you, and offer our hearty cooperation in this great movement of safety first.

The School Police of St. Paul, a Serious Business

The School Police organization of St. Paul is no joke or fad. It is a serious business.

I want to say to the children of Detroit and the nation: obey your teachers and the officers of the safety organization, observe the rules of safety, and you will never be brought home on a stretcher.

LIEUTENANT HETZNECKER: I wish to introduce Harold White, chief of the public schools.

HAROLD WHITE (Chief of Public School Police, St. Paul, Minn.): Mr. Chairman, Ladies, and Gentlemen: This is indeed a great honor to be shown a school pupil. For myself it is a great pleasure to have the honor of becoming a delegate at this convention. This opportunity for a boy comes but once in a lifetime. You can bet your last dollar that I will remember my trip to this convention in Detroit as long as I live.

I wish to say that you will find the school division an organization for safety in all its branches in St. Paul, and in behalf of the St. Paul school system, I wish to extend greetings to the National Safety Council for the work it is carrying on.

H. O. ROUNDS (Supervisor, Bureau of Public Safety, Police Department, Detroit, Mich.): On behalf of the school patrols in Detroit, I wish to invite these two boys to the luncheon tomorrow noon, at which there will be 455 school police from Detroit and from Toledo. If you folks would like to see the quality we have in this section, be in the lobby tomorrow between 11:30 and 12:00 o'clock, but you will not be admitted to the banquet, because we will have 455 in a room that will permit only that number.

CHAIRMAN COLLINS: We are greatly indebted to St. Paul for this object lesson in school patrol.

DR. B. L. CORBETT (Secretary, Milwaukee Safety Commission, Milwaukee, Wis.): Who is responsible in the event of an accident to one of these children who is in the middle of the street directing traffic? We have asked that question throughout the United States in the various cities

we have visited. I was wondering if anyone here can tell us of any experience in that line. Since in St. Paul it is covered by an ordinance, the city would not be responsible.

MR. CLANCEY: I would like to ask Lieutenant Hetznecker how many deaths we have had in St. Paul at corners since the school police were organized in 1920?

LIEUTENANT HETZNECKER: There has been but one death of a child, when going or coming from school, and that was a boy who disregarded the rules of the school. The school police were on the job and had the children in formation. The small boy for some unknown reason started out from the rear ranks and started to cross the street. He wasn't run over by the car, but landed at the side of the car. That particular case happened last year. The child died five days after the occurrence.

MR. CLANCEY: I never had a report of the school police being injured. They use their judgment as to the proper time to cross, and that is the time when they themselves would cross in a walking gait, in such time as they wouldn't have to run. They raise up this sign and the autos stop. The children do not start to cross the street until the traffic has been stopped both ways.

MR. MARSH (Pittsburgh, Pa.): I would like to ask the gentleman from St. Paul what the effect has been upon the ratio of all child fatalities from injury in the city? In other words, what proportion of the injuries have been actually removed?

Police Officers Must Have the Support of the Courts

MR. ROBB: Reports from St. Paul indicate that the pedestrian is only 47 per cent of their problem. The usual average is 69 per cent. The child problem is 21 per cent of that 47 per cent. The usual per cent is about 43 per cent of the pedestrian problem. Last year, or perhaps the first nine months of this year, there were seven deaths of children, all of which occurred during the vacation period.

CHAIRMAN COLLINS: No doubt that answers the question, and it certainly is a splendid record and speaks for the accuracy of the system in operation in St. Paul.

The hour is growing late and we still have some work to do before adjourning.

Unless police officers are given the support of the courts, we are helpless in our campaign for safety on the public highway. Too much stress can not be laid on this particular point. The laws in Canada are much more rigidly enforced than they are on this side of the line. The accident rate is considerably less than it is in the United States.

The courts depend upon political prestige for their existence. It is very seldom that we find a man is big enough to lay aside the things that he believes might affect him in a political way and go in day after day to the administration office without fear or favor, meting out punishment where punishment is deserved in the enforcement of the law.

I am sorry to say that in Chicago it has been my experience that it is

a very difficult matter to get the courts to stand behind the enforcement of the traffic laws, the enforcement of the laws relative to speed, in the manner in which they should be enforced.

I am free to say that if all the courts in the United States would stand behind the police officers in bringing in violations of the motor vehicle act, that we would be able to show a decided reduction in the number of accidents each year. In going around the United States, from one large city to another, I can tell after 10 or 15 minutes observation on their prominent thoroughfares, whether or not the courts are behind the police officers.

I am not going to mention any specific locality, but in the east I noticed the drivers were very, very careful about what they did on the highway, notwithstanding the fact that at many intersections there were no stopping regulations and no police officers. Traffic was going at a pretty rapid rate, but they were careful when they came to an intersection to see that they got over without injuring or offending anyone. In this particular city the accident rate has shown a steady decrease.

Automatic Speed Registering Devices in Europe

Before concluding our work this morning, I would like to have the delegates express themselves freely on the two subjects that have not yet been dwelt upon. That is, the relation of the courts to the enforcement of the law, and exceeding the speed limit.

ERNEST P. GOODRICH (Consulting Engineer, New York City): While in Europe this past summer, I had occasion to do some investigating work along the patent regulation line, and discovered in the office of the Chief of Police in the city of Stockholm an experiment was being tried with reference to automatic speed indicators of the registering type.

A special device was arranged, which was also applied to the motor truck and taxicab. This consisted of a disk which rotated at uniform rate, and every quarter of a mile a pencil placed a dot there. This could not be tampered with, and in case of an accident or a question as to speed, this automatic registering device was adjusted as to what the conditions were in different sections.

We have in this country certain suggestions about the limitation of speed by automatic devices so that a man can not exceed the speed limit of so many miles an hour. This has been pointed out very well by the presiding officer today. If the facts registered on this machine could be used, the problem of speed, I believe, would be very largely reduced. The consideration of some such automatic device might be objectionable to many drivers, but it is one which the police officials should consider.

W. H. WISE (Canadian National Safety League, Toronto, Canada): With reference to your remarks about the courts and the traffic laws of Canada, I want to suggest, as a probable reason, our judges are appointed for life by the Lieutenant Governor.

F. B. HENRETTA (President, Yellow Cab Co., Inc., Roanoke, Va.): Mr. Chairman, a prominent automobile manufacturer in this country. after

spending a great deal of time in getting up a book as to the proper care and use of the car, threw the whole thing away and got out a poster. The fact remains that you have got to get down to the simple rule, "Run under control." Until that is accomplished, no good will come.

I think that brings in clearly this matter of the relation of the police to the court. When a man is absolutely found to be reckless, make the punishment so severe that he will be a startling example for others.

MR. COFFIN: Mr. Chairman, I might add an instance that happened in Portland. We found a great many of our violators, through political pull or stand-in, were able to get out of appearing in court. It became so flagrant that a meeting was called by our mayor and at that meeting were the chief of police, the prosecuting staff, and others that were interested in the enforcement of the laws; and they all stood up, with uplifted hands, and swore there would be absolutely no political pull that would enter into the enforcement of the law.

Every man or woman that has been arrested since then has gone to court and the judges mete out proper punishment.

CHAIRMAN COLLINS: Now in conclusion, I desire once again to repeat that everyone should get behind the model motor vehicle act, the outcome of the Hoover Conference. As you all know, the Secretary of Commerce, Herbert Hoover, recognizing the great toll that automobile accidents were causing every year, caused this conference to convene. Everyone that was interested, either in building an automobile or in its operation, or had to do with enforcing the laws, or had to do with it in any capacity, was drafted into this service. They were all in attendance at these two conferences. Many committee meetings have been held. The result is that we have today a model vehicle act, something that has been devised free from politics, free from influence, free from the interest of anyone except the general public, and it behooves us all in every state in the Union to get behind this act and see that it becomes a law, so we may know in California as well as we do in New York what the laws relative to the movement of motor vehicles are on our public highway.

ADJOURNMENT

Traffic Regulation and Control

October 28, 1926

ERNEST P. GOODRICH, Chairman
Consulting Engineer, New York City

The meeting convened at 2:15 o'clock, Mr. Ernest P. Goodrich, Consulting Engineer, New York City, presiding.

CHAIRMAN GOODRICH: This meeting is in a partial sense a continuation of certain investigations which were carried nearly to a conclusion by the last two Hoover Conferences. One or two of the committees of that conference reported recommendations with reference to the items which are on this afternoon's program.

One of the sub-committees of the Hoover Conference made careful estimates of the cost of accidents and the delay in street traffic difficulties, and came to the conclusion that each individual citizen was charged at least \$20 per annum because of those conditions. It means then that it is worth \$20 personally to each of you to get this thing worked out. It may be worth a great deal more to you if you happen to miss a train some time because of street congestion, or if you happen to be in that particular branch of the engineering profession which is now interested in this topic.

The topics can be divided into two main groups. The first has to do with traffic survey and traffic control, which might be called the explicit side of the question. The last paper has to do with organization, which covers general traffic matters.

We should like to hear from Mr. Powell, of Buffalo, at this time.

TRAFFIC CONTROL BY SIGNAL LIGHTS

**W. B. Powell, Consulting Engineer on Traffic, Police Department,
Buffalo, N. Y.**

Traffic signals today are an outgrowth of the very rapid development of traffic congestion in our city streets. As soon as this began to infringe upon the consciousness of the city police departments, they did the very natural thing—they began to put out men at the different

intersections and of course, police departments being under-manned, they quickly got to the point where they didn't have an available man to take care of the increasing traffic.

They also found it a burden for a man to stand and wave the traffic with the motions of his arms and hands, and the second stage was to give him a mechanical device, which he could turn by a simple movement of his wrist. That didn't serve the purpose for a great length of time, for presently we found that even then we were not able to keep up with the increasing density of traffic, and so we began to have various types of automatic-control signals offered by ingenious manufacturers, and there were as many different types of devices as there were manufacturers, and that is quite a few.

The city of Buffalo, with which I am connected, was rather early in this field. One of our own citizens developed a traffic-control light in the early stage of that activity and was successful in getting one of them put up in our city streets about four and a half years ago. The signal is still working today, although it is considerably out of date.

Now the first and obvious method of adopting one of those signals was to set one color for the vehicles to move through the intersection, another color to stop them, and a third color to indicate there is going to be a change from one color to another. Even today I think that general system is in use throughout the country.

We fortunately managed to coordinate on green to go, red to stop, and yellow or amber for the change light. However, I don't think that is the last word in signal control, by any means. So we go on to find there are difficulties even with that method of signalling, which we can perhaps overcome by some ingenious changes.

Drivers Invariably Want to Jump the Signal

Buffalo has found as soon as you use signals of that type a great many of your drivers want to jump the signal. If he is standing still on the red, as soon as the warning bell sounds he is in a terrible hurry to get to his destination and so he steps on the gas before the signal actually changes and gives him the release color of green. That would be all right, perhaps, if it were true that the fellow moving on the green, when he saw the warning light, was willing to stop going and wait. But the unfortunate thing we find is that when a man moving on the green sees the yellow light and is about 100 feet from the intersection, he takes that as a jolly good chance to get through before the change actually comes, and he steps on his gas, too, and the two meet in the street with disastrous consequences for everybody.

The first thing we tried in our town to overcome that difficulty was a direct change from red to green and green to red simultaneously. It didn't work very well because the time between the two changes was hardly sufficient to clear the intersection. The next thing we tried was to cut out the yellow warning on the red side and only provide it for the man on the green side. That was some improvement, but, neverthe-

less, the fellow standing still on the red managed to get some idea of the fact that yellow came on the other side, so he hopped the signal just the same as before.

Ultimately we tried the scheme of changing directly from red to green and green to red, but brought the change from green to red on a definite interval ahead of the change. In other words, we overlapped our reds. After a little experience we found that five seconds was a reasonable time of overlap to clear our intersection.

Our first experiment was made a year and a half ago. It was put into effect in January, 1925. We tried it in one of our busy intersections, one having trolley lines in both directions and motor traffic and pedestrians. We were so thoroughly satisfied with the net results we got by that method of operation that we tried it on other corners under different conditions in various parts of the city, and eventually, about the first of this current year, made up our minds that was a good standard to adopt, and now we have every signal in the city, with the exception of one or two that can't, operating on that basis.

So if you visit Buffalo in the near future, you will find instead of having a warning, the change is made directly without any warning as to bell or light.

The Average Individual Observes the Red Warning

I believe the psychology of that is correct for this reason: your city ordinances generally require a reduced speed limit at intersections. In our particular case the standard speed limit in the city is 20 miles per hour, on the outskirts 25 miles per hour, and at the intersections 15 miles per hour.

If you use the warning light and the man steps on the gas to get across, he speeds up for the intersection instead of slowing down. If on the other hand, he is driving on our system, and he approaches a light which has been green up until he comes toward it, instead of stepping on the gas to get by, knowing it is going to change directly from green to red to hold him up, he approaches with caution.

Our experience has been that we have had considerably fewer collisions and near-collisions at street intersections controlled in this way than we had before. It is a very well-established fact that the psychology of that method of changing from red to green and green to red is correct.

Now it is true that even with the red changing to green and green to red, some ambitious drivers still jump the signals, but it is a remarkable fact that red holds the average individual better than the ordinary coloring. We have an ingrown belief that red is a dangerous thing to monkey with.

So the percentage is greatly reduced, and with a little police administration to back this up, which we administer with plain-clothes men on scattered intersections, we have succeeded in holding that down to a minimum.

That, however, is not the final solution to our whole problem. As we

increase the number of signal-controlled corners, we get to the point presently where the motorist begins to complain because he has been held up unnecessarily.

The average motorist thinks an automatic speed control is a speeding device to move traffic more quickly. I believe it is primarily a safety device and not a speeding device. However, you can use your safety devices so they will move traffic advantageously.

The next move was to figure out at his given rate of speed, if we alternated the colors we could let the driver go right on through without being stopped at all. We have several notable examples in the country of that method of operation, generally known as the progressive system.

We find the flow of traffic is not always uniform, some require a longer time in one direction than in others. So we go one step further, as they have in Chicago, where they vary the time interval as well as having the progressive system of movement.

Even then I don't believe we will have reached the final outcome of our problem, because even now we hear rumors of various schemes for still further refining the methods of controlling our traffic.

More Traffic Control Signals Change Traffic Stream

One curious by-product we have observed, and probably you have, too, in the introduction of traffic-control signals in a considerable number, is that you diffuse your traffic to other streets. The foxy motorist does not drive where there are control signals. He devises other routes to take him around the signals, and one of the very interesting results of the installation of traffic-control signals at any particular corner is immediately to decrease the traffic at that point.

However, I am rather inclined to think we may go a stage too far in this direction. I know one or two cities of my acquaintance where they think they have too many signals and want to take some out. It is difficult to take a signal out, because once the inhabitants have it in, they think it is the worst corner in the nation, and must necessarily be under control. Of course you can let the signal get out of repair and not fix it.

Another thing might be said along that same line. In our town we tried every kind of signal ever invented. Cleveland looked us over and said that Buffalo was the worst traffic-controlled city in the world because they had every system ever invented, which was true.

CHAIRMAN GOODRICH: We will continue this particular phase of the subject by listening to Mr. E. J. McIlraith, Engineer of Chicago Surface Lines. They have a particularly well worked out program.

If you will permit a personal reference first, some 15 years ago, while in charge of traffic in New York City, I took all the inspectors we could get and put them on cross streets in Fifth Avenue for about 30 blocks. In those days each police official was a law upon himself, he regulated traffic at his intersection as he saw fit, and you can imagine the helter-

skelter movement up that avenue, which was about as congested then as it was thought it could be.

RECENT DEVELOPMENTS IN TRAFFIC SIGNALS

E. J. McIlraith, Staff Engineer, Chicago Surface Lines, Chicago, Ill.

In interpreting the subject that has been assigned to me, I wish to change it slightly, and instead of "Modern Development in Traffic Signals," let's say "Modern Development in Traffic Signal Application," because I don't think we need any discussion of the type of signals or desirability of different types, or of the salesman's points, in discussing the merits of various types of red or green signals or red, green and amber sets of lights.

The real question in traffic-signal application is the justification—what is the excuse or reason for applying signals? If we apply to that question, engineering judgment, and real technical skill, there can be a good application of signals to improve the conditions at whatever intersection is selected, if the study shows that any signal is required.

I want to make it very clear that what was brought out in the previous speaker's discussion is all too prevalent in the United States. There are too many signals installed at the present time where they do not apply and have no business to exist. I think Mr. McClintock has expressed it very nicely when he says that a signal should not be installed in any location unless its presence will expedite the freedom of movement in that intersection.

If a signal is actually going to reduce the freedom of the intersection, it should not be placed at that point. A warning signal may be necessary. Some indication of the dangerous point may be needed, but the stop and go, which is the usual means for traffic signaling, can only be excused if tangles of traffic are going to be relieved by the use of an alternate stop and go.

There are many locations where a traffic signal may be desirable for two or three hours of the day and undesirable for the rest of the 24 hours. In such conditions it can be arranged that the traffic signal only operates at those periods of the day. It may be at some of the country locations traffic signals are needed on Sundays, but they can, and often should be, completely eliminated on other days of the week. Such conditions are peculiar or special.

All conditions have need for very careful examination before the signals are installed or put into use. It is that present-day tendency to give specific analysis to the problem before buying signals, that is the most promising feature of signal development.

Until there is real care given in the timing of signals, they usually become a handicap, and they are a handicap in the major portion of the installations in the cities of the United States. They do not promote the speed and comfort and freedom of movement as they were expected to do, and when they do not promote speed, comfort, safety and street

capacity, they have fallen short of what they might be doing, and have fallen short of what they will do if a little engineering skill is put into the idea of tying them together, correlating their indications, and timing them according to the problem they have to solve.

There is no question but that an individual officer at an individual intersection, who is working with good judgment, can handle that intersection more effectively than any traffic signal which can ever be installed.

I would like to wipe out any ideas that may prevail that signals can do something better than human beings can, if the human being is using the right and proper judgment and is not subject to inquiries for directions, etc., not subject to the faults and failings of his own mental lapses, or his anxiety to get away from the crossing, or anxiety to promote or enforce some of the ordinances with which he is especially concerned.

The officer has something else worth while doing besides the mere timing of the intersections. He can watch the people, to keep them safe; he can inspire a little moral persuasion in the minds of those operators of vehicles and pedestrians who would otherwise take advantage of the signals; he can guard against all sorts of traffic violations, and the officer really becomes available for street regulations when the signal does the timing automatically.

A Big System of Traffic Signals Brings Big Problems

If an intersection is by itself, not correlated to any others, it would still function very well through the entire period of control, even if the officer fails to use his best judgment all the time, and the best traffic officer is usually discovered as failing to use good discretion through the major portion of his time on duty. A single isolated intersection does not create serious trouble, even if poorly handled.

When the individual control, however, becomes a group of individuals, as in a large business area, and we have intersections over a half dozen or dozen or 50 different blocks of the city, all needing to work together in harmony, and each trying to play into the other man's hand, then you have a much more serious problem of officer's lapse and officer's failure, because no individual there slips ever so little without immediate reflection on the operating condition at the four corners adjacent to him. The officers are not able to give their individual attention to the timing of their intersections even if they would. There are continual questionings, happenings and incidents to disturb and delay them.

Further, they are bound to grow careless or indifferent, or one might call it hardened by the continuing strain of the job, and the natural thought that traffic gets along even if they do not worry much about it. The tendency is to develop to an automatic practice in which they really think very little. When the various mistakes and carelessness of the individuals are multiplied by all the individuals at adjacent corners, it is easy to understand how cumulative confusion results so that properly

timed signals are far superior to individual officers. Orderly movement results from groups of signals.

