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TRANSACTIONS

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Incorporated

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Plan of Publication

THE TRANSACTIONS of the Twenty-second Congress of the National Safety Council are published in two volumes. The first, containing the General, the General Subject, and the Industrial Section sessions, is supplemented by a smaller volume containing the sessions of the Street and Highway Traffic Section, the Child Education Section, and Home Safety.

THE LARGE GENERAL volume is being sent automatically to the Industrial members of the Council; the smaller volume is sent automatically to members who are believed to be chiefly interested in those sessions. It may also be secured on request by other Council members.

THE PLAN OF PUBLICATION is the same as that adopted for the sessions of the Twenty-first Congress and found to be very satisfactory. It is a condensed record. The papers of each session or division of the Congress have been assembled, edited with care and discernment to abbreviate or delete the less essential portions, and the concise results are presented for study and reference. Although not "complete" in the sense that every word is reproduced, it is a readable, interesting record which emphasizes the memorable parts of each paper and address. The original manuscripts are on file in the Council Library, available for additional reference as desired.

ALTHOUGH THE National Safety Council endeavors to eliminate from discussion at its conventions matters which are not pertinent to its purposes or which are contrary to its policies, the Council cannot accept responsibility for the views expressed either in the papers presented or the discussions thereon.

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Council Purposes and Policies

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

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

Today there are 4,000 members, representing every state in the Union, and many of the Canadian Provinces. There are 400 foreign members. The membership includes industrial corporations, firms, individuals, public officials, schools, chambers of commerce, clubs and civic organizations. About 70 per cent are industrial concerns, including the big steel companies, the oil companies, most of the railroads in the United States, the automotive industry, and others of outstanding importance in our national industrial field.

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

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

Results of Organized Safety

Since the National Safety Council was organized in 1913, the national accident death rate in all fields excepting motor vehicle has been reduced 42 per cent. The motor vehicle accident problem is a comparatively new one, yet there are evidences of progress. Nineteen thirty-two, for example, witnessed the first drop ever recorded in fatal motor vehicle accidents—a reduction from 1931 of more than 12 per cent. Even prior to this drop in total deaths—which was partially the result of a decline in gasoline consumption—it was apparent that accidents among commercial vehicles had decreased; that grade crossing tragedies had considerably decreased during recent years; that deaths of school children had decreased; that deaths in states having effective license laws with centralized administration and in cities having community safety councils had increased much less than in other states and cities. These facts indicate that the engineering, educational, and legal remedies for the highway accident proble, are producing results where conscientiously applied.

Since the National Safety Council started as an industrial safety organization, the best results are to be expected in this field. Here spectacular achievements have

Certain it is that work clothes should always be changed for street clothes, etc., and should be kept in locker rooms where they will thoroughly dry in air.

The re-used oil should be freed from metallic materials and should be sterilized.

The workers should be taught never to use waste to wipe oils from the hands because waste contains bits of metal and dirt which may break the skin and open the way for infection. It has been found that a magnet will pick up plenty of such particles when the skin is wiped with waste.

The workers should be taught to rinse off the oil, etc., under running hot water with the use of mild soap rather than to use the cutting compounds for cleansing purposes. This holds true for the use of kerosene, gasoline, etc., as before mentioned.

Because dermatoses form such a large proportion of all occupational diseases and are often disabling, one should be familiar with at least the more important occupations that are exposed to skin irritants. Complete lists are almost impossible because almost any foreign substance can become an irritant if it is in continuous contact with the skin. But it is always possible to have in chart form a complete listing of all chemicals used in your plant. To this list should be added a complete chemical analysis of all new materials as they are introduced into old or new processes.

Against such a list, it is then possible to check up on the substances that are known irritants or that are known to cause dermatoses. Substitute a non-irritating substance for a known irritant wherever possible.

Give the worker every possible protection against contact with a known irritating substance. In addition to the use of protective clothing, the length of time of exposure each day should be reduced by a system of alternation of work.

Provide for cleaning down machines, walls, benches, and other surfaces. Make this cleaning frequent enough to keep the equipment and the air as free as possible from scatterable dust and to reduce to a minimum the contact of the worker with oils, dyes, and other substances used in the operation.

Make floors impermeable and keep them clean.

Paint walls so they will show up dirt and so they can be thoroughly cleaned and have them cleaned regularly.

Wherever possible, have machinery painted to show up oil and dirt, and keep it clean.

Put the workers in washable uniforms provided by the company and laundered by either the worker or the company. Even the American Rolling Mill Company tried this out with men handling sheet metal and found it paid.

Have adequate hand washing and other toilet facilities ready available in convenient places and provide ample shower heads to take care of peak loads.

Either supply soap and towels, or provide a routine whereby each worker has his own. If a scrubbing brush is indicated, make it a part of required equipment but be sure they are not harsh.

Supervise hand washing, bathing, and the change from street clothing into work clothes and work clothes into street clothes.

Put all toilets, washrooms, and locker rooms in charge of a cleaner who does nothing else but keep equipment and rooms clean.

Give the workers sufficient time for the routine clean-up on company time; you will find it does not take long, once a system is established. You will find that the reduction in dermatoses with reduction in lost time and increase in efficiency will more than pay for the effort.

ADJOURNMENT

Dust Problem in Industry

FRIDAY MORNING SESSION

October 6, 1933

The special session devoted to a discussion of the dust problem in industry was called to order by J. R. Allan, assistant manager, Industrial Engineering and Construction Department, International Harvester Company, Chicago, who presided. He briefly outlined the purposes of the session and then presented the first speaker.

The Mechanical Control of Dust

By E. O. JONES

Consultant, National Founders Association, Chicago

The speaker said in part: During the last few years, much has been written about the pathological effects of dust. From this material there seems to be some lack of agreement among scientists as to the pathological effects of these types of dust, their dangerous dimensions, the length of time one must be exposed to their inhalation, the density of concentration which is dangerous, and the extent to which they are directly causative or contributory to disease.

It is unfortunate that in the twilight zone between ethics and non-ethics, there are certain members of the legal and medical profession who are willing to take advantage of these uncertainties and capitalize on them largely for their own benefit.

When the foundry industry was confronted with the accusation that it harbored a potential health hazard, its leaders immediately took steps to study the problem, with the object of eliciting all the facts and determining upon a course of procedure to eliminate the causation. This study has been under way in some localities for some time, but its procedure presents many difficult problems.

The mechanical control of dust is not our only problem, nor does the accomplishment of such control depend upon large expenditures of money. We know from experience that gradually human ingenuity will provide ways and means to this part of the problem.

But let us digress from the subject to consider the amount of dust we as individuals create. Take the molder, for instance, who goes to his bench at the start of his day's work. He reaches for his air hose, and starts the day by removing, with its force everything he can from his equipment. In close proximity to his bench,

or on the window sill in front of him, you will usually find a varied collection of relics. He will usually wet down his sand pile, but seldom his floor or gangway. When he is through with his shift he usually grabs the air hose and proceeds to take a compressed air bath.

And we have the foundry laborer: he has many menial tasks to perform. When he sweeps or uses a shovel he seems to be of the opinion that his efforts are judged by the atmosphere he creates. If he does sprinkle the floor it is usually done very sparingly.

Shake-out men and crane men seemingly give little attention to the results of their thoughtlessness. Grab buckets are usually lifted to the limit of their lift and then dumped. Many companies have furnished equipment, such as positive pressure helmets and respirators, to employees who work in extremely dusty atmospheres. But it is surprising to note the apparent lack of interest on the part of the employee for whose protection this equipment is furnished.

From these remarks some may say "Why shift the responsibility?" Not a bit. We have merely cited these few facts as an indication that possibly we can improve the supervision. If we make every man responsible for the cleanliness in the vicinity in which he works, and every foreman responsible for his department, and then in turn make the superintendent answer for the cleanliness of his shop, we will not have to worry about the increase in labor cost. After dust gets into the atmosphere, it is, of course, very difficult and expensive to remove. Keeping the foundry floor off the ceiling is a man-size job.

Ventilation is a problem everywhere. A diligent survey of our existing equipment may develop the fact that by small expenditures we can improve conditions. Inspect your dust-arresting equipment. See that the rapping device is in order, that the screens are in good condition, we suggest that they are rapped and the hoppers emptied regularly. Repair any leaks in pipes. See that the valves close properly. Chutes should be kept in good repair and when emptying arrestors, respirators should be worn by the men whose duty it is to perform this work. If refuse from the arrestors is not removed at once, keep it in containers or wet down until it is removed. Above all, watch your air velocities and make sure you are removing at the source as much of the dust as the equipment was originally designed to do. You pay for the current the motor consumes to operate your suction equipment, therefore get the proper return for that expenditure.

Do not store or allow sand to accumulate around your blasting equipment. Make sure you are receiving the proper air changes in your sandblast rooms. Inspect your masks to the amount of air purging through. The wearer is prone many times to just crack or partially open the valve, and when this is done he is not getting the full protection for which the helmet was designed. We suggest that the helmet be removed from the sandblast room and stored at the end of the day in a dust-tight cabinet, instructing the wearer to clean before re-using.

In your cleaning rooms where tumbling barrels are used, we deal again with air velocities. Piping should be diligently inspected and kept in good repair. Make sure traps are performing the service they were designed for. It might be well to keep floors in this department wet down. Remove the day's accumulation of refuse at the end of the day's run. When cyclones are used, make sure you are not exhausting at the level of windows which may be opened in other parts of your plant.

We will have to look for further co-operation from the foundry equipment manufacturers who serve our industry. Equipment will have to be sold to us not to meet existing codes, but as dust-tight as human ingenuity can design them. After the equipment is installed, it will be the purchaser's responsibility to see that it is regularly inspected and maintained to perform the service for which it was originally designed.

And we refer again to the employee's responsibility. When he elects to work in a foundry, he should be willing to co-operate and wear the safety devices which are provided by his employer, and it will be the purchaser's responsibility to see that the equipment is well cared for and properly maintained.

Our industry is a basic one and we hope that it will long continue to be essential. For this reason we want to assure those who are sitting on the side lines that it is our determination and hope that, with the help of those in the medical profession who have given so generously of their time in scientific study, we can soon determine the actual extent of the hazard.

In the meantime, while many diverse opinions are being brought into agreement, it is imperative that we give more than passive assent to suggested measures of precaution or improvement. The accomplishment of worth while results depends upon the diligent and active co-operation of everyone concerned and the utilization of all known means of prevention and control. Only through united effort can we hope to accomplish an effective program which will give maximum of advantage to employers and employees alike, and to such an end we are confident the foundry industry will continue to dedicate its earnest and conscientious efforts.

How to Determine the Dust Content of the Atmosphere in Dusty Industries

By DR. E. G. MEITER

Director, Industrial Hygiene Laboratory, Employers Mutual Liability Insurance Co., Milwaukee, Wis.

The importance of atmospheric dust as an agent in the causation of respiratory disease has long been known. However, it is only within the last few years that this subject has achieved medical and legal importance in dusty industries. Because of the extension of compensation laws to include occupational diseases, and through an ever-increasing number of legal suits against industrial concerns by employees claiming disability due to dust inhalation, there is need for a severe attack on the problem of eliminating or otherwise combating the dust hazard. In order to intelligently control the dustiness of the air, the amount of dust present must be determined. With a given dust, two factors are usually considered: (1) the number of dust particles in a given quantity of air, which is usually expressed in millions of particles per cubic foot of air; (2) particle-size, usually expressed in a size frequency distribution curve, that is the percentage less than stated size is plotted against the size of particles.

Instruments Used for Determining Atmospheric Dusts

Many instruments have been devised for determining the dust concentration in air and it may be well to give a brief historical review of this subject. The South African investigators began using the sugar tube method for the sampling of atmospheric dust in 1911; the same method was used by the U. S. Bureau of Mines as early as 1914. By this method a measured volume of the dust air is passed through

a tube containing granulated sugar, which filters out the suspended dust. At the laboratory, the sugar is dissolved in water and the number of dust particles are determined by counting those in a small volume of the sugar solution under a microscope. This method of dust sampling had certain disadvantages, the chief of which was the fact that the purest commercial sugar contained a certain quantity of dust, which introduced considerable errors, especially in those samples containing a low dust concentration. To overcome the limitations of the sugar tube method various other devices were developed, one of which was the Palmer apparatus. This apparatus consisted essentially of a pear-shaped glass bulb, the lower end of which terminated in a U-tube or trap. Suction was applied to the glass bulb by means of an electric exhaust fan and the volume of air measured by means of a Pitot tube. Dust-free distilled water was put into the U-tube. The air drawn through the water in the trap broke it up into a spray within the larger portion of the sampling bulb, which washed out and retained the dust. The dust so obtained was analyzed by the usual methods. The Palmer apparatus also had certain disadvantages, the chief of which was that its efficiency as a dust catcher was low. In the search for a more portable type of instrument, which at the same time would yield rapid results, the South African investigators introduced in 1916 a new instrument known as the Ketzé konimeter. The konimeter samples dust by impinging a small volume of air against the surface of a vaseline-coated glass plate, the vaseline serving to catch the dust particles. The dust retained on the glass plate was then counted under the microscope at a suitable magnification. The chief disadvantages of the konimeter are that in atmospheres containing a high concentration of dust, the spots are too dense to allow counting the individual particles and the method can, therefore, not be used in such cases, also many samples had to be taken to secure a correct average determination in places where the dust concentration was variable.

As a result of the different methods of dust determination being used by the different governmental bureaus and others, it was soon found that the various dust-sampling methods did not yield absolute results, consequently some confusion arose in interpreting the various dust studies. In order to arrive at some basis of comparison the U. S. Bureau of Mines conducted a laboratory study of dust-sampling instruments. The results of this study were published in Public Health Bulletin No. 144 entitled "Comparative Tests of Instruments for Determining Atmospheric Dusts." (1925) During the course of this study two of the investigators, Dr. L. Greenburg and G. W. Smith, devised a new apparatus called the impinger. In the comparative study the dust collecting efficiency of the impinger was found to be high, and in addition the method offered several advantages over previous methods. After several modifications to meet special requirements, this instrument was adopted by the Federal Public Health Service and Bureau of Mines as the standard technique for the sampling of dust in air. The instrument has been used in the study of a number of dust trades, and is the commonly accepted method in use today.

Size of Dust Particles Taken into the Lungs

It has been observed from a study of silicotic lungs that most of the dust particles that have penetrated into the air sacs are less than 10 microns in longest dimension (1 micron is 1/1000th of a millimeter, or 1/2500th of an inch). It is generally agreed, therefore, that we need not bother with particles larger than 10 microns in measuring the concentration of a dangerous dust.

So that you may visualize the size of these small particles consider a 280 mesh screen in which the screen openings are 50 microns. In the absence of a beam of light, an atmosphere containing these tiny particles will appear clear to the naked eye, and therefore is extremely deceptive. Only a powerful microscope can make such particles directly visible.

It is necessary, therefore, to make a microscopical examination of the atmosphere to learn how badly polluted it may be. Larger particles such as are visible to the naked eye are essentially harmless in the causation of silicosis, as these are caught by the membranes provided by nature in the nasal and other respiratory passages and are eventually coughed up or eliminated before any damage is done.

When small dust particles are dispersed in air, they are carried about like smoke and settle out very slowly. How long such particles will remain suspended in quiet air can be roughly determined from Stoke's law. Assuming a round particle to be one micron in diameter, it can be calculated by means of this law that such a particle will fall only 20.3 feet in 24 hours. It can be seen, therefore, that any fine dust dispersed into the air is not only a momentary hazard but remains in the air for an indefinite period. This fact is often overlooked by workmen, as it is usually assumed that as soon as the dust cloud is no longer visible all dust has settled out.

The term "dusty working place" is only a relative one. Most air, both inside and outside of factories, contains some dust. It is, therefore, necessary to adopt a standard content for the dividing line between slightly dusty and dusty working places. The Wisconsin dust code prescribes a "tentative figure of 15 million countable dust particles under 10 microns in longest dimension with free silica content of 35 per cent in a cubic foot of air as determined by Public Health Service technique. Variations in free silica content will make proportional inverse changes in this standard." In accordance with this standard the permissible count for practically pure silica would be 5,250,000 particles.

How Dust Samples are Collected

As mentioned previously, the instrument used in collecting the dust samples is that known as the "Impinger." With this instrument the air to be sampled is drawn through a glass tube and impinged at a high velocity on a glass plate which is immersed beneath a suitable liquid contained in the collecting flask.

The impinger, therefore, combines the principle of collecting dust by impingement with a water-washing or bubbling method and so possesses the advantages of both principles. The dust is thus trapped and remains in the collecting liquid. Suction is applied to the impinger by means of a steam ejector operated by compressed air. Where compressed air is not available, a small electrically-operated vacuum pump may be used. The rate of air flow is measured either by means of a small vacuum gage or an orifice-type flow meter.

The entire apparatus is calibrated before use against a standard gas meter, so that a known volume of air may be sampled. The rate of sampling is approximately one cubic foot of air per minute. The dust-collecting device is placed in close proximity to the breathing level of the workmen involved while performing their respective duties, so that air samples representing actual working conditions may be obtained. After a sufficient volume of dust-laden air has been sampled, the collecting liquid is placed in a suitable container and removed to the laboratory for the necessary analysis.

When the dust sample reaches the laboratory, the entire sample is filtered into a clean graduated flask through a 280-mesh screen so that only particles smaller than 50 microns are permitted to pass; particles larger than 50 microns are not considered

injurious and are, therefore, removed from the sample. After proper dilution, the contents of the graduated flask are thoroughly shaken so that a uniform suspension is obtained, and two portions of about one cubic centimeter are removed with a pipette to just fill two Sedgwick-Rafter counting cells. The cells are allowed to stand at least 20 minutes and the dust particles are then counted by means of a microscope.

The microscope with an Abbe condenser is provided with an eyepiece micrometer, a 16-millimeter objective and a 7.X eyepiece. The eyepiece micrometer has a large square engraved on it, and this square is divided into 100 squares, one of which is further divided into 25 smaller squares. The proper tube length of the microscope is determined by calibration with a stage micrometer, so that a side of the large square of the eyepiece covers 1 millimeter (1,000 microns).

The large square of the eyepiece micrometer, therefore, encloses the dust in an area of one square millimeter, and since the counting cell is one millimeter deep, all the dust suspended in one cubic millimeter of the sample is under the ruled field. All particles visually less than 10 microns in longest diameter in one quarter of the field are counted at five points on the cell, namely, near the four corners and the center.

Two cells of each dust sample are counted and the average of 10 counts is obtained. Control counts are subtracted from the average sample counts, giving finally, average net counts of the number of particles which are then calculated in terms of particles per cubic foot of air sampled.

Having determined the concentration of dust particles less than 10 microns in diameter in a given atmosphere, it is also necessary to obtain information regarding the mineral composition of the dust before any evaluation of the health hazard can be made.

In general it may be said that the harmfulness of a quartz containing dust is usually in direct proportion to its free-silica (SiO_2) content. It is, therefore, necessary to distinguish between "free silica", that is the silica that occurs as quartz, and "combined silica", or the silica that is combined with other elements in the various silicate minerals. It should be borne in mind, therefore, that the total silica reported in the customary chemical analysis is no measure of the amount of free silica.

The quartz content of fine dusts is usually determined by a combination of petrographic and chemical methods. Each dust presents individual problems and no individual technique applies to all dusts regardless of their composition. Those interested in this problem should consult Reprint No. 1560 of the Public Health Reports, February 24, 1933, entitled "The Quantitative Determination of Quartz (free silica) in Dusts" by Adolph Knopf, Professor of Physical Geology, Yale University, and Consultant, United States Public Health Service.

Orig. paper in duty

Discussion of Dust Problems

By DR. LEONARD GREENBURG

Yale University, New Haven, Conn.

The speaker said in part: On the technical side of this problem you have been presented with two excellent papers by Mr. Jones and Dr. Meiter. There is little that I should add from this point of view. Perhaps the most valuable contribution that I can make is to present to you my own personal view of the broader administrative aspects of this problem gained as a result of many years of close contact. In order to do this, let us analyze the problem in its simplest terms.

We may begin by agreeing that pulmonary fibrosis results from the inhalation of certain dusts in known concentration over a sufficient period of time. This fact has been demonstrated repeatedly by means of industrial, laboratory and pathological studies. On this simple fact, I take it, there is complete agreement.

Such legitimate cases of disabling pulmonary fibrosis are held in many states to be the responsibility of the employer. Further, a perusal of the compensation laws makes it evident that there exists a decided trend in the direction of broadening the compensation acts throughout the Union for we find from time to time that additional states are being added to the list of those holding silicosis to be a compensable disease. We would certainly be blinding ourselves to the facts were we not to admit the existence of this trend in social legislation. It should be pointed out here that this is a very wholesome and desirable state of affairs. The insurance principle has justified its existence in spreading the burden of ill fortune over a long period of freedom from catastrophe and surely in the case of industrial accidents it has freed us from the deplorable state of affairs in existence prior to 1912. In the case of the occupational diseases we may hope for equally satisfactory results.

Nevertheless, compensation insurance is not the complete solution of the problem at hand.

The only adequate means of avoiding the burden of silicosis is by the prevention of this disease. All other methods do not touch the crux of the problem and they carry in their wake a vast amount of litigation, illness, and a large financial burden on industry. If what we have agreed upon to this point is true it is obvious that industry must prevent the dissemination of dust in the workroom air by such adequate engineering techniques as are available; or in certain cases where this is not possible industry must provide, and force the worker to use, such means of personal protection as will adequately safeguard him against the inhalation of dust. It is only by these means that we can guarantee a future free of disabling pulmonary disease due to dust inhalation.

In spite of the very best efforts of industry to solve this problem there will undoubtedly be a certain number of cases brought to the courts and presented as legitimate cases of silicosis. While some of these are true cases of silicosis others, I have been informed, are not, but are designed merely as a means of obtaining funds from industry. A consideration of such cases brings us logically to the second part of the present discussion. What is the ideal method of handling compensation cases with reference to occupational disease and more particularly silicosis?