When signals are installed many officers are released from a timing job, to be available for observation of traffic violations and enforcement of traffic regulation, and the threefold advantage has accrued: reduction in cost of enforcement of traffic law in areas under signal control, improvements in speed and street capacity due to orderly movement and safer movement.

It is very desirable in traffic movement installation that the ultimate purpose of the traffic movement may be served. If the ultimate purpose is that, starting at the beginning of the section of the street, we wish to go the entire length of the street without delay, without stopping, the signals should be so set, and so controlled that the majority of the vehicles can move through the entire area without stopping because of red lights or traffic interference.

Coordinated Control Simplifies the Freedom of Crossing

There are sometimes mechanical interferences with such an ideal. Occasionally cross streets require unusual treatment to prevent either left turns or straight through movement on the cross street. Occasionally some particular restriction may have to be made to fit special street layouts, but in general traffic movement of any area, when thoroughly analyzed, when reduced to its logical parts or groups of intersections, can have for each of those parts a signal control so arranged that traffic will move across the area at the maximum speed which the conditions of the streets normally will permit, without red lights interfering.

Proper coordinated control will simplify the freedom of crossing intersections, simplify traffic at intersections, and should speed up traffic movement over anything that can be introduced by ordinary officer-control.

However, very few cities have put engineering analysis into this problem to discover the logical sub-divisions into which controlled areas should be divided.

It is inevitable that when high-speed boulevards are beside a business district, the high-speed boulevard can not be treated in the same way as the business district. If the two are thrown together and tied up together in control, there is bound to be a serious sacrifice to one or the other or both.

However, by carefully picking out the factors that are involved, by laying out the itemized movements, classifying them, determining speed, time, intersection interference, and the controlling factors involved in the movement, it is quite possible to lay down in advance of signal installation, the exact detailed results that will be accomplished by that signal installation.

It should be as easily demonstrated as the engineering features of a building, because you can detail just what is to be done in traffic movement with much the same certainty that you can detail the steps in

construction of a building. You can determine the possibilities of it and you can control some of the difficulties.

In making an installation in Chicago for the central area, controlling 49 intersections, it was necessary to go into a very detailed study, and the results accomplished there are almost identical with what were expected. Yet to any casual observer it now seems like an ordinary city. It does not seem seriously different in the operation of the control there than would be observed in Cincinnati or Cleveland. To the casual observer there would seem to be similar features in the results from the two methods of control. Actually there is a material difference in results, and one can not from street observation differentiate fully between the two systems. The smoothness of operation in Chicago gives the streets the appearance of light traffic. The usual type of synchronized control would create serious blockades.

Reversed Synchronized Control in Some Cities

The freedom of movement may seem to be good in many cities because of the relative density of traffic, but if the more careful observations, timing and planning are developed in the setting of the control movements of the individual intersections, progressive timing will do marvelously better than the ordinary method, and it costs very little more in comparison. It can be done at a cost not to exceed \$300 in each intersection as compared with the synchronized timing, and the results may be as much as 100 per cent better, depending upon the type of city.

In speaking of the difference between types of signal control, progressive timing is merely a method of timing signal control that permits each individual intersection to have its timing individually set up as compared to all others, in order that when vehicles move from one intersection to the next, in as many cases as possible, the signal will change for the vehicle just at the time it arrives at the next intersection and is ready to go.

This is somewhat the same as is done in Washington, D. C., or Cincinnati, Syracuse, Minneapolis, and several other cities, but it is not exactly the same. The cities mentioned above use a reversed synchronized control. A synchronized control is one where all lights of the group change at exactly the same instant and all lights indicating movement along a given street are set green at the same time, and then change and become all red at the same time. The reversed synchronized type of control may be illustrated by saying that all lights are changed at the same instant, but numbering the intersections along the given street, Numbers 1, 3, 5, etc., will be all green at the time when numbers 2, 4, 6, etc., are red. In the next change numbers 1, 3, 5, etc., will become red while the others become green, or it may be that 1-2, 5-6, 9-10, along a street are green while number 3-4, 7-8, 11-12 are red, and then these two sets reverse at the same time, keeping the groups of two intersections always paired out as shown above. Sometimes groups of three are so coupled up.

The purpose of this reverse control is to so arrange the timing that the leading vehicles entering the control zone will be permitted to travel at the desirable rate of speed, say 20 miles per hour, and the red lights ahead of the driver will change just before the driver arrives at the first intersection of the group that has been red. If these control groups are three successive intersections, then when the change actually comes, only one-third of the vehicles operating through the three blocks, that are under green light control, will have passed the last green signal of this group when the change comes, provided there is uniform distribution of traffic along these three blocks. It is obvious, then, that only the first one-third of each moving group can go through without a stop. Further, when signals are so arranged in reversed synchronized control the time split at each intersection must be arranged on a fifty-fifty split, in order that each street can have the same portion at successive intersections.

This is a great waste of time where a main street is crossed by a succession of minor streets, although such a system does get along fairly well on most of its present installations, due to the volume of traffic, and because it is an improvement over what was previously in existence.

Each Intersection Timed to Individual Requirements

With the coordinated or progressive system each intersection is timed according to its own requirements, and the start of the red or green signal for a given direction of movement is such as to permit vehicles arriving at that intersection to continue passing without delay, because it changes at the time when the correct speed of movement will bring the vehicle to that intersection from the last control intersection. The control permits the time of change at one intersection to occur at the exact instant best suited to the operation of the system, and this change need not happen at the same instant as any other change is occurring. Such flexibility is the great asset of this method of control, and enables the engineer to obtain the maximum usefulness for the streets and to give the greatest freedom to the users of the streets.

There is about to be started in East Cleveland such a system of progressive timing, where it is hoped that 25 miles per hour or thereabouts will be the speed of automobiles moving along the streets, and once they start, there will be no red light to stop them if they proceed at approximately that speed.

There are about to be installed in Chicago, two such systems, one on Michigan Boulevard and the other on Upper Broadway, where there will be installed for two and a half miles such progressive control. In each installation vehicles will go the entire direction without material change of speed, and we can guarantee that when they start they will not have to change their speed until they pass that controlled area.

Such movement is a true traffic control that expedites movement and is the only type that can be usually tolerated, and it is the principle on which traffic movement should be set up in so far as it can possibly be

done consistent with the type of business. In an intense business center where the streets may be narrow and the cross streets may be in large numbers, and the control necessary in speed is determined to a large extent by the movement of the street cars, their stopping and loading keeps the speed of vehicles lower than it might be otherwise. However, in busy areas vehicles can not attain high speeds even if no street cars operate.

If the people served by the street cars are in greater number than the people served by the automobiles, it may be desirable to set the signals so as to give the maximum speed to the street cars, for it may be that the vehicles can not go any faster than the street cars due to street widths. That is true in the more congested areas without safety zones. Under such conditions it may be considered that the speed is set for the street cars, while as a matter of fact, it is actually set at the highest speed at which all vehicles can move. Today with the present system of traffic regulation and of parking and delivery of vehicles, etc., that prevails in Chicago, the street car is actually able to move through faster than vehicles can normally move through, so the speed happens to be the speed of the street car; but when we come to an installation like Broadway, where the street is wide and the number of street cars is relatively lower, then the street car will make a faster speed than before signal installations, and probably 12 miles per hour, including stops, while the automobile can go through at 22 or 25 miles per hour. This district will not seem to be affected by the street cars as Chicago's downtown district now seems to be.

Emphasis Laid Upon Flexibility of Control

It is this flexibility of control and the recognition that is being paid to it throughout the country that is the feature I want most to emphasize today. It is an engineering analysis of the peculiar situation with which each control installation is confronted, that should be given the most serious attention.

It matters relatively little what type of lights or standards one wishes to put in, whether there are two lights or three lights in the signal post. These are controversial points on which I may have definite opinions, but as long as there is a reasonable standardization of meaning of signals throughout the country, detail of design or location is not so very important. The important thing is to use engineering analysis and engineering skill in arriving at a way that will expedite traffic movement instead of slowing it down. Unless that skill is used and that result is accomplished, traffic signals are going to be handicaps and many of them should come out. Many of them must come out, and the traffic control systems in many cities must be turned inside out before real basic satisfaction in the handling of traffic is obtained.

I regret that I have talked so long. The other items that are involved are standardization of this particular type of signals, such as control of boulevard traffic streets, or control at such intersections that are pecu-

liarily dangerous or peculiarly subject to traffic accidents. Standardization should, therefore, always prevail, and a particular type of sign needed has not yet been generally adopted, and it has not had enough systematized attention to decide what is best. It is open for discussion and should be developed so all cities will have the same meaning for flashing red signals and the same meaning for flashing green signals or amber signals.

There are other somewhat controversial points, too. The question of pedestrian control has not been satisfactorily settled and is being handled in different ways in different parts of the country. It is very necessary to get a good solution, but in small cities you can get away with some things which can not possibly be taken into consideration in larger cities.

These are all controversial questions, and I can not express my views at this time, but if I can induce any greater attention to the planning and induce attention to the traffic engineering idea in city management, or produce for traffic engineering a better status, or encourage getting into it much more engineering skill, I will have served my purpose.

It is Possible to Vary Traffic Speed From Block to Block

CHAIRMAN GOODRICH: My own studies of this particular system have led to the belief that it is possible to vary the speed of traffic from block to block so as to take account of the different periods of cross traffic. Of course you need a considerable number of signs.

It is also possible in some instances nearly to double the speed of the vehicles compared with the street car so they run in different periods, the street car going half as fast, and therefore skipping each period.

There are numerous other schemes of that variety which can be included in this progressive system.

DR. B. L. CORBETT (Secretary, Milwaukee Safety Commission, Milwaukee, Wis.): Mr. McIlraith, did you recommend signals to operate on a 24-hour basis or turn off between the hours of 12:00 and 6:00 in the morning?

MR. McILRAITH: They are turned off any time. It may be some signals will work 12 hours, some 24. For instance if you have red, green and amber alternating, you can flash steady amber all night long.

There is one other feature I neglected to mention. That is, if it is set for 20 miles an hour speed, there is no chance of your overrunning that speed. It has the additional safety argument that you can not speed 25 miles an hour down a street which is set for 20 miles an hour. In the ordinary simplified system where they are all green along the street, at one time, there is a premium on fast driving, and you can introduce the hazard of the fast driver. Under the progressive set up, the driver gains nothing by speeding.

C. E. REDERER (Windsor, Canada): I want to ask a question with reference to automatic signals, where you have two or three blocks in sections of 300 feet, the next block 800 feet, another block about 300 feet. How do you handle that successfully? It is a matter that seems to be somewhat complicated.

NORMAN ANDERSON (Cleveland, Ohio): Under the direction of the City Railway Company there has recently been installed on Euclid Avenue in Cleveland a system of progressive signals such as has just been described. I drive that East Cleveland distance, probably three or four times a day, and can go from one end of East Cleveland to the other at 25 miles an hour without interruption.

CHAIRMAN GOODRICH: I would like to take a moment to answer our friend from Windsor. You have a 300-foot block. We will say it takes two seconds to travel that at the given speed. The green signal on the second block is set to start two seconds after the one on the previous block. The next block, being 300 feet, would also have a two-second interval. If the succeeding block were 900 feet, it would have three times two, or six seconds, so a progressive wave or green light would appear before the eyes of the motorist as he is operating down the street.

It is simply a matter of setting the signal to start the red or green at a given time.

H. S. BUTTENHEIM (New York): Would it be possible, before we change the subject, just to have a show of hands? I wonder if any city here represented, which has not been mentioned, has a progressive system in operation?

CHAIRMAN GOODRICH: I wish each one would stand and give the name of a city where the progressive system is in use.

(The following cities were named: Milwaukee, Wisconsin; East Cleveland, Ohio; Lynn, Massachusetts; Minneapolis, Minnesota; and Chicago, Illinois.)

CHAIRMAN GOODRICH: Washington has a partial system, Detroit has a partial system and so has Los Angeles a partial system. There are some others.

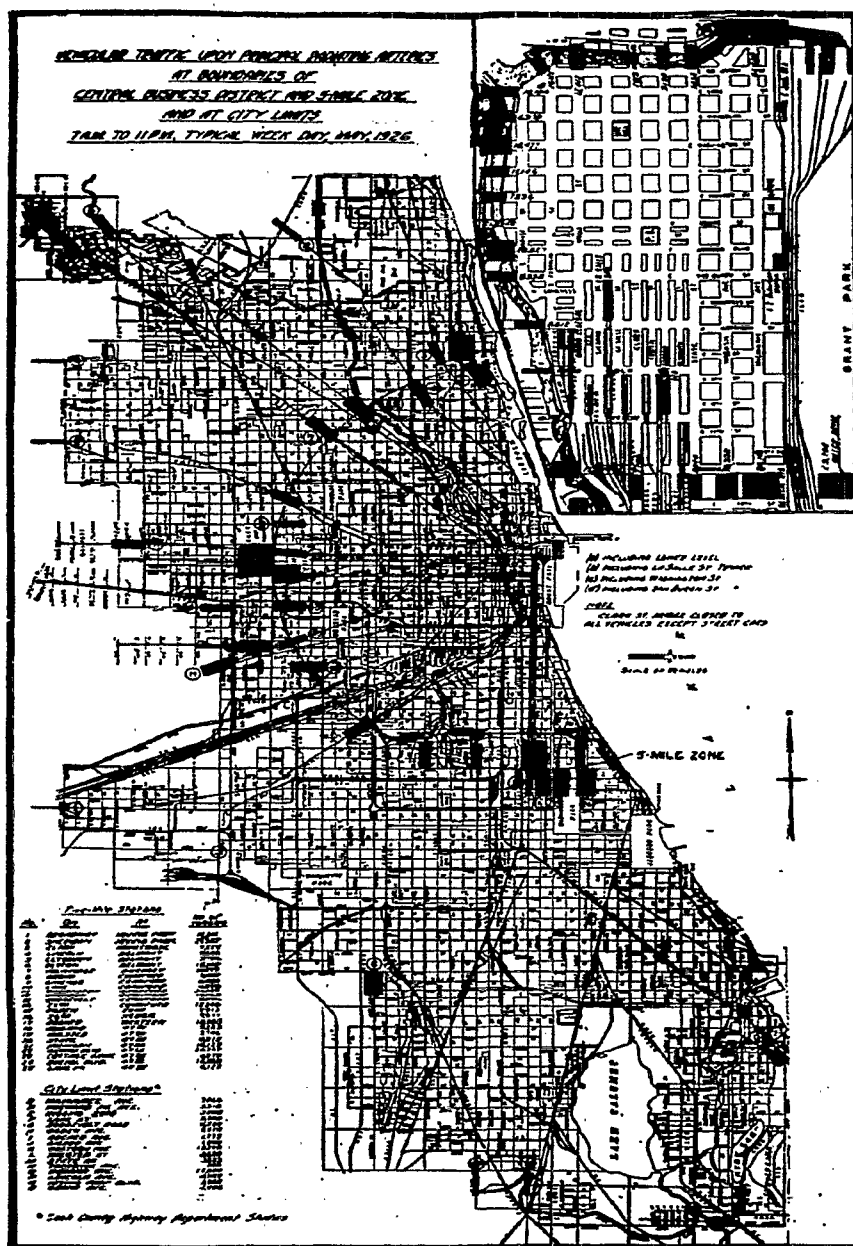
We will take up now the paper by Dr. Miller McClintock. If you will pardon the quotation, the first shall not be last, but pretty nearly so in this particular part of the program. Dr. McClintock is the man who wrote the first real book on traffic. He is Director of the Albert Russel Erskine Bureau for Street Traffic Research, and is attached to Harvard University. He has been doing excellent work in Los Angeles where a new code has been prepared, and he has been retained by the Chamber of Commerce of Chicago.

HOW TO MAKE A COMMUNITY TRAFFIC SURVEY

Miller McClintock, Director, the Albert Russel Erskine Bureau for Street Traffic Research in Harvard University, and of Metropolitan Street Traffic Survey, The Chicago Association of Commerce

The type of survey I will discuss is one designed primarily for the purpose of collecting facts which will assist in rational plans for the reduction of accidents and congestion upon city streets, through a better use of existing facilities. It should not be confused with community studies which are made as a basis for city planning work, that is, as a

FIGURE NO. 1



foundation for the improvement of street traffic conditions through the provision of new and more adequate facilities.

It is apparent that the traffic and physical conditions of American cities vary so widely that it is impossible to lay down detailed survey plans which will be universally applicable. Each city, because of its local peculiarities, presents a special problem. In the preparation of this discussion therefore, an attempt has been made to select methods which would be suitable to communities which may be considered typical.

Further, a statement of the details of a survey in a sizeable community would consume all of the available time with their mere listing. An attempt has been made, therefore, to give the general outlines of the survey and the principles which should govern it.

The Reason for a Traffic Survey

A question which naturally arises is: "Should a community feel it necessary to undertake a serious study of its traffic conditions?" The answer is that while the weight of the street traffic problem in the form of accidents and congestion is generally recognized by public officials and business men of most cities, those in charge of the problem are too apt to overlook the most obvious causes of the difficulties. Guess work in street traffic control is no more fruitful of beneficial results than in any other engineering problem.

And this brings me to the kernel of the situation. If the control of street traffic is to be dealt with as a purely political problem, as too frequently it is in American cities, then a serious attempt to collect facts is merely a waste of time and money. On the other hand, if the street traffic situation has reached a point where it can be considered as one demanding thoroughly rational action, it is time for the application of sound engineering technique. Such technique may be described as the process of collecting accurate data, and on the basis of these facts drawing warranted conclusions. There is no republican nor democratic method for handling traffic, but there is usually a fairly simple solution for most traffic difficulties, once their causes are understood.

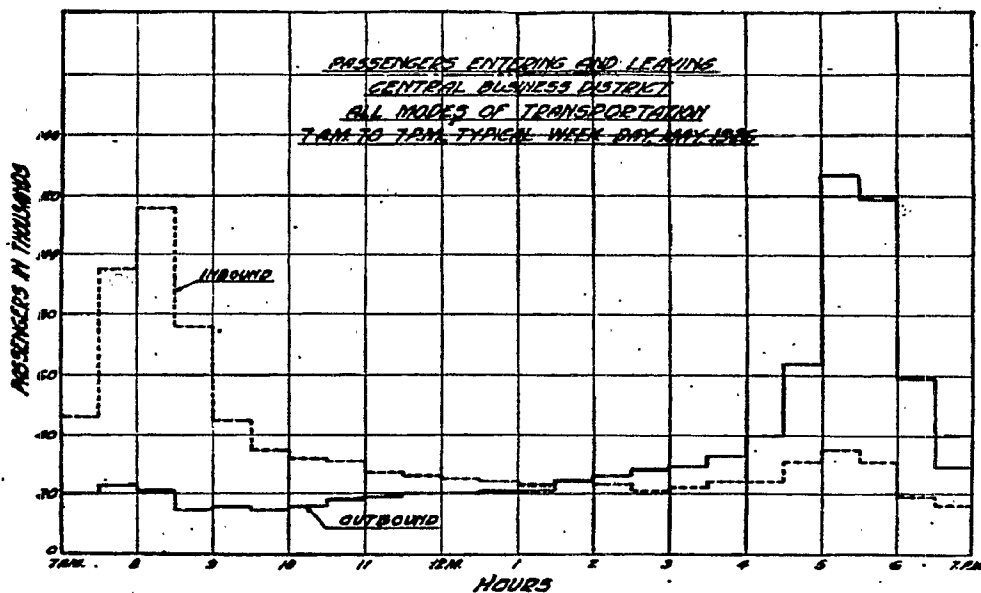
This entire discussion is based, therefore, on the assumption that the street traffic control problem is similar in its general characteristics to the other physical problems of municipal administration, such as, water supply, sewage disposal, street maintenance, and city planning, and that its solution or relief is to be found in a similar type of approach.