If we examine the development of the compensation acts we find that a technique designed primarily to adjudicate cases of industrial accidents has by degrees been given jurisdiction over occupational diseases. In fact, in some states diseases are regarded as injuries so that they may be brought within the scope of the original compensation acts. But on close examination it becomes apparent that diseases are far more difficult to adjudicate than are the ordinary injuries arising in industry. They present many technical facets and often require a detailed knowledge of this particular branch of medicine with which the average commissioner is very often unfamiliar. As a result we find in practice that the Court is presented with highly technical evidence by experts for the plaintiff and for the defendant which is very difficult if not impossible to satisfactorily evaluate. Often the commissioner is caught between the conflicting views of such witnesses and is not provided with his own experts to aid him in arriving at the real scientific background of the problem at hand.

What we really need is a strengthening of the technical side of the compensation acts to keep pace with the increased factual understanding regarding the occupational diseases. This does not merely refer to the Courts themselves but should begin with the promulgation of accurately worded compensation acts which clearly define the diseases for which compensation is to be paid. Compensation commissioners should be assisted by boards of technical experts composed of engineers appointed by the deans of the various engineering schools and of physicians appointed by the deans of the recognized medical schools. The engineers selected should have a very complete knowledge of factory conditions and the field of ventilation, and the physicians should be experts in the field of industrial hygiene and occupational disease. It is only with the aid of such highly specialized boards, or their equivalents, that the compensation commissioners may be able to do complete justice to both sides in these highly technical cases. It is the belief of the speaker that employers and employees alike would benefit greatly from the establishment and use of such boards. In order to hasten the establishment of this system employers are justified in appealing to their legislatures with this end in view; certainly such a legitimate demand should receive the hearty support of all concerned.

Frequently one is asked, what should be done with those claims which are based on little or no real evidence of injury to the worker but which are merely reared by some very enterprising attorney? Such claims are, I have been told, becoming very common of late and constitute a real problem to industry. It is obvious that the compensation advisory boards suggested earlier will, as soon as they are formed, serve the future as a healthy bulwark against this type of baseless claim and I venture to predict that few such cases would be favorably acted upon by a board of real experts in this field. At the present time factory officials should employ the very best legal talent available and should reinforce such legal talent with technical and medical experts thoroughly versed in the field of silicosis. Many cases have been lost by a failure to bring to bear the requisite technical aid required to prove the non-existence of a hazard. Here is an excellent example of a case in which money may be saved in the end by increased expenditures.

We now arrive at the final steps in the control of this problem, the physical and X-ray examination of the worker. Every factory should have pre-employment and routine post-examinations. It seems obvious that the burden of the health of the worker should not be placed on the plant without the privilege of the pre-employment examination. How can industry be legitimately expected to hire a worker "in the blind" as to his or her physical condition and then a day later be expected to shoulder the burden of the worker's health? By repeated physical examinations it is possible to discern the faint early deviations from normal health if any take place. In this manner the employer would be forewarned very early if any workmen showed lung changes suggestive of early silicosis. The routine industrial health examination on a broad scale throughout the major portion of American industry would constitute a public health procedure of major significance. By its means a very large proportion of the population would be aided in the prevention of the degenerative diseases of middle life which today constitutes such a real menace.

ADJOURNMENT

Falls of Persons

THURSDAY AFTERNOON SESSION

October 5, 1933

The special session devoted to discussion of problems arising through falls of persons was called to order by W. S. Paine, manager, Engineering and Inspection Department, Aetna Life Insurance Company, Hartford, Connecticut, who presided. Chairman Paine welcomed the delegates and immediately introduced the first speaker.

Ladder Accidents and Their Prevention

By F. L. HURLBUTT

Manager, Patent Scaffolding Co., Chicago, Illinois

The speaker said in part: In discussing ladder accidents, let us divide our subject into three divisions: (1) selection; (2) care or maintenance; and (3) proper use.

I can think of no piece of plant equipment in which there is the opportunity to buy either safety or accidents that there is in ladders. Basically, no ladder is better than the poorest piece of stock used in its construction. Only well seasoned, straight-grained woods should be used. For extension and string ladders, the rails should be of spruce, Douglas fir, Norway pine or long leaf yellow pine. Because the last named is somewhat heavier, it is not as desirable as the others. Rungs of oak, ash or hickory are by far the best, and here grain is all important. To assure straight grain, the best rungs are hand split in distinction to the ordinary machine turned rung.

The sectional size of side rails must vary with the length of the ladder, and likewise the diameter of the rungs must vary with the width of the ladder between the side rails. But in no case should the diameter of the rung be less than 1¼ inches, nor the tenon less than ⅜ inches. A genuine safety measure on extension ladders is the use of automatic locks, instead of the old fashioned gravity locks. All hardware should be of malleable iron or mild steel. No cast iron fittings should be permitted.

Much discussion has been indulged in over the question of whether rung tenons should extend fully to the side rails or only to within a quarter of an inch. My experience is that where the tenons do not go all the way through the rails, such ladders retain their rigidity better and do not get wobbly as soon as ladders which have the rails completely bored through. Also, moisture is less likely to get at the tenon of the rung and cause rot.

opportunity to work in a larger risk. Then, too, the experience of a risk in a hazardous trade is a more reliable guide to the risk's future performance than the experience of a risk of similar size in a non-hazardous trade for the same reason: the hazardous trade producing more accidents and, therefore, is a better chance of getting an indicative average. In experience rating, it is primarily the cost of the accidents rather than their number so that severity within limits also has a major effect upon our consideration of the risk's experience. All other conditions being equal, for example, we would actually not rely as much on the experience of the risk if it all resulted from one serious case as we would if it reflected a lot of less serious cases more frequently occurring. The first instance probably would never occur again for years, because of the workings of chance; while the second would probably approximately repeat year after year. As a result of this condition in experience rating, accidents are treated under two distinct groups: the low-frequency high-cost cases such as the deaths and permanent total disability cases, and the high-frequency low-cost cases which cover all other compensation cases and also medical costs.

One other feature of experience rating is of very decided importance. This is the application of the principle of "weighting" the experience of the risk in determining a future premium rate. The principle of the "weighted experience" provides that the same degree of importance shall not be attached uniformly to the experience developed in all years of the risk's operation but that each year shall be arbitrarily graded so as to give the most weight or credence to the latest experience. As a matter of fact, the weights assigned to the five years of experience are represented by the factors .40, .60, .80, 1.00, and 1.00, beginning with the earliest year's experience. In other words, the experience of the two latest years is accepted at its face value, while but 80 per cent, 60 per cent, and 40 per cent of the experience of the third latest year, fourth latest year and earliest year respectively are retained for rating purposes. The reason for this feature of experience rating is again to restrict the influence of conditions which are not considered reflective of the risk's loss cost prospects for the immediate future.

Suppose we have a risk where five years ago it was under the management of persons not interested in any way in accident prevention or in the use of safety equipment. During that year probably there would have occurred numerous accidents as a result of such attitude on the part of the assured. Suppose that during the last two years, however, new blood had been brought into the firm which had been thoroughly sold on accident prevention and extensive safety programs had been inaugurated and all evidence indicated a continuation of this practice. It does not seem logical that the shortcomings of the risk in the earlier years of the risk's history should unduly influence the future rate of the risk. While unquestionably the risk's earlier experience should be reflected in the rating, its effect on the future rate for the risk should be modified in the light of the more modern conditions. The weighted experience principle which we follow does just exactly this. In other words, it makes the assured pay in full for the most recent conditions in his plant and it does not drag out unduly the penalty for some particular condition which may or may not be reflected in the present conditions of the risk.

ADJOURNMENT.

Safety Organization and Program

WEDNESDAY AFTERNOON SESSION

October 4, 1933

The special session devoted to problems in connection with Safety Organization and Program was called to order by J. E. Culliney, Bethlehem Steel Co., Bethlehem, Pa. He welcomed the delegates in the name of the Executive Committee of the National Safety Council, and then introduced George Opp, safety engineer, The Detroit Edison Company, Detroit, who presided during the session. Chairman Opp outlined the discussion in view and introduced the first speaker.

Mechanical Safeguarding and Engineering Revision

By L. W. LOHREY

Manager of Personnel, Delco Products Corporation, Dayton, Ohio

The speaker said in part: Many speakers have presented statistics so often to prove that most accidents are due to causes other than the lack of mechanical guarding, that many have reached the conclusion that the job is done, in so far as this very important phase of safety is concerned. In fact, they have sold this point so well that many of the safety engineers of the country have lost their jobs within the past few years. Management everywhere evidently believed them and since it was necessary to reduce overhead expense, their services were dispensed with, as their departure would not be missed. I can't say that I sympathize with these chaps; in most instances it was good riddance. They were the fellows who told management every time a worker got hurt that the machine was properly guarded and that the accident was due to the carelessness or the cussedness of the worker. They did not, however, tell management that with additional engineering the machine could be guarded, and with little additional expense, so that regardless of the carelessness of the worker, it would be impossible for him to be hurt.

No—mechanical safeguarding and engineering is not completed—it is practically in its infancy. The sooner we recognize this fact the greater will be the improvement in this field of safety.

Let us consider for a moment the report of the Division of Safety and Hygiene of the Industrial Commission of Ohio, and then determine whether or not mechanical safeguarding has reached the point of perfection that many would have us believe. In 1932, 131,519 total claims were filed with the Commission. Of this number—

45,123 were due to cuts and lacerations; 25,723 crushes and bruises; 19,710 sprains

and strains: 11,528 puncture wounds, 8,663 fractures; 8,295 burns and scalds; 713 dislocations; and 220 concussions.

The number of direct amputations of some member or members of the body, by machinery or other hazards, was 422. Of this number seven were arms; five were hands; four were legs; one was a foot; five were toes; and four hundred fingers or parts of fingers.

You will note that the parts most susceptible to injury were fingers. Of all the claims filed with the Commission most of them were due to injury to the fingers—a total of 33,676. I do not want to tire you with figures, but as long as the state of Ohio continues to send out such reports no one can convince me that mechanical safeguarding is doing all that it should do to reduce hazards.

I would not have you believe that I do not recognize the importance and value of proper supervision and training of the worker to control hazards. This form of accident prevention has a very *definite* place in the control of safety—but it does not, and should not take the place of a mechanical device when needed.

A study of accidents in many of our larger plants will generally show that very few of them are due to unguarded machines. This, in my opinion, is not true of the many smaller plants which for various reasons do not purchase modern machinery and equipment as do the larger plants.

I will cite a few instances of accidents due to the lack of proper mechanical guarding or engineering.

Case No. 1. An operator working on a dial feed punch press lost the tip of his thumb when the press did not eject the material properly. Instead of taking a stick or stopping the machine he used his thumb to force out the part, with the result that he lost the tip of it. After this accident occurred a guard was placed over this particular part which made it impossible for anyone to put his thumb in this particular position.

Case No. 2. The operator of an automatic punch press received a severe injury to his finger when he placed his hand on the guard used to prevent the tie rod from falling in case it should break.

Case No. 3. An employee lost a thumb on a hydraulic press which operated at a very slow rate of speed.

Case No. 4. An operator of a punch press lost a tip of his finger when he was equipped with a positive guard.

These cases show the need for better engineering. In the age of speed we cannot trust to anything but the best in safety. There are too many factors which cause the human being to fail.

Again—why should we assume that we have reached the goal from the standpoint of engineering? Why do we maintain our large engineering forces for the improvement and development of our products? If it is desirable and profitable from that standpoint—why is it not equally as important to continue our engineering development in safety?

Who would want an automobile that was designed twenty years ago in preference to the splendid model of today? Likewise, the models of safety of today must progress if we are to reduce accidents to a minimum.

Mechanical safeguarding and engineering play an important part in the control of occupational diseases. A noted labor leader, a few years ago, made the statement that no man should do the work that a machine can do. Likewise, may I say, that no man or woman should be permitted to perform an operation which involves an occupational disease that a machine can perform. I have in mind a particular operation which required the use of wood alcohol. Under the old method this operation would have been performed in a very crude manner. Under the present conditions a modern machine costing five thousand dollars was installed to take care of this particular operation. The only reason that this machine was installed was the consideration of the operator's health.

Orig. pape. — 23120

Safety Education

By W. J. PEACOCK

Head, Department of Personnel, Northern Paper Mills, Green Bay, Wis.

The speaker said in part: Most of us in the safety game go through the stage of guarding our plants, and then of having foremen and occasionally executives expect accidents to cease, as though machine guards might exert an influence on stumblers, trippers and those who neglect their goggles. It was only after we had analyzed our accident statistics and dug out the causes that we discovered a major category of human causes which no amount of machine guarding could prevent.

Today we know that education is the most concern of any industrial safety expert, indeed plant education is so vital that we must find ways of putting a thrill into it.

First of all, a thrill for ourselves.

It is worth while to visualize the environment in which our modern safety program is being produced. An engineering section, accustomed to weighing facts for their accuracy, acts as sponsor for our codes and safe practices pamphlets. Psychologists inspire us to accurate thinking regarding the mental attitudes of workmen. Medical science gives us warning and procedure regarding industrial diseases, infections, and every-day health requirements. Psychiatrists are helping us to locate and to retrain the "accident-prone" employee. Sociologists are writing textbooks on the organization of our plants for safety as well as production. And checking up on our entire set-up, we have expert statistics emanating from the American Engineering Society.

I narrate these facts to bolster any who may be losing courage in these trying days. It will not be long before safety education will be accepted as on a par with other industrial interests founded upon scientific research.

It is not to pillory the men in question, but to express my surprise that their kind still exists, that I mention two headline speakers on one 1933 regional safety program. The first speaker created a laugh where a laugh was out of place by stating that the only printed matter he could find in preparation for the topic of "Public and Home Safety" was a book on funerals. The matter was serious, because he is a regent of State Normal schools and lives at his state capitol, where access to at least three libraries of unusual size is available. The other speaker, a plant superintendent and a college graduate, stated that he was formerly a plant safety man and that he had been trying to unlearn the nonsense of his earlier years in which plant safety depended upon "the carnival method", "sob-stuff appeals", and the contest inducement. There were in the audience many friends of the speakers who could have loaned them scientific material on their subjects which would have made either humor or tirades appear what they were in fact, a waste of time that ought to have been used constructively.

Every delegate to this Safety Congress owes it to himself to visit the headquarters

Conclusion: Our society and the National Safety Council as a whole have passed through several difficult years which have reflected the business depression felt so keenly by our industries throughout the world. Regardless of commercial depression, however, safety work must be carried on. The conservation of human life is just as important during times of slack work as it is in boom years, and our work is now more essential than ever before because it is anticipated that the NRA will bring back to work thousands of men who have lost considerable portions of their old skill and stamina. The mental hazards of their jobs are also increased because of worries due to idleness, reduced income, and pressing financial obligations. Many industrialists are asking "What is to be done to keep our accident records down to the low figures of 1931 and 1932?" Certainly such conditions and questions constitute a challenge which cannot be ignored and which definitely calls for the very best that is in each individual safety man, as well as for co-operative effort through new as well as old and established channels of the ASSE-Engineering Section.

Note: Reports of sub-committees and of chapters are not published in these transactions, but copies are available upon request to Council headquarters.

Report of the Nominating Committee

Mr. Keown presented the report of the nominating committee, the personnel of which included R. McA. Keown, Chairman, Harry Guilbert, Cyril Ainsworth and E. J. Culliney. The following officers were elected for the coming year:

General Chairman—S. E. Whiting, Liberty Mutual Insurance Company, Boston, Mass.

Vice-Chairman—E. F. Blank, Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Vice-Chairman—A. S. Regula, Industrial Relations Counselors, Inc., New York City.

Secretary—W. Dean Keefer, National Safety Council, Chicago.

Members of executive committee for three years:

W. S. Paine, Aetna Life Insurance Company, Hartford, Conn.
C. B. Boulet, Wisconsin Public Service Corporation, Milwaukee, Wis.
C. W. Smith, Standard Oil Co. (Ind.), Chicago.

A. J. McMaster, president and technical director, General Motors Laboratories, Inc., Chicago, then presented a demonstration and illustrated address on "The Electric Eye—A New Tool For Safety."

The following subject sessions of the Congress were sponsored by the ASSE-Engineering Section:

Accident Records
Hoisting Chains
The Safe Use of Chemicals In Industry
Handling Materials
Safety Organization and Program
The Safe Use of Electricity In Industry
Falls of Persons
The Dust Problem In Industry
Maintaining Interest In Safety

ADJOURNMENT

TWENTY-SECOND ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL

Automotive and Machine Shop Section

Officers 1932-33

General Chairman—M. J. McCarthy, Fisher Body Corp., Detroit.
Vice-Chairman—Dr. James H. Greene, Studebaker Corp., South Bend, Ind.
Secretary—K. A. Callam, Kelsey-Hayes Wheel Corp., Detroit.
News Letter Editor—Nils Juell, Hayes Body Corp., Grand Rapids, Mich.
Chairman Program Committee—Hoyt L. Fracher, Detroit Steel Products Co., Detroit.
Chairman Statistics Committee—C. W. Bisbee, Lycoming Manufacturing Co., Williamsport, Pa.
Chairman Engineering Committee—V. H. Kupferer, Studebaker Corp., South Bend, Ind.
Chairman Slides and Safety Kinks Committee—Marvin A. Heidt, Budd Wheel Corp., Detroit.
Chairman Membership Committee—M. A. Kruger, General Motors Corp., Detroit.
Chairman Publicity Committee—W. A. Bechill, Chrysler Corp., Detroit.
Chairman Health Committee—Dr. A. F. Leckliner, Fisher Body Corp., Detroit.
Members at Large—
L. E. Averill, C. H. Dodson Co., Detroit.
C. M. Dotterer, Detroit.
R. A. Shaw, The Murray Corporation of America, Detroit.
R. F. Thalner, Buick Motor Co., Flint, Mich.

WEDNESDAY MORNING SESSION

October 4, 1933

The Automotive and Machine Shop Section convened with General Chairman M. J. McCarthy, Fisher Body Corporation, Detroit, presiding. Upon calling the session to order, J. I. Banash, president of the National Safety Council, took the chair, welcomed the delegates, and introduced as presiding officer, J. C. Wilson, vice-president in charge of safety, Lumbermens Mutual Casualty Company of Chicago, who acted as chairman throughout the sessions.

Membership Committee Chairman—R. A. Chaffin, Continental Steel Corp., Kokomo, Indiana.

Railway Car Builders Committee Chairman—P. J. Brand, Pullman Car & Manufacturing Corp., Pullman, Chicago, Ill.

Members at Large—

L. S. Adams, Hubbard Steel Foundry, East Chicago, Ind.
C. M. Allen, The American Rolling Mill Co., Middletown, Ohio.
J. A. Coltrin, National Radiator Corp., Johnstown, Pa.
H. M. Croghan, Inland Steel Co., Indiana Harbor, Ind.
G. A. Davis, Illinois Steel Co., Chicago, Ill.
John P. Eib, Illinois Steel Co., Joliet, Ill.
E. A. Ellis, Wheeling Steel Corp., Wheeling, W. Va.
W. T. Filmer, The Youngstown Sheet & Tube Co., Youngstown, Ohio.
A. C. Gibson, Spang, Chalfant & Co., Inc., Pittsburgh, Pa.
Charles W. Hanko, Pittsburgh Steel Co., Monessen, Pa.
S. E. Hawkes, MacWhyte Company, Kenosha, Wis.
H. G. Hensel, The Youngstown Sheet & Tube Co., Chicago, Ill.
W. J. Ireland, Kohler Co., Kohler, Wis.
W. A. Jarvis, The Chase Companies, Waterbury, Conn.
F. A. Lauerman, Republic Steel Corp., South Chicago, Ill.
T. H. McKenney, Illinois Steel Co., South Chicago, Ill.
D. V. Medalie, Interlake Iron Corp., Chicago, Ill.
W. E. Megraw, H. H. Robertson Co., Pittsburgh, Pa.
Robert L. Schmitt, Louisville Car Wheel & Railway Supply Co., Louisville, Ky.
J. K. Stafford, Mississippi Valley Structural Steel Co., Decatur, Ill.
J. M. Woltz, The Youngstown Sheet & Tube Co., Youngstown, Ohio.

Health Hazards in the Foundry

By CAREY P. McCORD, M.D.

Medical Director, The Industrial Health Conservancy Laboratories, Cincinnati, Ohio

The speaker said in part: Over and over again it seems necessary to restate in many guises such well established foundry fundamentals as the following:

1. Excessive heat is a hazard common to all foundries.

2. Excessive heat means high loss of valuable chlorides from the body and calls for replacement. The use of salinized drinking water is now better established as desirable than ever before. Here rather than less salt is advocated for the normal foundry worker exposed to high temperatures.

3. Molten metal emits chemical rays at times harmful to the eyes. Goggles fitted with glass barring these rays prove their worth to the workmen in many plants.

4. Metal fume fever fortunately is fleeting in its known effects, but no less is real. It is more often found where zinc enters the metal mix.

5. Sudden and extreme variations in temperature may be the lot of foundry workers—notably so in winter. The body makes adjustments to these quick changes with admirable facility. No less, these burdens are conducive to respiratory diseases, including pneumonia. Pneumonia reaches highest frequency among foundry men.

6. Lead poisoning is far from rare in the foundry.

7. Carbon monoxide may be found in harmful quantities.

8. Antimony, nickel, cadmium, manganese, phosphorus, arsenic, and sulphur may on occasion find their way into the crucible and thus make possible the development of ill health traceable to such causes.

9. In core making, many binders have led to skin diseases.

10. If metal grinding, polishing and buffing constitute a part of the foundry's activities, a long list of additional hazards may be cited, ranging from the action of chrome polishig materials to tenovitis from the drag of the buffing wheel.

11. Last, but foremost, is the hazard of dust. At the present moment concern over health hazards in the foundry may be divided in the ratio of 99 per cent for dusty lung diseases and 1 per cent for all others combined. While this disproportion may not be warranted, it appears desirable that I devote the major portion of my comments to selected items related to dusts and the diseases produced by dusts.

Confronted with any new and outstanding hazard in industry, the tendency is to exaggerate the requirements for control. This notably was true when benzol first came into wide industrial application. Now the conditions under which benzol may with safety be used are so well delineated that where these conditions are provided benzol poisoning is unknown. A similar course is predictable for the silica hazard in foundries.

As the major problems connected with dusty lung diseases and their causations become harnessed by the specialist, opportunity is provided for the consideration of many secondary aspects of dust and dusty lung diseases. I propose now to comment on five of these slightly less significant matters—important in my opinion to the employment manager, the safety engineer, and the plant physician.

1. How shall the foundry operator protect himself against cases of dusty lung diseases originating in other plants?

Many foundry operators are faced with suits or other forms of claims that undoubtedly are related to previous employment in other foundries or other dusty trades. Since silicosis may require and usually does require many years for its development to the point of disability, it naturally follows, by way of example, that 16 years of previous foundry exposure is more blamable in the causation of silicosis than two years of similar exposure in present employment. Yet the present employer is likely to find himself saddled with full responsibility.

Lately I have had opportunity to examine well made film negatives of applicants for work, without admitted previous exposure in industry. These persons were found to live and drive on dusty country roads made of flint. Approximately 50 per cent of these young adults presented sufficient involvement in their films to be rated as "suspicious" in relation to pneumoconiosis. Given a few months exposure in a foundry anyone might hold himself eligible for claims against his employer alleging dusty lung disease.

The answer to the problem is definite. Every prospective employee for any dusty portion of a foundry should be x-rayed by a competent maker and interpreter of chest films. For the good of the prospective workman and for the good of the operator, any applicant exhibiting any x-ray evidences of any degree of involvement resulting from the action of dusts or the presence of other pulmonary pathology in well established degree, should be denied employment in any dusty exposure. Expensive as x-rays may be, they are likely to prove one of the most economic steps that may be taken in these days of wholesale litigation, synthetic testimony, unskilled physicians, and plaintiff-prone juries.

2. What shall be done with the workers known to possess dusty lungs?

In late months many employers in dusty trades have procured routine x-ray examinations of all employees. Out of every hundred undisabled men, properly examined, a fair percentage is likely to present some degree of clear-cut pneumoconiosis. What is to be done with such men? Many are not disabled. Some are outstandingly hale and hearty. Shall they be told of their state? Many are likely to develop mental quirks and neuroses. Some will take an unfair advantage of the employer through claims. A small consensus of mature and fair-minded opinions as to appropriate action for this very time may be epitomized as follows:

Seek to eliminate further exposure to the dust hazard. Do not apprise any undisabled workman of his condition. Make repeated x-ray examinations at about six months intervals. If advancement of the condition appears, then take action suited to the individual case. Otherwise keep these men at some work.

3. Are negroes more susceptible to dusty lung diseases than whites?

I know of no large series of cases arising under identical conditions in this country among whites and negroes that prove the negro to be more readily involved by dusty lung diseases. The negro is more susceptible to tuberculosis than his white fellow workman. His housing is likely to be on a lower plane. His exposure to tuberculosis is prone to be greater than in the case of the average white man. On account of this background, the negro at this time is rated as a greater risk in the foundry than whites under conditions of equal exposure.

4. How necessary are dust counts in detecting hazardous work points in a plant?

The dust counter has established itself as the best available yardstick for the determination of different quantities of *dust in the atmosphere*. Like so many instruments in its class, the dust sampler and counter has been glorified far beyond its real merits. Opportunities for errors are legion. Legal standards based on present dust counting methods are utterly futile. Notwithstanding many pitfalls, however, the dust counter is a most valuable instrument. It finds its greatest usefulness in discriminating between much dust and little dust; improving the efficacy of preventive measures and devices; in the determination of the carriage of fine dust into non-dusty departments; in the detection of unsuspected dusty work points.

5. In litigation what medical defense may be involved?

Without presuming any qualifications in the domain of law, the plant physician, the safety engineer or the employment manager may be called upon to furnish attorneys all possible information in preparation for trials. Below I am listing a number of items that are in prospective use or have been used in various instances:

(a) *Denial of the existence of dusty lung disease*: Recently in the examination of a sample of 202 films of men exposed and unexposed to dust, one was singled out as exceptionally free of even usual amounts of fibrosis. This film was examined as an unknown, as were all others. Later it was pointed out that the workman from whom this film was made was a litigant demanding a large sum of money on account of an alleged silicosis. Similarly, about four out of every five litigants alleging dusty lung disease are in fact free of such diseases. The claims are spurious and may be proved so by appropriate examinations carried out by qualified investigators.

(b) *The denial of disability or prospective disability*: A large number of workmen whose lungs show some signs of dusty action are not incapacitated and no proof exists that real disability is an early prospect.

(c) The denial of neglect: Many of the true cases of dusty lung disease have been developing over long periods of years such as 15, 25 or 40. Since the medical profession has professed scant knowledge of these diseases during these periods, it is unreasonable to believe that the industrialists could have possessed more. Inevitably it follow that operators of dusty industries may not be presumed to have possessed earlier and greater information of these occupational diseases than physicians, industrial hygienists, state health departments, state factory inspectors, and other agencies devoted to health conservation. No industrialist may be charged with neglect for failure to supply protection against an insidious disease unknown or little known to the medical profession. Even at this time the average physician possesses the most meager information as to these conditions.

(d) The origin of the dusty lung disease in previous employment: Manifesting it is unjust that a few weeks of employment in some one foundry should be held responsible for a well established dusty lung disease when antedating this employment, there have been years of exposure to similar work in other plants.

(e) The origin of the dusty lung disease from causes other than industrial employment: In some localities over the country it seems probable that sufficient dust may arise from roads, farm work, etc., to induce characteristic involvement of the lungs.

(f) The actual quantity of dust present in an industry is below any reasonable threshold of probable production of damage: The mere fact that an industry or department is classified as a dusty operation is not in itself proof of the possibility of development of pneumoconiosis. The nature and extent of protective devices may fully exculpate the plant as a practical hazard. Dust count methods have certain undeniable limitations, but this form of testing along with tests of the efficacy of ventilating apparatus may be utilized on occasion wholly to eliminate any justification for contention that the air dustiness prevails.

(g) Diseases other than pneumoconiosis fully may account for abnormal state in the lungs, or other chest contents: At least ten other diseases may so stimulate pneumoconiosis as to permit confusion and error. Among others are fungus diseases, tuberculosis, especially disseminated tuberculosis, cancer, syphilis, pleurisy with calcifications, certain types of unresolved pneumonia. In addition, claims are known to have arisen alleging pneumoconiosis when in fact the pathology centered about such unrelated conditions as aneurysm, mediastinal tumor, anaphylactic asthma, valvular heart disease, etc.

(h) Silica is not a poison: In some states claims at law must be based upon acts applicable only to poisonous substances. What constitutes a poison is a matter of definition. At the present time, the best thought as to the action of silica within the lungs is unfavorable to acceptation *of it as a poison*. Primarily, silica action is physical rather than chemical.

(k) Pneumoconiosis does not constitute an accidental injury: In some instances it has been contended that dusty lung states are accidental injuries. Such specious arguments ordinarily are put forth in effort to obtain compensation in political states where no provisions are made for occupational diseases. To the contrary, every valid concept prompts a recognition of the pneumoconiosis and occupational diseases.

These several defense items are of course not set out as having any element of the panacea. However, on occasion some one or more may play a helpful part in defeating some of the cases now pending, richly deserving defeat.

THURSDAY MORNING SESSION

October 5, 1933

At this session the trophies of the National Safety Council awarded to winners in the Metals Section Annual Safety Contest were scheduled for presentation. General Chairman Schmitt first called attention to the outstanding points of the contest as follows:

A total of 208 units participated in the contest, which ran from July 1, 1932, to June 30, 1933. During the twelve-month period approximately 118,000 employees worked 222,997,701 man-hours for an average of 1,890 hours per person. The average frequency rate during the contest was 9.534. This represents a 4 per cent increase over the 1932 rate of 9.194; but a 14 per cent decrease over the 1931 rate of 11.117.

The formal presentation of the handsome awards to first place winners, consisting of bronze plaques, was then made in the name of the National Safety Council by C. B. Scott, president, Bureau of Safety, Chicago, and past president of the National Safety Council. Trophies were presented to the following companies:

Steel Mills Division Group A—The Corrigan, McKinney Steel Co., Cleveland, Ohio.

Steel Mills Division Groups B and C—Republic Steel Corp., South Chicago Plant, South Chicago, Ill.

Rolling, Finishing and Fabricating Division Group A—Pittsburgh Steel Products Co., Allenport Plant, Allenport, Pa.

Iron Foundries Division Groups A and B—Mackintosh-Hemphill Co., Garrison Plant, Pittsburgh, Pa.

Steel Foundries Division Groups A and B—Haynes Stellite Co., Kokomo, Ind.

Heavy Machine Shops Division Groups A and B—C. Hager & Sons Hinge Manufacturing Co., St. Louis, Mo.

"Safety Kinks" and "Your Hour"

The remainder of the session was devoted to two highly interesting features. The first was a presentation, by John A. Oartel, chief of Safety Bureau, Carnegie Steel Company, Pittsburgh, Pa., of his annual collection of "Safety Kinks—Illustrating the Handling of Materials by Hand." The feature consisted of a long series of lantern slides and was accompanied by a running fire of comment by Mr. Oartel in his characteristic manner. Unfortunately, it is impractical to reproduce these lantern slides in the Transactions and without the pictures no description of the devices would be intelligible.

The second feature was the annual event entitled "Your Hour" led by T. H. McKenney, supervisor of Labor and Safety, Illinois Steel Company, South Chicago, Ill. This feature, enlivened in characteristic manner by Mr. McKenney, was participated in by a large number of the section delegates. Since the remarks were all extemporaneous, and no record of them is available, they cannot be reproduced or summarized in the Transactions.

ADJOURNMENT

Mining Section

Officers 1932-33

General Chairman—THOMAS E. LIGHTFOOT, Koppers Co., Pittsburgh.
Vice-Chairman—FRANK B. DUNBAR, Mather & Co., Mather, Pa.
Vice-Chairman in Charge of Engineering—P. M. ARTHUR, American Zinc Company of Tennessee, Mascot, Tenn.
Vice-Chairman—J. W. ALT, Calumet & Hecla Consolidated Copper Co., Calumet, Mich.
Vice-Chairman—WILLIAM G. METZGER, Hudson Coal Co., Scranton, Pa.
Secretary and News Letter Editor—DANIEL HARRINGTON, United States Bureau of Mines, Washington, D. C.
Chairman Statistics Committee—W. W. ADAMS, United States Bureau of Mines, Washington, D. C.
Chairman Entertainment Committee—J. T. RYAN, Mine Safety Appliances Co., Pittsburgh.
Publicity Committee—M. R. BUMP, Explosive Engineer, Wilmington, Del.
R. DAWSON HALL, Coal Age, New York City.
Chairman Poster & Slide Committee—J. J. FORBES, United States Bureau of Mines, Pittsburgh.
Chairman Program Committee—LEE LONG, Clinchfield Coal Corp., Dante, Va.
Members at Large—
W. H. COMINS, National Lead Co., St. Francois, Mo.
M. F. FAIRLIE, The Mining Corporation of Canada, Toronto, Ont., Canada.
C. W. GIBBS, Harwick Coal & Coke Co., Pittsburgh.
H. C. HOXIE, Phelps Dodge Corp., Bisbee, Ariz.
R. N. HOSLER, Pennsylvania Compensation Rating & Inspection Bureau, Harrisburg, Pa.
GEORGE MARTINSON, Pickands, Mather & Co., Hibbing, Minn.
D. D. MOFFATT, Utah Copper Co., Salt Lake City.
HOWARD I. YOUNG, American Zinc, Lead & Smelting Co., St. Louis.

TUESDAY MORNING SESSION

October 3, 1933

The first session of the Mining Section convened with Frank J. Lanahan, Fort Pitt Malleable Iron Company, in the chair, who welcomed the delegates in the name of the Executive Committee of the National Safety Council. He then introduced

General Chairman Thomas E. Lightfoot, Koppers Coal Company, Pittsburgh, Pa., who presided. Chairman Lightfoot then introduced the first speaker.

Orig. paper - 1317-Mining

Report of the Secretary

By DANIEL HARRINGTON

United States Bureau of Mines, Washington, D. C.

The speaker said in part: For the first eight months of the present year the mines of the United States have had the longest consecutive freedom from major explosion disasters in the past 50 or more years. Seven persons were killed and one injured in an explosion in a bituminous coal mine in Pennsylvania on the morning of September 11, 1933, this being the first major explosion in any mine, coal or metal, in the United States since December 23, 1932. *There is no record of any continuing period of* immunity from major disasters in our mines even approximately this in length.

The first eight months of 1933 show a lower fatality rate in the coal mines of the United States than for the same period of 1932 or for the full year 1932. But 627 persons were killed in the coal mines of the country to September 1, 1933, in the production of slightly less than 240,000,000 tons of coal, the fatality per million tons being only 2.62; for the first eight months of 1932, there were 684 killed in the production of about 216,000,000 tons of coal, with a fatality rate of 3.17 per million tons produced. It is noticeable that there were fifty-seven fewer deaths in the first eight months of 1933 than in the first eight months of 1932 and there was an increase of about 24,000,000 tons in the 1933 period.

Tentative figures available as to coal mine fatalities in 1932, placed the total at 1,166 against 1,463 in 1931. West Virginia had the largest number of fatalities, 263, a decided improvement over the 351 for 1931. Pennsylvania anthracite came second with 245 fatalities, also a much better showing than the 383 of the previous year. Pennsylvania bituminous was third with 158 or considerably fewer than the 210 in 1931. Fourth place went to Illinois with 114, an increase over the 92 of 1931, and fifth place to Kentucky with 101, a slight decrease from the 110 of the previous year.

The health and safety of the approximately 1,000,000 persons in the United States engaged in the mining and quarrying industries unquestionably are improving during recent years in spite of the numerous unsatisfactory conditions now confronting those industries.

Orig. paper M6650

Safety

By CHARLES E. BOCKUS

President, Clinchfield Coal Corp., and President, National Coal Assn., New York City

The speaker said in part: At a time when the selling price of a product is less than cost, when red figures show up month after month, and that has been the unfortunate history of a great majority of the coal producers for the past three years, it is not hard to curtail the amounts paid for safety work. I say it with real pride, however, that *in many of the companies this temptation has been resisted. Nor should we* forget that in periods like the recent past when mines are operated only one or two days in the week, the most careful inspection is of the highest importance, both as regards top conditions and ventilation. Increase in mechanization has helped reduce

certain classes of accidents. The working of men in groups under direct supervision is undoubtedly the reason for this. On the other side of the picture, you will find experienced miners who state that the amount of noise from conveyors or loaders is a handicap. Mechanization should be coupled with intensive inspection of the top at all times.

How much do coal mine accidents cost?

First, the actual cost to the operating company in payments made under Employers' Liability or Compensation Laws or in damage to property. That item is put first, not because it is either the largest or the most important, but merely because it is the easiest to measure with the yardstick of business—dollars and cents.

Second, the loss of wages directly due to the enforced idleness of those who have been injured. That can be determined with relative accuracy by those employees who keep careful records and follow up their accident cases to the end. But even in those circumstances there has to be some estimating, for a man, after a severe injury, may have to return to employment in some position not compensated for so well as was the place he held before. This, measured in "cash loss" is the largest item of the four.

Third, the loss, and it is a serious one, that comes from the shattering of the morale of any organization where there are frequent injuries to the workers, and the effect is particularly marked after a fatality.

Fourth, the loss of effectiveness of any worker who has suffered a serious accident. A man who has passed his youth may be discharged from the hospital as recovered completely from damage done; but it is only in exceptional cases that he can ever be really restored to the physical and mental condition he enjoyed before his injury. *I know of no way* the losses under the last two headings can be even approximated, but they are actual and material.

Last year accidents cost our company directly more than did the salaries of all our mine foremen and their assistants: more than the total expense under either of the items, hoisting and loading, or ventilation and drainage. Please do not misunderstand me: by cost I mean what was paid out in 1932 irrespective of the year in which the accident occurred. But our cost of accidents that happened in 1932 was of itself more than the charges for ventilation and drainage. What it cost our employees under my divisions, two, three, and four, is a question. I am sure of this: Under all the headings I have mentioned, the burden was far more than double the direct expense to the employer.

Greetings from South Africa

By J. W. STRAW

Safety Inspector, Roan Antelope Copper Mines, Ltd., Luanshya, Northern Rhodesia, Africa

Mr. Straw made a short extemporaneous talk without manuscript, and unfortunately no adequate record of his remarks is available. In many respects his talk was a personal one. He commended the work of the National Safety Council and emphasized the profit which his company has received from material and service rendered by that organization. Suggestions by the Council have been widely used in the organization of accident prevention campaigns on the properties of the Roan Antelope Copper Mines, and have been very instrumental in keeping down the accident toll.

How Can Interest in Accident Prevention Be Best Maintained?

By LT.-COL. HENRY A. RENINGER

Special Representative, Lehigh Portland Cement Company, Allentown, Pa.

The speaker said in part: While each section and each industry has its own peculiar problems, the matter of sowing the seeds of safety in the various departments of a company and maintaining that interest not only with the executives and department heads but with superintendents and foremen, is very much the same.

Let me call your attention to the Safe Practices Pamphlets published by the National Safety Council. These pamphlets are a compilation of experience in accident prevention gathered from all types of industry and over a period of twenty years. They are not federal, state or insurance requirements or national codes, but they are common practices and experiences of all tyypes of industries, and, if followed out, will do more to help the safety engineer, the superintendents and foremen, in their accident prevention work, than anything I know of. I also want to refer you particularly to pamphlet No. 67, entitled "Maintaining Interest in Safety," which is a complete discussion of my subject and covers it far more thoroughly than I can do here.

Most of our big industries have awakened to the fact that today they must have their presidents and vice-presidents understand that they cannot afford to operate without a safety program. But it is not enough to have them merely interested—they must issue a blanket order to all departments and all operations that safety is a part of the company's program and must be carried out by all employees in the company; and that it is just as important to prevent accidents as it is to produce the company's products.

It is important that the comptroller of a company be interested in safety from the financial standpoint, and he should be furnished with the reports showing the cost of accidents, cost of compensation, insurance, etc. These reports should also be given to the treasurer, and when you can show them reports of several years of experience where your insurance premium is coming down and your cost of compensation is lower, then they will not hesitate to approve any bills that may come in for safety work.

Naturally, your engineering department should be vitally interested in safety, and to maintain their interest it should be the duty of the safety engineer to furnish them with reports and charts showing accidents, days lost, man-hours, and days lost per 100,000 man-hours. Anything new in safe practices pamphlets, any new state codes affecting construction, fire prevention, good housekeeping or anything that comes under their jurisdiction, should be brought to their attention.

To maintain the interest of the higher executives, I wish it were possible to get the president or vice-president, general manager, superintendents and any other high officers to attend this Safety Congress each year. If they would spend three or four days at a gathering like this I am sure their eyes would be opened and they would get a picture of accident prevention activities and their importance that could be given to them in no other way.

Safety committee meetings sometimes become dry and uninteresting. Many safety committees are organized merely for the purpose of taking care of plant inspections relative to safeguards. We believe that a safety committee should be the one functioning body or organization in a plant to handle any and all problems whether they relate to plant hazards, machinery, or construction; and we also believe that it is their duty to look after fire prevention and fire protection. Sanitation and health hygiene should also be a part of their work. Where you give your safety committees some real authority and some real definite work to do you can maintain their interest.

Safety contests properly run will maintain the interest of the organization. An outstanding example of this is the Portland Cement Association yearly contest for the trophy awarded by the Cement Association to those mills who go through the year without a lost-time accident. This contest has been running since 1923 and there is just as much interest and enthusiasm today in the cement industry as there was in the very beginning. If a safety contest is conducted for one month during the year, this will interest and inspire the men for a time, but we cannot expect a campaign of a month to give the men sufficient enthusiasm to carry through the balance of the year.

We find that the material furnished by the National Safety Council is needed to keep the interest of the men, the foremen and the superintendents. All of our plants receive copies of the *National Safety News* each month, also each plant has a complete set of the safe practices pamphlets, the foremen and members of the safety committees get a copy of *The Safe Worker* as issued each month, and every truck driver of the organization receives a monthly copy of *The Safe Driver*, and all the plants are supplied with the poster bulletin service of the National Safety Council. In addition to these, of course, various local poster bulletins are made up and used.

Another important item of service by the Council is the safety calendar, and I urge all organizations to make use of this in a large way. I make it my business to go into many of the homes of workers at our plants, to see how they are kept with regard to sanitation, fire prevention, etc. I cannot recall any one of these homes that did not have a copy of the safety calendar on its wall. During this depression we considered doing away with the safety calendar, but before we took that step we consulted with our safety committees in our various plants. Such a howl was set up by the safety committees that we felt we could not afford to stop the safety calendar. Any accident that happens in the family of an employee has an indirect effect on our company. We believe that the safety calendar keeps safety in the minds of the mother and children and if we can avoid one accident in the saving of one life in the family of any of our employees, we have saved many times the cost of a calendar.

WEDNESDAY MORNING SESSION

October 4, 1933

The session was opened by the reading of several brief reports presented by chairmen of standing committees. The chairman then called for the presentation of the Nominating Committee's Report, which was given by W. H. Comins, National Lead Company, St. Francois, Mo., and officers for the ensuing year were elected as follows:

General Chairman—P. M. Arthur, American Zinc Co. of Tenn., Mascot, Tenn.

Vice-Chairman in Charge of Membership Coal Mines—F. B. Dunbar, Pickands, Mather & Co., Mather, Pa.

Vice-Chairman in Charge of Membership Metal Mines—J. W. Alt, Calumet & Hecla Consolidated Copper Co., Calumet, Mich.

Vice-Chairman in Charge of Engineering—W. G. Metzger, Hudson Coal Co., Scranton, Pa.

Secretary and News Letter Editor—Daniel Harrington, U. S. Bureau of Mines, Washington, D. C.

Entertainment Committee Chairman—J. T. Ryan, Mine Safety Appliances Co., Pittsburgh, Pa.

Poster and Slide Committee Chairman—J. J. Forbes, U. S. Bureau of Mines, Pittsburgh, Pa.

Program Committee Chairman—R. N. Hosler, Coal Mine Section, Pennsylvania Compensation Rating & Inspection Bureau, Harrisburg, Pa.

Publicity Committee Chairman—M. R. Budd, Explosives Engineer, Wilmington, Del.

Statistics Committee Chairman—W. W. Adams, U. S. Bureau of Mines, Washington, D. C.