With this principle in mind I want you to think of a traffic survey, not as a study which is to be made, printed and filed away, but a study which is designed for the purpose of collecting information from which immediate results can be obtained. Moreover, it should be conceived as merely a first step in a rational method of dealing with the difficulties of street accidents and congestion. A single survey, no matter how skillfully designed, can not be of perpetual value. It should serve merely as the basis for a continuing and intelligent study of traffic difficulties.

The principles and methods of traffic surveying are by no means new

nor original except in their application. They have been used by public officials and public utilities for many years in dealing with the knotty problems presented by local transportation, telephone, gas, electric, water and other fields of public service.

FIGURE NO. II



Filed in ST & T Survey - general -

A successful survey requires both liberal public support and funds. These necessitate a suitable organization. The first problem, therefore, is to provide a body capable of sponsoring the work. Rather limited experience thus far appears to indicate that non-governmental groups are more apt to be successful in the initiation and support of such work. This is illustrated by the activities of the Los Angeles Traffic Commission, a group of prominent citizens with actual monetary interests in the traffic problem; in the conduct of the Metropolitan Street Traffic Survey by the Chicago Association of Commerce; and in the Traffic Survey of the city and county of San Francisco, under the direction of a committee of leading business men appointed by the mayor.

In all of these instances the entire cost of the engineering work has been carried by private subscription. The non-governmental character of these groups has made possible a liberal financing, and a freedom from some of the limitations incidental to official operations. The conclusion is by no means drawn, however, that public officials could not successfully engage directly in such work.

One of the advantages which results from a private group is to be found in the opportunities it presents to bring together the numerous and often antagonistic traffic interests. As your own experience will indicate, questions of traffic control are highly controversial. Matters relating to parking, the relation between motor vehicles and street cars, the operation of motor buses, the position of the pedestrian, and many others, often create real and sometimes bitter differences of opinion. Opportunities for free discussion, under the restraining influence of the facts which are revealed in the survey, frequently show many of these differences to be more imagined than real, and to open the way for mutually acceptable adjustments.

In the non-official plan to be followed for the body sponsoring the survey it is essential that care be used in its organization. It should be widely representative of all of the interests which feel that they have a stake in the use of the public streets. A list of those agencies which under no consideration should be left unrepresented might be given as follows:

Street Railways.	Motor Coach Operators.
Motor Car Dealers.	Insurance Companies.
Automobile Clubs.	Cartage Companies.
Retail Merchants.	Building Owners.
Taxicab Operators.	

The financing of the survey may properly come from this group, and a wider representation which may be added to it. More or less casual groups of business men who form organizations for the consideration of traffic problems are too prone to pass resolutions and let the matter lie at that point. On the other hand, when a business man goes into his pocket for \$4,000 or \$5,000 to support a project he is going to demand something more than talk. It will be apparent from your experience that local safety councils may serve readily as the basis for a survey organization.

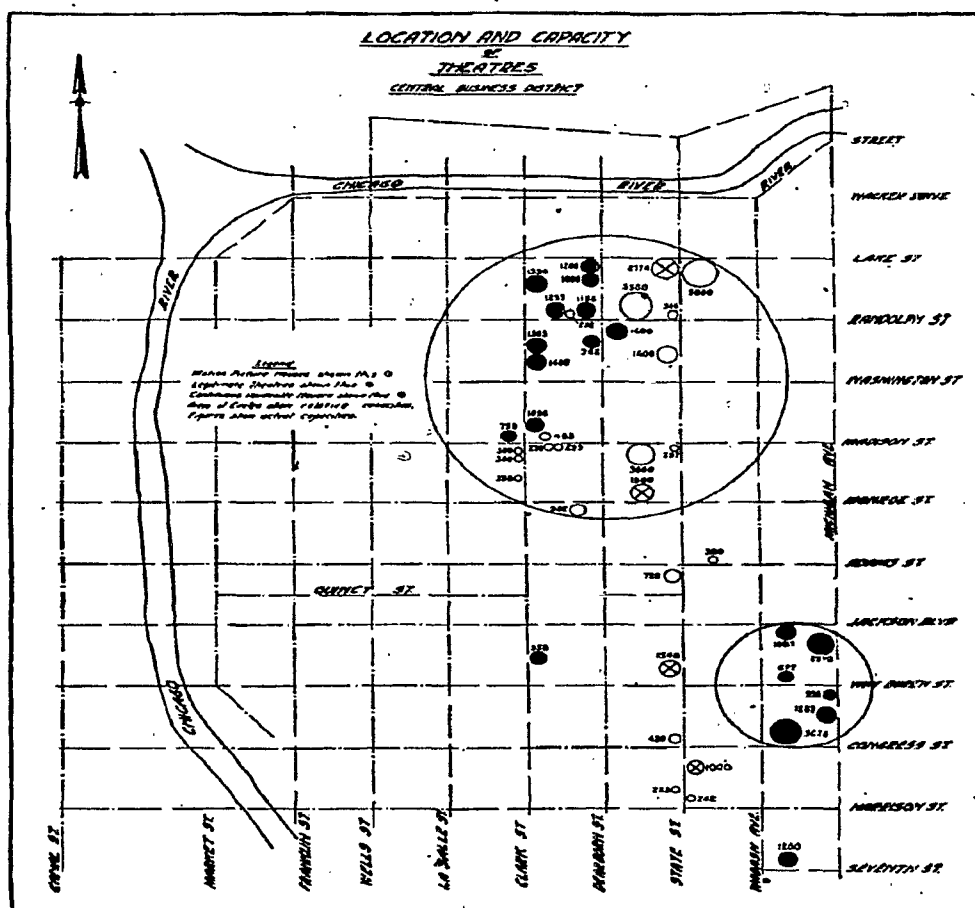
The sponsoring body outlined above will serve as a jury, or perhaps more accurately as a board of directors to pass upon the facts and conclusions resulting from the survey. The agreement of such a representative and responsible group upon proper recommendations naturally carries weight with public officials, and expedites the application of remedial measures that may be proposed.

The Technical Staff

Business men who may willingly give their time to such a committee as that outlined above, have neither the time, nor generally the inclination to engage in actual survey work. The next step, therefore, is the organization of a technical staff.

There are a number of courses that may be followed. In the recent past a number of engineering firms, especially those operating in the adjacent fields of city planning, or local transportation, have been manifesting an interest in the problem of traffic control. The services of a

FIGURE NO. III



At this point it may be well to clear up a misapprehension that has arisen in some quarters. The Albert Russel Erskine Bureau for Street Traffic Research in Harvard University was not designed for the pur-

pose of rendering professional traffic engineering service to American cities, but rather to assist in an approach to the problem through the collection and dissemination of sound information, and through the training of young men for professional activity in the field. Such surveys as have been conducted directly by the Bureau have been primarily for the purpose of developing a practical technique, and demonstrating the advantages of rational methods.

Conducting the Survey

Methods for the collection of data, will depend somewhat upon the funds available and the organization of the technical staff. Many of the investigations will be in the form of innovations, and these will require direct action by the staff. Large counts of vehicles requires the services of several score men for a considerable period in the larger cities and this naturally involves large expenditures. Where funds are available the best results will be obtained by a paid personnel, selected and trained for the work. Where conditions are favorable—and they are more likely to be in the smaller cities—volunteer workers can be used to advantage as checkers with definite instructions and adequate supervision. In one city members of the Chamber of Commerce gave their time for this service. In another a very effective check was made through the services of the Boy Scout organization.

Fortunately much of the information of basic importance to a comprehensive survey is already in existence in the average American city. The city departments should be able to provide information regarding the general physical characteristics and conditions of the streets. Efficient city planning organizations usually possess detailed data that are applicable to the problem of traffic control. The street railways, taxicab companies, motor coach companies, and trucking concerns normally keep useful reports of their operating conditions.

Their representation on the sponsoring body, and their understanding of the purpose of the survey will facilitate the acquisition and use of this material. Earlier studies of traffic conditions, even though local and special in character are serviceable where their accuracy is dependable for the drawing of comparisons. A full use of these and similar sources of information will greatly reduce the cost of a comprehensive survey, and will expedite its completion.

The physical scope of the survey will depend upon local conditions. Where funds permit, the investigations should extend out from the center of the community, so far as traffic effects local conditions. Little or no attention should be paid to political boundaries, for traffic does not heed them. Intensive investigation within the city will naturally be directed to those localities where traffic has proved to be burdensome, the principal arteries leading into and through the community, the more important outlying business districts and the central business district.

The subjects to be covered by the survey will be determined by local problems to some extent. There are certain data, however, which are

of general importance. For the purpose of conciseness the suggested subjects are listed below in outline form:

I. The study of existing traffic:

- A. A census and analysis of traffic flow at important points throughout the city, including data on the following factors:
 - 1. Volume.
 - 2. Direction.
 - 3. Speed.
 - 4. Types of vehicles.
 - 5. Hourly variations.
- B. A study of the operating conditions and problems of various vehicle types:
 - 1. Street cars.
 - 2. Commercial vehicles.
 - 3. Private passenger cars.
 - 4. Taxicabs.
 - 5. Buses.
- C. A study of the concentration of traffic in the central business district through the making of a cordon count on a typical business day:
 - 1. Total number of vehicles entering the district.
 - 2. Total number of persons entering the district.

II. An analysis of the parking problem; a study especially applicable to the central and outlying business districts:

- A. Capacity of the districts for parking.
- B. Current practice in parking.
- C. Amount of traffic obstruction offered by parking.
- D. Existing and potential off-street storage facilities.

III. Collection of accident statistics:

- A. Collection and tabulation of existing data.
- B. This is not a study that can be completed satisfactorily in a short period. The collection of accurate information over a period of months, and even years, is requisite for confident generalization. The report forms and methods of the National Safety Council are recommended.

IV. The relation between traffic and business:

- A. A computation of trucking and other transportation costs attributable to traffic congestion.
- B. The effect of traffic upon accessibility of retail establishments.
- C. The relation between parking and retail trade.

V. A study of physical obstructions.

- A. Street design.
- B. Pavement conditions.
- C. Private use of streets:

1. Merchandising.
2. Signs, posts, boxes, etc.
3. Building encroachments.
4. Storage of materials.
- D. Street openings.
- VI. The effectiveness of existing regulations:
 - A. Through street—stop regulations.
 - B. Left turn rules.
 - C. Operation of signal lights.
 - D. Overtaking movements.
 - E. Relation between street cars and vehicles.
 - F. Pedestrian regulation.
- VII. Study of police operation:
 - A. Enforcement methods.
 - B. Directive methods.
 - C. Adequacy of personnel:
 1. Numbers.
 2. Training.
 3. Equipment.
- VIII. Functioning of the courts:
 - A. Volume of cases handled.
 - B. Classification of cases.
 - C. Disposition.

Concluding the Survey

The materials of the survey when collected and analyzed, should be set forth in a clear and concise report. Emphasis can not be laid too strongly upon the necessity to present the data in such form that they can be readily understood. Several charts are incorporated in this report from the Metropolitan Street Traffic Survey recently conducted by The Chicago Association of Commerce to indicate graphic methods for the display of factual results.

The drawing of conclusions from the materials collected presents, of course, the most difficult and delicate part of the survey work. Few suggestions can be offered as to procedure. With sound facts available, however, reasonable men, even without a large degree of technical training, are likely to come to similar conclusions.

Recommendations to be drawn from the survey material will naturally fall into two classes: First, those rules for the regulation of traffic, which have been indicated as necessary. These should be formulated into a simple traffic code. Secondly, there will be inevitably recommendations for administrative changes to make the future control of traffic more effective. Specific details of such proposals will vary according to local political conditions. In all cases, however, provision should be made for the placing of definite responsibility over traffic control in some official or group of officials, and for the provision of suitable traffic engineering services for the future.

CHAIRMAN GOODRICH: I think we should tell Dr. McClintock we have enjoyed hearing his paper, also Mr. McIlraith's paper.

MR. REDEKER: There is a question that came up to me in Windsor. We instituted the automatic system and it has taken, as one of the speakers said, considerable traffic off the main streets. This particular situation has arisen: the complaint has come from business men, that due to the fact that much of the traffic now is taken off that street in order to avoid the automatic system, it does materially affect the amount of customers that come to these places of business. They have felt it to such an extent that some of them are objecting to continuing to pay the amount of rent for those places of business.

CHAIRMAN GOODRICH: The chairman had one such experience as that at least, in a certain city in the state of Massachusetts. After the traffic system was installed, which was recommended, the newspapers almost immediately came out with headlines that the main street was now simply a country town street instead of a congested city street.

The merchants, probably largely influenced psychologically by the newspapers in that instance, complained against the system, saying they were losing business. The facts were that business was being lost by other people in the city as well as by those merchants. There was simply a momentary depression throughout the community.

Merchants Often Mistaken About Automobile Business

Surveys made under my direction have disclosed that there is a wrong idea on the part of retail merchants as to the amount of business they get from automobile patrons. In one community, a relatively small town where the country people drove in on Saturday afternoon to do their shopping, complaints were made that the parking privilege which had heretofore been in existence and which was changed through the new regulations, actually drove patrons to other communities because the farmers had to walk one or two blocks to get to the downtown stores.

It happened that complaint was made on a relatively cloudy, rainy Saturday afternoon, and that in succeeding months there was no diminution shown in the amount of traffic. In fact they did more, because more people could get to the stores, rather than less because they had to park further away.

MR. POWELL: I might add a little testimony to that.

Our main street is also our principal shopping street, and at one time was our main thoroughfare. Our recent traffic efforts have been directed in driving through traffic away from that street so local traffic, which wants to patronize the stores, can get there.

Not long ago we undertook to clear up the street in the late afternoon, so when the traffic peak was on it could move faster. The store-keepers came to us the first week after the operation of that ordinance and claimed they were getting no customers after 4:30.

We had anticipated that and made a count. I asked them if they had,

and they said, "No." I compared our figures and they showed they were getting more business than they got before.

MEMBER: We are having a great deal of trouble in our community on the subject of left-hand turns. I am wondering if this is an appropriate time to ask what the cities are doing in left-hand turns?

CHAIRMAN GOODRICH: Left-hand turn practice at the present time is not standardized. There are a good many different schemes being employed in as many different communities.

JOHN J. GALVIN (Inspector of Police, Minneapolis, Minn.): I would like to ask the gentleman from Cleveland if the red light means, "stop and get killed by the man making the left-hand turn?" The question just asked is really a case for the Safety Congress and not the question of expediting traffic.

CHAIRMAN GOODRICH: This is primarily a question of safety. Safety, however, is coupled almost as closely as two things can be tied together with the handling of traffic. If traffic is delayed, it has been proven by statistics there are more accidents. If traffic is expedited too much, there are also more accidents, so there is a happy medium.

Making the Left Hand Turn in Dense Traffic

I will answer the first question first. Left-hand turns are permitted in some cities to be made from the center of the street and some from the right-hand side of the street. In some cases they have to be made around the center of the street and in other cases out of the center of the thoroughfare.

In some cases left-hand turns are permitted with the traffic. The complaint against that is that pedestrians are also moving with the traffic and are liable to accident from those vehicles making the left-hand turns.

In some communities the left-hand vehicles are not turned until after the vehicles have passed. In other places the left-hand vehicles turn before the vehicles pass, or whenever there is a gap in the traffic coming from the opposite direction.

We need standardization in traffic control, and the left-hand turn problem is one which is going to be as big a question as any. Some communities absolutely prohibit left-hand turns at any time.

My personal opinion is that red should mean absolutely nothing but stop.

MEMBER: How about the right-hand turn? If you stop, can you proceed on the red on the right-hand turn?

CHAIRMAN GOODRICH: That is a question differently handled in some communities. In some communities the vehicle can proceed and in other cases it must wait until the traffic has passed. It will depend entirely on local conditions, just as the two previous speakers have indicated.

The traffic at any intersection, and by and large, throughout the community, must be based on conditions in the community. Where a police official is on duty in addition to the red light, it is sometimes within his

discretion to indicate where the vehicle may turn, to left and right. Where there is no officer on duty, it is wise to make a rule and to adhere to it, and maintain it, perhaps change the rule after a few months' experience has been secured.

The best scheme seems to be to keep both turning vehicles back until just before the other traffic moves, and let them turn both right and left. So there would be introduced into the signal system, as at one point in Boston for example, the green to go, another combination of color to make the turns, another combination to stop and let the other vehicles pass on the intersecting street. In that particular case in Boston there is a still further signal for the pedestrians to move when all vehicles stop.

The Problem of the Pedestrian Always With Us

MR. PACKARD: Red always means stop, and when they put their signals in, that is the theory. Then we got a lot of complaints, as I guess everybody has, and we tried a new idea. We painted aisles in the streets. On a certain aisle the cars were supposed to go when they wished to make left-hand turns. Other aisles were for right-hand turns. We painted those aisles and permitted the left-hand turns on the private cars when the signal was red against them. The number of accidents caused by cars making left-hand turns was reduced 48 per cent over a similar preceding period of time when red meant, stop absolutely. Still we get the objection. What the answer is going to be, I don't know.

BERT N. WHEELER (Commissioner of Public Safety, Duluth, Minnesota): How are the pedestrians going to get across if they do not have the automobile traffic stop on the red?

MR. SHORNS (Detroit): I think along with your traffic discussion you will have to take into consideration the pedestrian. You have a problem here of vehicles that are traveling 20 to 25 miles an hour, and pedestrians going four miles an hour. I believe in Cleveland I was told that on a street extending 35 feet in width the average time of the amber light signal is insufficient for pedestrians to cross streets, and the inclination in our larger cities is toward wider streets, so we will have to give the pedestrian a separate way in which to cross.

CHAIRMAN GOODRICH: That is a very interesting problem, and one which has been discussed from time to time by practically every traffic engineer in traffic survey.

When I was in London a year ago, I went to examine the situation at the intersection known as the Elephant Castle. Five or six streets come in from varying directions. There is a very complicated movement on the surface. Pedestrians were almost taking their lives in their hands to cross that at the congested time of day. The authorities, therefore, built subsurface radii like those above, with a control area into which all pedestrians would feed and then take the turn which would lead them to their own streets.

I chose about 4:30 in the afternoon, when I thought the traffic would

be dense on the surface, both vehicle and pedestrian, and found it was as I had surmised. I was much interested in discovering how many people were using the surface. Two children on roller skates and I were the only people in the subway.

In the olden times in New York City congestion used to be very heavy at the intersection of Broadway and Fulton Street, and there was in those days a bridge over Broadway. I have a photograph of that bridge with one man leaning on the balustrade and looking at traffic below.

There is in New York what is known as "Death Avenue," along which the New York Central operates trains to a grade and on which there is a great deal of heavy trucking, and across which many people have to go at different points to reach the waterway on the west side of the thoroughfare.

The New York Central erected an overhead bridge for pedestrians. When this question was under discussion in New York City some years ago, I used to take some time about once a week to investigate conditions at "Death Avenue" crossing, where this bridge was erected, and on at least half a dozen occasions saw a total of one person using the bridge.

Many of the subway stations in New York are so designed that a person can go down on one side, cross under the street, and not have to pass through the turnstiles. On days of dense traffic it is very rare that a person uses those means of crossing. They prefer to take their lives in their hands, rather than go downstairs and upstairs. The question is whether such under-surface crossings should not be more used, but I personally believe until we put up fences which are pedestrian-proof, we won't be able to get them to go over or under thoroughfares.

Are there any other questions? If not, we will take up the regular order of business and listen to a paper by Burton W. Marsh, Traffic Engineer, Department of Public Safety, Pittsburgh. We have been discussing the physical side, and will now discuss organization.