Members at Large—

W. H. Comins, National Lead Co., St. Francois, Mo.
M. F. Fairlie, The Mining Corp. of Canada, Ltd., Toronto, Canada.
C. W. Gibbs, Harwick Coal & Coke Co., Pittsburgh, Pa.
H. C. Henrie, Phelps Dodge Corp., Bisbee, Ariz.
T. E. Lightfoot, Koppers Coal Co., Pittsburgh, Pa.
Lee Long, Clinchfield Coal Corp., Dante, Va.
George Martinson, Pickands, Mather & Co., Hibbing, Minn.
D. D. Moffatt, Utah Copper Co., Salt Lake City, Utah.
M. W. Price, Jeddo Highland Coal Co., Jeddo, Pa.
L. T. Sicka, St. Joseph Lead Co., Bonne Terre, Mo.
Howard I. Young, American Zinc, Lead & Smelting Co., St. Louis, Mo.

Following Through With Safety

By THEODORE MARVIN

Editor, The Explosives Engineer, Wilmington, Delaware

The speaker said in part: The explosives industry is thoroughly cognizant of the importance of having its products correctly and safely employed, and it expends time and money to develop products capable of utmost efficiency in application, but which also can be handled and used safely. Ordinarily, one considers explosives as one of the greatest potential hazards in mining, quarrying, and construction. Yet, because of the attitude of the explosives industry, that it must do its part to see that explosives are correctly and safely used, the following achievements have been made:

1. In the last six years, two and one-half billion pounds of commercial explosives have been transported on railroads of the United States and Canada, with no loss of life, with no accidents resulting from the explosives, and with total property loss of less than $100.

2. In 1930 the fatality rate per million man-hours underground for explosives in this country's bituminous coal mines was .048 (or one death every 20,833,000 man-hours). The non-fatal injury rate was .733 (or one injury every 1,360,000 man-hours underground exposure).

3. In keeping with these records for consumers of explosives are the operating and safety achievements of explosives manufacturers themselves.

These achievements in controlling the dangers inherent in explosives did not "just happen"; they were accomplished only by intensive attention to absolutely every detail involved in the design, making, storing, moving, and use of the different types of explosives and blasting supplies.

Following through with safety for the explosives industry involves many activities, some of which might advantageously be employed by other manufacturing groups. For instance, there is the Institute of Makers of Explosives. Many of its committees are continuously at work on safety subjects such as transportation, explosive containers, fumes, magazine construction, storage conditions, general safety education, and elimination of blasting cap accidents. Approved regulations for moving and using explosives are printed on cards and in booklets for distribution to users.

A number of explosives manufacturers individually publish data on safety in handling explosives. Their salesmen, service men, and technical experts are available at all times to advise customers with respect to selecting the most efficient explosives for a definite job and how to employ it with maximum safety.

I have said that the explosives industry recognizes its obligation to users of its products, and I believe consumers concur that a good job is being done to advance the cause of safety in their properties. But the full force of this effort cannot be utilized unless users of explosives wholeheartedly co-operate; therein is the only obligation of the buyer which explosives sellers ask. To obtain this co-operation many mines and quarries supply capable explosives engineers and safety engineers. Many of these men have been specially trained and are capable of supplying detailed rules for safe and efficient use of explosives in their company's work. In some organizations, instructions for the correct and safe handling of explosives comprise almost a full sized book. For the usual operator, however, single rules of the proper handling of explosives and blasting supplies—practices which would practically abolish explosives accidents if correctly followed—is available in printed form. I refer to the safety rules of the Institute of Makers of Explosives. By placing in effect suggestions applicable to each particular job, most properties can improve their blasting practices and their safety standing.

Discipline—Accident Prevention (Anthracite)

By CADWALLADER EVANS, JR.

General Manager, The Hudson Coal Company, Scranton, Pa.

The speaker said in part: The question of discipline naturally divides itself into two parts: (1) Discipline enforced upon officials; (2) Discipline enforced by officials upon the workmen.

The question of disciplining officials is a very important one, and at the same time very delicate. We have adopted no set standard, but endeavor to judge each particular case upon the facts developed. There is, however, an exception to this, of course, in such major offense as neglect of duty, intoxication, etc. In such cases discharge is mandatory. Except for the major offenses just mentioned, our disciplining of officials takes several forms: (1) Placing them on undesirable jobs, such as steady night shifts; (2) demotion; (3) discharge.

Discipline of this nature has been enforced on officials because they allowed unsafe working conditions to exist, or because they failed to properly teach their men to protect themselves, as a result workmen being injured. Discipline has also been imposed because of the failure of the official to find gas, which was afterward discovered

30,000 bulletins are issued annually, both to European and native employees. The posters for natives are generally in three native languages understood by the majority. Sometimes a graphic picture needs no wording. On many mines the boards are illuminated at night to attract special attention. Thousands of copies of extracts from mining regulations in English and African have been distributed to underground employees; numerous leaflets drawing attention to dangers, such as those due to falls of rock, mis-fires, truck accidents, septic injuries, etc., are issued periodically to both Europeans and natives. The safety movement beats the drum of warning all the time.

To encourage interest among workmen, a prize team sub-committee supervises inter-mine safety competitions. All producing gold mines on the Witwatersrand are divided into six classes. Certificates are presented to the winning mine in each class, prizes to the officials concerned, and a silver floating shield goes to the mine earning the largest number of marks of all the competitors. These competitions, which were inaugurated in 1915, have aroused great enthusiasm in the maintenance of low records. Since 1932 the basis of the competitions was changed, the accident casualty rate instead of the accident death rate being the guiding factor. Interesting experiments have recently been conducted at the instance of the committee with broadcasting safety messages to natives and with musical programs. The installation of microphones for addressing natives on safety and other topics is being found most useful.

The committee fully recognizes that a first aid man is almost invariably a careful man, since he realizes the consequences of accidents. Bearing this in mind, the committee encourages proficiency in first aid and ambulance work, and co-operates with the South African Red Cross Society. The phenomenal growth of the first aid movement on the Reef is largely due to this co-operation. In 1932 some 1,800 European mine employees made themselves proficient in first aid; over 7,650 certificates were issued to mine employees by the South African Red Cross Society during the last five years.

Great interest is always aroused by the ambulance competition. Elimination contests for surface and underground teams are held on the individual mines, and the winning teams go forward to the district competitions. For the purposes of these competitions, the Witwatersrand gold mines are divided into seven districts and the winners of the respective districts compete in the finals for the championships of the Witwatersrand. There is, in addition, a district competition held for the coal mines in the Transvaal. Cash prizes for the district competitions are provided by the prevention of accidents committee. First aid classes are conducted regularly on the individual mines, and although every official is by regulation compelled to possess a first aid certificate, a large number of other employees are taking up first aid.

The eagerness of natives to acquire a knowledge of first aid is truly remarkable. The native movement was inaugurated in 1920. Ten years ago, the number of natives who qualified yearly was under 2,000. Last year over 7,300 mine natives have made themselves proficient to render first aid. The total number of natives instructed in first aid since the inception of the movement, in 1920, is now well over 42,000. The extreme value of a knowledge of first aid acquired on these fields is recorded in frequent reports of excellent first aid work performed in the native kraals where their homes are located. Many of the natives who proceed home impart their first aid knowledge to folks in the kraal, and the work therefore becomes of a national character, the value of which is incalculable.

ADJOURNMENT

TWENTY-SECOND ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL

Paper and Pulp Section

Officers 1932-33

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W. J. Peacock, Northern Paper Mills, Green Bay, Wis.
Samuel Pruyn, Finch-Pruyn & Co., Inc., Glens Falls, N. Y.
Ben D. Rogers, Bird & Son, Inc., East Walpole, Mass.

MONDAY AFTERNOON SESSION

October 2, 1933

The Paper and Pulp Section convened with G. E. Sanford, General Electric Company, Schenectady, N. Y., in the chair. Mr. Sanford, as a representative of the

the annual savings. This tabulation alone, I believe, proves conclusively that the accident prevention dollar, properly invested, pays big dividends.

About ten years ago the executives of our company believed that it would stimulate further interest in accident prevention to organize an annual safety contest. I will not burden you with the many details that have been carried on each year in conducting our annual contest. Suffice it to say that each year during the past nine years, with the single exception of 1929, our company has shown an improvement in accident prevention work. During 1929 there was a decrease caused by five deaths, two of which, however, were disputed claims and were settled on a percentage basis, but have been considered as fatalities in our tabulation.

I believe that every industry should know how its accident experience compares with other industries. Likewise, every factory should compare its accident experience with the experience of other factories in the same industry. Years ago the rubber industry was considered a hazardous business, and perhaps that was true; but during the last few years, due to the splendid efforts on the part of the National Safety Council in accumulating industrial accident statistics, we are able to prove conclusively that the rubber industry is not now a hazardous industry.

In 1931 the rubber industry stood tenth best in frequency and ninth best in severity among 28 of the leading industries. In 1932, the rubber industry was ninth best in frequency and sixth best in severity among 31 leading industries of the country. The only industries having a better combined severity and frequency rate than the rubber industry were the tobacco, laundry, printing and publishing, and textile industries.

Doubtless you will be interested to know how we use our accident and cost figures at a particular factory. For example, take the accident and cost experience of a factory employing from 1,500 to 2,000 men, manufacturing mechanical rubber goods, including fire hose, packing, belting, rubber tiring, etc. You will note that during the four years, 1927 through 1930, the accident experience of this plant did not improve. In October, 1930, a decided change was made in the entire safety program at the plant. An experienced full time safety man was engaged, safety committees were organized, safety foremen meetings were held, and the safety advisory committee, composed of executives, met monthly to discuss safety policies and pending safety matters. The results were outstanding. Within one year the cost was reduced $17,000, and within two years, the cost was further reduced $27,000. And this was a factory which had trailed along for several years well down in the list of factories in our annual safety contest.

I can not help but mention, also, the excellent work of one of our textile mills. During 1928 they had 77 lost-time accidents; in 1929, 50; in 1930, 13; in 1931, 2; and in 1932, only 2.

Don't think that it is necessary to spend large sums of money in order to get ... i-dends. I know small factories where there is no safety organization, but the management is constantly taking the time (and I believe that time is worth more than money) to impress all of his associates with the importance of accident prevention work. As an illustration, I know of a large plant where an employee coming down the stairs one night slipped on an apple core, falling in such a manner that he broke his back. The poor man has not worked a day since. In the small factory that I have just referred to, no one in the plant could imagine anyone throwing or leaving an apple core on the stairs.

ADJOURNMENT

Safety Section, A.R.A.—Steam Railroad Section N.S.C.

Officers 1932-33

Chairman—CHARLES E. HILL, New York Central Lines, New York City.
First Vice-Chairman—C. L. LAFOUNTAINE, Great Northern Railway Co., St. Paul, Minn.
Second Vice-Chairman—H. A. PARISH, Chicago & North Western Railway Co., Chicago.
Secretary—J. C. CAVISTON, American Railway Assn., New York City.
Members, Committee of Direction:
F. HARTENSTEIN, Lehigh Valley Railroad, Bethlehem, Pa.
H. A. ROWE, Delaware, Lackawanna & Western Railroad Co., New York City.
C. N. WOODWARD, New York, New Haven & Hartford Railroad, New Haven, Conn.
ROBERT SCOTT, Atlantic Coast Lines Railroad Co., Wilmington, N. C.
A. O. BECK, Canadian National Railway, Montreal, P. Q., Canada.
F. W. CURTIS, Denver & Rio Grande Western Railroad, Denver.
E. G. EVANS, Louisville & Nashville Railway, Louisville, Ky.
C. F. LARSON, Missouri Pacific Railroad, St. Louis.
F. M. METCALFE, Northern Pacific Railway Co., St. Paul, Minn.
J. T. PRATT, Reading Co., Reading, Pa.

The complete report of these sessions is published in a booklet entitled "Proceedings of the 13th Annual Meeting of the Safety Section", available from the American Railway Association.

TUESDAY MORNING SESSION

October 3, 1933

The sessions of the Safety Section, American Railway Association—Steam Railroad Section, National Safety Council, were held as a part of and in conjunction with the Annual Congress of the National Safety Council in the Stevens Hotel.

The opening session was called to order by Chairman Charles E. Hill, General Safety Agent, New York Central Lines, New York City. The invocation was given by the Very Reverend Gerald Gratton Moore, Dean of St. Luke's Pro-Cathedral, of Evanston, Ill. The report of J. C. Caviston, Secretary of the Association, was presented; and the chairman then called upon the first speaker.

Report of the Committee on Education

By L. G. BENTLEY

General Safety Agent, Chesapeake & Ohio Railway, Richmond, Va.

After presenting figures on the distribution of educational literature under the supervision of his committee, the speaker said in part: The committee on education believes that in producing educational matter for the consumption of the men back home there are three kinds of ideas that can be presented. There is the inspirational, which puts the minds of men to work on their moral responsibilities for the safety of their fellow men; there is the informative, which tells the men over the country how the work is progressing; and there is the educational, which gets right down into the heart of accident causes and remedies and seeks to plant in the minds of those who direct and those who work a knowledge of the manner in which they can prevent men from getting hurt.

It has been said that the day of the inspirational appeal is past, that safety today is altogether a matter of supervision and obedience to rules. Is this true? Is the day of sentimental appeal gone? Have we forgotten that man is his brother's keeper?

The answer to these questions seems to be conclusive, when we find that during the last year our distribution of inspirational posters greatly exceeded in volume the distribution of any other type of educational material. Although both our informative posters and our strictly educational posters were well received, the inspirational posters led all the rest.

But are we doing all that we can with these products? Do you know that there are 430,000 miles of track on our railroads and that we sold but 2,000 copies of our educational poster entitled "A Bum Stroke," or one poster for 215 miles of rails? On the very best distribution that we were able to effect, we sold only one for 43 miles of track. A man would have to travel a long way to see such a poster.

If I were the executive of a railroad, what would be my attitude toward the safety of my men? Would it be active or passive? Are you, Mr. President, satisfied to delegate the authority of carrying on the safety work to your subordinates, and then withdraw your active evidences of interest? Nothing is more discouraging to the man who is out in the field striving to accomplish, than to know that the big boss has a passive attitude toward his work.

I think the safety work on any railroad is an operating feature. Safety is operation. If there is an accident it is a criticism of the operation of that organization. Therefore, the safety department of a railroad, in my opinion, should be actively and closely associated with the operating head of the railroad; and by the same token, it seems to me that the reporting of accidents to the Interstate Commerce Commission should be done by the operating head of the railroad. They are his accidents, and if he is required to report them to the Interstate Commerce Commission, he must know all that is to be known about those accidents, how they occurred, what might have been done to prevent them, and whether or not they are proper to be reported to the Commission.

Report of Committee on Prevention of Highway Crossing Accidents

By H. A. ROWE

Manager, Claims Department, Delaware, Lackawanna & Western Railroad, New York City

The speaker said in part: Your committee has the satisfaction of once more reporting a definite decrease in the number of railroad highway crossing accidents, fatalities and injuries throughout the nation for the calendar year 1932, this being the fourth consecutive year of recessions from the peak year of 1928. The record is as follows: 1932, 3,499 accidents, 1,526 fatalities, and 3,989 injuries; as compared with the year 1928, 5,800 accidents, 2,568 fatalities, and 6,667 injuries. The reduction therefore, in accidents was 22 per cent, in fatalities 40 per cent, and in injuries, 40 per cent.

The problem of the prevention of railroad highway crossing accidents where double or multiple tracks are concerned seems to be growing in importance. In the month from the first week in March to the first week in April, 1933, three crossing accidents occurred in widely divergent sections of our country. In each of these cases, seven persons were killed. All three tragedies happened on double tracks.

These tragedies are indicative that the present signal system at highway crossings does not convey to the public mind a proper understanding of the situation. There appears to be necessity that signal systems should speak the language of motorists rather than be regarded strictly as a railroad engineering project.

The consensus of opinion of members of this and preceding committees of your section, studying the same subject, is that approximately 95 per cent of all railroad crossing accidents are preventable by the driver of the motor vehicle. This indicates definitely the necessity of education of the individual driver.

Your committee unanimously presents the following recommendations:

That particular stress be laid upon the necessity of giving adequate and timely warning to the public of the approach of trains to a highway crossing by sounding of the crossing whistle and the ringing of engine bell;

That the warning from engine should be continued until the crossing is definitely reached;

That suitable standardized methods of protection be employed where necessary at crossings to facilitate uniformity and public understanding thereof;

That crossings be periodically inspected and continuously maintained in sound travable condition.

Address by the Chairman

By CHARLES E. HILL

General Safety Agent, New York Central Lines, New York City

The speaker said in part: During the five-year period ending with 1913 and immediately prior to the general adoption of organized safety on American railroads, the employee casualty ratio increased at an alarming rate. In 1914 the casualty rate began to drop and there has never been a year since this downward trend in accident frequency started when the casualty rate was as high or even approached that of 1913.

Based upon the official record of the Interstate Commerce Commission, covering all railroads of the United States, 1932 as compared with 1913 shows a decrease in the number of employee deaths from 3,715 to 557, and a decrease in injuries from 171,417 to 17,416. On a man-hour basis, this represents a reduction of 72.5 per cent in deaths and 81.6 per cent in injuries.

This means that in 1913 there was one death for every 498 employees, whereas in 1932 there was one death per 1,829 employees. The injury rate was reduced from one injury per 11 employees to one injury for 60 employees.

Had organized safety not been inaugurated upon the railroads of this country and the record of 1913 continued, there would have been during the succeeding 19 years up to and including 1932, 29,277 more employees killed and 868,162 more employees injured than actually occurred during this period.

Although railway accidents have been substantially reduced, we must not be unmindful of the fact that this record is in the past and future achievements must be measured against the record of today. We are still having accidental deaths and injuries to employees in such volume and through such inexcusable causes that they stand as a further challenge to railway management. They not only warrant our increased efforts, but a greater concentration of such efforts in the application of the well known specific remedies that will serve to ultimately result in the complete abolition of preventable accidents.

The Safety Section of the American Railway Association was organized in 1921 for the purpose of coordinating the efforts of the individual railroads in the prosecution of various activities in connection with the prevention of accidents of all kinds resulting from railroad operations.

It is imperative that we carry on this work and it must be pursued with greater zeal than ever before. As an aid to this plan, we must have a goal pledging this section and the individual carriers to use every legitimate effort to continue the descending ratio. It is necessary that we have a goal, it matters not what our vocation in life may be. A man, to be successful, must have a definite objective. When that is reached, he must change his objective, making his goal increasingly difficult to attain. Our perspective in life changes as our ideals change and our ideals are controlled largely through a process of comparison. Therefore, our plans for the future must contemplate a new goal—one that will reflect the spirit of the Safety Section, the spirit of the individual character and the spirit of the American Railway Association—a spirit of indomitable courage and the will to do.

We must visualize the more than 18,000 railway employees who were the victims of 1932 and resolve unto ourselves that in so far as it is within our control such needless sacrifice shall not continue.

How to Establish and Maintain Safety in the Shops

By T. W. DEMARRST

General Superintendent of Motor Power, Pennsylvania Railroad, Chicago

The speaker said in part: The development of safety in a shop is wrapped around three major factors which have already produced lack of safety: (1) conditions; (2) practices; and (3) the human equation.

It is certain that if the conditions in a shop are such as to produce lack of safety, no rational correction of practices can be consistently made. The workman is always in a position to point out that the management is not consistent in endeavoring to correct practices when they themselves do not establish safe working conditions. I would first then clean up the shop, maintain a clean shop, not only from the viewpoint of appearance but from the viewpoint also of the distribution of materials. I would endeavor to create a desire for cleanliness in the minds of the workmen. A dirty shop makes a dirty man, a dirty man cannot respect himself, and the combination will produce very poor results in any safety movement.

I would correct as far as practicable all unsafe conditions in the shop in order that the management shall be in a position to approach the men and obtain safe practices from them.

I would then begin the correction of unsafe practices, selecting the most glaring ones for correction first, and in such correction would most thoroughly explain not only to the man involved but all of the employees in such departments, the reason why the practice is unsafe and the possible effect of producing an accident, the results to the man involved and also perhaps to his family. If you are acquainted with the more personal conditions of a man's life, you can use this knowledge very effectively in getting his attention when talking about safety work. Refer to his family, to his children, and in this friendly way you will be able to interest him in what you have to say about safety.

Talks of this nature can be given by the department foreman or his gang foreman to his men at regular intervals. In the meanwhile, the education of the master mechanic, the general foreman, department foremen and gang foremen should also be progressing. The question of education is never completed. Talks are much more effective than papers or letters of instruction.

Too little attention has been paid to the mental process of new men being employed for service. We are very careful as to their physical condition, their education, and their skill and ability to perform the service for which they were being hired. We have in the past, however, paid no attention to their mental trends, to develop whether or not from a safety viewpoint they would make a good employee. Such tests should be established as a requirement and in addition to the physical examination.

Safety to be effective must be automatic and subconscious in the individual. If it is necessary for him to stop and think before performing any operation, whether he is doing it safely or not, he is more apt to make an unsafe employee than a safe one. Its initial establishment must begin as a youngster at home, and this has caused me to believe that where there are ladies' societies of any kind on a railroad, that a part of their work at regular meetings or calls should be the safety education of the mothers from the home viewpoint. It is certain also that safety studies in our schools would be more useful than some of the work now being taken.

Then safety rules; their development and application are apparently necessary in the inauguration and advancement of a safety movement. They are the texts from which instruction is given. They are effective, however, only in so far as their practice becomes subconscious on the part of the man.

I am of the opinion that the explanation of a safety rule should be reinforced by practical illustrations. Men transferred from one department to another, with little knowledge of such department's work, have difficulty in grasping the rules as the terms used are not familiar. We find the same situation in our laborers, many of whom are of foreign extraction and who do not have a good knowledge of the English language.

TUESDAY AFTERNOON SESSION

October 3, 1933

Address

By FREDERICK E. WILLIAMSON

President, New York Central Lines, New York City

The speaker said in part: I got my first lesson in safety in a very trying way. I was working in Utica, and the yard was badly congested. I was working with a switch engine in the lower part of the yard, and it was snowing hard. I was on top of a string of cars, and I was trying to figure out how to get them out. I swung down on a side ladder, with my mind wholly intent on what I was trying to accomplish, and stepped back on track No. 3—there was a screech of a whistle, and here suddenly was No. 3's engine about 50 feet away, or so it seemed to me. Instinctively, I made a dive between this string of cars that was pulling out, and I could just feel that pilot beam whistle by me, and the engineer thought he had hit me. He stopped and came back to find that I was all right, but certainly I got a safety lesson from him in no uncertain words.

So I learned my first safety lesson by a shock and a scare. Today, however, we have adopted another principle. Now we are trying to teach the young men safety by rules, by education, rather than by letting them learn through experience and narrow escapes that safety is essential.

You and the affiliated safety bureaus of the several railroads have taught us to understand that while you can't undo accidents that have happened, you can see to it that no accident that does happen will be considered a closed book until there is a thorough analysis of its cause, with a view to the avoidance, wherever possible, of that same cause of succeeding accidents.

As we review the official records of the Interstate Commerce Commission, we note with pride the progress of the American railroad in the reduction of accidents, and all who are familiar with the subject recognize the large contribution of the Safety Section of the Association in that noteworthy achievement.

One of my distinguished predecessors in the presidency of the New York Central Lines was fond of saying that a railroad is composed of plant and personnel, and that personnel represents 90 per cent of its value. Much of the success of your work is dependent upon a recognition of the large importance in safe railroading of the so-called "human element." You must consider and deal with a mental approach of officers and employees to all safety work. It is not enough that the physical plants be cleared of lurking hazards, nor is it enough that instructions as to the safe methods of operation be promulgated. Both of these things, of course, are vital. Of equal importance, perhaps of larger importance, is the molding of mental attitude toward safety movements, and toward safety itself. The number of accidents that are utterly unavoidable is surprisingly small. Everything that is done to impress on all the frightful cost of accidents in life, limb and money, is yeoman service. We must eternally seek to instill in the minds of all a serious respect for safety measures and a dogged determination to do each one, his job, not only well, but safely. Your section is now, as it has been from its inception, in the vanguard of that movement, and it is but candid that I say to you that railroad executives generally, congratulate and honor you for what you have done and are doing.

The Art of Teaching Safety

By C. B. BOULET

Safety Director, Wisconsin Public Service Corp., Milwaukee, Wis.

The speaker said in part: Safety engineers and executives have learned that before you can stop accidents, the accidents must be analyzed individually and collectively, and proper remedies applied; and the only way to apply the remedies is through teaching the facts that the accidents disclosed must be taught. That cannot be done in a week or a month. It is a continuous job, year in and year out.

It is a generally accepted fact that teaching is made easier and more successful if the individual we desire to teach is in a receptive frame of mind. How are you going to do this? By appealing to the things that the man most desires to have. Put yourself in the position of the man who is working for you, and let's see what the things are that are wanted. Suppose he is a machine operator, a switchman, or whatever his job is—there are certain things he wants. First, if he is any kind of a man, he wants to keep his job. That is the first thing. Second, he wants to keep his pay. He doesn't want a job unless he gets paid. Third, he wants to be able to do his work in a satisfactory manner, not only satisfactory to himself but to his employer. Fourth, he is interested in his family, in his family's protection and in his family's welfare. Fifth, he is interested in his own pleasures, playing the violin, moving pictures, playing golf, etc. Sixth, if he is the right kind of an employee, and if you have taught him right, he is interested in the company's success, because in that he will find his own success.

We as safety engineers must absolutely first convince the man that an accident to him, no matter how minor, is a real loss to himself and to society. After that, I think you can show him first of all that your company is interested in safety, and you can prove it to him by saying, "Do you know that safety construction is in everything we have? Notice the guards on the machines, the type of operation we are carrying on, the type of equipment we are using. Safe construction and safe conditions are part of the management."

I used to be a teacher and there are a few things I believe I can pass on that will be helpful. First, the presentation of the subject that you want to teach. The presentation must first of all be simple. It must be brief. It must be absolutely to the point.

Second, the arrangement of the material that you teach must be logical. There must be a logical sequence to the things that you are trying to teach.

Third, the facts that you are trying to teach must be, wherever they can, related to the facts the man already knows, in order that by association with existing knowledge he can retain those facts.

Last, your word picture must be clear.

How can we accomplish these things we are going to try to present? Let us go back to the school situation. How did your teacher teach you arithmetic and spelling? First of all, by repetition. You remember how you learned the multiplication table. How were you taught spelling? Again, by repetition. You would spell the word orally, and if you missed it you would write it a hundred times.

Are you using that trick in teaching safety, or are you just telling the men once and forgetting it? That is one of the first principles of teaching safety, repetition. In connection with repetition, it is very important that repetition be made not over only one day, but over a long period of time. Experiments have proved that the

longer the period of time over which the repetition is made, the more firmly will the idea be fixed in the man's mind. The teaching of safety must not stop in one week, one month, or one year, but it must be continuous.

What do you get by continued repetition? You get reflex action, a sub-conscious working of the man's mind, so he cannot help himself. He has to do the thing that way. You do one thing, the same one, time and time again, and no matter how you try to break yourself of that habit, it is almost impossible. With an old employee who has done a thing a certain way for a long time, you may run into sales resistance, because he has formed the habit. The new man is the fellow to go after. When you are taking on new men it is your opportunity to teach them by repetition. Form the right habits.

Second, there is a proverb that practice makes perfect. Just telling a man something isn't going to teach him. He has to do it himself. Once having gained a fact or an idea, continued practice will improve technique and more firmly fix that technique in the mind. That is particularly true of complicated operations. It is the only way a man can learn them.

And right along with practice, you will remember another phase of your school work in high school or college, perhaps. You were taught how to experiment, and experimentation and practice are very similar, although actual practice is better than experimentation. To teach by experiment fixes the thing in a man's mind because he not only gets the lesson through the ear, but he gets it from several other sources. First of all, he works with his hands and gets the sense of touch. The thing is impressed on his mind through the sense of touch. Second, he hears it; third, he sees it; fourth, he has to be thinking about it while he is doing it. You are stimulating practically every sense the man has in teaching the subject, if you are doing it through practice or experiment.

I suggest to you that another old proverb might come in handy, namely, "Experience Is the Best Teacher." It ties right in with the other. What a man experiences he doesn't forget. What is told to him, as I am telling these things to you today, he soon forgets. If I were to do this job right, I would make each one of you write down the things I am telling you. I would have a board with slides or lights on it, and you would see it, and I would tell you about it. But the things I am saying to you here you are going to forget, unless you are making notes of them.

But we can also bring to any individual the result of somebody else's experience. That is where experience steps into the play. Every time there is an accident, make use of the experience obtained through that accident, because an accident is a real living issue. It is part of the man's life. If it happens to someone that he knows, or in some town that he is familiar with, he is going to be particularly interested in that accident. You picture the accident to him, explain the accident, and say to him, "How could it be stopped?" You are employing some of the best teaching in that way, a conference method. After he tells you how that accident should be stopped, do you think he will have an accident like that? No. He has analyzed that accident, he has told you the results and how to stop the accident, and he is not going to be queered by doing what he said should not be done.

Make use of every accident you can lay your hands on. Let the employees tell you about them; bring into play the last sense, the sense of speech. Make the man tell you how that accident can be stopped. Take him into your confidence and he won't have an accident of that type.

I mentioned a few moments ago that teaching could be improved by the use of a chart. That is known as visualization. There are a number of ways to visualize. A chart is one way, and there are also pictures, posters, actual demonstration of apparatus, just looking at it—all visual demonstrations. The only object of that in teaching is to get another entry into the man's mind through the eye. A man is given a certain number of senses. How many are you making use of? Make use of all the senses you can.

Few of us realize that we are all teachers, whether we want to be or not. Each of you, I venture to say, has some particular gentleman in mind as a person who has had influence on your life. You have set up somebody as your example. You have watched him and tried to do things as he did them. Every minute of the day, you also are a teacher, whether you want to be or not. Just the way you act makes you a teacher to somebody. And it is very easy to be a bad teacher by example. The case of railway officers standing on the tracks is a perfect example of terrible teaching. They are setting up a wrong example. They are establishing a wrong practice, and men are going to follow their example because they respect them and look up to them. It is like the case of the foreman who posts a "no smoking" sign, and the president of the road or some other officer comes through there smoking. The employee says, "I don't know what kind of fire he smokes, but I can smoke if he can."

We are today in difficult times. New men are coming on the job, and old men who have been laid off are coming back to work. They are sometimes unfamiliar with the operation; they have forgotten; the period that has elapsed since they practiced these things before has been so long that the practicing of them has become kind of lost in their minds, they are lazy, and they try to do the thing in the way they used to do it and they will get hurt. The new man and the old man coming back need especial attention, and ought to have it the day they come on the job. Don't delay, because, if you do, some of them will have trouble, perhaps a serious accident, before you can teach them again.

Address

By M. J. GORMLEY

President, American Railway Association, Washington, D. C.

The speaker said in part: While sitting here thinking about this question of repeating instructions in the interest of safety, I recalled to mind that good old war horse whom we all remember, Ralph C. Richards, one of the fathers of the safety movement. I worked with him on the North Western Railroad for a great many years. He was an inspiration to anyone, regardless of whether he was on the claim end of it or the operating end of it or the safety end of it. I remember one experience while a trainmaster in Minnesota. We had a switchman with red hair who got injured too often to suit me. One day he was coming down through the yard with a string of cars and made a stop, and instead of getting off the side of a flat car as he should, he reached over and took hold of the uncoupling lever, and fell off. He was laid up for a week, and I thought, "I guess I will write to Mr. Richards and recommend that he pay the gentleman nothing for the time he is off." He was off about ten days.

Well, Mr. Richards wrote the letter for me, and I presented it to the switchman. When he got home and told his wife that he wasn't going to get any pay for those

ten days, she became his safety supervisor from that time on, and he was never thereafter injured. That was one of those object lessons that cannot be forgotten.

I was also much interested in the idea of repetition of safety instructions. I have two daughters whom I taught to drive an automobile. I said to them: "There is just one rule in driving an automobile, that I want you to remember; and that is to learn to talk to whoever is sitting alongside of you without moving your head sideways." I drilled this idea into the head of the younger one time and time again until she got it down pat. One day she was driving alongside of me and I said suddenly, "There's a new house." Instantly she turned around and looked at the new house, and then she caught herself. I don't believe anyone could catch her on that kind of thing again.

I have heard it said that the railroads are obsolete, that their equipment is run down, under-maintained, and everything of that kind. I was greatly interested in that, so I checked up a while ago carefully and I find we have a decrease in ownership of freight cars of 337,000 compared with 1925. There has been a decrease in freight trains. We have better cooperation in loading and unloading. You do not get the full results of the efficiency and movement unless you reduce the units required to handle that business. How much has the reduction of 337,000 cars in the handling of a given business contributed to the safety movement? How much has the retirement of 1,091,000 cars since 1923 and the addition of approximately 900,000 new ones added to the safety movement? If you buy a new car that is better than the old one, it is a move toward safety. If you buy a locomotive that is better, you add to safety. If you can handle more cars on the train, you have less opportunity for employees to become injured. The more safely you operate the more economically you operate.

I saw some figures prepared by someone in a statement, I believe by Mr. Palmer, comparing the last ten years with the previous ten years, showing that the payment for personal injuries alone showed a decrease of $160,000,000. To carry it further, to make a comparison on the question of the reduction in the cost of operation due to wrecks, derailments, etc., we have something in excess of a billion dollars saved during that same period.

Report of Committee on Statistics

By T. H. CARROW

Superintendent of Safety, Pennsylvania Railroad, Philadelphia

The speaker said in part: I want to summarize as briefly as I can some of the previous reports of this committee, because it is necessary to give a basis to what I am going to recommend today.

In 1921 the first report covered the question of accuracy. In 1922 we were able to report that the Interstate Commerce Commission had adopted a million man-hours as the basis for comparisons by roads and by occupations. In 1923 we made a general analysis of fatal and non-fatal injuries due to being struck by trains. In Salt Lake City in 1924 for the first time the possibilities of reductions were apparent, because up to that time we had no knowledge of what we might do, and even then our conclusions were predicated largely on our practical imagination, because the statistics were more or less in a crude state no further back than 1924. We, therefore, recommended the 35 per cent goal.

In 1925, recognizing the necessity of a definite program, the committee worked

up twelve skeletonized bulletins for publicity and recommended that the Association adopt these as a regular program. In 1926 we presented four resolutions on the basis that the remedy for accidents on the railroads rested directly with trainmasters, road foremen, master mechanics, and division engineers. In 1926 we introduced four resolutions appealing to these four classes of supervisors. There were miscellaneous analyses from 1927 to 1931, particularly in charts that were put out showing the different departments of each railroad, how they stood in comparison with each other. I think that was an innovation that marked great progress. In 1932, for the first time, we suggested the possibility of a standard rate; we suggested for the first time the possibilities of standard casualty rates.

I have here a statement which is a composite of the accident situation on all the railroads in the United States. It is one that shows casualties in the seven classes of service, from 1923, 1931, 1932. In maintenance of way and structures in 1932 we have, roughly, 4,000 accidents; in maintenance of equipment and stores we have also 4,000 accidents; and in "other transportation" which is nearly all station, we have nearly 2,000 accidents. Then in train and engine service, we have in round figures 7,000 injuries. If you examine those rates you will notice a very marked drop from 1923 to 1931. But we came to an impasse in 1932, and showed almost no improvement. As a matter of fact, in the maintenance of equipment department the rate was virtually the same each year.

There are two significant features to that statement. The first is the fact that we made no appreciable progress in 1932, and the second is the preponderance of accidents to train and engine service employees.

The total number of accidents to all employees last year was, roughly, 18,000; in the train and engine service, however, 7,000 accidents occurred, which is 38 per cent of the total, while the train and engine service had only 19 per cent of the man hours.

There is something, however, very much more significant even than that, and that is the rate in engine service is very small indeed, and in the passenger service there is no more hazard than with clerks.

The fact that the train and engine service predominates indicates that we must concentrate our energy on that department, and I am prepared to say that I don't believe that from a purely numerical standpoint the hazard in train and engine service is materially greater than it is in the shop or in the maintenance of way department, and that the explanation for the poor performance is that we as a body have not done our job, and that the trainmasters have not done their jobs, and that individually and collectively we have got to get together and find the solution for the train service accident situation, which is indicated very clearly by an analysis of the statistics.

I want to speak of the fluctuation in train service accidents. Fifteen trainmen were killed in 1923 on account of negligence in connection with train orders, and not a single one in 1931. That was good work, wasn't it? No, it wasn't good work, but just largely luck, because in 1932 there were ten of these accidents.

Now let me turn to another matter. I will not mention any roads specifically, but I have taken fifteen roads and designated them as No. 1 to 15, inclusive. Isn't it indicative that something is decided wrong when we find that the first road I have listed has a rate of 2.40, and the last road has a rate of 13.40? There is something wrong somewhere, there is some deficiency, as surely as figures can indicate it.

I have made a note of a railroad that has made a very fine record, and that still has a rate of 7 in the maintenance of way department and only 2 in the maintenance of equipment department. If I were president of that railroad, knowing safety as I do, I would say, "Look here, Mr. Maintenance of Way Office, what is the matter with you? Have you lost your interest in safety? What is the difficulty that keeps you from getting in line?"

I want to suggest to you the propriety of working up a statement similar to this for every one of your divisions, and at the end of each month using the cumulative figures, put a red ring around each one of them and pass them on to the boss, and say, "There are the individual officers who are not on the job."

Now I am coming to the purpose of my talk. Let's then begin to consider the future of our work on the basis of the possibilities of each department. There is no sense in assuming that train service will ever be exactly like the maintenance of way or the maintenance of equipment. For that reason, we have got to establish rates that will be reasonable for each department.

There are a lot of circumstances that enter into this thing. It may be that Mr. Warfel's report may change the basis of reporting. It may be that there are plenty of railroads in the United States that are just as honest as they can be, that would report more accidents if Mr. Warfel's report is accepted and adopted. I don't know exactly what the rates ought to be, and I think I ought to know if anybody else does know. But I have thought that the figure for the maintenance of way department ought to be less than three casualties per million man-hours; the maintenance of equipment department ought to be three and the train and engine service ought to be eight, and the total ought to be four.

I come to the important question, "How will this goal be reached, how will these figures be achieved?" By the same methods that we enunciated in Salt Lake City, namely, improved design, construction and maintenance to insure the greatest immunity from physical hazards, and all of the accidents from that cause represent only five per cent; improved training, supervision and discipline to insure the adjustment of the mind to the hazards of operation in the case of every railroad man in the service of our railroads, so that they will be literally capable and able to master the dangers of their work. This consummation, which is so devoutly to be wished, will be realized when required by the management of every railroad; that is, when safety is fully woven into the duties of all operating officers and supervisors.

Following Mr. Carrow's report, the suggestions he had made were embodied in a motion, and the recommendations of the report were duly referred to the committee of direction for consideration.

The Railroad Trespass Evil

By T. E. PRATT

Chief Special Agent and Superintendent of Safety, C. B. & Q. Railroad, Chicago

The speaker said in part: I am not exaggerating when I inform you that there are at least one-half million trespassers using railroad trains as a means of transportation, 90 per cent of this number being under the age of 25. Men, women and children are now traveling via the hobo route. For instance, a man and his wife, with a three weeks old baby in a basket, were found on top of a refrigerating car on the Illinois Central Railroad recently. In another instance, a mother and father placed their two children, 6 and 7 years old respectively, in a box car to send them to another city where they had relatives.

It is not an uncommon thing to see on a freight train as many as 150 hobos. When a derailment occurs, many are injured, or killed. Hundreds of them are injured while beating their way on trains, resulting in the loss of arms and legs, which is costing either the community or the railroad large sums of money. Some of them unconsciously turn angle cocks while climbing through trains, some of this being done maliciously, and this at times causes serious accidents.

Perhaps you may wonder why the special agents or the police department cannot do anything about this trespassing. Do you realize that we have communities where, if we arrest a man for riding on a train, he is not only turned loose but the officer is criticized by the court, and snitch lawyers are there to file suit against the company? In one instance we had a fine young man working for our company, who was killed in cold blood by a man taken off the head end of a passenger train. In that community, when the man was apprehended, upon trial he was not only turned loose but the citizens in the community made up a purse to send him back to his supposed home.

I say to you that because the public was not informed, they did not understand what a menace to society that man was. They did not understand what they were saying to the youth of our land who are going around under the guise of hobos. That is the reason, when we talk about trespassing, that we must, before we start in, educate the public, and this section of the American Railway Association, together with every other section, should assist the Protective Section in molding public opinion so that they will understand that it is to their interest to stop this undesirable traffic.

The Supervisor's Responsibility

By H. S. CORBIN

Supervisor of Safety, Atlantic Coast Line Railroad, Wilmington, N. C.

The speaker said in part: Working on the theory that every accident results from a definite cause, it is my belief that there is no greater cause of accidents than supervisor's responsibility covers all phases of operation.

Standard operating rules, along with special instructions, cover practically all conditions of service and, when there is an accident, or personal injury, it usually develops that some rule has been violated. Therefore, there can be no greater responsibility resting upon a supervisor than to see and know that rules and instructions are carried out.

From the standpoint of the maintenance of way department, the supervisor is responsible for condition of the roadbed and tracks on the territory which he covers as section foreman, roadmaster or general roadmaster. He is also responsible for the safety of the men under his supervision and the tools they work with. He should make a personal study of local conditions and needs in this respect.

One of the most hazardous conditions with which track men must contend is the operation of track motor cars. Because they usually carry more than one man, and an accident assumes greater proportion in the number of employees injured, and the extent of their injuries. Some employees will naturally take a chance in

the operation of track motor cars by: (1) operating a car at excessive speed; (2) improperly storing tools on the car; (3) permitting men to occupy unsafe positions on the car; (4) failure to protect against trains and other track motor cars; and (5) failure to observe switches and crossings, especially with respect to speed and obstructions.

The maintenance of way supervisor must know the standard operating rules, and should at all times have in his possession current time tables and be familiar with special instructions. There are few duties of a maintenance of way supervisor that we can well delegate to someone else, or avoid responsibility for.

From the maintenance of equipment standpoint, it is particularly the duty and responsibility of the supervisor to note hazardous conditions about the shop plant. He should be quick to hear any report of unsafe conditions of the premises, machines and tools, and his quick eye should personally observe these conditions. He should be of as great value as others working under him in foreseeing possible accidents and injury as the result of these hazardous conditions.

After a possible injury, the supervisor also has an important duty toward the injured employee. He should see that immediate first aid care is given the injured person and make sure that he gets into the hands of a competent physician as rapidly as possible. To call in a physician and a claim agent every time a man stubs his toe or skins a knuckle is, of course, a mistake. It is possible to make too much fuss over small injuries. But there should be at hand some simple means of preventing infection for minor injuries, and if an injury is serious, the personal attention of a physician is the only recourse.

The Green Book

The final feature of this session was a presentation of the current "Green Book" by L. R. Palmer, Conservation Engineer, Equitable Life Assurance Society, New York City. Mr. Palmer very briefly called attention to the fact that he had prepared a tabulation covering employee casualty rates for the six months' period of 1933. Class I railroads, in accordance with the standard Green Book grouping and will forward copies to Class I railroads.

WEDNESDAY MORNING SESSION

October 4, 1933

The Goggle Rule and How Enforced

By J. C. YOCUM

Manager, Safety Department, Chicago, St. Paul, Minneapolis and Omaha Railway

The speaker said in part: It has always been a puzzle to me why it is necessary to repeat over and over again to employees that one of the greatest things which has been given us is sight and how necessary it is that they use the means so freely afforded them to protect and preserve this blessed gift. To my mind, being blind is about the worst disaster that can happen to anybody.

Experience has shown that we cannot take it for granted that men will of their own accord think for themselves in this respect, and for this reason it has been found necessary to adopt rules requiring men to wear goggles in performing operations that are hazardous to the eye.

The record of one of the largest railroads shows that there was a total of 124 eyes destroyed over a period of five years, as follows: 1928, 34 eyes lost; 1929, 32 eyes lost; 1930, 29 eyes lost; 1931, 21 eyes lost; and in 1932, 8 eyes lost.

The principal causes of these losses were as follows: struck by flying materials, 18; using tamping picks, 11; using track chisels, 6; cinders in eyes, 6; driving spikes, 5; driving nails, 4; struck claw bar with spike maul, 3; cutting cotter keys with hammers and chisels, 3; cutting nails with hammers and chisels, 3; striking steam hose coupler with hammers, 3; and struck by stones thrown by boys, 2. There were also reported 31 other causes, each producing loss of one eye. A total of 26 eyes also were lost due to dust, scale and other foreign particles entering the eyes.