ORGANIZING FOR THE CITY TRAFFIC PROBLEM

Burton W. Marsh, Traffic Engineer, City of Pittsburgh, Pennsylvania

From two and one-half million automobiles in 1915 to nearly twenty million registered today in the United States is a tremendous increase. This avalanche of some seventeen million automobiles is of course largely responsible for the modern traffic problem—one of the most serious problems cities have ever had to face, and a problem which, with its ever-increasing growth and complexity, threatens economic calamity to cities which do not courageously and effectively attack it.

The magnitude and costs of our unsolved present-day traffic problems are staggering. In traffic accidents alone, we yearly kill what would amount to one person from every thirteenth family in the city of Detroit and seriously injure about one-half as many people as live in that great city. Including property damages, it is estimated that traffic accidents represent an annual loss of \$600,000,000. If congestion, time losses, increased maintenance and operating costs, and similar losses are added,

the Hoover Conference estimates an annual total loss of \$20 for every person in this country, or a total of more than two billion dollars. Here are costs and losses we do not easily comprehend in magnitude. And the figure grows larger every year! Surely considerable expenditures are warranted in minimizing such losses.

What are cities doing today towards coping with their traffic problems? Numerous cities have realized that much of their present trouble may be traced to their inadequate streets and outlet arteries, irregular layout, and other inherited city-building faults. They have, therefore, made City Plans to correct some old errors and to avoid, as far as possible, mistakes in the future. In very large cities, rapid transit has become necessary. All such future planning now seeks to improve traffic conditions, and whereas some plans emphasizing centralization probably will complicate traffic problems, the best of such city plans embody real solutions to traffic ills.

But such plans are largely very costly, and even if they can be financed, they require long periods to be carried out.

In the meantime, there is always the "current traffic problem"—that of securing the most efficient and safe use of available streets and arteries. In this limited field there is much confusion. Common experience in cities and dissatisfaction of citizens indicate the general inadequacy of efforts to cope with the fast-growing current traffic problem. The muddle of opinions as to parking, the disorganized and confused use of streets, the wide variety of traffic signs, the inadequacy of knowledge of the fundamental causes of traffic accidents and how best to prevent recurrences, the generally unsolved pedestrian problems, the general ignorance of the public at large on many basic traffic matters—these all illustrate the need of—what?

Method of Attacking the Problem

In the first place, the need is for facts to replace opinions! There is a very evident need of more light on the various involved traffic problems. What are the real effects of no parking restrictions in certain districts? What are the extents of various demands on streets and how can they most justly be met? How does the elimination of certain turns affect the general traffic problem? What are the fundamental facts about the traffic problem?

Having the facts, the next steps in a logical attack on the problem are:

- (1) Effective analysis.
- (2) The development of improvements, remedies, solutions.
- (3) Putting the remedies into effect and checking results obtained.
- (4) Throughout all of these steps, a most vital work must not be neglected—that of "keeping the public informed." For the public must understand (if proper results are to be obtained) what is being done and why, and how to act under various conditions. It is in this field, perhaps more than in any other, that cities have the greatest opportunities for improving traffic conditions.

The above-outlined, common-sense procedure must be a continuous program to be adequate. There are constantly new problems arising, new factors entering the picture: new street car and bus routes, new streets and bridges, subways, pavement improvements, grade separations, new theaters, new ramp-type parking garages. Traffic counts must be kept up to date. The whole procedure is a steady job.

The question of the most effective way of carrying on this job—of coping with current and "immediate-future" traffic problems—is one which cities must seriously consider.

A first essential is proper organization, and few cities even including the largest, would claim that they are today adequately organized for their traffic problems.

What does constitute the usual present-day organization for coping with these complicated problems? Largely, the traffic police—a group of generally hard-working officers who largely through the hard school of experience have come to know much about how to handle traffic.

Complexity of Traffic Situation Demands Special Police

The traffic police, in general, have done and are doing excellent work. All over the country, however, those in charge of traffic police are crying for more men. The need for large increases in the numbers of traffic officers is quite generally realized, although the question of whether the existing personnel is being used to the best efficiency is frequently raised. The demands upon city budgets are so tremendous, however, that it is becoming quite generally obvious that other methods must be devised to aid in handling the traffic situation, because cities are not financially able to add sufficient numbers of men.

The increasing complexity of the traffic situation has brought out the need of specialized squads within the traffic police organization. Thus Detroit, Cleveland, New York and other cities have very effective accident investigation squads. Squads especially trained for brake, headlight, and over-weight testing, are needed. Officers trained for educational work exclusively, are also sadly needed all over the country—such officers to be teachers in traffic officers' training schools and to aid in the general traffic education of the public by talks in schools, in garages, at various safety meetings, etc. Detroit and New York are examples of cities which have provided such men. The demands for "special details" have become so important that they need special consideration.

In summary, the traffic police divisions in most cities are faced with a problem growing by leaps and bounds, and constantly becoming more complicated, with the needs of specialized activities emphasized. At the same time, these traffic police divisions are in general being forced, partly by lack of real appreciation by municipalities and the public of the true magnitude of their work, and partly by the financial limitations of the city budget, to attempt to carry on this ever-increasing work with, if any, only few and decidedly insufficient increases in the number of men to handle the job.

The need of developing other methods to aid in coping with the situation is a positive one. Many fundamental phases of the modern traffic problem are decidedly technical in nature and require careful engineering studies for their solution.

Just as "city planning" was found necessary in the problems of city building, it is becoming appreciated that there is another function which should be carried along to aid and supplement the work of the traffic police. This function may be called that of "Traffic Planning." The development of this work does not mean the elimination of traffic officers, and should not conflict with their proper work, but should rather aid and supplement it. If provisions are made for such planning work, the traffic police are enabled to concentrate more completely on their primary work of dispatching traffic, educating citizens on traffic matters, preventing violations where possible, and enforcing laws where necessary.

As mentioned above, the primary need in solving traffic problems is to secure the essential facts and then effectively to analyze them. For this work a traffic planning staff under trained technical direction is the proper type of organization, though in all such work the officials in charge of traffic police can be most helpful. A previous speaker has outlined in admirable fashion, "How to Make a Community Traffic Survey." The carrying out of such traffic surveys, including traffic counts, speed tests; the preparation of necessary maps and charts showing actual conditions, are all matters which can be handled best by some engineering traffic planning organization. Similarly, the design or selection, and erection of traffic signs, signals, and other equipment are matters where the engineer can be of real service. Analyses of traffic accident data, charting of results and development of preventive measures are all problems for which the engineer is best suited. Studies of segregation of types of traffic, street car, bus and truck routings, and the development of various inter-district routes, along with the preparation of necessary maps and charts on these subjects, are also traffic planning functions.

Methods of Traffic Planning

As stated above, other means of traffic control must be found than the constant addition of traffic officers, if for no other reason than the purely financial one. The recent development of electric traffic control signals and interlocked systems is the most promising step in this direction yet devised. In the development of the proper control system for any important district or thoroughfare, the experiences of several large cities have shown the tremendous importance of making a careful engineering study of how most closely to approximate the ideal in the system devised. The excellent downtown Chicago traffic control system and the good system on 16th Street in Washington, have been the product of careful engineering study. It is reasonably safe to say that the main future progress in this art will come through such studies. Here again are examples of proper traffic planning functions which many cities are today entirely incapable of carrying on in an effective, continuous fashion.

(1) There are at least three methods of organizing the traffic planning work. The first consists of employing an outside consultant to make a detailed traffic survey, building up a more or less temporary organization for the purpose. The usual conclusion of such a survey is a report containing many excellent recommendations. One important drawback to the outside consultant is the usually unwarranted, but frequently inescapable, aversion of local officials, and even citizens, to somebody from the outside telling them what they should do. Such pettiness may be on the decrease, but still exists.

Another great danger of this method is that those who should use the recommendations will be so busy with other affairs that they will not give the report proper consideration, and will file it away instead of carrying out its recommendations. This danger can be greatly minimized or eliminated (as evidenced by the outstanding accomplishments of Dr. Miller McClintock) by the consultant "carrying along" with the development of the plan, a sufficiently strong group of directly affected and prominent officials and citizens so that when the final report is submitted, this group will take up the work of getting it put into effect. Under such an arrangement, a logical step would be to have certain of the staff used in the survey, remain as permanent employees to aid in devising ways and means of getting the recommendations carried out, and to keep data up to date.

A Traffic Planning Organization Part of Local Government

Traffic planning work can not end with the presentation of such a report, or even with the execution of its recommendations. New studies must constantly be made and further solutions devised for the modern traffic problem is developing with almost hurricane speed. Hence it seems logical that there should be some permanent traffic planning group within the city government.

(2) This is the second method of organization—a traffic planning organization developed within and as an integral part of the local government. The greatest difficulty at the present time with such a plan, is to find the proper person to lead the technical staff.

No college turns out traffic engineers today, although some are beginning to give special work along this line. The only alternative is, therefore, to select some engineer who has had experience in some sort of traffic work (such as city planning traffic studies). Through study and experience he can develop effective leadership in such work. With only a small staff the engineer can begin to study the local needs, but he will very soon need an adequate working staff.

The staff should be of sufficient size to enable it to carry on continuously the necessary surveys, counts, investigations and studies, and to aid in putting them into effective use.

Under such a plan of organization, it may, of course, be advisable to have occasional consulting service from experts on particular phases of the problem. Thus, Pittsburgh may employ some outside consulting service on certain details of the downtown traffic control system.

(3) A third method of organizing traffic planning work, and one seemingly well adapted to smaller communities, is that of employing intermittent, or continuous part-time local consulting engineering service. At least one large city, Buffalo, uses this plan.

Other units in what seems to be a proper organization for traffic work, would include:

1. A responsible traffic head;
2. A traffic court (or in smaller communities, all traffic cases heard before one judge);
3. A traffic committee (or other means of securing active citizen and governmental support).

Each of these three divisions will be considered and then comparative descriptions will be given of the functional relationship existing between these various units in several of the larger cities which have been developing what now seem to be reasonably complete traffic organizations. In these cities most of the various divisions outlined are covered in one form or another, but the relations between them differ somewhat.

Advantages of a Special Traffic Court

It seems to me absolutely essential that there be some one official in responsible charge of all planning, administrative, and executive phases of the traffic work, including both the traffic planning organization and the traffic officers. The importance of centralizing responsibility on this as on any other important work does not need to be enlarged upon. Of course, such an official could not properly be in charge of the traffic court.

It is probably fair to say that the advantages of a separate traffic court are becoming quite generally recognized among the larger cities at least. The ever-increasing numbers of traffic violations of various sorts and the increasing complexity of the laws and ordinances governing traffic, call for a judge to become a specialist in this field, if even-handed justice is to be given and cases are to be handled with the necessary dispatch. A judge exclusively on traffic work comes to develop a technique for getting at the essential factors in the case. He quickly comes to detect flaws in arguments and to know those who are "repeaters", and to govern his decisions accordingly.

For most effective work, such judges should be removed in every way possible from the danger of political pressure and should not have short terms. Where such a traffic court is set up, good systems for keeping records are usually devised and plans worked out so that either as a direct adjunct to the traffic court or in a separate so-called "violations bureau", minor violations may be handled without the necessity of a hearing before the judge. Thus the judge is relieved of minor cases and can give his attention to the vastly more important major violations, such as speeding, reckless driving, failure to stop after an accident, etc. In smaller cities where a separate court is not warranted, considerable of its advantages may be gained by having all traffic cases heard by one judge.

It must be realized, of course, that only a small proportion of drivers are frequent traffic law violators, and only a much smaller proportion are intentional violators. In other words, the vast majority of citizens are law observers. Improvements in observance of traffic laws are brought about largely by a better understanding of simple and reasonable regulations by the public. This is one of numerous examples of the importance of active citizen support.

Especially in the early stages of working out an effective traffic improvement program, the importance of the active cooperation of citizens is too generally minimized. Though such cooperation and advice are needed most until an adequate official organization is fully developed and firmly established, it is my belief that such cooperation and advice should prove of inestimable value as a permanent policy.

Securing Active Support of Influential Citizens

In the solution of practically all traffic problems, there is the unavoidable clash of conflicting interests. The various types of conflicting interests may be grouped, however, and recognized representatives can frequently by discussion around a common table, come to an agreement after realizing all phases and analyses of the problem. Thus the necessary action is taken: whereas, the usual method of submitting an ordinance commonly results in concerted attacks on the proposal, and frequently a sorely needed improvement fails to be put into effect.

As to the method of securing such active citizen support, there is considerable difference among the cities. The following description relates to the method very effectively used in Pittsburgh. In other places, entirely different methods may be preferable.

Pittsburgh has a so-called "Better Traffic Committee" appointed by the Mayor. This advisory committee is made up of representatives of the main business interests directly affected by traffic, and of representatives of civic and trade groups. It also includes those representatives of the city government who must, by virtue of their positions, be the officials to aid in carrying out plans for improvements.

Much of the value of this committee has been brought about by the careful selection of prominent, active, civic-minded members.

The Committee's work is carried on by four sub-committees: (1) Engineering, (2) Traffic Flow, (3) Laws and Enforcement, and (4) Education and Publicity. These sub-committees consider and act upon recommendations of the Traffic Engineer and other city officials, and suggestions from citizens. They also initiate numerous projects, and develop ways and means of getting results. The sub-committees report at general committee meetings, where final committee action is taken. Certain recommendations are then forwarded to the proper municipal department or bureau for direct action or for transmittal to city council. Some are actually carried out by the sub-committee themselves.

The following two examples illustrate the valuable work of this committee:

(1) Pittsburgh was, it is believed, the first large city in this country to eliminate on a large scale, parking in its main business district. A critical street car service problem, narrow streets, an irregular lay-out, insufficient outlet arteries, bridge problems, and other factors made it essential that this step be taken. The recommendations were carefully considered by the committee and the desirability of the step agreed upon.

Ordinances were presented covering "no parking" and certain street car routing changes. The opposition which developed was tremendous. Had not this citizens' committee supported the Council and taken much of the burden off its shoulders by holding a considerable number of hearings with complaining groups, and effectively explaining the need of the no-parking rules, the regulation might have been defeated, or rather quickly rescinded by the insistence of the temporary opposition.

Instead of forcing traffic away from the downtown district, as it was stated would happen, counts showed that there was an increase in the traffic, comparing the period before the regulations were put into effect and one month afterwards. Instead of putting merchants out of business because of loss of private-car trade, investigation showed that, whereas there was a general business depression in the whole western section of Pennsylvania during that year which caused a falling off in the volume of business in the entire Pittsburgh district of three per cent, business in the district where parking was restricted fell off only .8 of one per cent.

The Better Traffic Committee Did Good Work

The Better Traffic Committee was very largely responsible for getting this measure adopted. Council and the mayor frequently want to do the right, but temporarily unpopular, thing to improve traffic conditions, and it is often of the greatest value to them to have a strong, non-partisan, respected committee willing to sponsor such recommendations, and to hold hearings, attempt to adjust differences, and explain the necessity for measures.

(2) Another illustration of the value of the committee is in important educational work now being undertaken. A large proportion of traffic difficulties in cities undoubtedly result from the fact that citizens do not know how they should act under various conditions, why various regulations are passed, and what they mean.

In the field of traffic accident prevention, the need of education is tremendous. The Better Traffic Committee is shortly to publish some 22 short illustrated, single-sheet statements concerning various fundamental traffic and traffic safety matters, 150,000 to a set. These will be widely distributed, and will, no doubt, produce most valuable results. Further, realizing the awful traffic accident situation, a Prize Essay Contest for school children is being inaugurated. Substantial prizes are being offered, some 100 in number, totaling some \$900. A one-year scholarship at a local college is also being offered.

The committee also aids in securing one of the most important con-

ditions for efficient development and prosecution of traffic movements—close cooperation and coordination between various affected city departments, commissions, etc., on all matters relating to traffic work. As has been stated, representatives of most of these departments and commissions sit on the committee itself, and are in this manner kept in close touch with projects under consideration. The importance of preventing over-lapping and of securing coordination can not be minimized.

The committee carefully avoids over-stepping its advisory capacity, and instead refers matters properly coming under departments or commissions sit on the committee itself, and are in this manner kept in close touch with projects under consideration. The importance of preventing over-lapping and of securing coordination can not be minimized. City Planning Commission and of a Department of City Transit, have a marked effect in determining what the proper scope of the traffic committee and the Traffic Planning Bureau should be. In cities where such functions are not provided for, it may be necessary for the traffic committee and the traffic planning staff to take over such functions, at least temporarily.

The support of the mayor and city council are, of course, essential. The committee, with its numerous prominent citizens and with constant evidence that it is not seeking to serve the advantage of any special interest or faction, has enjoyed most excellent cooperation from both the mayor and city council. Council has been quite liberal in providing funds and in setting up necessary positions, including the addition of 125 policemen, has shown a willingness to enact ordinances requested by the committee, and quite generally refers important traffic matters to the committee.

Points of the Adequate Attack on Traffic Problems

The Pittsburgh Traffic Committee had been operating so successfully that no need was felt, when the Hoover Committee on Metropolitan Traffic Facilities report was made public, to add any Official Traffic Commission. The plan of having the Traffic Engineer responsible to one official who also has the final control of the traffic officers, is believed to have many advantages over the arrangement under the above-mentioned Commission set-up. Other objections to the commission plan are divided responsibility, and the danger of the officials named being so busy as not to give adequate thought and consideration to traffic needs. Some of these objections may be only theoretical. At any rate, Pittsburgh has never formed such a commission. The suggested officials are mostly members of the committee.

Through experience, Pittsburgh is learning what changes and adjustments are necessary in its traffic organization, and is gradually improving it. It is believed that the general organization is one which will enable an "all-around" adequate attack on the various current traffic problems constantly arising, and with gathering momentum will bring about the development and execution of plans for traffic improvements, including:

- (1) The determination of causes of and contributing factors to traffic accidents and the gradual reduction of traffic accidents by applying remedies;
- (2) The determination of the most effective means of traffic regulation and control and the enactment of necessary regulations, and installation of necessary men or equipment;
- (3) The determination and execution of remedies for parking problems.
- (4) The effecting of the necessary minor street and roadway changes and improvements;
- (5) The absolutely essential education of the entire public on the fundamentals of traffic and traffic safety.

It is not claimed that the present Pittsburgh organization is perfect, but it is believed that it represents, as do the organizations of other cities to be mentioned, a tremendous step forward compared with the present very inadequate organization in most cities.

Supplement

Comparisons in Organization Forms in Pittsburgh, Detroit, Washington and Buffalo

The inter-relations of the various organization divisions mentioned above constitute an important functional question which has not yet, perhaps, been worked out ideally in any city. The following is a brief comparison of this functional relationship in Pittsburgh, Detroit, Washington and Buffalo:

In Pittsburgh, the Director of Public Safety is the responsible traffic head. To him reports the Traffic Engineer for the traffic planning phases; and through the Superintendent of Police, the Traffic Inspector for the traffic officers' division. An important point to note here is that the Director of Public Safety under this plan has direct authority over both the traffic planning function and traffic dispatching function. This point will be amplified in relation to the Washington organization. The director is a member of the Better Traffic Committee. All planning, statistical and technical matters are handled in the Bureau of Traffic Planning under the Traffic Engineer. All matters of traffic dispatching, assignment of officers to corners, educating of the public by officers, and enforcement, are handled by the traffic division under the Traffic Inspector.

The Better Traffic Committee is entirely voluntary and advisory, with a citizen chairman. The traffic engineer acts as the engineer and secretary of this committee, though the secretarial duties are in most ways an undesirable feature.

Traffic Court is under the direction of a magistrate appointed by the mayor.

Coordination and cooperation between city departments and bureaus are secured through membership on the Better Traffic Committee and through informal meetings and discussions.

With the present Pittsburgh organization, the following objections are noted:

(1) The duties of the Director of Public Safety are so considerable and exacting that he does not really have sufficient time to devote to consideration of traffic matters. The suggestion of the Traffic Engineer of Washington that an ideal organization would provide a Deputy Commissioner of Public Safety as Director of Traffic, who should either himself be a traffic engineer or have a traffic engineer as his principal assistant, is worthy of consideration.

(2) Insufficient personnel and funds in both the traffic planning bureau and traffic division.

(3) Not altogether satisfactory coordination between city departments carrying out functions relating to traffic.

The present Detroit organization consists of a Committee of Traffic appointed by the mayor, with a traffic engineer (who has a small staff) reporting to the committee in weekly meetings. The committee, and hence the engineer, are responsible to the mayor. The committee acts in an advisory capacity to the Director of Traffic. The traffic police are under the direction of the Traffic Inspector, who is the Director of Traffic.

Under this arrangement there is the danger of conflict between the dispatching and enforcement branch (the police) and the planning and legislative branch (the committee and its traffic engineer).

The accident investigation and prevention work in Detroit is one outstanding accomplishment of the organization there. The drivers' school to educate prospective operators before issuance of a license, and the violations bureau for minor traffic ordinance violations, are other outstanding features in Detroit.

The Organization Functioning in Washington, D. C.

Washington has a traffic court. In considering the remainder of the Washington organization, it must be constantly borne in mind that the problem is quite different from that of any other city in the country because the traffic organization, in addition to covering the customary city functions, must also occupy a position corresponding to the motor vehicle division of a state.

Washington has a Director of Traffic with an Assistant Director of Traffic who is the traffic engineer, and who has a working staff though, an evidently inadequate one. The traffic police are under the customary police head. It is understood that an at least potential difficulty with the original Washington organization plan has been the question of authority of the Director of Traffic over the traffic officers. As a matter of fact, there is a strong spirit of cooperation between the traffic bureau of the Police Department and the traffic director. It is understood that at one time, consideration was given in Washington to the creation of a distinct Traffic Department with traffic officers entirely separated from police in general. This would have certain executive and other advantages, but it would have serious disadvantages in the relations between the two separate police units, and in the questions of jurisdiction

between them. The separation of police units in such a manner is not generally favored.

Washington has an advisory traffic council composed of two members from each of the following organizations: Board of Trade, Chamber of Commerce, Merchants' & Manufacturers' Association, Commercial Vehicle Owners' Association, Automotive Trade Association, and American Automobile Association. A Washington official states that the value of such an organization depends entirely upon its makeup. If the appointees of the various organizations are men who have knowledge of traffic conditions and are selected for their fitness they can be of great assistance. If, however, they are merely picked on account of their personal prestige, without regard for any particular qualification, they are naturally of less value as advisors to the Director of Traffic.

Those working with the problem in Washington believe that better results can be obtained with the Traffic Bureau of the Police Department reporting through the Superintendent of Police to a Deputy Commissioner of public safety holding the position of Traffic Director, than would be possible with an independent force of traffic police reporting directly to the Director of Traffic.

The Buffalo Organization Has Several Differences

Consideration of an ideal organization in Washington has led to the belief that there should be a statistical division under the traffic engineer, charged with the preparation of comprehensive reports on causes of accidents, traffic counts, traffic flow maps, etc. Also it is believed that the installation and operation of electric traffic signals should be exclusively in the hands of the Director. The further suggestion is developed that the ideal organization should include an additional division for organizing school boy patrols, taking care of children on streets, and educating the public in general. The importance of a Violations Bureau as an adjunct to the traffic bureau or traffic court, is brought out.

An outstanding recent accomplishment of the Washington organization is the 16th Street traffic control light installation, which has brought about a reduction of traffic accidents of 58 per cent in the past six months as compared with the same period before the traffic signals were in operation.

The previous three organizations are either much similar or are developing towards a similar governmental organization. The Buffalo organization has several differences:

There is no active citizens' committee, cooperation being secured largely through numerous personal contacts. Buffalo had a citizens' committee, but for certain local reasons it did not make much progress. The mayor of Buffalo is the Director of Public Safety. The traffic division is in charge of the captain of traffic who reports through the chief of police to the mayor. The chief of police has a consulting engineer acting as his traffic engineer. In Buffalo there are weekly meetings of a "traffic committee" composed of the chief of police, the captain of traffic, the secretary of the safety council, the president of the motor

club, and the traffic engineer. This group to some extent constitutes a citizens' committee. To this committee all recommendations are submitted, and are discussed and voted upon. Authoritative action follows when the chief of police (with the approval in major cases of the mayor) issues orders based on the committee's recommendations. In general, no changes in traffic regulations are made without the sanction of this committee.

Buffalo reports substantial progress with its form of organization and cites numerous accomplishments. In general, it may be said that even this form of organization is not so different from the other cities' organizations, save that the planning function is carried out under a sort of contract with private local consulting service, and that the planning function is actually under the police department instead of being a separate function reporting directly to an administrative head in charge of both the planning function and the police department.

Making Efficient Use of the Present Street Facilities

E. J. REEDER (National Safety Council, Chicago, Ill.): It seems to me there is one point that applies particularly and ought to be investigated in connection with this question. That is, a distinction which ought to be drawn between the immediate problem of traffic engineering and the less immediate problem of city planning. In the last analysis they are one and the same thing, but we must remember that the purpose of city planning is primarily to lay out the picture of the way the city is going to be when eventually all these things are accomplished.

The problem we think of as being a problem of the immediate present is largely one of making most efficient and safe use of the present street facilities for moving.

I believe that is specifically the thing Mr. Marsh had in mind in presenting his paper. That is one of the problems that are of immediate importance in the present day and one which we must take into consideration when we are reaching out into the field of traffic engineering.

There are several ways, of course, to go about that thing. There have been surveys of various kinds conducted. I was glad to hear Mr. Marsh say that the specific and individual survey that is to close today and to be left up to the local people to carry on as they see fit, is not likely to be the most successful one unless there are proper facilities provided for the follow-up, and that constitutes the reason for men in the positions of Mr. Marsh and Mr. Simpson and others in traffic engineering in different cities.

The problem is one that is constantly changing and one which must have attention almost from day to day. We can make a survey that will represent the best judgment of the present day upon this rapidly increasing problem of traffic, and we may find that in a year and a half or two years the situation is quite different. That is the reason it needs constant and every-day attention.

The survey of the type Mr. McClintock and Mr. Marsh have spoken of is of particular importance to show the large pictures of the problem;

but I want to emphasize that we must at the same time set up machinery for handling the follow-up of that particular study after we have obtained the first picture, and carry it through to make the individual studies from time to time.

AUGUST VOLLMEYER (Chief of Police, Berkeley, Calif.): I should like to ask the delegates, if there are any here who have had experience in educational work, what success they have had with traffic in their cities, and what has been their program?

I will say Grand Rapids has had considerable success in organizing the Professional Drivers' Club. St. Paul has had success with their boy patrols.

I should like to know what other activities there are in existence in other parts of the country that would be useful to us in carrying on the educational work. Obviously the engineering problem is first, but all the engineering work is practically useless unless we count that in the human element, in our traffic problem. I should like to know what is being done to educate the public?

Educational Programs on File in the National Council

CARL SMITH (Cleveland Safety Council, Cleveland, Ohio): This gentleman has just asked for a large order, and we could spend all the rest of the evening and all the next day and two or three more days discussing it; but let me say this, for the benefit of some of the new ones here, that there are organized at the present time about 65 cities that have an educational set-up in the form of a Safety Council.

Now about 50 per cent of those cities employ a safety director, and in some cases, as in Cleveland, a staff of seven people. If I were to attempt to give you a set-up of our educational program, I would consume the next hour, and it would be the same way with St. Louis, Kansas City, and Grand Rapids.

I would like to say this: on file in the National Safety Council is a complete set of these educational programs, and they can be obtained, all that information can be obtained by anybody who wishes, by writing to them; or they would be glad to have someone visit your city and explain the value of the work that is being done by these councils.

I might point to the statistical report that was presented in this conference two or three days ago by Mr. Robb, where he pointed out that for the first eight months of this year analysis of accidents showed in 27 cities that had Safety Councils they had succeeded in having a decrease of five per cent in all traffic fatalities. Where they did not have Safety Councils backed by the communities, the reverse was true—they had a five per cent increase in accidents.

C. C. VARNUM (St. Louis Safety Council, St. Louis, Mo.): I would like to ask one question of Mr. Marsh. I would like to know what his experience has been in Pittsburgh on the segregation of various classes of traffic? I have reference particularly to the segregation of traffic such as street cars.

I know there is a situation that has arisen in St. Louis recently, which concerns this particular problem, and it has been our view that wherever traffic can be so segregated, there is a decided beneficial effect as well as a reduction of accidents.

MR. MARSH: We have not had anything in particular along that line. I will say that scheme of segregation does bring up one little point which I think might be of general interest. It is a special problem entirely, and relates to the entire segregation of the section between two parallel streets in Pittsburgh.

We have a big stadium there which seats about 70,000 people. We have developed a traffic plan for the big games at that stadium. We have the Boulevard of the Allies, so-called, leading from our downtown district. It unfortunately leads into another street before it gets out very far. On the Boulevard of the Allies only vehicles operate. Therefore, we have a high rate of speed on that street. There are few cross streets on either side. We have a very good situation, but all vehicles stop when they get to Forks Street.

We are routing street cars entirely on Fifth Avenue and allowing the Boulevard of the Allies during those particular hours to continue through the open district by taking all the street cars off, with the most unusual results. We have made a new record I believe in the recent game when about 50,000 people were able to leave that game in 18 minutes.

CHAIRMAN GOODRICH: To supplement perhaps what Mr. Marsh has said about segregation, we had some experience in Jersey City and also in Springfield, Massachusetts, which may be of interest to you in St. Louis.

Jersey City is located on a narrow tongue of land parallel to the Hudson River with relatively low land, a sharp bluff, and low land again to the west. To negotiate that bluff several viaducts and zigzag streets have been constructed from time to time.

Traffic Surveys Made in Jersey City and Springfield

A traffic survey was made in Jersey City some years ago, and it was decided to initiate an entire segregation of these several streets mounting the bluff, street cars being kept practically entirely on one viaduct, heavy motor traffic and motor trucks using the incline which was less steep but a rather longer route, and pleasure automobiles or the passenger cars being permitted to make use of certain other more direct thoroughfares. That was found highly satisfactory to the people in Jersey City, also to the motorists of each kind and to street car riders.

In Springfield, Mass., an endeavor was made to improve traffic conditions on Main Street. The through traffic was first given an opportunity to use a parallel thoroughfare close to the river. Then a number of street car lines were proposed to be shifted over onto an adjoining thoroughfare, leaving Main Street practically the shopping street through which the pleasure and passenger automobiles would go.

When the shifting of street cars was suggested, the merchants on Main Street protested vigorously because they wanted all street cars to go past

their stores. We told them they were narrow-minded and insular and various other things, but they still believed they were right. The shifts which were made in a few lines, however, showed that just as many people came to those stores after the street cars had been moved one block away as formerly. It is largely a matter of fear. If the segregation is carried out on a logical basis, it has been found in my experience invariably that it was eventually received and believed to be of advantage to the community.

Are there any other experiences? If there are not, I think we can consider we have had a very pleasant afternoon, and give the speakers a vote of thanks.

ADJOURNMENT

Home Safety

October 29, 1926

MRS. JAMES N. DOWNEY, Chairman
Chairman, Women's Safety Committee, Detroit, Mich.

The Home Safety Section of the National Safety Council convened at 9:30 o'clock in the Ball Room of the Hotel Statler, Detroit, Michigan, Mrs. James N. Downey, chairman, Women's Safety Committee, presiding.

CHAIRMAN DOWNEY: It is indeed a privilege to have been invited to preside at this first home safety session. When I tell you of the struggle we have had here (and perhaps you have had it in other places) to get a five minute speech on a program, perhaps you will realize that we feel we have almost arrived on this question. We have with us this morning the wife of the president of the National Safety Council and she has asked me to let her have just two minutes, so I am going to call upon Mrs. Scott at this time.

MRS. CHARLES B. SCOTT: - Madam Chairman and Ladies: having in mind the many courtesies extended to us through your gracious chairman, Mrs. Downey, and her able assistants, we visiting ladies thought it only fitting and proper that we should take this opportunity to present her with a small token of our appreciation.

Mrs. Downey, on behalf of the ladies of the National Safety Council, it gives me great pleasure to present to you this little remembrance. The flowers may wither and lose their sweetness but our regard and esteem for you and your co-workers will last always.

CHAIRMAN DOWNEY: Mrs. Scott, I haven't words to express my appreciation. I thank you so much and I am certainly overwhelmed.

This morning's program has been planned for the specific purpose of first pointing out the economic and social importance of home hazards and then for the discussion of the actual concrete method of solving the problem in the community.

To men must be given the credit of starting the safety work and they say, as the old saying is, "There is nothing new under the sun." I have been under the impression that until recently home safety hadn't been given any attention, but I was told this morning that it had been given attention in a little different way quite a long time ago.

I believe that the first safety work was started from an economic point

of view and so it is very fitting that our first paper should be along this line. We have two very able men in New York City, statisticians of the Metropolitan Life Insurance Company, who have prepared papers. We will hear at this time from Mr. E. W. Kopf, of New York City.

WHAT DO HOME ACCIDENTS COST THE NATION?

**E. W. Kopf, Assistant Statistician, Metropolitan Life Insurance Company,
New York City.**

We have all been accustomed to look upon the home as a haven of rest, security, and protection from the stresses of the external world. And yet there are hazards to life and limb in and about the American home which bring an annual toll of death and injury almost as great as that which arises in industry.

In fact, the 17,000 deaths or more which occur each year in and about the American home equal the deaths which arise in industry; they almost equal the deaths from hazards on our streets and highways. The one agency in society which exists for the protection of the very young and the old, the helpless and dependent, gives rise almost to the same number of deaths which have been the focus of attack for more than 20 years by the organized safety movement in American factories and workshops.

The hazards in industry have been brought sharply to public attention because of the interest of sociologists, economists and the managers of industry in humanizing the productive and distributive processes of society. The number of serious industrial injuries and deaths has been materially reduced, especially for certain of the large scale enterprises where the more dangerous processes are carried on. This includes such industries as the fabrication of iron and steel products, the steam and electric railroads, mines, and other important fundamental industries. The death toll on our streets and highways has also engaged the attention of our statesmen to such effect that two National conferences have been called under the auspices of the Secretary of Commerce for the development of ways and means for reducing the annual toll of about 22,500 deaths.

But with respect to the heavy toll of about 17,000 deaths and three million serious injuries in and about the home, little, if anything has been done. The facts, themselves, have not been brought to public attention. Would it not seem that as much attention ought to be directed to the chief agency for life and health conservation—the home—as to those agencies which deal with the production and distribution of physical goods?

In the field of domestic accidents, not only is there a lack of any statement of the facts, but there is even no definite approach toward the problem at the present time. We sorely need a definite recognition of this tremendous drain upon our vital resources and a broad-gage

approach on the part of agencies whose work can be brought to bear on this problem. We should recall that little more than one-third of these domestic fatalities occur among children under 15 years of age and a little more than a fourth among persons at ages 65 and over. There are organizations in the field at the present time which have facilities for reaching the home because of their interest in other social problems which affect the lives and destinies of children and of old people.

Close to two-fifths of these fatalities in the home are found to occur between the ages of 15 and 64 years, the main working period of life. Here there is an opportunity for all agencies which affect the lives of intelligent adults. All that is needed is the recognition of the extent of this problem of tremendous waste of life and a realization of the gravity of the serious disabling injuries which occur in or about the home.

The safety engineer in industry has done a good job, especially in specific locations. The movement for greater safety on our streets and highways is about five years old. Especially effective productive work has been done by safety engineers who have gone into communities and used the data such as now are available from the National Safety Council uniform reporting system, and injuries have been reduced on the streets and highways, and deaths averted. But with respect to the study and prevention of the 17,000 deaths in and about the home, and three million serious injuries, little, if anything, has been done in an organized way.

That more than one-third of these deaths, 34.4 per cent, occur among children in an environment which is expected to provide protection for the dependant and helpless should arouse the active efforts of every organization interested in the promotion of child health, child safety and child welfare in the United States. These young lives which are extinguished through exposure to domestic hazards are valuable lives, not only in the sense that economic productiveness has been cut off, but in the wider sense that possibly important cultural and higher values have been extinguished. Deaths from accidents among children occur among all classes of the population.

Early Text Books Upon Organized Safety Work

Much could be said also about the deaths from the exposure to needless hazards in adult life; the deaths of mothers and fathers which, in so many instances, occasion resort to agencies for the dependent, the disabled and the crippled. The large number of deaths in old age shows also the existence of preventable hazards for persons who have again become dependent upon the family circle for care and support.

I can recall very definitely about 1895 when the first text book on elementary hygiene and physiology was introduced in the grade schools, and I recall also the chapter on first aid and on accidents and injuries in and about the home. I also recall possibly 20 minutes of instruction from the grade school teacher at that time on what to do in case of injury in and about the home. That was organized safety work because those texts on physiology and hygiene were encouraged by the American Physiological Educational Association. Right now I want to say that the

work of that association has never been appreciated in public health or safety work. No one has ever given credit to those physicians and teachers who first began to teach hygiene to school children 30 years ago.

From our data for the industrial department of our company we estimated this figure of 17,000 deaths in and about the home each year. That checks in fairly well with the figures produced by Mr. Robb. He estimated 19,000. I suppose we could say that it is not less than 17,000 nor more than 19,000 a year.

Now, the problem of considerable interest to women is shown by this fact, that of the 17,000 deaths 9,000 are deaths of females and 8,000 are deaths of males. We were asked to prepare a figure on the economic loss from these domestic accidents. We were able to do that fairly roughly for males only and our figure is that there is an annual loss of about \$120,000,000 a year, and that loss means this: it is that amount which males contribute to the national wealth annually over and above what it costs to maintain them. It is not what these males would have produced, but it is the excess of the value of what they produce or contribute over and above the value of what they consume. One hundred twenty million dollars a year for males only. We haven't any idea of what the economic losses are from the deaths of females, but it must be at least that figure, or more.

Tracing the Causes of Accidents in the Home

We also have some facts on the nature of the accidents which give rise to this death toll in and about the homes.

We find first, that one-tenth of these domestic deaths is due to falls. Another tenth is due to accidental burnings and falls. Another tenth to accidental drownings in and about the home. Two per cent of the domestic fires. Two per cent of those deaths were due to accidents by fire. That, of course, excludes deaths by burns and by scalding. Two per cent, therefore, of the domestic deaths arose in the course of domestic fires. Two per cent of those deaths was due to accidents by poisoning and some three per cent to the accidental discharge of firearms.

There seems to be wide scope for the development of means for the study of the hazards which lead to falls. I looked over one of those very early text books—got it out of a second-hand book store, and one of the paragraphs had a slight discussion of this question of falls in and about the home. It warned against the rickety step ladder—against the defective stairway with no hand rails—the stairway with the hang-over, jagged metallic guard. The substitute for the step ladder—the rickety kitchen chair and sometimes the rocking chair. And it also warned against the bad placement of articles of domestic equipment. That was in 1895 and all of that, of course, holds true at the present time. These facts in respect to falls in and about the home ought, of course, to interest architects and experts in home economics and home design.

The next important group of injuries was the drownings; especially the drownings of young children which could have been prevented

Every day we hear about the tragic blunders which are made in abstracting articles from the family medicine chest.