In checking goggle rules issued by several of the lines, it is found that some are very brief and merely recite that goggles are furnished by the company and must be worn by all employees in performing operations hazardous to the eyes, while another road will use the above quoted rule and then follow with specific items covering operations in which goggles must be worn. To my mind, the rule should be as specific as a rule can be made, as it is more easily understood and violations more easily detected.

In my study as to the means of enforcing the goggle rule, my conclusions are that it is a matter of cooperation between the management and the employees, and that each has a duty to perform.

To further emphasize the enforcement of the goggle rule, I would gather together the foremen or supervisors under my direction who have direct charge of gangs and speak to them in the following language:

"The management expects me and my department to enforce the goggle rule 100 per cent, and I expect the same from you. I also expect you to know that each man working under you is furnished with the proper type of goggle for his work, and you must take especial care to have proper goggles for your men who wear glasses with corrective lenses. You are to see that these goggles fit properly, are in adjustment, are comfortable, and that they are afterward kept in proper repair. You will remember that the safety department has given you some valuable hints as to the wearing of goggles and the care of them. The most important of these hints are as follows:

"1. To prevent fogging, keep ventilating screens clean, and lightly rub glycerine soap over the lenses, then wipe off.

"2. A gauze band worn over a man's forehead above his goggles will prevent perspiration from running into and over the goggles and prevent fogging.

"3. There is a proper way to remove goggles. Bend head forward with both eyes closed, take off the goggles and with the eyes still shut, wipe off the forehead.

"All of the above are duties in connection with the saving of eyes which you owe to the men who work under you and will do much to assist you in enforcing the rules. When you carry out the above ideas completely, you have done all you can for their comfort, but you have a further duty and it is up to you to educate your men to have their goggles with them at all times during working hours. The fact that some of your men may think it a burden to carry the goggles on their caps or around their necks in the extremely hot weather is no excuse for you allowing them to do without their goggles when they need them—also, you are to consider that it is just as essential that goggles be worn in doing work dangerous to the eyes

which takes only a second or two as that work which takes a longer period of time. I expect that each of you supervisors will be smart enough to secure the full cooperation of at least 95 per cent of your employees in a 100 per cent obedience to the rules because your employees realize the wisdom and desirability of compliance. It is possible you may have 5 per cent of your men who cannot or will not obey the instructions and rules. I am back of you fully in the enforcement and discipline necessary."

Accidents to Yard and Train Employees — Their Cause and Remedy

By E. A. MEYER

Manager, Safety and Fuel Departments, Chicago, Milwaukee, St. Paul and Pacific Railroad, Chicago

The speaker said in part: In looking over the list of accidents to switchmen on the Milwaukee System, which comprises 11,207 miles of main line, I find we had 30 switchmen injured during the past 12-month period; 7 of these were injured by falling; 3 had their hands injured or fingers crushed while making couplings; 5 resulted fatally, 3 of these 5 victims went between moving cars to adjust couplers which is a direct violation of the rules, and one stepped in front of moving cars. The fifth fatal injury was to a man who crossed in front of moving cars to reach a platform.

During this same one-year period, we had 19 trainmen injured. Five of them were conductors and 14 brakemen. No conductors were killed although 5 were seriously injured. Four of these accidents to conductors could have been avoided: one scratched his hand on a train order hoop and neglected the injury until infection had set in; one was injured in opening a stockyard gate, the wind blew the gate against him, throwing him against the loading chute. Another was hurt while kicking a wood block out from under a wheel, and one was pulling a jack from under a derailed car on a bridge when the jack gave way and he fell backward off of the bridge. The fifth accident was one for which the conductor was not to blame. He was assisting passengers to alight from the train when a lady missed the top step and fell. He caught her and in so doing severely injured his knee joint.

Fourteen brakemen were injured, one of these being killed when a train was derailed. He was not to blame, simply a victim of the mistakes of his fellow employees. A majority of these accidents to brakemen were falls from cars or injuries received while the men were getting on or off moving trains. They were not particular about getting a good hand hold and foot hold and were not sure of the nature of the ground surface where they alighted. One brakeman was injured while standing alongside of an engine when the engine man opened the blow-off cock.

I have given a resume of the accidents to train and yardmen for a period of a year. What are the remedies?

First, safety education. By meetings, talks, and letters we are trying to have our men become safety minded. We also try to instill a competitive spirit in them by issuing statements showing the list of accidents in their departments in comparison with the same department on other divisions. We also compile comparative standings of divisions. This creates a desire to have the record of their craft or department excel. It also generates loyalty to and pride in the safety record of the entire railroad.

A second remedy is stricter discipline. Whenever an accident happens, whether there is an injury or not, an investigation is held. The cause of the accident is determined and the responsibility placed. Very often several persons are to blame. The punishment varies depending upon the seriousness of the mistake and also on the man's past record. Sometimes a reprimand or mark against his record is all that is given. He is sometimes taken out of service for a certain period of time. Often it results in his dismissal from the service.

We are placing more and more stress upon supervision. The man at the head of the department should be held responsible. Even though a foreman does not personally disobey a rule, if he allows anyone to follow an unsafe practice or if an accident happens through the lack of his supervision, he is the one who should receive the punishment. For instance, a conductor is responsible for the brakeman, and if he allows his brakeman to do something contrary to rule, the conductor is the one to be held responsible and he should be disciplined as well as the brakeman.

Operation of Hand Brakes

By FRED BRASTRUP

Superintendent, Fargo Division, Northern Pacific Railway

The speaker said in part: In considering the general subject of hand brakes, the upkeep, I think, should be mentioned first. A great many accidents that result in personal injuries, as well as damage to equipment and contents of cars, occur as the result of defective hand brakes. Some of the items that contribute to this result are too much brake chain, which permits the chain to be wound around the staff and jammed before the brake shoes come in contact with the wheels. Defective ratchets and dogs that will not function after the brake is set are another cause of trouble that should be checked in making equipment inspection.

The styles of brake differ from the old style staff, mainly in that they are constructed with leverages that will respond promptly and bring a heavy load to a quick stop. In this connection it is important, however, not to provide excessive leverage that will result in sliding wheels, as it is a well known fact that too much breaking power is not good practice as it increases liability of flattening wheels which again is a source of danger.

The following are points that are essential in a hand brake:

1. A brake that can be applied and released with one hand. Both feet and the left hand are thus free to be used in retaining safe position on a car.
2. A brake that can be quickly applied with one hand with such small effort that the operator's mind and body are free to observe and act promptly in emergency.
3. Instantaneous release by the use of one hand only.
4. Graduated release for permitting a car to drift with the use of one hand only controlling the brake, thus permitting a trainman or yardman to maintain positive control of car movement with minimum effort and with safety to himself.

Some of the things to be guarded against in connection with the operation of hand brakes are:

1. Do not permit the use of a make-shift brake club. The use of the brake club in the spotting of cars on sidings and in yards, particularly in what is known as hill territory, is recognized, but the practice of train or yard men using a pick or

mawl handle converting it into a brake club should not be permitted. Such a stick, frequently made of inferior material, is liable to break when stress is exerted against it, resulting in personal injury. Brake clubs should be selected from the very best of material.

2. The importance and necessity of securing every car left standing on a heavy grade, at way stations and at isolated points, should be stressed.

3. In controlling the speed of several cars that are being kicked or switched over a hump in the yard, or on heavy grades, the operator should not depend on one hand brake to control a greater number of cars than may be fully retarded with that amount of braking power. If necessary the brakes should be applied on several cars.

The bracket platform on the ends of high cars is favored instead of the deck location as it is quicker to ascend to this location and it permits the operator to have a double hold at all times—once he is positioned on the bracket platform he is enabled to watch in both directions, which is a decided advantage over the deck type of brake.

Operation of Air Brakes

By MARK PURCELL

General Air Brake Inspector, Northern Pacific Railway, St. Paul, Minn.

The speaker said in part: Mr. George Westinghouse invented the "Plain Automatic" Air Brake in 1872. The automatic feature resulted from the obtaining of an indirect application of the brakes through the medium of a valve device called a triple valve, and an auxiliary storage reservoir, which were added to the brake cylinder on each car.

The plain automatic air brake was a great improvement in many respects over the straight air brake, but chiefly from an emergency or safety point of view. Much of the flexibility (ability of the operator to increase or decrease the cylinder pressure quickly and in small amounts) for ordinary service brake operation had to be sacrificed. This brake served the purpose fairly well while trains were short and speeds, weight and frequency of trains low, but as these factors changed, its limitations became more and more apparent, particularly with reference to emergency operation. The propagating operation was too slow with long trains, which resulted in severe interchange of slack due to brakes becoming heavily applied on the forward portion of the train before the application had time to take hold on the cars farther back toward the rear. This limitation was overcome to a great extent by the invention of the "Quick Action Triple Valve" in 1887 and the equipment with which it was used came to be known as "Quick Action Automatic Brake." The quick action triple valve was developed by adding to the plain triple valve parts which brought about a local venting of brake pipe pressure in emergency applications, and thus caused a rapid serial application throughout the length of the train so that the time for the full application of all brakes on a 50-car train was reduced to about one-sixth of what is inherent with plain triple valves, and shocks are therefore lessened to a great degree and the distance for stopping greatly reduced.

Two of the features that exert a governing influence on braking are: First, the adhesion between the car wheels and the rails: this varies to considerable extent due to rail and wheel conditions, but changes little when the vehicle is moving as compared to when it is standing. Second, the adhesion or friction between the brake shoes and the wheels. This latter is greater when standing than when running and varies widely with a change from low to high speed and vice versa. The percentage of brake power used is based upon the empty weight of the car, unless an empty and load type of brake is used. For a long time it has been customary to use a somewhat higher percentage of brake power on passenger than on freight train equipment. Due to passenger train speed generally being greater than that of freight trains, making greater braking power necessary if stops are to be made in similar distances, the amount of brake power necessary to stop in the same distance increases as the square of the increase of speed: that is, if speed is doubled, it requires four times as much braking power.

To take care of the many conditions that affect the safety and economy of train operation, from a brake control point of view, such as the progressive increase in weight of cars, longer trains, high speeds, greater weight and power of locomotives and greater frequency of trains, has necessitated several corresponding changes in brake equipment for passenger and freight cars and for locomotives.

Getting On and Off Cars

By J. B. SULLIVAN

Road Master, C. R. I. & P. Railway, Burr Oak, Ill.

The speaker said in part: Quoting from the records of train service accidents, I find the following: Year 1930, 5,451 accidents in which 441 persons were killed and 5,010 injured; year 1931, 4,543 accidents in which 447 persons were killed and 4,096 injured; year 1932, 4,466 accidents in which 520 persons were killed and 3,946 were injured. These records further show that but four train service accidents and four casualties were caused by defective equipment, all of which goes to show that practically all those deaths and injuries were directly traceable to the old human element, better known as man failure. A great many of those injuries were caused by alighting from cars on unfavorable terrain, such as ice, switch stands, timbers and ties, rocks, lumps of coal, holes in the ground, etc. Alighting from, or trying to board cars moving at excessive speed, is also conducive to injury and should not be attempted.

The proper way to get off a moving car is, first, face the direction of movement; second, place the inside foot on lower tread of sill step; third, grasp convenient tread of side ladder (depending on height of person) with inside of hand. When sure of the ground on which you are about to alight, let go with hand hold, remove foot from sill step and with body slightly inclined backward and legs partly flexed, alight on outside foot, using the other foot to overcome momentum.

To get on a moving car, grasp a convenient grab-iron or tread of side ladder firmly and swing the inside foot onto the lower tread of step. Practice, natural agility, a sense of timing and judge of distance, all go toward simplifying the movements until they become almost second nature.

The standardizing of safety appliances, such as sill steps, grab-irons, side ladders and such, although considered adverse legislation at the time of its inception, proved to be a blessing in disguise and their uniformity has done more in my estimation to eliminate casualties than any other thing.

But it is to the unsung hero of the railroads that I would dedicate this theme. This is the man that is known in railroad parlance as the "end man" or "pin puller" on a switching crew. Invariably the youngest man on the crew in point of service, he has more mounts, dismounts and remounts than all of the jockeys in America put together, with all of Uncle Sam's cavalry men thrown in for good measure. On

a lousy lead, that does nothing but swing switches, this man will get on, make his cut and get off on an average of 200 times on an eight-hour shift, and this in addition to his other duties.

Just a few hints to make his work easier and safer. Assuming that the crew is working in the orthodox manner on the right hand side of the switching cut, the pin puller in getting on, should grasp the second tread of the side ladder firmly with left hand, place left foot on lower tread of the sill step, and brace his right leg against the rear journal box. This position will give him all the necessary leverage to operate the cutting lever with his right hand and, what is most important, his body will be braced against all unexpected bumps or jolts.

Inspection of Trains In Yards and Enroute

By A. A. LOWE

Supervisor of Transportation, Southern Pacific Railroad, San Francisco

The speaker said in part: On the lines of the Coast division we work on the principle that the best way to avoid trouble is to remove the fundamental causes, and the best way to do it is by stressing the need for thorough conditioning of triple valves, tight brake pipes, paying attention to leakage tests by enginemen, testing of retainer valves at designated points, correct piston travel, close attention to draft rigging and air hose, careful education of enginemen in the handling of air brakes and constant attention to those numerous other details of maintenance and operation which have a vital bearing on avoidance of stuck brakes, break-in-twos, slid flat wheels and damage to brake rigging.

Our principal yards are located about 500 miles apart. Cars arriving and departing in those yards are placed in thorough condition and, as a rule, require very little attention after serving at these points. As a train arrives in yards where car inspectors are employed, they station themselves where they can give entire train a careful rolling inspection. Rush cars are usually blocked at the head or rear and are given first attention by inspectors for prompt release to yardmen. In some yards it is found advisable to have traveling carmen make the rounds of the industrial, team and house tracks to effect minor repairs.

When trains are made up, the usual inspection is made in accordance with Interstate Commerce Commission regulations and general practice. Trainmen are required to look train over to see that hand brakes are released and assist carmen in making rolling inspection as train departs. We have no hump yards with depressed inspection pits as the volume of traffic through any one yard is not considered sufficient to justify this investment. Standing inspection of freight trains is made every 50 to 80 miles in open country. Stops are made at intervals of seven to ten miles on heavy descending grades to permit wheel heat to equalize. Inspection is made at such points by trainmen. On these heavy grades where view is obscured we require a trainman to ride on rear of caboose to watch tracks for indication of derailed wheels and by night we light the track to the rear of the train with two inspectors' heavy lanterns. We make standing air brake tests before descending heavy grades and give train a rolling inspection at every opportunity as stops are made.

In snow shed territory we make use of electric reflector lights, permanently located on foundations at the wheel level and facing the track to aid trainmen in making rolling inspections. These lights are actuated by track circuits as trains approach and depart. Trainmen are required to ride on the top of trains to change retainers as required and to watch for overheated wheels, excessive fire flying or other indication of trouble. In certain districts where operating conditions are especially difficult, such as through snow shed territory, we make use of emergency air hose cut in between cars and extended to top of train so that trainmen may apply air if an emergency arises and if obstacles cannot be seen.

Our records show we are remarkably free of accidents which may be traced to the quality of our train inspection, but that, on the contrary, both carmen and trainmen, including the enginemen, render a good account of themselves in detecting trouble at its inception and taking necessary action to prevent serious results.

The Car Department's Responsibility In Accident Prevention

By W. E. DUNHAM

Superintendent, Car Department, Chicago and North Western Railway, Chicago

The speaker said in part: The responsibility of the car department can be separated into three general groupings: 1st, the responsibility for accidents to car department employees themselves; 2nd, responsibility for accidents to employees of other departments; and 3rd, responsibility for accidents to the patrons of the road. As an example in the first grouping, our railroad in 1910, when matters of safety and accident prevention were first attacked in something like an organized manner, had in the car department about 289 reported lost-time accidents and 7 fatalities per year, with an average force of 3,356 employees. By dint of earnest correction of tools, exchanging methods that had in themselves any chance for accidents, by installing safety guards and similar devices, as well as trying to develop in the individual employee a personal interest in his fellow employee's safety, that original record, after ten years, was brought down in 1920 to 593 reported lost-time injuries, and to 6 fatalities.

However, the problem was studied from a different angle. Direct responsibility of the supervisory organization for the actual training of the employee under the individual jurisdiction was determined to be the most prominent line of attack on the causes of injuries. A few years of effort along those lines, in addition to the maintaining of the previous form of attack, brought the reported lost-time injuries for 1928 down to a total of 80 per year, and reduced the fatalities to 3, among a total of 5,234 employees.

Such a record, as compared with 1910, might have appeared to be very satisfactory, but there was still another step in accident prevention that was practical. That step was to eliminate the careless man and the man whose mind was not on the job at hand. The result was that in 1930, with an average force of 4,846 on the payroll, there occurred but 21 lost-time injuries and 2 fatalities. In 1932, with an average force of 2,434 on the payroll, 8 lost-time accidents were reported and only 1 fatality.

In considering the second responsibility, that to employees of other departments, it is rather more difficult to present concrete results. However, they can be brought out in a general way. The employees referred to are those who in their assigned duties use the active freight and passenger equipment which the car depart-

ment employees maintain and inspect daily on the repair tracks and in the yards. It is here that personal responsibility of the car department employee is demonstrated, and a full appreciation of that responsibility is shown, for underlying the duty of the department in the inspection of equipment is the keynote of safety. First and foremost in a review of the activities of inspection and maintenance of equipment, there properly comes to mind the elaborate system of safety appliances, such as hand-holds, ladder rounds, coupler releases, etc., as established by regulation on all cars for passengers or freight. The primary purpose is to reduce accidents to train and yard men. The condition of the brakes on the cars, including air operating features as well as the physical parts such as rods, levers, pins, beams, shoes, etc., is another of the car department's responsibilities in accident prevention. Every one of these parts is subject to constant wear and possible breakage. They must be watched with extreme care to know that at all times they are in safe and suitable condition for further service. Running gears, couplers, draft gears, etc., are parts with which many railroad employees are not familiar and their "diseases" are not known. To the carman they are vital parts of the safe operation of the train as well as in the prevention of accidents. Experience has taught him where to look for failures, what weaknesses to check, what wear to allow and what limits beyond which he must not "take a chance" under any circumstances.

Freight House Accidents — Their Cause and Remedy

By L. B. HINE

Agent, Erie Railway, Binghamton, New York

The speaker said in part: Freight house accidents do not happen—they are caused. It is the agent's responsibility to eliminate them. This can be accomplished only through untiring effort, investigation and developing the cause of every accident, and the application of a remedy or cure that will prevent a repetition.

There are many routines and manners to be followed by a successful agent, in his promotion of the safety movement, and it is needless to say that this goes hand in hand with efficiency.

One, know your men. Two, issue a daily bulletin, quoting a safety rule, and require each member of your force to know that rule. Three, adopt a suitable safety slogan and change it with regularity. Four, be fair with your men, create in their minds without a shadow of doubt that you are interested in their personal welfare; develop their confidence—get them to realize the requirements of the rules and necessity for compliance with them to protect themselves and their families.

Realize that the education of some men at the larger stations or piers is quite a task owing to the general class of men employed. You must not forget, however, they are human beings. It can be done.

Have the rules and slogans issued in languages in accordance with the nationalities of your forces.

Have the general foreman and the foremen give a short safety talk to their forces each day before starting work. Conduct a weekly safety meeting, at which the agent must preside.

Place bulletin boards at various positions in your freight house, indicating the number of days your forces have worked without a personal injury.

One of our large railroads has had what is known as the star system. A chart is placed in a conspicuous position, in which a space is shown for each day of each month, covering the current year. The foreman places on this chart before the forces go to work each day a gold star if no accident has occurred the previous day. A blue star for a minor accident and a red star for a lost-time accident, also are used. It doesn't take long to create enthusiasm by such an arrangement. It is by the creating of personal interest that results are accomplished.

A contented man is an asset; and when the average man knows that his superior is interested in him, he is contented. When he is in that state of mind you can easily convert him into a safe man.

Report of Committee on Train Accidents

By G. H. WARFEL

Assistant to Executive Vice President, Union Pacific System, Omaha, Neb.

The speaker said in part: The subject of train accidents is one which oftentimes does not get the attention it deserves, particularly from railroad safety men, because only a comparatively small proportion of the casualties (and the casualty rate per million man-hours is the criterion upon which the safety men judge their work on railroads) result from train accidents, and men are apt to overlook their importance.

Of the 1,265 collisions occurring in 1932, 114 were head-on or rear-end collisions between trains. There were also 112 side or raking collisions and 10 at crossings with other railroads, leaving something over 1,000 occurring on yard switches and in similar operations.

More significant from a safety standpoint is the fact that more than 90 per cent of all collisions are directly ascribed to negligence of employees. In the analysis of these negligent cases, the principal items are: the disregard of fixed signals; the disregarding or misunderstanding of hand signals; failure to secure hand brakes; leaving switches set wrong; failure to comply with speed restrictions; improper handling of locomotives; and failure to keep proper lookout. We find, therefore, as we go through other classes of train accidents besides collisions, that that same old factor, which in the annual statistical bulletin is described as negligence of employees, insists on showing up.

Train accidents are important in another way, too. A railroad may have a very fine employee casualty rate; it may even have won an award because of its employee casualty rate on the basis of safety work among employees. It may have a good safety record all the way around. But one train accident of serious nature may largely undo in the public mind all the advantage of those long years of patient work in building up a reputation for safety.

So we get back to the same thing in train accidents that we have in the train service and in every other type of accident on a railroad. The all-important thing in any safety campaign on any railroad is the proper education and training of employees.

The first thing necessary for a trainer is that he know the thing he is training the men for. If he does not know it from his own experience he must study it very carefully, because the teacher cannot teach the student if the student knows more about the game than the teacher himself.

We have a situation on the American railroads today somewhat analogous to that in surgery a generation ago. Thirty-five or 40 years ago American surgeons knew almost as much about anatomy as they know now. The doctor knew where to cut and how to cut; he knew how to stitch; but of the number of cases that

went into hospitals, too large a percentage, sometimes 50 per cent of them died, although the operation was successful.

Our trouble is not that we don't know how to switch cars, it is not that we don't know how to get trains over a railroad, it is not that we don't know how to make those trains fine and comfortable for passengers or to meet the needs of the shipping public, but we cannot perform our operations without the infection of carelessness: and the only way we can eliminate it from our railroad operations is to make each individual man on our railroad an expert in the performance of his operations.