There is also to be considered the hazards from cleaning substances used in and about the kitchen—the proper disposition and use of lye, ammonia, and strong soaps. Some efforts have been made to safeguard the dispensing of poisonous substances, such as carbolic acid, bichloride of mercury and other items which find their way into the family medicine chest. But this movement is still sporadic; no one has taken hold of it in a way which would make safety publicity continuously available to the public.

In our experience last year, out of 228 deaths from accidental poisoning in and about the home, we found that 104, or nearly one-half, occurred among children under 15 years of age. What a field there is for determining ways and means for keeping poisons out of the hands of children! Perhaps some of you will recall the epidemic of bichloride of mercury poisoning which spread over this country seven or eight years ago, following the first case of an accidental poisoning in and around Atlanta, Georgia. We kept track of the deaths which arose in the course of that epidemic in the nation due to bichloride of mercury poisoning. I suppose within six months we had 40 deaths, a cause of death which up to that time was comparatively infrequent.

One-Half the Accidental Poisonings Are of Children

As I say this movement is still sporadic, no one has taken hold of it in a way to make it available to the public, but this could be taken hold of by the manufacturers of pharmaceuticals, by associations of retail druggists and by agencies entering the home. That this affects children largely is shown by this fact that out of 228 deaths from accidental poisoning in and about the home, as I say, we found that 104 or nearly one-half, occurred among children under 15 years of age.

Another important group of deaths in and about the home, where public discussion with respect to it has had some publicity for more than 30 years, are those from illuminating gases. Three per cent of our domestic deaths were in this class. During the past five years health departments have endeavored to establish a standard code with respect to tubing used in and about the home to convey gas from the pipe to the hot plate. The engineers of the American Gas Association have been active in studying the manufacture of domestic gas appliances and the development of the devices attached to those appliances which would make their use much safer. Illuminating gas, one of the most useful substances in household economy, can be made entirely safe for use and the solution of this problem depends largely upon cooperation between the manufacturers of gas appliances, the engineers studying the proper use of such appliances and the general public.

The domestic conflagrations or building fire hazards have been attacked by the fire insurance group, especially by the National Fire Prevention Association of Boston. Each year there is a fire prevention week

and no doubt this work has done much good. Our committee on public accident statistics estimates there are about 2,600 deaths each year from fire in buildings. And, of course, in the control of the domestic fire hazard one must consider the situation. This phase of domestic hazards should appeal to architects, the city planning movement, real estate owners, the electric industry and other important groups in the further improvement of domestic construction and equipment.

Through the courtesy of the secretary of one of the largest accident insurance companies we were able to determine some of the facts on domestic accidents which occurred among adult males insured in their preferred risk department. Their classification of fatal accidents shows that the most important cause of death in their experience was poisoning by plants, insects and infections. The next important cause of death in and about the home for these adult males was falls from benches, ladders and roofs; and burns in burning buildings, falls on stairs, falls on steps, lawns and ice. There evidently is some very close connection between father and the family step ladder. The accident insurance companies have ever so many claims each year where householders in hanging pictures use the treacherous step ladder or some substitute for it.

The statistics for non-fatal domestic accidents are of prime interest. The chief cause of disability in non-fatal domestic accidents in this accident insurance experience, was cuts on bottles and sharp instruments which accounted for 16 per cent of the non-fatal accidents; and then falls on steps, lawns and ice, caused 20 per cent; falls on stairs, eight per cent; working around barns and gardens, six per cent, and collisions with inanimate objects, six per cent. The inanimate object is chiefly bed room chairs and all sorts of obstructions which crop up at night in the dark which are not there in the day.

The Council Is Taking an Important Step Forward

Now, in view of this very heavy death toll each year what should the National Safety Council do about it? The Council has taken an important forward step recently in instituting its effort to study and to encourage prevention of street and highway accidents. It took a most important part in industrial safety movements. As far as I have been able to determine this is the first session held under Council auspices, where the problem of domestic accidents is given attention. You say from the figures which I quoted that domestic accidents account for more deaths than occur in industry and for almost the same number of deaths which occur on our streets and highways.

Our suggestion is that the National Safety Council, temporarily, under its division of public safety, appoint a committee of representative persons; draft a program for consideration of the Executive Committee of the Council, and that program should be a statement of the facts available—of the facilities available for entering the homes of the entire nation; relationships which could be set up in respect, particularly to

organizations such as the American Gas Association, also the home economics groups—groups of teachers and the family case workers and agencies. Many details will have to be worked out in a consideration of this program but we are confident that shortly that program could be put into effect and that perhaps we could utilize agencies which are, at present, attacking the problem of public safety. It is quite possible that in teaching public safety it would also be possible to develop and teach domestic safety.

We therefore recommend that the Council take under consideration the formation of a committee broadly representative of the several interests in the Council and that that committee be requested to bring in a report on plans and scope and facility at the next meeting of this Council in 1927.

CHAIRMAN DOWNEY: I am sure we all appreciate that very fine talk. Not long ago in Detroit there appeared in one of our leading papers this startling headline, "The Street Is Safer Than the Home," so I am sure it will spur everyone of us, especially the women, to be interested in this home accident prevention campaign.

Our next speaker is one of the leaders in social service work in America. I think very often we lose sight of the close community of interest between safety workers and social service agencies. It is an honor at this time to present to you Doctor John A. Lapp of Chicago.

WHAT ACCIDENTS MEAN TO THE FAMILY

**Dr. John A. Lapp, President, National Conference of Social Work;
Director, Department of Social Action, National Catholic Welfare
Conference, Chicago, Ill.**

Madam Chairman, Ladies and Gentlemen: I beg your indulgence this morning. I have to tell you that I have arisen from a sick bed to come to speak to you here, and I am not able to give you a written paper such as I had intended to do.

The subject is a most interesting one—the relation of accidents to the home, and it is especially interesting to me because of my connection at the present moment as President of the National Conference of Social Work—for social workers are interested in the family—interested in the family above all else. In a fashion, our entire interest centers around the stabilization, protection and promotion of the family. Anything that interferes with the family—breaks it up, destroys it—therefore breaks up the home, is a disastrous thing in the life of the nation. And I believe most social workers devote most of their attention to means of keeping families on their feet, to means of protecting them against those causes which would break them down, and to means which would make them function just as complete as possible for the purposes they have been granted by nature.

We must remember that the home and the family is the basic institu-

tion of this country. Away back as far as we can trace in history we find the family, far back beyond any other institution that we can trace, and we know not how much farther back it goes, but we are assured that it must have gone far back, certainly, to the beginning of human relations. And so the home is in all respects the most vital thing in society, and, of course, in connection with the home comes the individual in the home. We must protect him, not solely for his own sake, but for the sake of his part in the family, in making the family do its part in the world's work.

I was very much interested to hear the previous speaker mention the fact that the first safety work began back in the teaching of hygiene. That fits in with what I have to say because that tended to strengthen the individual—tended to make him able to play his part; to protect him from breakdown and thereby protect the family from breakdown.

Things That Break Down the Individual's Resistance

There are many other things of a similar character that work constantly for that end. I have seen some very good movements for the betterment of the feeding of people. I have seen some very good text books, past and present, for the guidance of those who would feed the family, but this morning coming up on the train I saw a new one and I am not sure but what this will go a long ways toward stabilizing the family and certainly stabilizing the individual of the family. I found an advertisement in Harper's Magazine this week of a new book on foods and feeding and recipes and so forth. It was prepared by two very distinguished women and it was entitled "Feed the Brute." So we may expect in the future that we will have the brute better protected and, therefore, capable of performing his functions and preventing the breakdown of those functions in the family.

Now, then, social work centers around the individual in the family and what are the things that break the individual in the family? Well, first of all, there is sickness and I have come to the conclusion this week that sickness is an accident. I know it is an accident. I did not will sickness. I did not neglect anything that I knew how to prevent and yet sickness comes as an accident, but I am not going to discuss sickness today, although sickness is the great cause that breaks men down and makes it impossible for them to maintain families.

Secondly we have this question of accidents. We have accidents as a very important, a very significant cause of the breaking up of the family. And we see the very spectacular in accidents; we see it even more than we do in sickness. We see it so well in accidents that we have been legislating against the economic disaster of accidents so far as they occur within industry, but we haven't done anything with respect to sickness yet. That is largely because accidents are so spectacular that we can't get away from the sight of them. Even when we read about them, they spring up before us. We visualize them and therefore we are horrified at the conditions and we do all we can—first, possibly in prevention, sec-

only, in the economics of the situation, even going so far as to provide in many spectacular accidents to take care of the victims.

We have provided, under workmen's compensation laws, for accidents within industry, and some states are doing fairly well in protecting the family against breakdown due to accidents in industry. They haven't gone far enough yet in any state and they are far from being far enough in most of our states, but they are approaching the ideal, namely, that no person injured in industry need apply for charitable relief on account of that injury. An ideal workmen's compensation law would hold that as its motto, that no one need apply for charity because from the fund created by insurance they are paid the cost of their medical care; the cost of their hospital care; a goodly portion of their wages, sufficient to maintain the family during the time, and, therefore, they should be in no need, such as requires the intervention of social agencies, with the exception of need for temporary care.

But we come now to this question which you are discussing today. We find that the home which is to be protected against accidents is the one source of the worst kind of accidents that could possibly take place.

The Home a Great Factor in the Accident Totals

Accidents outside of the home take place largely with respect to workers and we have been providing so many protective measures that we have learned much of the way to protect the family. For example, when the worker is killed in an accident and leaves dependent children we have the workmen's compensation law, but when the mother is killed in the home and there are dependent children under 14 years of age, there are no means of keeping the family together.

But we find now that the home is a great factor in accidents. Seventeen thousand deaths in one year. Seventeen thousand, a large part of which consist of people between the ages of 15 and 64. Mr. Kopf mentioned that something over half of the accidents were among women. So we find that in the home this very greatest of disasters is the injury or death of the mother and in all probability in a good many cases, a large part of them in fact, the person injured or killed is the mother.

Consider the great extension of machinery in the home; the great extension of just such things as the electric wringer. In my own experience I have seen case after case, and heard of many, many others, of children and older people having their hands dragged into the automatic wringers and crushed, many of them thereby being handicapped for life. And that is only one of the modern automatic machines that is being put into the homes. These machines must necessarily be operated by unskilled hands—the most unskilled hands, and must be there where children and others who can not possibly foresee dangers are going to have access to them, and the only way in which we can prevent results of a disastrous character is by education of the parents to keep these things safeguarded (but after all it is a long job to reach parents and teach them to keep things safeguarded); and secondly, a campaign to get just as much of this

machinery made foolproof as possible and just as much proof against children—just as much proof against those who can not be expected to protect themselves.

So it is a very fortunate thing that the National Safety Council is approaching the subject of home safety, and from my point of view as president of the National Conference of Social Work, I should like to see this same idea brought forcefully to the attention of social workers throughout the country, for they are in a position to reach vast numbers of people. I have in mind that body of near-social workers at least, the public health nurses who reach the homes of the poor and the middle classes, and those who perhaps most need education; they are in a position, if anybody is in a position, to teach safety. Get the Public Health Nurses' Association on this job, as well as the teachers of the schools. I think probably in all respects the public health nurses and the family welfare agencies will reach the people more effectively, that you want to reach, than even the schools can possibly do.

There is the other aspect of this question which I want to bring to your attention because it is on the program of the National Safety Council—the Michigan Conference on Rehabilitation. Aside from this question of death which we have talked about, we have the three million people who have been injured in the homes, more or less seriously. Probably if we knew the facts we would find that a very considerable percentage of the three million are having some sort of a handicap put upon them for the rest of their lives, and among three million injuries we will find thousands of cases that need rehabilitation. And it is fortunate that social workers have been in modern times the leaders of public opinion, and have developed the plan of rehabilitation. It is very fortunate you have meeting with you the Michigan Conference on Rehabilitation. In the past I believe you have had a meeting of the National Conference on Civilian Rehabilitation.

Social Work Is Very Largely to Help Prevent Accidents

As I finish what I have to say, I feel inspired to write a better speech than I have given—to write more completely my views upon the subject that I have dealt with here necessarily in a cursory sort of way, because it does seem to me that we are right at the very heart of social work. I would like to have safety people impressed with the idea that they are social workers, too. I would like to have them impressed with the idea that it is a large part of the program of social work to prevent accidents; to rehabilitate the injured, put them on their feet physically and vocationally and I am very happy to have had the privilege of participating even informally in the discussion.

CHAIRMAN DOWNEY: I am sure you will all agree we are very fortunate in having Doctor Lapp on the program. We have a gentleman from Michigan with us this morning and he has just a little different angle from which to tell you about this home safety work, and I am going to

Introduce at this time Doctor Sidney G. Davidson, Superintendent of the Butterworth Hospital, Grand Rapids.

HANDLING ACCIDENT CASES IN THE HOSPITAL

Dr. Sidney G. Davidson, Superintendent of Butterworth Hospital, Grand Rapids, Mich.

Madam Chairman, I confess at this time a woeful lack of information and a great amount of ignorance with reference to the work of the safety council. I presume that your work is largely educational and as an evidence of the advance of the educational work, may I say that having been connected with hospitals for a great many years, it was only within the past three or four weeks that I was educated to the fact that there was a place in the safety council work for hospitals?

I can't bring to you the figures that Mr. Kopf has brought to you this morning nor perhaps much of the message that Doctor Lapp has brought; but let me take you down to a little town in Michigan with three hospitals, and just outline the work that is being carried on in one of those institutions.

A great many accident cases are brought there. In 1922 there were 749, and they have increased each year until, in 1925, there were 1,194 accident cases. And from September, 1925, until September, 1926, it had increased to 1,393 for that period. For 1926, from the first of January to the first of October, there were 1,039, of which 412 were due to automobiles, leaving a balance of 771 accident cases due to other causes. Of the automobile accidents during last year (and I am sorry to say that the hospital has not kept a very accurate record), up until 1925, 231 persons were struck by automobiles on the streets.

Fifty-five accident cases were brought in due to individual automobile accidents, that is, where the automobile ran off the road and hit a tree or telegraph pole or turned over in the ditch or something of that sort. Eighty-nine were injured in automobile collisions. Nineteen were injured when the automobiles were struck by trains and three when the automobiles were struck by trolley cars. Of this group of 231 people so injured, 39 died, 21 of them within 24 hours. One hundred and forty-seven of these people were hospitalized at a cost of \$15,000 in hospital bills, for which they were able to pay only \$7,000 and the community had to make up the difference.

A man buys a second hand Ford car for \$125 and he is working two days a week or three whenever he can get a job, and he pays for the Ford as he can and buys a little gasoline; takes two working girls out driving, and of course he drives recklessly. He has an accident. He is not injured but the two girls are. They are in the hospital for eight and ten weeks, and they have no funds. It is a community problem. The community has to pay for their care.

Only three of the accidents last year were due to children being injured by automobiles while going to or from schools, which is an evidence of the very fine work that is being done along that line.

Of the accidents for a year from October 1st, 1925, to September 30th, 1926, 444 were automobile accidents, 268 home accidents, 304 accident cases of people employed in manufacturing places, and then the balance—323—due to such causes as being bitten by dogs, falling off bicycles, playing basket-ball, volley ball and so forth. Fighting only one, fire-cracker accidents one; only three hunting accidents; 26 poisonings of one kind or another. Of this group 407 were hospitalized at a cost of \$34,000 of which less than 50 per cent was paid by the injured person and for which the community had to foot the bill for the rest. On the balance of those injured, 937, there was a cost in hospitals, for dressings, X-rays and first aid, of nearly \$10,000.

The education of these people, it seems to me, as Mr. Lapp just said, is a tremendously big job which is going to cover many years. Just Tuesday night a man and his family were driving out of Grand Rapids in an automobile, going to their home in a town 15 or 16 miles away, driving through another small town in the early evening. It wasn't raining either; it was a fairly clear night, and he drove his automobile into a moving locomotive on the main thoroughfare of that small town through which he was passing, and his nine-year-old son was seriously injured and died the next day. I don't know how you are going to educate a man of that kind.

Another Little Child Horribly Burned

As to the home accidents of which Mr. Kopf has just spoken—Wednesday there was brought into the hospital a little child of three years, horribly burned. Its muscles were hardened and charred. It had no feeling at all and died within a half hour after being brought in. The father, a poor crippled man, was out looking for work and the mother was hunting for some work so as to get some funds with which to keep the family together. There were several other children. The little three-year-old child was left home alone and got hold of the matches and set itself on fire.

We have, I should say, three different types of individuals to educate: the man of average or more than average intelligence; the person with less than average intelligence; and then that great mass of people who are loose in all of our communities who haven't any intelligence; and we ought to know when the accidents happen what type of intelligence it is on which to base a program of education for those different types of people.

Go back to the man of more than average intelligence. Doctor Lapp said that sickness was an accident. I think it is to a very large extent, and perhaps it might be necessary to educate that tremendously intelligent group of people—the physicians of our country. I have been trying

for three years to get the physicians connected with the hospital in which I am superintendent, to see the value of making that hospital a center for the physical examination of employees in the many factories in Grand Rapids. As soon as I mention it they say "State medicine," or some other such thing as that, or, that I am crazy and that nobody will stand for it.

I have been going around lately interviewing the employers and I think in time we might educate the employers to the advantages of that thing, for it has many, many advantages. I had the opportunity some years ago of being in the health department of New York City when we began physical examination of the employees in that department, and the first year I think less than 30 per cent of the employees would submit to physical examination. At the end of three years, all of the employees were coming in for their yearly examination. I talked with several employers of labor last week in Grand Rapids and slowly that thing is beginning to interest them, and the next big job for the public of Grand Rapids is to so interest the medical profession of that community that they will fall in line with a suggestion that means tremendous savings for the people and for the community.

The Hospitals Can Aid Safety Councils Greatly

I have come to the belief that the hospitals can add tremendously in giving to the safety councils of their communities information which will be available upon which to base an educational program, and it would seem to me that perhaps in those communities where there is a safety council, contact should be made with the hospital or hospitals in that community and they be asked to keep a separate record of the accidents. We are doing it at the hospital where I am. A record slip is kept of every accident case coming in—age, name, residence, sex, married or single, occupation, brought in by, from where, employed by, injured while at work, nearest relative, address, telephone number, surgeon attending, conscious or unconscious, serious or not serious, cause of the accident, whether the case was hospitalized or not, whether he was sent home, and when he died. And then, going on into the hospital, if the patient has been hospitalized the record of that patient is kept separately from the other records so that any time we are able to give the figures on our accident cases.

Now, that is not difficult. If you can not make contacts with the local institutions, contact can be made with the state hospital associations. There is one in nearly every state and contact certainly can be made with the American Hospital Association at its national headquarters. We, long ago, in the National Association, decided upon a standardized accounting system. This work very largely fits in with our accounting system and with the statistics we have to keep, and I am certain that when the contact is well made with any institution and standard forms are prepared and the institutions are asked to keep their accounts in that way, that they will realize the value, not only to the Safety Council and

the community, but the value to themselves, because there is a tremendous loss to the hospitals on these cases, unless there is, as we are so fortunate in Grand Rapids to have, a community chest which takes up the burden.

CHAIRMAN DOWNEY: We have now come to the discussion of the topic of reaching the home. It will not be necessary to discuss specific home hazards, as I think most all of us are familiar with that subject, but we will have discussions on what is the best method or how we can reach the community. We will have to limit our discussion this morning to six minutes, because it is very necessary for this room to be vacated at 12:00 o'clock.