So we need to study each individual operation and see where the bug gets into that operation, and develop a technique that will assure efficiency every time that operation is performed.

WEDNESDAY AFTERNOON SESSION

October 4, 1933

Report of Committee on Train Service Accidents

By D. G. PHILLIPS

Superintendent of Safety, Wabash Railway, St. Louis

The speaker said in part: In 1932 there were 63 employees killed and 326 injured in train accidents, while in train service accidents for the same period there were 367 employees killed and 6,861 injured. So without minimizing the importance of safety work in connection to train accidents, these figures show us the much greater field for work in the prevention of train service accidents. In 1932 there were six times as many killed in train service accidents as in train accidents, and 20 times as many injured.

In 1932, 20 persons were killed and 307 were injured in accidents while coupling or uncoupling cars or locomotives. The remedy for this class of accidents naturally suggests itself, keep from between moving cars that are about to couple, do not attempt to make any adjustments in the coupling apparatus of a moving car that requires you to go in front of the car. Such adjustments should be made when car is still. We believe that proper supervision can eliminate entirely this class of accidents, but if a supervising official stands around seeing men doing work in this manner and says nothing, just so long will accidents of this kind occur.

During 1932, 9 persons were killed and 123 injured while coupling or uncoupling air or steam hose. The principal cause of employee injuries coming under this heading is due to attempting to do their work without proper protection and from inadvertently uncoupling air or steam hose under pressure. If accidents of this kind are to be prevented, it is absolutely necessary that where a blue flag rule is applicable, such a rule should be made and should be complied with. However, frequently in switching operations there is no opportunity for the use of a blue flag. In such cases, not only the men doing the work, but those working with them should be on the alert to see that no movement is made when men are between the cars. Of course, the man himself should be sure that air and steam are shut off before any attempt to uncouple hose, and even then they must be careful, as steam and air are frequently trapped and remain for sometime in a short section of hose. Supervising officials should not overlook the failure to blue flag when the rule so provides and should watch to see that the man understands the proper method to uncouple air and steam hose.

In 1932, 12 persons were killed and 593 injured while operating hand brakes. Injuries arising from operating hand brakes result largely through men losing their hold on wheel, slipping or falling, or by sudden move of train or when tightly set brakes are released, or thrown or knocked from the car by brake club or revolving wheel. While it is true that defective brakes are frequently found it is also true that if the employee properly braces himself and holds the brake wheel properly, a defective condition is not going to cause an injury. Employees must be taught when handling brakes to constantly be on the alert for sudden movement of cars.

In 1932, 2 persons were killed and 210 injured while operating switches. Before a man operates a switch, he should be in such a position that the switch lever cannot strike any part of his body or feet, especially where a switch is being thrown with the engine or car almost on the switch. There is a great danger of serious injury due to lever flying around, but if a man will place himself in a position free of the lever, all danger from flying handles is removed.

In 1932, 520 persons were killed and 3,946 injured while getting on or off cars or locomotives; however, 471 of those killed were trespassers. A number of railroads prohibit men from getting on or off moving locomotives and, of course, men are seldom injured; but on the other hand it is possible if a man has his mind on his work to get on or off of the moving engine or cars without danger of accident. No matter how careful a man may be he is liable to slip if attempting to alight on ice, snow or mud. When about to alight from a car or engine, he should make that his special order of business until safely on the ground and be governed by the conditions at the time and place he is about to alight. All rules are valueless, however, unless complied with and they will not be complied with unless those in authority exercise the supervision that they should exercise and see and know that the rules are being enforced.

In 1932, 1,445 men were killed and 3,911 injured in accidents (train service) at highway grade crossings. Although the subject of grade crossing accidents will be handled in a separate report, it also comes within the scope of this report. While it is true that nearly every accident could be prevented by the exercise of ordinary care on the part of the automobile driver, that does not mean that the railroad must not do what it can to lessen the danger of grade crossing accidents. The neighborhood of the grade crossing should be kept as free from obstructions as possible. The crossing itself should be kept in first class condition and, above all, our enginemen should comply with rules with regard to whistling. Good whistling has avoided many a grade crossing accident; bad whistling has been a contributing factor to many accidents that have happened.

1. Switch crews and train crews working at stations should be prohibited from dropping cars across highways, their engines going down one track and the car going down another track, without protection on the crossing by a member of the train crew.

2. Switch engines, switch runs and local way freights backing cars over crossings at uncontrolled speed and without proper protection on the crossing should be prohibited.

3. Passenger trains and switch movements backing up with tail hose at the rear over highway crossings, should reduce speed at all crossings that are not protected.

4. Cars being kicked over crossings without engine attached should be protected.

5. Switch engines, way freights and switch runs doing industry switching where it is necessary to shove cars by a building where there are alleyways where trucks and automobiles might be parked too close to the track, should be prohibited unless a member of the crew walks in advance of the movement to protect.

In 1932, 6 persons were killed and 1,042 injured while operating locomotives. We must again call attention to the fact that many of these injuries due to operating locomotives arise through failure to comply with operating rules and the general regulations. Men injured operating locomotives are generally doing something that they should not do.

In 1932, 71 persons were killed and 284 injured when coming in contact with fixed structures. Men are usually injured by fixed structures on account of forgetting their location, generally coupled with looking backward or rather looking in a different direction than the train or car is moving. Of course, if the fixed structures can be conveniently moved, it should be done, but frequently this is impossible. The remedy then is to get an employee, first, to have in his mind all these non-clearance points, and second, in switching movement always face the way in which the car is moving.

In 1932, 1,590 persons were killed and 911 injured through being struck and run over, not at public crossings. Nearly all of them come under one of the following three heads: failure to look before stepping on the railroad track; walking on the railroad track or foul of the track where possible to walk elsewhere; walking too close to the end of a car in a live yard.

It is all the more regrettable that we have so many men killed in this manner when we remember that this class of accidents can probably be more easily remedied than any other. Of course, the remedies, briefly stated, would be as follows: always look both ways before stepping on the railroad track; never walk on the railroad track or foul of the track when it is possible to walk elsewhere; never go within ten feet of the end of the car in a live yard.

Any railroad man will tell you that these three remedies are proper and reasonable things to do. They all know of the large number of men being killed by their violation, then naturally, the question arises why do men continue to do these things, knowing that they are wrong, knowing that every time they violate one of these three rules, it is merely a matter of chance that they are not killed or injured. The answer is "habit."

Maintenance of Way Accidents — Their Cause and Remedy

By G. C. WENDLING

Division Engineer, Louisville & Nashville Railroad, Louisville, Ky.

The speaker said in part: The key note of our safety endeavors has been the development of an interest in the safety situation in the minds of our foremen. We started with this idea and our experiences have strengthened us in our belief. If he goes safely, then the safety of the gang is assured, and he will go safely if he is held strictly accountable for the actions of his men and is given the proper training —by means of various pertinent printed matters; by instructions and by the example of his supervisor, his roadmasters, his division engineer and his superintendent. Without the moral support he receives from these men above him, all the printed matter we could send him would avail nothing; hence our first necessity was the

guaranteeing of this interest on the part of superintendents, division engineers, roadmasters and supervisors.

And realizing that the same principle prevails with them as with the foremen, that they would not reflect the attitude of the men above them, we went to the top, to our president, and secured from him a statement which served as a key note for the building up of our safety organization.

We then laid out our campaign under two headings, primary safety, and secondary safety. Under the heading of primary safety came the general policies designed to affect the masses of our workers, such as the development of the proper morale, creating in a man the desire to improve his record, and the development of a spirit of interest and a spirit of competition between the various units. Under the heading of secondary activities came the actual preventive measures to be taken on the ground, proper supervision, proper reports to be made when injuries occurred, instruction of the men as to the safe way in which to perform their various operations, supervision of tools, the inspection of equipment: in other words, the removal of the causes of injuries.

One of our first moves was the preparation of a book of rules on safety. Our foremen were instructed to make these rules the warp and woof of the pattern of their daily lives; they were to know the rules and teach them to their men. They were instructed that at the noon hour they should have the men get out their books and they should discuss with them the rules; that before starting out every morning they should remind the men of the necessity for working safely through the day. They should, in case special work was to be done, go over with their men the precautions that should be taken in performing the work; they should, in case injuries occurred, point out to their men the violation that caused the injury; they should impress the men with the fact that the rules were made for their protection and for no other primary reason; that to work safely does not mean to work slowly, our experience having proved that just the reverse is true.

In some cases we have been forced to resort to discipline and in my opinion it is these cases that are helping us to go forward in our campaign of education and enforcement. The day of the heavy hand is passed, but the day of right is still with us, and it is certainly the right of an employer to insist that after he has provided his employees with the proper equipment and conditions with and under which to work, that these men perform their work in a proper and safe manner.

The problems offered by the malingerers were virtually solved by insisting that every man who was injured promptly report his injury to the foreman, who followed up all the details.

So far I have dealt with our general problems: but I want now to go into details regarding the specific causes of injuries occurring in the track department. A detailed analysis of the injuries occurring during a typical period showed that while injuries were divided among 18 causes, more than 50 per cent of the total was chargeable to one cause—handling of rail and ties; 65 per cent of these while handling rail and 35 per cent while handling ties.

One of the most important steps toward improving this condition was in arranging for our new rail loaded on flat cars instead of in gondolas. This alone removed one of the principal sources of accidents. A close study of the situation proved also that a lack of supervision was responsible for a large portion of these injuries and we are insisting that supervision be given to all matters pertaining to the handling of rails and that all movements be made according to signals. The same principles are applied to loading, unloading, carrying and piling of crossties.

Motor Car Operations

By F. P. GUTELIUS, JR.

Division Engineer of the Delaware & Hudson Railroad Corp., Oneonta, N. Y.

The speaker said in part: It is surprising, as we review the accidents occurring in motor car operations, the number of division engineers, roadmasters, or supervisors who are involved. As long as this condition exists on the roads, I suggest to them to look to themselves before they can expect safe motor car operation from their subordinates. This is the supervisor's responsibility and it is to be regretted the number of times justice has erred in dealing out discipline.

Recognizing the A.R.E.A. Manual of Rules and Instructions Pertaining to Maintenance of Way Employees, we used this information as a base for formulating a group of such instructions adapted to our local conditions. It was then a question of educating the individual operator. The old system of placing this in the hands of the roadmaster was discarded because many were of the old school and could not adapt themselves to this new mode of railroading. We, therefore, through the cooperation of his operating department, had the services of the Division Rules Examiner made available to us. This man, knowing the transportation rules, made an ideal instructor. The candidate selected for the course was one capable of passing the eye test satisfactorily. Classes were held once a week in the evening and were fully attended. After an instruction of six or seven weeks the embryo motor car operator was given a *written examination, his paper reviewed by the Rules Examiner* and graded. This course was also compulsory for roadmasters, track supervisors, region building masters and supervisors.

After the first aid course had been completed and the division safety agent felt his students were ready for examinations, they were sent to the company doctor who gave them an examination, if they passed in the first aid examination he made a note to that effect, arranged for a safety first certificate to be presented to them, and the railroad in turn gave them a portable first aid kit. Shortly after that it was made compulsory for every man in the maintenance of way department to wear safety shoes. But we did not stop there. There was a re-examination in motor car rules and in first-aid made compulsory every two years.

Handling Rails and Ties

By JOHN W. SIMS

General Supervisor, Maintenance of Track, Illinois Central Railroad, Chicago, Illinois

The speaker said in part: The safe handling of rails begins with the loading: if improperly loaded there is serious danger of injury to the hands of employees. Frequently, when cars are loaded by using a magnet or crane in a haphazard manner, it is almost impossible to unload the rails without having serious difficulty. The proper loading begins with the placing of the first rail and the first tier of rails on the car. The first layer is placed ball-up along the floor of the car, then the second layer is rolled in ball-down across the first layer. This process provides proper footing for the men on the car both when loading and unloading.

To properly handle the loading or unloading of a car of rails, requires a gang of six men; these men should always be experienced. A power crane, either steam or gasoline, should always be used. Three men are placed on the car and the other three on the ground. In each group one man is clamp man while the other two are used to steady the rail. The center of each rail should be marked before the loading is commenced, so that the clamp man on the ground will know exactly where to place his clamp in lifting the rail from the ground to the car. When the clamp is placed on the rail, the clamp man gives a signal to the operator of the crane to lift the rail. As it is lifted, the two men on the ground steady it at either end until it reaches the level of the car, when the work is taken over by two of the men on the car, who continue to steady the rail and keep it from swinging. When the rail reaches its proper place, the clamp man on the car gives a signal to the crane operator to drop the rail.

The directions for unloading rail are very similar to those for loading.

Next in importance to proper handling of rail in loading and unloading, is the proper method of laying it in the track. In laying rail a power crane should always be used with three men besides the train operator. Again we have one man who acts as clamp man. He should give all of the signals and the train operator must not take signals from anyone except him. The rail should never be raised higher than two feet from the ground. This forces the men handling the rail to bend over, and in this position their feet are protected in case the rail should be dropped. In moving it to a position on the ties the man nearest the crane should handle the expansion shims. The rails should never be handled with bare hands, either rail tongs or rail forks should be used to get the rails in position for the clamp.

The source of almost as many injuries in handling rail is the work incident to cutting it. Many eye injuries and serious cuts have occurred in this work. The use of acetylene torches has eliminated much of this, but it is frequently necessary to cut a rail with a track chisel. When this is necessary the greatest of care should be exercised. Those men not directly engaged in the cutting should be stationed where they will not be struck by flying chips. The man holding the chisel should always wear goggles. The chisel itself should always be provided with some sort of a guard. Frequent inspection should be made to see that chisels with battered heads are not in service or used; a spike maul must never be used to strike the chisel, but instead a sledge should be furnished for this work.

The safe handling of ties starts with the loading of the tie. From a safety standpoint cross ties should be loaded flat and crosswise in coal cars. If loaded in stock cars or box cars the ties invariably shift during transit. This makes bad footing in the car and personal injuries result when men start to unload the car. In unloading ties from stock or box cars, the first consideration is safety. Not more than two men should be allowed to break into a car, since there is not safe room for more. These men should remove a sufficient number of ties, probably 100, to give a freer working space. It is then satisfactory to put in one or two additional men.

If ties are loaded crosswise in coal cars there is no chance for them to shift, the footing is better, and it is not necessary to carry them lengthwise in the car to unload. Two men are not enough to pick up a heavy creosoted tie and throw it out of a car. Three or four men, if necessary, can take hold of a tie in a coal car and slide it over the side, while in a box car two men always have to handle a tie. Unloading from coal cars requires special attention from foremen to be sure that

there are no men on the ground along the cars, as the men in the cars cannot see them on the ground. In handling ties, the men should be trained to watch each other. Invariably the man who gets pinched by a tie rolling or being dropped can blame the man at the other end of the tie.

Safe Use of Machinery and Tools

By W. O. LeBER

Safety Inspector, Canadian National Railways, Montreal, Que., Canada

The speaker said in part: The thought of being injured is generally associated with power driven machinery but you will find that a great proportion of the accidents today are still caused by the use of hand tools. The mishandling of hand tools, the neglect of proper care and inspection, and the leaving of these tools around in dangerous places are the most common causes of such accidents.

It is of prime importance that the material from which the tool is made shall be the best. Probably no one thing contributes more to safety in the use of hand tools than proper care in manufacture. The tempering of the tool is a very important factor, because it is possible to temper a tool sufficiently hard to stand the *blows without mushrooming to any special amount, and yet soft enough to avoid* fracturing, and that is an important thing to consider in your tool.

Shock tools, such as chisels, punches, hammers and sledges should be made of the best and most suitable class of steel. Frequently companies try to economize by buying cheaper handles for tools. There is no money saved in buying cheap handles for tools, the handle should be of the best grade possible, and preferably of hickory, ash or maple. When the handle of a heavy sledge hammer breaks, you may have a fatal accident as a result.

Probably one of the most common tools used is the hammer. There are various types of hammers, each of which is suited to a particular class of work, and an important factor is the choosing of the hammer suitable for the work. A machinist's hammer is not a good hammer to drive nails with, nor is a carpenter's hammer a good hammer to do a machinist's work with, and so on. On one occasion I found that our purchasing department had bought a hammer which was two pounds lighter than the usual one used in track work. The result was that the misstrokes that were being made were causing accidents. We immediately recalled these hammers and sent out hammers of the proper weight for the work.

The wrench is another tool with which we are having quite a few accidents. Men will use wrenches of a smaller or larger size than the nuts which they are trying to tighten or loosen, and as a result the wrench will slip and injuries will be caused. Sometimes a wrench will be used as a hammer and we all know the wrench is not to be used as a hammer.

Axes, adzes and other sharp edged tools frequently cause accidents, because if left lying around a workman is likely to stumble against them. When such tools are not in use, a good way of preventing an accident is probably by putting them into a tie where the cutting edge will be covered up. I have seen men using draw knives and trying to steady their work by using their knees to hold the material.

The lathe is probably one of the most common of the metal working machines. Every industry has one or more lathes and we have many lathes in our large shops. The most common accidents that happen in connection with the lathes are those in which the man's sleeve is caught in the revolving stock or chuck, because he is not paying close attention while working, and that sometimes results in a very serious accident. We recommend that men who are working on lathes should not wear any sleeves at all.

Drill presses, driving pulleys, belts and things like that, of course, should all be properly guarded. The best types of modern machinery are properly safeguarded by the manufacturer. But you might have some antiquated machinery in some of your shops or roundhouses, and I assume that you men who have been in the safety department for some years have seen to it that these antiquated machines have been properly safeguarded. You have got to pay the necessary attention to the guarding of these driving pulleys and sometimes the drill presses.

Specific Remedy for Avoiding Foot Accidents

By O. F. JOHNSON

Superintendent of Safety, Minneapolis & St. Louis R. R., Minneapolis, Minn.

The speaker said in part: On one railroad, out of 27 injuries to the feet during the past two years, approximately 7, or 26 per cent, were reportable.

Adjusting draw bars with the foot, as cars are about to couple, is a dangerous and reckless thing to do. Years ago most every railroad had one or more of these accidents. What is the remedy? We must continue to impress upon our men the importance of compliance with the rules, by adjusting the draw bars only while the engines or cars are standing still.

A number of foot injuries have occurred while hopping off engines or cars while train is in motion, without looking down to see if the ground is clear of cinders, pieces of coal, wood or other obstructions. The result is often a badly sprained ankle.

A number of accidents to the feet each year are due to adzing ties or timbers. Sometimes in adzing one may strike a knot and on account of its being harder than other parts of the timber, the adz may glance off and cause an injury. Extreme care should be used in handling adzes.

Many other accidents are caused each year by stepping on nails, glass, etc. Boards or other scrap material with nails sticking up may be hidden in the weeds, etc. Sometimes infection sets in and you know the result. We should correct, where possible, any defects which may be discovered. As an example, turning down an upturned nail found in a dangerous position; removing broken glass from paths used by workmen, etc.

Soles of shoes should in all cases be free from holes that may catch on splinters in wood floors or that may allow the feet to be cut by stepping on nails, broken glass or other sharp objects. Heavy soles are necessary. Safety shoes which are made substantial and flexible, and look like the ordinary street shoe, can be purchased at reasonable prices. Men should become more interested in toe and foot safety.

Many injuries to the feet are caused in the handling of materials, rails, ties, timbers, etc. Failure to act in unison where two or more men are carrying a load and one end is dropped without warning, usually results in injury to others. Unless men are properly trained in handling ties, rails, piling and other heavy material, there is always danger of injury to the feet. Too much stress cannot be laid upon this subject and upon the importance of training men in co-ordinating their efforts when handling heavy material.

Handling Materials and Supplies

By F. W. CURTIS

Supervisor of Safety and Fire Prevention, Denver, Rio Grande & Western R. R., Salida, Colo.

The speaker said in part: How important is this phase of safety work? Here are some interesting figures, as taken from the I. C. C. Bulletin No. 100 for the year 1931: Handling rails, ties, bridge timbers, etc., accounted for 4 deaths and 1,874 injuries; handling explosives, flammables, hot or corrosive substances accounted for 8 deaths and 306 injuries; handling freight and supplies accounted for 6 deaths and 1,573 injuries. Thus, in handling materials and supplies in 1931, there were 18 deaths and 3,753 injuries on American railroads.

Let us proceed, then, with a consideration of the men who handle these materials. In selecting men who by reason of their positions must do much of the handling of materials and supplies the same general requirements applicable to all railroad employment should be followed, with these characteristics outstanding: intelligence, physical fitness and a co-operative disposition, for he must be able to team.

1. Men are cautioned not to show their strength foolishly, like the unnecessary handling of a barrel of oil alone. Setting a barrel of oil on a can is two men's work.

2. Never put green men at handling wheels, mounted or loose. It is a big hazard and a waste of time. Keep the wheel platform free of loafers.

3. Only capable men may operate alligator shears—those who know metal.

4. In handling scrap or salvage material men must know that way is clear and piles or bins must be kept orderly the same as with new material.

5. No man may enter nor remain in an oil tank without another man at the manhole.

6. Only experienced men may make hitches or hooks for train loads.

7. Men are forbidden to ride any load being raised or lowered by power.

8. Men must keep from under loads, magnets, etc., and be close only when loads are lowered to position. If necessary to guide loads, ropes or long poles must be used.

9. When any unusual load or unusual material, because of its weight or shape, is to be moved, the foreman must direct its handling.

10. Finally, the most important consideration in handling heavy materials is team work. An adequate number of men to handle the job who can be counted on to work in unison or harmony, each doing his share, lifting and reaching at the proper time and being watchful of his own safety and that of fellow workers is a prime essential. And don't forget that some men simply cannot do this. Their make-up is not rhythmic.

We may now consider methods. It is quite universally recognized that the first essential of safety in methods is good housekeeping. General suggestions on handling materials and supplies may be as follows:

1. Keep workroom supplies as low as practicable. Storage should not be allowed here. Likewise keep finished products moving; congestion makes hazards.

2. Piling stock safely is an obvious requirement of the safe method. Heavy materials low, light materials higher; height of piles governed by nature of shape, bulk and weight of materials; fillers to prevent piles from rocking, rolling or slipping; bins, boxes and trays for smaller articles; adequate aisles, runways and track clearances are all necessary general governing rules to follow.