A Center of Information Upon Employees' Health

LEWIS MACBRAYNE (Manager, Massachusetts Safety Council): I am very much interested in the remarks that the last speaker made relative to endeavoring to establish in his hospital a center of information on the physical condition of employees. It ought not to be difficult to sell that idea. In my own city of Boston we have in our membership one very large corporation that last year selected a group of 1,000 employees and gave them all a very thorough physical examination. What the examining physician did was to re-assure them as to the condition of their health or point out trouble which was about to develop and indicate the change of diet or whatever might be needed to correct it. The other group of employees, numbering about 1,000 was not examined.

At the end of a period of about 10 months the lost time due to sickness was computed in the two groups. In the group of 1,000 employees who had been examined and had received advice, there was a very large saving in lost time as compared with the other group. Translated into dollars and cents there was a very important saving, both to the employee and to the company in the group of people who had had that human engineering done.

The doctor spoke of the people who have almost no intelligence. We conducted in the Massachusetts Safety Council the first study I know of made of the habits of pedestrians. We examined the habits of 19,000 pedestrians. We selected five cities. The people in charge were usually trained police officials—lieutenants and traffic sergeants, and they stood on the intersections and watched what pedestrians did under two circumstances: when there was a traffic officer in charge of traffic, and when there was a heavy flow of traffic with no light control and no traffic officer. We found that out of the 19,000 pedestrians, 10 per cent in the five cities did absolutely nothing to prevent an accident. If the traffic officer said to pedestrians, "Stop!" the 10 per cent pushed their way through those who did stop in order to walk by the traffic officer; and sometimes when he said, "What are you trying to do?" they did not even know the traffic officer was there; and the corresponding group, where

we have the heavy flow of traffic and no officer, pushed their way through and walked out into the stream of traffic.

Now, at our general session here on Tuesday the statement was made that 10,000,000 Americans—relatively 10 per cent—passed through the hospitals of this country last year, and I wonder whether there wasn't a relation between the 10 per cent of the pedestrians we found and the 10 per cent of people passing through our hospitals.

The Army used to give the Binet Simon test and some 87,000 were found defective and they were told they could not go over the top. If we applied the same test in the hospitals and in the home, of course we would find the same proportion and the problem is how to reach them.

I have one interesting example that may be helpful. In one of the fleets of automobiles in our membership, the manager said, "What is the type of man whom I should discharge? I believe that a small group of my drivers are responsible for a majority of my accidents." And the engineer on the job said, "Discharge any man who has two driving accidents in one year for which he is responsible." Well, the manager said, "I have a chap who has had three accidents in six months for which he is responsible." The engineer said, "That being an unusually interesting case will you turn it over to me?"

Handling the Habitually Careless Employee

He interviewed this chap and he said, "Are you married," and the fellow said, "Yes." "Have you any children?" and the man said, "You bet your life, I have got five now and I expect another." The engineer said, "You can't afford to lose your job?" and the man said, "No, why should I?" Then he said, "We have decided that you are in the class of drivers whom nobody should employ. You should be discharged now. Of course that is the theory of these scientists and they may be all wrong. My own idea is that some of you chaps are having accidents just because you have accepted no responsibility, and I am going to arrange your discharge on this basis: you remain at work until you have your next accident and then you lose your job automatically."

The six months has elapsed since then and the man is still on the job. Now, if it were possible for us to say in the home, "You are going to lose your standing in the community the moment you are involved in another accident through your own carelessness," possibly we might salvage something out of what appears to be the "nut" 10 per cent of the community.

I have pretty nearly used up my time except to say that in the city of Boston in the last nine months we have had 75 deaths from automobile accidents, and 107 deaths from falls. We have had in the last three years a steady reduction in home fatalities from accidental causes and the only way we have been able to get into the home there is through the district nurses—the school nurses, social service workers and through the play ground.

We delivered a message in some 15,000 homes in the congested areas

this summer. In a previous year we reached some 20,000 homes through a little booklet, entitled "Common accidents in the home," which was written for the poorer people. There is an approach to the home through the social service worker and the nurse, provided we can put into her hand the message in such simple, direct form, that the mother will be able to understand it. In one of our cities once, I had 25 policemen ringing 2,500 door bells in the area where we had our accidents, and the policeman said to the woman—and she might be one of seven nationalities—"Read that carefully; there are too many children being injured on this street." The policeman being in uniform probably arrested the attention of the mother when I would not have done it if I had gone and talked to her as I am talking to you here. The problem is to dramatize and translate in such a way that the busy mother in the home will get something practical out of it.

Getting the Women to Help in Better Home Safety

FRED ROSSELAND (Manager, Newark Safety Council): We found in Newark, as I presume many have found in their own home city, that we have many more home accidents, both fatal and non-fatal, than industrial accidents, and we have just about as many home accidents as we have public accidents. In the non-fatal group the data are very insufficient and we can only proceed on what we believe to be an authoritative estimate rather than actual statistical information. We have found we were not getting very far with the home accident situation. As in so many other cities, we have a large foreign population. We have many Hebrews whose knowledge of English is very limited. We have many Italians and many Polish to say nothing of the other good people who come to us from foreign countries. These people do not seem to be interested at all in English printing, and our printed matter did not get very far with them.

We found that through the schools we were getting pretty good results, but that was not going far enough. We found that pretty generally the accidents occurred—those about which we secured a record—in the homes of what I presume social workers would call the middle class, and the lower class; not that the third group didn't have any accidents, but they did not seem to have so many of them, and we found that our attempts to work with the organized women's clubs of the community (and we have some splendid ones) did not get results particularly.

So now we propose to get one of these women's club leaders—and we have the matter already arranged—who has had experience in organization and who is a real leader, to undertake to organize some of the other women who have not had this organization experience, and carry out a rather simple and, we believe, a direct program for home safety.

The first thing they have already agreed to do is to conduct a series of meetings which Mr. Corn, the field secretary of the National Council, has originated and which I, for my own purpose, call a safety instruction course for social workers. That struck home with our people. They said

that we have such splendid social workers they would like to help, but they don't know just what to do about it. So we propose, through these lectures, to teach them what to look for—what to say and do to help in preventing home accidents—to help in teaching home safety.

Then we will ask that committee to go into the wards and districts of the city and distribute these printed safety instructions, hints and so forth, about which we have already talked. They will be printed in the different languages of the particular peoples to be approached. We are going to ask them to make a special effort to report dangerous conditions and dangerous practices. We have national surveys and community surveys and some of us know pretty well just what the dangerous conditions and dangerous practices are that may be found in the homes of the community; but I have found that people like to find out those things for themselves, and with the information which has been made available for me, I can direct their investigations and help them to see most quickly just what the hazards are—just what the dangerous practices are, and in the meantime they will be developing the data themselves and I think will be the prouder of their work and the more interested in it.

A Special Fire Prevention Campaign to Follow

Then we propose to carry on a special campaign which might be called a fire prevention campaign, although actually from my standpoint it is more of an accident prevention campaign, for we have found a number of these people, and there is no distinction as to who they are, are still using some of the dangerous materials for home cleaning. We have had a number of persons, grown up men and women, who were seriously burned, and I think in two cases very recently burned to death, through our old familiar and long-condemned practice of home cleaning with gasoline.

Then these women's committees will conduct what you might call safety mass meetings. In those meetings we will have the people addressed in their own languages. I am going to try to suggest to them what they shall say and I hope they will say it. That is much the same as with our foreign language newspapers. We provide them with material and others tell me that they use it.

We believe the home safety mass meeting following the safety courses for the social workers will be truly effective; and then, somewhat contradictorily it may seem to you, we propose to have this committee conduct our next women drivers instruction courses. Those courses have proven to be very interesting and well responded to in our territory; and again we find that automobile driving seems to have no boundary lines, and where a family may need many other things they also have an automobile and they contribute to the street accident hazards and are involved in them.

CHAIRMAN DOWNEY: We have with us this morning a Detroit man who is about the most enthusiastic safety man I have ever met and it is a

pleasure at this time to present Mr. Paxton Mendelsohn, who is chairman of the Fire Prevention Committee of the Detroit Board of Commerce.

HOME FIRES AND THEIR CAUSES

Paxton Mendelsohn, Chairman, Fire Prevention Committee, Detroit Board of Commerce

I have divided my important subject into four divisions. The first is, to compare the home fire hazards with industrial hazards. You do everything possible through the safety council and chamber of commerce organizations to protect the theaters, the hospitals, the factories, and the stores with all modern devices that possibly can be put into them or used in these places, but what do we do for the home? I don't think we do anything. The person at home has not even in most cases a fire extinguisher and has no sprinkler system. It is too expensive and he can't afford it or won't afford it. So what must we do? We must educate the people in equipping the home.

The next point is the things happening in relation to home hazards and accidents and in relation to fire, because fire is, as our previous speaker said, an accident. Mr. Kopf, I believe, told us there were 22,000 or more people killed in public accidents, and I am sorry to have to add to that by direct fire losses in the United States last year, 15,000 were killed and 17,000 more, more or less permanently disabled and disfigured; and out of those 15,000 deaths and 17,000 injuries it is appalling to note that 85 per cent are women and children.

Does that strike into the home or doesn't it? And furthermore while we have been sitting here this morning, every minute we have been here, there has occurred a fire some place in the United States, and also, strange to say, 85 per cent of these fires are home fires. One big factory fire of \$1,000,000 may be a tremendous loss financially, but against that one fire there are 85 home fires. In the home fires there may be only small losses and no accidents, but every fire in the home is a possible injury or death. That is why I talk to you about fire in relation to home accidents.

Now, what happens in the home? There are three places in the home where fires start. I know, I go to them. In the basement, poor housekeeping, rubbish and dirt. In the attic, again poor housekeeping—rubbish or dirt. Defective chimneys or so-called defective wiring in the walls, and it has been found in many cases that the so-called defective wiring is not defective or it was not when it was put in. Maybe it is made defective by the occupant of the home who is not an electrician and doesn't know when he is making the wire defective—overloading lines and putting in extra base plugs and so forth.

How to prevent these accidents requires education—absolutely only education. Do you know, ladies and gentlemen, that the great majority

of home deaths from fire last year were from inflammable liquids? I have been on a committee of the National Fire Waste Council which has been making tests on losses of life and accidents by fire; and we find that the greater number of the home fires are due to inflammable liquids, and second, electric light appliances. I wish I could tell you of an accident I knew of where a lady was cleaning her chamois gloves in a bowl of gasoline. In rubbing the gloves it made static electricity and burned her arms off. I wish I could tell you of the day I helped to take a burning baby out of a crib.

Now, how are we going to get in contact with the home? We can't go from door to door like a postman delivering mail. It is impossible. It might be done in a small town, but where you have a city like Detroit, or Chicago, or New York or Boston you can't make a door-to-door canvass to tell each mother and each servant maid and each occupant of that house what is there that they don't recognize or what they are doing that they don't know is dangerous.

Education Through Visiting Nurses and Children

There is one possible chance, as I see it—and that is through some of the ladies I see here—the visiting nurses; and I am going to get to their superintendents because if they were in fire prevention work and we could get the visiting nurses of the big cities to go from house to house and get them to teach what we know, we will get a closer contact than by any other means.

The next thing we have to do is get to the school children. That is old stuff, but if you will get to the school children you will get into the home. I know that you can not go to the school child with a high-tone serious talk, that you must do this thing or that thing; but play with them—make them interested in what the subject is, and they will go home and tell daddy and mother about what happened in school because they do it. My children do it. Your children will do it. They come home and tell you what happened in school and if it is funny or if it is interesting they will pay attention to it and remember it.

Perhaps some of you know Chief Rogers, the Fire Clown, who teaches by this method: He falls off of step ladders and he does everything in his act that he should not do, and the children and teachers think he is great. Then when he does all these things he reviews the subject and tells why he fell off of the step ladder and why the mop exploded under the stair steps. He first of all did all of these things that he should not do and made the children scream with laughter, and then he gets serious and tells them those things happened because of certain things. I happen to know a case down in Wichita, Kansas, where four years after Chief Rogers talked to a little girl she caught herself on fire and she saved her life by remembering from four years back what this funny, stupid clown told her to do.

I happen to be the chairman of a fire prevention committee in Detroit.

I am very glad to say our chairman of today is also a member of that committee. Why is she a member of that committee? Because she, as a woman, is interested in the work of public safety. Mrs. Downey is one of our points of contact with the home through the clubs of the women, because women will discuss things among themselves. They are interested if you will get to them. We have also on our committee of 20 people Miss Harriet Beard, whom you probably all know, Supervisor of Safety work in Detroit schools. Why is Miss Beard on the committee? Because she is interested, not alone in Public Safety, but in any type of safety. She is supervisor in the schools and our committee can only contact by having people who are interested and have in turn the contact to carry on.

CHAIRMAN DOWNEY: You have heard from all these gentlemen and I am going to call upon Miss Rose Brooks of Paterson, New Jersey, to tell us something about her work.

Paterson Women Interested in Safety Work

MISS ROSE BROOKS (Paterson Safety Council): We have started some constructive work in the prevention of accidents in the home. We really started it in a very indirect way when last spring we conducted a safety instruction course for women automobile drivers. We had a splendid turnout for that and over 500 women were enrolled in the course. At the end of the course we asked the women whether they would care to do permanent safety work and called their attention to the fact that there were more accidents occurring in the homes than on the streets or in the shops—our statistics which had been compiled, showed that very clearly—so we got together a group of the women and have organized what has been said to be the first women's division doing active safety work in the homes in the United States. The group has its own board of control. They meet once a month and are planning some constructive work. We have with us today Mrs. Shrantz who was a representative of that group of the women's division and I think she could tell you more than I know about it.

MRS. JULIA SHRANTZ (Paterson, N. J.): The Paterson Council pointed out to the women that there were many, all too many, deaths resulting from accidents in the home. When the women investigated the conditions they found the figures astonishing. For instance, the women's division found at the end of nine months, ending September 30, there were a total of 65 deaths from accidents in Paterson, and out of those, 35 were due to home accidents. It was more than 50 per cent of the total and something was wrong. We therefore started our campaign of education.

The first thing we did was to make a poster. We distributed it first by means of the Paterson Council poster bureau and then women carried the posters to their neighborhood stores. We have a volunteer group of women who will visit women's clubs at all times and tell the story

of these home accidents. In order that the women may tell the story well, each one of these volunteers—there are 12 of them—will all learn the same speech.

In addition to this we plan for the fall and winter to send a letter by means of the school children into every home and this will tell the mothers and fathers of the dangers there are in the home from falls, fires, burns, asphyxiation, piling things in the attic, stairways, lack of light in the stairways, misuse of gas and electricity. Altogether we have developed an ambitious program and we feel that in a year or two we will have educated home makers as to the danger of accidents in the places where they live. We also have an emblem and a pin that indicate the connection of our order, and we have our distinctive poster. We are placing it in all public places and we are asking the women to put it in all the stores and wherever they can find a place to exhibit it.

A Few of the Things Accomplished in Kansas City

JULIAN HARVEY (Kansas City Safety Council): All of the managers are intensely interested in the development of our home safety program. We have realized and we have talked for many, many months and years, I might say, of the only effective method in reaching the home and I hate to throw a discouraging note into any discussion, but I think we all agree it is one of the most difficult problems with which we have to contend.

I don't know what to tell you except a few of the things we have done in Kansas City—not nearly all the things we should have done. I hope the managers who are here this morning will pardon me for telling a story that I tell every time we meet. It concerns the matter of home inspection campaigns, and we are very proud of the record we have made through these campaigns, the ninth of which closed last week. To give you a concrete illustration of the results I might quote the figures Mr. Vernor used in the general session the other afternoon, which are to the effect that in Kansas City in 1922 there were 2,217 fires and after the campaign in 1923 it was reduced to 1,931, the succeeding year to 1,633 and last year, 1,430, and this year I am confident it will be under 1,100.

The first of these campaigns resulted in the return of 11,000 of these inspection blanks. The one that has just closed goes to over 60,000. These boys and girls in the different schools are not content with simply 100 per cent returns based on the enrollment in their schools, but in many instances they go out and canvass the neighborhood. We have had schools that go as high as 350 per cent, based on their enrollment.

The matter of home inspection blanks is a more or less routine proposition and if we have had any success in Kansas City, I attribute it to the fact that we have thrown into the campaign many stunts of various kinds to stimulate the children. We don't believe in asking any home owner to answer 25 questions for us. We confine it to five or possibly 10, picking out the principal causes of fire or accidents in the home. We award prizes. Some people may not agree that we should offer prizes.

Some people think it creates a wrong attitude on the part of the children or the school. I do not believe that at all. I think that regardless of our age, we always have an objective and if we can hang up as an objective before one of our young junior safety councils a banner or bulletin board, or something for them to strive for it is going to increase their interest. That has been the experience with us.

I wish I could tell you of the effect the campaigns have had on the matter of accidents in the home, but unfortunately we have not been able to assemble that information. We intend to continue the campaign in the future as we have in the past because of the success that these figures indicate.

We have had some discussion in reference to the lessons prepared by the National Safety Council on the subject of home safety and designed to reach the social workers, and I think that is one of the most distinctive forward steps that has been taken by our National organization in a long time. I think it presents a great opportunity, if we will go back to our respective cities and take this matter in hand.

The National Council will prepare the materials, but we all know that it is useless to have that material unless we will constructively go to work in our various communities and do something with it. The material, if properly used, will have wonderful results, not only along this line, but many others as well, and it means enthusiasm and optimism on the part of every community if we are going to get any place with it. Our visiting nurses association and many other organizations in every community present a wonderful opportunity for us to go to them with this course of lectures and instill in their minds great possibilities that can be accomplished.

Most Accidents Occur in Homes of Poorly Housed

E. WILLIAMS CORN (Field Representative, National Safety Council): Those of you who are not acquainted with me don't know that this is my hobby. I began thinking in terms of home safety immediately upon my relationship with the National Safety Council, partly because of the tremendous problem that it presents, and partly because of my past experience in family case work and family reconstruction.

I found myself confronted with the two horns of a dilemma, as I thought. In the first place the 75 per cent of these accidents we find occur in the homes of the poorly housed. I don't say they are poor, but they do occur in the homes of the poorly housed. The second place is that the homes of the poorly housed are occupied by people who are not easily reached in group life and do not have at present organizations that can be easily made accessible. The hill sections and the brown-stone fronts have their wealth and their societies, but Mrs. Marchinski doesn't have anything of that kind and generally her entire domain is the four walls of her home with the possible addition of the picture show.

So it seemed to me, knowing these groups as I know them and knowing

the people who have worked in these groups and with whom I have been associated for the last 10 or 15 years, that if we, through education and inspiration, could fill their minds full of this tremendous problem—the minds of the family case workers, the minds of the visiting nurses, the minds of deaconesses and assistant pastors, the minds of settlement workers and in certain instances the minds of the men who are doing the collecting for the industrial insurance companies of the United States—that we will get a group of people who are professionally going into those homes; and it was pursuant to that end that I took my pen in hand and tried to lay out a course of six lessons. I believe that if we are going to do anything in a large way in home accident prevention it is going to be through such a definite course of instruction.

Planning an Educational Series for Home Safety

I am going to tell you briefly what that course is—just merely give you the titles and tell you; if you want further information, write to the National Safety Council, 108 East Ohio Street, Chicago.

The first lesson I have chosen to use as a more or less inspirational lesson on the social aspects of home accident prevention, in order that we can get the picture. The second lesson is upon home engineering and equipment, preferably to be handled by an architect or engineer, who knows the tricks of the trade—the right kind of house building or rebuilding. Third lesson, preferably to be handled by a housekeeper, is entitled, "The house we live in," it is a lesson on good housekeeping and after all there are more accidents caused by bad housekeeping than any other one thing. The fourth lesson is entitled, "Out-guessing the children," preferably to be handled by a mother. It outlines the tricks in handling that little lad who is two or three or four years old, who has not come to the point of judgment or discretion, and keeping the hazards out of his way. The fifth lesson, with due respect to our fire prevention people, covers fire hazards and fire protection; and the sixth lesson is entitled "When accidents occur."