3. Trucks, trailer wagons, etc. should be kept in first class repair, and good judgment used not to overload them. In placing and piling of materials on them work must not be slovenly and awkward; materials must be secured or held during the movement.

4. In store stocks, many good standard practices have been recommended. These should be followed and occasionally checked up. Then there is the standard method of stacking journal brasses, safe and which will protect bearing surfaces. All such standards should be followed religiously unless better methods are known and here we might mention the many standards prescribed for loading freight on cars, all of which may be obtained from the mechanical division, A.R.A.

5. Only standard signals should be used to direct train movements and one man at a time giving them, unless necessary to relay the signals. In directing the movement of timbers a long stick is helpful. All hitches should be felt out before lift is made. Lifts should not be made until operator knows men are in the clear.

6. Heavy loads should not be lifted until outriggers on portable cranes are placed.

7. Wheel platforms should be kept free of obstructions, smooth, free of ice, snow and frost when in use.

8. Perhaps it is the failure to foresee the unusual in the ordinary routine that causes more injuries in handling materials and supplies than any one of the whole range of classified causes, for pinched and bruised fingers and toes constitute the greater part of them all. The general cause is usually given as carelessness, but another name for lapse of attention.

Report of Committee on Non-train Accidents

By C. F. LARSON

Superintendent of Safety, Missouri Pacific Lines, St. Louis, Mo.

The speaker said in part: An employee in any department or occupation may suffer a non-train accident, but the general classes in which this type of accident predominate are maintenance of way and structure employees; shops, roundhouse, power house and store department employees; and station and office employees.

We are using the Interstate Commerce Commission figures for the year 1931, because these are the latest complete authentic figures that have been analyzed and made available to your Committee, and because 1931 was a more representative year than 1932 by reason of heavy repairs and betterment work having been almost completely cut of the picture during 1932.

Attention is directed to the fact that the number of non-train accidents is greater than the train accidents and the train service accidents combined:

154 killed in non-train accidents in 1931 represents 24 per cent of the total killed.

12,598 injured in non-train accidents in 1931 represents 58 per cent of the total injured.

Thus a total of 12,752 casualties are recorded in non-train accidents in 1931, which represents 57 per cent of the total casualties.

The principal effort against non-train accidents should be carried on in the maintenance of way and equipment departments, since they produce 75 per cent of the total industrial accidents, and 95 per cent of the accidents in those departments are to non-train men; 38 per cent occurred in maintenance of way, with 4,965 casualties,

64 of these being fatal and the casualty rate being 8.52; and 37 per cent occurred in mechanical and stores, with 4,733 casualties, 46 being fatal and the casualty rate 6.59.

Before proceeding to a study of the occupations which produce the majority of the casualties in these maintenance departments, it is well to have in mind the six principal possible causes of these particular casualties, as follows: 2,103 falls of persons; 1,878 handling rails, ties, bridge timbers, etc.; 1,579 handling freight or supplies (3,457 handling materials); 1,476 in the use of hand tools; 1,466 falls of objects; and 825 motor cars. Thus, there were a total of 9,327 in these six causes of accidents, which represent 75 per cent of all non-train accidents.

When we view the results of our study of the statistics relating to maintenance of way and structures, we find a picture that is not satisfying and one that should excite railroad management to take more aggressive steps to remedy the evil that is causing so much suffering and economic waste.

We recognize that supervision in this department has, at its fountain source, a highly technically educated overseer in the person of the Division Engineer, and under him there are the roadmasters, bridge and building supervisors. From these offices must flow the instruction and inspiration that will, or should, bring about that understanding and knowledge among the workers that will cause them to be safety-conscious at all times. As a rule, we do not have a foreman directing the men out on the work, the same high class of men as you find in other supervisory positions, being drawn largely from the same class of employment over which they now have supervision, a class that is not always as susceptible to educational effort and *training as those having a better opportunity*, but who, when shown what is wanted, are willing to abide by instructions when made plain to them. We would here pay tribute to a class of labor whose loyalty to the employer under all conditions is unequalled by any other class. Called at any hour in all weather conditions to do anything in emergency, he is there fulfilling every demand made on him to the utmost of his ability. We, therefore, feel that employees in the maintenance of way department deserve and should have, the closest and most intelligent supervision that can be given them. In this department we find bridge men falling from bridges due to wrenches slipping from nuts and bolt heads, causing all kinds of serious injuries, because they have not been told how to place themselves when doing this work so that they would not *fall from the bridge*; or, *if they knew, the importance* of it was not enforced by the foreman *in charge who, if present, permitted it.*

Section and extra gang laborers are being injured when falling from motor and hand cars while in motion, sometimes due to overloading and men standing up on the car. Eye injuries are due to flying steel when cutting rails, and from flying rocks, etc. from ballast when tamping, etc. Lack of understanding of intentions between men and groups of men when movements are to be made, or material is to be thrown, is causing many accidents. To avoid these and many other accidents is a matter of simple education, by giving instruction in language that can be and is understood by the worker, and the foreman seeing that instructions are invariably carried out, not winking at or encouraging violations.

Your Committee feels that it is incumbent upon all supervisors to enforce all rules and instructions through measures planned to promote the general efficiency and safety to their units. We further believe that, except in cases where all reasonable measures to correct an employee have failed, discipline usually is unnecessary, as effective leadership tends to overcome accident probabilities. We have not failed to recognize that due to recent business conditions, railroad organizations are greatly

reduced and supervision understaffed and which condition will, we greatly fear, continue for some time. But whereas *many* activities *must* be reduced, the one activity, safety education of railroad workers, cannot be allowed to be relegated or delegated to *inefficient leadership*. The safety organization on every railroad must function as never before in energizing and stimulating interest.

THURSDAY MORNING SESSION

October 5, 1933

Report of Committee on Proper Method of Reporting Casualties to the Interstate Commerce Commission

By G. H. WARFEL

Assistant to Executive Vice President, Union Pacific System, Omaha, Neb.

The speaker said in part: A year ago, in the Committee of Direction, the question was raised as to whether or not there was need for some other method of determining the relative progress of safety work on various railroads. The casualty rate per million man-hours has from time to time been questioned, particularly the very low casualty rate sometimes established, and there have been those who wondered if some other basis could not be developed. So our Committee was appointed *to study the desirability or the practicability* of developing some form of severity rating for casualties, as well as the frequency rating, to see if by that the relative standings of different carriers and the progress of safety work generally could be better determined.

After a very careful study of severity ratings and the conditions surrounding their reporting, and especially the very great difficulty of securing accurate severity statistics, we came to the conclusion that the casualty rate per million man-hours has been and is a very reliable guide and index to the progress of accident prevention work on railroads, and that the general casualty rate, as it has been established through the Green Book and our other agencies, is a good and reliable general guide to the progress of safety work among the railroads.

There is no question in our minds but what there has been some distortions one way or the other of the relative standings of individual carriers, due usually to different interpretations of what constitutes reportability. Your Committee believes, however, that what is needed is not some other yard stick to measure by, but the assurance that everybody use the present yard stick the same way. We come to the conclusion that what was most desirable was that everybody who had to do with the reporting of accidents on a railroad should understand alike the requirements of the Interstate Commerce Commission Reporting Rules. So this Committee undertook to put together an interpretation of the Interstate Commerce Commission Reporting Rules. We tried to make this interpretation as clear and concise as possible, so that anybody reading them could understand clearly whether or not a man's injury was reportable. I want to sketch for you briefly here some of the points in the text we have finally agreed upon.

Take, for example, "Accidents arising from the operation of a railway." I will read two or three things here: "This expression is intended to include not only accidents resulting directly from the operation, construction or maintenance of a

railway, but also those arising in connection with such activities. Reports are not required for certain kinds of accidents as designated in paragraph three of the General Instructions, nor for any accident occurring outside the railroad right of way or premises leased or used for railroad purposes, if such accident does not result directly from the operation of the railroad." The following kinds of accidents are not considered as arising from the operation of a railroad:

a. Contact with poison ivy, nettles, and similar weeds unless received in required handling of shipments of same.

b. Stings, bites, snake stings, etc., of insects, reptiles or animals, unless occurring in connection with necessary handling of same in shipment, driving off right of way, or handling animals being used in railroad work.

c. Accidents at highway or street crossings, or on parts of highways within railroad right of way, not involving the presence or operation of trains, locomotives, cars, track cars or similar equipment and not involving employees engaged in the repair or maintenance on the crossing or the protection of highway traffic.

In other words, the brakeman who is out on the street crossing to act as a watchman, and is struck by an automobile has an accident arising from the operation of the railway, because his duty put him there. But the brakeman who has reported for duty and is walking down through the yard to get on his train, or report to the caboose, and who walks across a crossing and is struck by an automobile, has an accident that is not arising from the operation of the railway under this phrase.

You remember, also, the phrase of the original text, "Accidents arising from the operation of a railway, resulting in damage to railway property amounting to more than $150, including the expense of clearing wreck."

There was considerable difference in practice of the reporting of such train accidents. Some roads did not consider that the breaking of a side rod or a main pin that did not result in the derailing of the locomotive, although it might result in serious detention of the train and $400 or $500 of repairs, as a train accident, if the detention of the train could be made up before the engine got in, or if they did not have to send out a relief engine. The fact is that anything that occurs in connection with the operation of a train that causes $150 property damage should be reported as a train accident.

Now, let us take the word "injury." Here are a few paragraphs:

"For I.C.C. accident reporting purposes, an injury resulting from accident is defined as any physical impairment or damage to, or distortion of, any part of the body resulting directly from a specific act or occurrence, but not as a stimulating effect of repeated or continuous exposure. Thus, a bruise, laceration or sprain resulting from a particular swing or stroke of a pick, bar or other tool should be considered as an injury, but a blister or lameness developing from continued chafing or manipulation of the tool for several hours should not be classed as an injury or reported as such.

"Freezing, sunburn, sunstroke, dizziness or fainting are not considered accidental injuries, but if a person so afflicted should fall, or strike or be struck by anything as a result of such affliction, any physical damage thus received must be considered as an accident injury. Hernia, resulting from a fall or from the strain of violent effort and developing immediately thereafter, is reportable as an injury. Hernia developing gradually and not definitely connected with exertion at a specific time and place promptly identified, should not be classed as an injury. Any sprain or strain of back or other part of body must be classed as an injury if it develops immediately from a specific act, movement or occurrence in the nature of a sudden and unexpected mishap at a time and place immediately identified."

The next word we have defined is "employee." I will read to you as follows:

"A person who performs joint service and is paid directly both by the railway and another employer for their respective portions of such service, should be considered an employee on the railway only when engaged in that part of his duties for which he receives pay from the railway. Since depot porters derive their principal remuneration from individual tips and gratuities, they are not classed as railway employees for accident reporting purposes, even though under the general supervision of the railway. Persons employed only for emergency jobs, or intermittently as need for their services may arise, must be classed as employees during periods for which they receive compensation. Persons who contract to perform occasional services, such as carrying mail between depot and post-office at stated times, caretaking of non-agency depots, shelters, parkways, etc., will not be classed as employees but should be considered other non-trespassers."

Here is a paragraph on the term, "on duty."

"It must be understood that the phrase 'on duty' applies to an employee on railroad premises (or on industrial or private while actually engaged in train or switching operations), throughout his designated work, from the beginning moment to the ending moment of his shift, trick or tour of duty or time paid for, unless he has been definitely relieved from the performance of any or all service for a definite time, or has wilfully left his customary post contrary to accepted or tolerated practice, constituting a recognized violation of the carriers' rules. Brief absence just to get a drink, go to a lavatory, get a breath of fresh air, etc., are not to be considered wilful absence from post of duty. Regardless of whether his hours paid for have begun or ended, an employee coming to work or leaving work must not be considered as on duty during the time he is traversing company premises to reach the point where he customarily reports, checks in or registers, or otherwise assumes duty, nor after departing from such work when through work. An employee either on duty or off duty (other than a member of the crew in charge of the train) when riding in that part of a train open to the use of passengers, must be classified as a passenger. An employee deadheading on a train, whether under pay or not, should be classed as an employee off duty, unless he is riding in that part of a train open for the use of passengers, in which case he is a passenger."

Here we have the phrase, always of interest, "injury to an employee on duty."

"The phrase 'sufficient to incapacitate' is interpreted as meaning sufficient to prevent a person from doing his usual work, by reason of possible injury consequences, or because of pain or limitation of motion or of function, whether such pain or limitation result from the injury, or from the bandaging or treatment. Thus, a laceration or fracture of a finger or toe might not in itself prevent a man from doing his usual work, but if the hand or foot is bandaged, splinted or placed in a cast in such a way as to prevent a man from doing his usual work, his injury should be considered as sufficient to incapacitate him. In like manner, if the dressing, bandage or medication of an otherwise minor injury to a dining car steward or waiter or ticket clerk required to meet the public, makes it undesirable for him to do so in the opinion of the railroad management, it must be considered sufficient to incapacitate."

Under "performing his ordinary duties" we have the following: "The phrase

'performing his ordinary duties,' is interpreted as meaning performing fully and acceptably and without extra assistance all the duties customarily included in a regular assignment to one of his title, payroll classification, and pay rate. For example, a brakeman or switchman must be able to walk, throw switches, get on and off cars and set brakes; a fireman must be able to fire an engine, take water, shake grates, etc.; a trackman must be able to walk, remain standing and work, use wrench, shovel, rake, etc. with both hands; a carpenter must be able to stay on his feet, walk, set and drive nails, use handsaw and other tools in a workmanlike manner, a machinist must be able not only to operate his machine, but to do the customary work in connection with placing material in position on the machine and removing same. Generally speaking, any injury which, if it occurred off duty, would be regarded as necessarily incapacitating an employee from performing his regular work should be likewise considered as incapacitating him when the accident occurs on duty. The best and most acceptable evidence that a person is able to perform his ordinary duties consists in his continuing to do his usual work and performing those duties throughout his regular working period without disability amounting to more than three days during the ten days following an injury."

I have heard contentions from railroad safety men that employees were trespassers, merely because they violated some rule of the company at the time they got hurt, and I am particularly anxious that we all have uniform understanding of this term, as well as others.

A railroad employee on the premises of a railroad, injured while on duty during hours paid for, should not be classified as a trespasser. The fact that he was violating the railroad rule, or even a law, does not justify such classification. Such casualties must be reported as occurring to an employee. A railroad employee on the premises of a railroad, injured while off duty or outside of hours paid for, cannot be classified as a trespasser if his presence on the property is for the purpose of getting to or from point of work, or for any other purpose connected with his service as an employee. Violation of a rule or law does not justify such a classification. Such casualties must be reported as occurring to an employee off duty. He may only be classified as a trespasser if and when his presence on the premises is for no purpose connected with his services as an employee."

Necessity of Uniformity in Reporting Accidents

By DR. M. O. LORENZ

Director, Bureau of Statistics, I. C. C., Washington, D. C.

The speaker said in part: We are all agreeing that it is important to have these statistics based on the reports as accurate as possible, and if they show a favorable tendency, we can all rejoice; if they show an unfavorable tendency, you are the first person who wants to know about it so you can correct the condition.

I think the work of this committee is very important and will help a great deal toward securing uniformity. The definitions which it proposes are, with very slight exceptions, in accord with the interpretation and rules, as I understand them, now, aside from minor differences which we shall be able to iron out without any trouble.

There is one which I wish to mention especially, to which I take exception, and that is the proposed modification of what is a reportable train accident. Mr. Warfel has indicated that he proposes to cut out from the expense which is counted in building up to $150, that being the limit of a reportable accident, the expenses of

going to and from a wreck. His proposition is entirely logical. Of course, the expense of going to and from a wreck does not affect the importance of a wreck at all, but this is a critical sign in the condition of the railways, and these particular statistics of train accidents are being watched, and it would be unfortunate to make any change just now that would destroy or affect to any material degree the comparability from month to month, or from year to year.

I would rather not see the statistics disturbed, even though they are not entirely logical or perhaps entirely uniform or complete, but I would let each railroad continue to report them as they have been, and the trend in this particular period will still have some significance. In fact, I think that instead of tinkering with this rusty old dipper, we might try to get a new dipper and frame an entirely new definition of what is reportable as a train accident, and make a fresh start, for that $150 limit has very serious objections.

Passing to another part of the Committee's report, the interpretation by the Committee, that the three days' incapacity means 72 hours and not three calendar days, is in accord with our past interpretation. We put out a circular letter some years ago to that effect. On the other hand, as he has said, there is not complete uniformity at the present time. Some roads are using the calendar basis, and they have perhaps on their side of the argument the fact that the American Standards Association, in its plan for uniform accident reporting from all industries, suggests a three-day calendar day basis. I should be inclined to adhere to the Committee's report and our past practice, unless I heard from a good many more of you that the calendar day basis was preferable. Perhaps, we ought to issue a circular on the subject and gather our experience, unless the Committee is satisfied that the majority using the 72-hour basis is now so large that it would not be wise to change.

I am much pleased with that part of the Committee's report which Mr. Warfel explained, defining the phrase "performing his ordinary duties." As he pointed out, his proposed definition is, "The phrase, performing his ordinary duties, is interpreted as meaning performing fully and acceptably and without extra assistance all of the duties customarily included in the regular assignment to one of his title, payroll classification, and the payrate. For example, a brakeman or switchman must be able to walk, throw switches, etc."

If we had had that strict definition and had adhered to it in recent years, I think it would have eliminated a good deal of the criticism that has been leveled against the statistics of injuries. I am sure that even if we had adhered to it, there would still have been a very considerable drop in the number of injuries reported because of the close attention obtained to what is a reportable injury, but I mean it would have eliminated the grounds for criticism that have existed. For example, it seems as though a switchman reported at work when he was merely answering a telephone. Things of that kind are magnified far beyond their real importance, and therefore this particular part of the Committee's report will help a great deal, I think, to verify the matter.

The following resolution was presented by L. F. Shedd, chairman of the Resolutions Committee:

Whereas, the Safety Section of the American Railway Association in session at the Stevens Hotel in Chicago, October 3-5, 1933—is not unmindful that the success of this Thirteenth Annual Convention and of those Conventions that have preceded it can only be attributed to the unceasing interest and untiring efforts of those in whose hands the responsibility for arrangement and necessary details were placed

and to the co-operative response and assistance of those called upon to contribute their thought, time and effort to promote such a commendable cause as the conservation of human life and limb, and desiring to recognize each and every one in a proper and fitting manner,—therefore, be it resolved—

That this Section recognizes and appreciates the contribution made by each and every one who in any manner arranged for or participated in the conduct of these meetings, including, and with particular reference to, those whose presence, although not upon the program, have added so much;

That the Section is not only grateful, but indebted to Messrs. F. E. Williamson, President, New York Central Lines; M. J. Gormley, President, American Railway Association, and Judge R. V. Fletcher, General Counsel, Association of Railway Executives and of the American Railway Association; for their sacrifice of time, and for the great and lasting benefits that must accrue to and aid in the advancement of this Section and its work because of the timely, well chosen and pertinent thought given us;

That our appreciation is also extended to the management of the Stevens Hotel; to the Press and to all others who have so kindly assisted in making our stay in "America's Chicago" so pleasing and so profitable;

That in our hearts, we cherish the memory of those who have been called to fields beyond, and express our earnest desire and hope, that to those of our Members upon whom burdens have been placed through physical infirmities and otherwise, lasting and effective relief may speedily come.

That these Resolutions be spread upon the records of this Annual Meeting.

Announcement of Election of Officers

The chairman then called for the report of the tellers who had canvassed the votes for officers of the Section for the ensuing year. This report was presented by Frank Strouse, Pennsylvania Railroad, who announced the election of officers as follows:

Chairman—C. L. LaFountaine, Great Northern Railway.
First Vice-Chairman—H. A. Parish, Chicago & North Western Railway.
Second Vice-Chairman—W. H. Failing, Central Railroad of New Jersey.
Members of Committee of Direction—
Eastern Territory (One-Year Term)—T. H. Carrow, Pennsylvania Railroad.
New England Territory (One-Year Term)—F. R. Bradford, Boston & Maine Railroad.
Southern Territory—L. G. Bentley, Chesapeake & Ohio Railway.
Canadian Territory—A. O. Beck, Canadian National Railways.
Western Territory—E. A. Meyer, Chicago, Milwaukee, St. Paul and Pacific R. R., and
G. H. Warfel, Union Pacific System.
Committee on Nominations—
O. F. Johnson, Minneapolis & St. Louis Railroad; J. G. Fitzhugh, Gulf, Colorado and Santa Fe Railway; A. V. Rohweder, Duluth, Missabe and Northern Railway; J. L. Walsh, Missouri-Kansas-Texas Railroad; D. G. Phillips, Wabash Railway.

ADJOURNMENT

TWENTY-SECOND ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL

Textile Section

Officers 1932-33

General Chairman—Dr. Charles H. Eames, Lowell Textile Institute, Lowell, Mass.
Vice-Chairman in Charge of Program—Ignatius MacNulty, American Woolen Co., Malden, Mass.
Vice-Chairman—M. W. Heiss, Proximity Manufacturing Co., Greensboro, N. C.
Secretary and News Letter Editor—E. E. Place, American Mutual Liability Insurance Co., Boston.
Chairman Statistics Committee—J. T. Trowbridge, Bemberg Corp., Elizabethton, Tenn.
Chairman Poster Committee—Fred W. Seitz, Aetna Life Insurance Co., Hartford, Conn.
Chairman Engineering Committee—Paul W. Viets, Plymouth Cordage Co., Northampton, Mass.
Members at Large—
Arthur Barlow, Armstrong Cork Co., Lancaster, Pa.
Russell T. Fisher, The National Association of Cotton Manufacturers, Boston.
Walter Humphreys, National Association of Wool Manufacturers, Boston.
E. G. Padgett, North Carolina Industrial Commission, Raleigh, N. C.

TUESDAY MORNING SESSION

October 3, 1933

The session of the Textile Section was called to order by Will Cooper, representing the Executive Committee of the National Safety Council, who welcomed the delegates, and then introduced General Chairman Charles H. Eames, Lowell Textile Institute, Lowell, Massachusetts, who presided. Chairman Eames outlined the activities of the Section during the past year, praising the individual work of committee chairmen, and also called attention to some of the more outstanding problems which would have to be met during the coming year. He then introduced the first speaker.