I am not trying to give first aid in this sixth lesson at all. A reasonable expectancy in the arrival of a physician in the case of an accident is from 15 to 20 minutes. The problem, therefore, is to keep your patient in comfort and out of danger until the physician can arrive. Resuscitation will be described. As far as fractures and sprains are concerned, I don't care if they know whether it is a fracture or a sprain or not. The treatment is exactly the same: demobilization. Hemorrhage—we don't want to fool with tourniquets or pads or anything of that kind. I am endeavoring to set out the pressure points so that we can take the patient by the arm or wherever the point of pressure should be placed to stop a hemorrhage, and through that I try to run in the idea not to get scared (because most of us are scared at the sight of blood) by saying that we have about four quarts of that kind of liquid in us and it won't all leak out of a little hole in a few minutes, so if you don't hit it the first time, feel for it again until you do stop it. In other words, I am trying to

give in my sixth lesson, just the little simple tricks of the trade that are necessary for the protection of the patient until the physician comes. I am decidedly interested in the problem, and I will be glad if I can give you any help as the months go on in the programs that you may undertake.

H. H. COFFIN (Oregon and Columbia Basin Division, N. S. C., Portland, Oregon): We began our safety work in Portland, Oregon, 20 years ago, both in the school and in the home. We have a letter there from the Japanese Government, from their educational department, asking how we are accomplishing results in our city. I have two or three concrete examples that I desire to leave with you, and possibly they will help.

In the first place we try to have one child in the various rooms write on the board a composition which is copied by the children and taken home. In that way we reach the home with some subject upon safety in the home. Then every morning the teacher asks the pupils, "Now, children, have you had an accident in the home since we met yesterday?" If there has been an accident the child is asked to make a report, and those reports are sent to the principal and turned over each week to the administrative department. If they were serious they are immediately telephoned in to our department and the visiting nurses department is notified, or the police officer may be notified. We use the firemen of Portland to reach every home. They make an inspection and if they see a hazard in the home they report that to the National Safety Council and in that way we reach every home in Portland.

The Insurance Toll Necessary for Fire Inspection

CAPT. G. R. G. FISHER (Illinois Manufacturers Association, Chicago): I would like to say a few words on this matter of home accidents. Of course, we all agree that the great thing is education. Do you know that the insurance companies of this country are paying six cents on the dollar for inspection alone? Just let that sink in. Six cents on the dollar for inspection alone. Now, inasmuch as there are five times more accidents in the homes than all the railroad and steamship companies of this country, I think we have a subject that ought to grip our hearts.

When you think of burns, accidental poison cases, falls, and so on; we have something we should try to remedy, but I just want to say a word or two about infections. The unfortunate thing is that in most of our homes we have too many substances that are absolutely dangerous. I wonder how many of you ladies or gentlemen know that when iodine is dark it is not safe and the trouble is when you go to the trouble to buy iodine you get it three times stronger or twice as strong as it should be and very often it is in a deteriorated stage.

I wonder how many here know that peroxide should not be used three days after the cork is taken out of the peroxide bottle? It is dead. The only thing it is good for would be to bleach the hair—I won't say anything more about that. Here is a thought I want to give you. When you buy a so-called infecticide or bactericide or germicide and the bottle is

colored, don't buy it. The fact that the bottle is colored shows it is not stable. I am sorry to say we in industry are being a little wary of mercurichrome because even those who are advocating its use say that it must be fresh when it is used. Therefore it is not practical either for the small industrial shop or the home because it may not be safe after 72 hours.

ADJOURNMENT

Junior Safety Council Representatives

(Luncheon)

October 29, 1926

H. O. ROUNDS, Toastmaster

Supervisor, Bureau of Public Safety, Police Department, Detroit, Mich.

The meeting convened at 1:00 o'clock in the Ball Room, Statler Hotel, Detroit, Michigan. Mr. H. O. Rounds, supervisor, Bureau of Public Safety, Police Department, Detroit, Michigan, acting as toastmaster.

TOASTMASTER ROUNDS: I take pleasure in presenting to you a gentleman known throughout the United States as one of the chief educators of the nation, the man who is the head of the public schools of Detroit, Superintendent Frank Cody.

FRANK CODY: Mr. Chairman and Boys: Here is where I am going to make a world's record for a short speech. I have enjoyed looking into your clean faces and have enjoyed hearing you eat. It has all been fine.

I particularly wish to congratulate you boys in this community and all other communities on the fine work you are doing for your classmates, not only in this state, but in every other state in the Union.

I look upon the work of safety education as just as important, perhaps more important, than any other subject taught in the schools. I know in Detroit last year we have had a fine record as far as protection is concerned. I think we had only about three fatal accidents in the school systems of this city. I am sure that to you, and to this organization, go the thanks of fathers and mothers all over the community.

TOASTMASTER ROUNDS: I see you all like to yell. They have a yell master down there, and I wish I could do as well as he can. We have a safety yell, and I want you to learn it, if you don't know it.

I am going to read it to you and you listen

"Stop, look, listen,

Before you cross the street,

Use your eyes, use your ears,

Then use your feet."

(The boys then gave the yell.)

TOASTMASTER ROUNDS: Fine! Now please be very quiet once more.

We are honored this afternoon by having with us a gentleman who is well known, and the society he represents is known all over the world, Monsignor John Doyle, who is Chancellor of the Diocese of Detroit, and who has charge of the parochial schools of the diocese.

RT. REV. MGR. JOHN DOYLE: Mr. Chairman, Ladies and Gentlemen, and Boys of the Patrol Squad: I am honored in having the opportunity to address a word to you of commendation for the splendid work that you boys are carrying on, in each of the schools throughout the school year. You boys, because of your youth, I believe, can not fully realize the responsible task you have and the tremendous good you are accomplishing.

I know that there are perhaps thousands of mothers in this city who every morning are worrying about their little ones on the way to school, but since the patrol boy has been placed near the school and is there to safeguard these little ones of tender years, that mother is relieved of her anxiety.

I believe also that that work is building your character. It is developing in you during these years when you are molding your character, an early sense of responsibility, of the obligation you have to your fellow men and the spirit of sacrifice that you must build up in your character if you are to be useful agents in society later on. These, I believe, from a selfish point of view, are the great benefits that come to you individually and personally.

Accomplishing a Good Beyond Estimation

You are accomplishing a good that is beyond all human estimation. No one will ever be able to tell the lives that have been saved through your efforts. No one will know how many have been saved from permanent injury throughout their lives, because of your efforts and because of the merits of your splendid work.

TOASTMASTER ROUNDS: I just discovered a gentleman in the house whom I want you all to meet. I want you to meet him this way; I don't want you to meet him in a business way, for I know you never will, for school patrol boys don't do things that make it necessary for them to appear before a judge. I want you to see Judge Bartlett, of Detroit.

JUDGE BARTLETT (Detroit): I only wish I was up there playing the violin instead of speaking here. I am a much better violinist than a speaker. I used to play first violin in Mr. Rounds orchestra, and I really can hold a position as violinist.

I didn't expect to talk here this afternoon, but as probably most of you know, I have a decided interest in children, young men especially.

I have sat there in court for a great many years and listened to the stories of frightful accidents and losses of life of beautiful children in our communities, and elsewhere. What a wonderful work, boys, you have started on! How many lives this will be the means of saving, not only in this community, but in other communities!

I spoke at a meeting at Battle Creek, Michigan, recently, gotten up by the Automobile Club, and there in a space of 12 to 15 blocks there were 18 or 20 thousand people in a small city like Battle Creek who were interesting themselves in this great, life-saving problem. Battle Creek, a small city, probably put on the greatest safety parade ever seen in the United States. It certainly was a great safety gathering, and every man, woman and child in that small city is sold on safety.

Boys, I am just going to give you a few little hints on how to be successful. I receive hundreds of letters during the year from young men who want to know what they can do, and I always try to answer them. They want to know how they can start life, how they can make headway, and I reply in this fashion to most letters:

Advice to Any Boy Starting Out in Life

Boys, you are starting now upon your careers. Remember that the boy who does anything wrong or takes anything that doesn't belong to him, or does anything selfish, is bound to make a failure of life. A fine boy will make a fine man.

You must take care of your health. You must study. Above all, you must work hard. The boy who is a drone and doesn't work hard accomplishes little.

You must, above all things, use every effort to secure a good education. What little education I got, I got through playing a violin at country dances, and I paid my way through Ann Arbor. I started out, boys, at 40 cents a week, pumping the organ in the Episcopal Church. I wasn't satisfied, so I struck for a raise of 10 cents a week and they wouldn't grant the raise, so I resigned promptly.

Then I was ambitious. I went ahead and worked myself through business college and high school and secured a position as bookkeeper, and I worked for over six years as bookkeeper. I tried to do that which was given to me, well. I tried not to slight anything. The boy who feels that he can get by in this world either on his parents' reputation or his good looks or pleasant manners is bound to meet with disappointment.

Boys, all of you want to make a success, I am sure. Father Doyle has covered most everything I can cover. You are on a great, life-saving work, boys. Don't forget that. Perhaps your efforts will be the means of saving 40 or 50 lives in the city of Detroit and hundreds of accidents next year.

You must remember that every eighth or tenth car contains either a reckless or drunken driver. This car is liable to strike you any minute. Last week I had seven cases of drunken drivers, where they went up on the curb and hit people, hit little children. So you are not safe, even on the sidewalks.

Carry this great safety work on! Remember the little children that were torn to pieces by automobiles in the United States last year. The loss of life was appalling. It is a national problem, boys. It is a problem you should interest yourselves in. When you see a man driving reck-

lessly, it is your duty to report him, get his license number and report him, because that man may kill one of your classmates.

Remember this, every time you write up one of those drivers or assist in apprehending him, you may be saving a human life. So let's continue this work. Let's protect the lives of the people in this community and in other communities. Let's fight for the lives of these children, and let's have a real "Father and Son Week," a real "Mother and Daughter Week" in the City of Detroit, not the kind of Father and Son Week where the father and son sit at a banquet and nothing is accomplished. Let's have a Father and Son Week where the father and son will pledge themselves to each other and not only protect each other's lives but protect the life of every child in this great community.

TOASTMASTER ROUNDS: In connection with the Safety Council there is a magazine called *Safety Education*. I presume you are familiar with it. It carries up-to-date ideas for safe thought and safe teaching that are available today. The editor of that magazine is present. She came all the way from New York, and I want you to see Miss Idabelle Stevenson, who is going to speak to you.

Greetings From the National Safety Council

MISS IDABELLE STEVENSON: I want to tell you that I am not the editor of that magazine. She is here, but I don't know where she is.

However, I do want to bring you greetings from the National Safety Council, and tell you that in the Education Division, the division that publishes the magazine, we feel that we absolutely could not do our work if it were not for you.

During the last four years I have been in every state east of the Mississippi river, and I would like to say to you that in every city I visited where they were getting a reduction in accidents of children, it was because the boys and girls in that community had gotten behind the work.

I am glad there are some girls here. You know, of course, there are about 20,000 children killed accidentally each year, and we know from the work we have done that you can cut that down 50 or 75 per cent. So I hope next year your goal will be to bring the number of deaths down to 10,000 instead of 20,000.

I want to congratulate you on the splendid work you have done in Detroit, and other cities in Michigan, and in Toledo. I hope you will all keep in touch with us, so we may tell other people what you are doing.

TOASTMASTER ROUNDS: Next I want to present to you a man who has been working days and nights and Sundays to carry on the safety work throughout the state. He is the representative of the Detroit Automobile Club, and is known as the Director of Safety and Traffic.

I take pleasure in presenting Mr. L. J. Van Schoick of the Detroit Automobile Club.

L. J. VAN SCHOICK: Mr. Chairman, Ladies and Gentlemen, and Life-Savers: We feel that the group of boys we have before us today are life-savers.

Before I go on with the program, I would like to have our group of state troopers over at that table please rise.

(The state troopers rose amid applause.)

They make up part of a group of 23 who are insisting on the school boy patrol and junior state police throughout the state. It is our habit to keep an interest in our boys, keep them on the job, and to put up three prizes, a loving cup and two American flags, for the school boy patrol in the state which does the most efficient work while on duty.

This is the time that we are repaid for the time that we put forth, when we can gather with a group of boys like this, who are out on the streets looking after school children. We feel we are repaid when we bring them together and see their smiling faces and the enthusiasm they show.

I am going to call on Wayne Hesseman.

(Wayne Hesseman then came forward.)

We are pretty proud of Wayne. He is the captain of Helmar School Patrol, of Jackson Michigan, which is the state winning patrol. It is with great pleasure that I present to the Helmar School and to Wayne, the captain, the cup we offer as the efficiency prize.

Helmar School Captain Receives Efficiency Prize

WAYNE HESSEMAN: The boys of the Helmar School State Patrol, of Jackson, Michigan, are very happy to accept this cup from the Detroit Automobile Club. We surely think it is far better than anything we have really earned, though we tried to do our very best.

This cup will be kept at the Helmar School so boy patrols may see it and try to live up to what it stands for.

MR. VAN SCHOICK: The second prize goes to No. 5 School of Battle Creek. We have a group of boys from Battle Creek who are running very close to the Helmar School at Jackson. In the group of boys we have from Battle Creek today are boys who have won the meritorious service medal.

They are: Roy Jarvis, Carl Dobel, Wayne Cornwell, Harry Wagner, Milton Winans, Wayne Brockway, Kenneth Ellerton, Mauray Selley, Charles Zeller, Joe Mellick, Jack Hill.

I would like to have those boys rise.

(The boys rose amid applause.)

I would like to have Hiram Tresenberg come forward.

(Hiram Tresenberg came forward.)

Hiram represents the school patrol of the Vine Street School of Kalamazoo, winning third prize. So it is with great pleasure and honor that I present your school with the American flag.

HIRAM TRESENBERG: Mr. Chairman, Fellow Patrol Members, and Safety Patrol Members, and Friends: In behalf of the Safety Patrol of Vine

Street Junior High School of Kalamazoo, I wish to thank you for this honor you have shown us. It is to the untiring effort of each member that we owe our success.

Although meeting with many difficulties in the beginning, we finally succeeded in organizing a patrol. We will try to make a better patrol for the coming year.

Mr. VAN SCHOICK: Will Wayne Cornwell of No. 5 School, Battle Creek, please come forward.

(Wayne Cornwell came forward.)

Wayne, I am happy to present to you the American flag, as second prize for doing your duty.

WAYNE CORNWELL: Mr. Chairman and Friends: In behalf of the patrol boys of Battle Creek, we accept this flag in recognition of our service on patrol.

I am sure I am expressing the sentiment of all the boys when I say each of us is glad we served on the patrol, because it has given us a greater sense of responsibility, loyalty and adherence to safety.

Mr. VAN SCHOICK: Sometimes the old folks wonder if these boys are doing a real good. It is hard to measure the amount of good work they are doing. It is hard to measure the number of accidents and lives they save. But in our school boy patrol in the state of Michigan last year there were 263 who won service medals. There were five who won medals for actually saving a life. So we know that through the work done by these boys five children are playing today that would not, had it not been for the patrol.

The groups that you see from Battle Creek, Kalamazoo, and Jackson are just a few of the 18,000 school boy patrols on duty in villages and cities throughout Michigan, and 11,000 junior state police in the country schools.

The Gold Medal for Saving a Human Life

Through his quick-thinking, Patrol James Kane, of Dearborn, Mich., saved a boy from being electrocuted, and I can not tell you the sincere honor it is to place upon this boy's chest the meritorious gold medal, the highest medal we give, for this act. So with great pleasure, I present you, James, with the gold medal. (Applause.)

I hope at each of the following Congresses we may have the chance to get together a group of boys and girls such as we have today. I want to assure you that I appreciate the opportunity and the honor of making these presentations.

TOASTMASTER ROUNDS: Will Ward Keith come up here? The last number on our program will be just a word from Master Ward Keith, of Toledo, who is going to speak to you for just a moment.

WARD KEITH: Members of the National Safety Council, Pupils of Detroit Schools, and Friends: On behalf of the Toledo Presidents of the Junior Safety Council, I want to thank you for this splendid dinner.

We are doing our very best to make Toledo safe, and we are here today to learn how to do better work this coming year than we did in the past year. Last year in Toledo there were 31 fatal automobile accidents. So far this year our deaths due to traffic accidents were reduced 60 per cent of what they were last year at this time.

This year we are paying special attention to home hazards and the prevention of accidents in the home, and through the efforts of our secretary, Mr. Jay E. Thompson, we are very hopeful that we may reduce the accidents in the home as well as on the streets.

Again I want to thank all those who have in any way made it possible for us to be here today.

(Cheers from the Toledo group.)

TOASTMASTER ROUNDS: That is fine. You can't imagine how much pleasure it has given me to be able to preside over this assembly.

We have now reached the end of our first luncheon, and I hope we have one every year whenever the National Council meets.

Before closing I want you all to stand and sing "Hail, Hail, the Gang's All Here."

(The boys rose and sang.)

ADJOURNMENT

School Safety and Junior Safety Councils

October 29, 1926

MISS HARRIET E. BEARD, Chairman
Supervisor of Safety Education, Public Schools, Detroit, Mich.

The program of this session, held on Friday afternoon, October 29, at 2:00 o'clock, in the Ball Room of the Statler Hotel, consisted entirely of pictures, demonstrations, and plays, making it impossible to present a detailed stenographic report.

The session opened with a showing of the film, "St. Paul School Police," accompanied by a description given by a representative of the St. Paul Police Department. This interesting film showed how the school patrols in St. Paul are organized and how they operate to protect the lives of the school children going to and from school.

The next number was a demonstration of safety instruction in the class room, presented by Miss Marie Sibley and children from the Hillger School, Detroit, who gave a delightful demonstration of safety games and the use of other safety material in a kindergarten class.

This was followed by a demonstration of a Junior Safety Council meeting, put on by the American Civic Club of the Balch School, Detroit, and Miss Mary McSweeney, teacher. The boys and girls of this club went through a regular Junior Safety Council meeting, including the discussion of various safety problems in the school and the trial and discipline of offenders against the safety rules.

Miss Doris Greenwood, Massachusetts Safety Council, then spoke briefly on the value of Junior Safety Council work and described the work of this nature that is being done in Massachusetts by the schools and the Safety Council.

The program closed with three charming safety plays—

"Bruin's Inn"

"How Knowledge Driveth Away Fear"

"The Runaway Ball"

These were acted by children from the Franklin and Poe Schools, Detroit, under direction of Mrs. Mabel Foote Hobbs, Consultant, Community Drama Service, Playground and Recreation Association of America, New York City, assisted by Miss Ethel Ann Cumming, Miss

Rhea Dalrymple and Miss Helen Doremus, of the Detroit schools mentioned. The plays presented striking evidence of the value of the dramatic method in expressing the safety idea, especially by and for children.

It is worthy of mention that the rehearsing of the plays, including the learning of parts by the children, did not begin until the preceding Monday, only four days being consumed in this work. In spite of this short time for preparation the plays were presented in a most excellent manner, due to their simplicity and naturalness and the splendid direction by Mrs. Hobbs. The costumes and stage settings likewise were effective but simple and prepared at very little cost. Copies of these plays with suggestions on costumes and stage settings may be obtained from the Education Division, National Safety Council, 120 W. 42nd St., New York City.

The entire program produced a deep impression on the hundreds of children and adults who witnessed it. One could not help feeling that through these demonstrations and plays both the actors and the audience caught the true spirit of safety to an extent that is rarely produced by formal addresses.

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