

PLAINTIFF'S  
EXHIBIT  
OSC-5

## PROCEEDINGS

# of *Fifth* All Ohio Safety Congress

Held under the auspices of  
THE INDUSTRIAL COMMISSION OF OHIO  
and the direct management of  
THE DIVISION OF SAFETY AND HYGIENE

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Columbus Chamber of Commerce

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#### SOCIETY OF OHIO SAFETY ENGINEERS

#### THE VARSITY QUARTET

Ohio State University

Tuesday, April 19

General Session

Executives' Dinner Meeting

Wednesday, April 20

General Session

Fire Prevention Meeting

H. G. EHRET, Soloist

Tuesday, April 19

General Session

Wednesday, April 20

General Session

MISS LUCILLE BUTLER, Soloist

Tuesday, April 19

Executives' Dinner Meeting

Thursday, April 21

General Session

MRS. J. J. ROCKENFIELD

Columbus

Piano Accompanist

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in the

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#### ILLUMINATION

#### FIRE PREVENTION

#### ACCIDENT CHARTS AND CONNECTION

## EXHIBITORS

Fifth All-Ohio Safety Congress, Neil House, Columbus, Ohio,

April 19, 20, 21, 1932

Safety Engineering, New York, N. Y.  
 Torchweid Equipment Company, Chicago, Illinois.  
 Safety Clothing Company, Cleveland, Ohio.  
 Melflex Products Company, Akron, Ohio.  
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 National Safety Council, Chicago, Illinois.  
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 Safety First Shoe Company, Framingham, Massachusetts.  
 American Optical Company, Cleveland, Ohio.  
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 Pulmonan Safety Equipment Company, Brooklyn, New York.  
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 H. Childs & Company, Inc., Pittsburgh, Pennsylvania.  
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 Prest-O-Save Company of Ohio, Columbus, Ohio.  
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 The Gerson Stewart Corporation, Cleveland, Ohio.  
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 Stanley Electric Tool Company, New Britain, Connecticut.  
 The Fyr Fyter Company, Dayton, Ohio.  
 Positive Safety Manufacturing Company, Cleveland, Ohio.  
 Surtly Manufacturing Company, Chicago, Illinois.  
 Bauer Manufacturing Company, Wooster, Ohio.  
 The Strause Company, Inc., Pittsburgh, Pennsylvania.  
 Industrial Commission of Ohio, Columbus, Ohio.  
 United States Bureau of Mines, Pittsburgh, Pennsylvania.  
 Globe Wernicke Company, Columbus, Ohio.  
 Orrell Company, New York, N. Y.  
 Warren Davis, Mt. Vernon, Ohio.  
 H. W. Peters Company, Columbus, Ohio.  
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*Chairman:* L. E. NYSEWANDER, Industrial Commission of Ohio, Columbus, Ohio

## SUBJECT

## CARRYING ON

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| SHOULD INDUSTRY REDUCE ITS ACCIDENT PREVENTION WORK DURING THE PRESENT DEPRESSION?: ..... |  |
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*Chairman:* F. O. LEWERTZ, Ohio Inspection Bureau, Columbus, Ohio.....

*Vice Chairman:* W. T. FILMER, Director, Fire Prevention, Youngstown Sheet & Tube Co., Youngstown, Ohio.

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T. Alfred Fleming, Director of Conservation, National Board of Fire Un-

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## THURSDAY, APRIL 21 2 P. M.

### FOREMEN'S SAFETY TRAINING SECTION

**Chairman:** R. W. JENKINS, Supervisor, Foremen's Conference Training, Ohio Department of Education, Columbus, Ohio ..... 638

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 Walter E. Darling, Cincinnati, Ohio.

### MOTIVE DEMONSTRATION

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## GENERAL SESSION

### TUESDAY MORNING, APRIL 19

The First General Session of the Fifth All Ohio Safety Congress was called to order at 9:30 o'clock by Chairman Thomas P. Kearns, Superintendent of the Division of Safety and Hygiene, Industrial Commission of Ohio, Columbus, Ohio.

**CHAIRMAN KEARNS:** "If the meeting will now come to order, we will open the session by having the song 'America,' led by our own Mr. H. G. Ehret, Safety Director of the Division of Factory and Building Inspection, Department of Industrial Relations.

### AMERICA

By the Audience.....Led by Mr. H. G. Ehret  
**CHAIRMAN KEARNS:** The audience will please remain standing, and we will ask Rev. Robert R. Reed, of the Indiana Presbyterian Church, of Columbus, Ohio, to pronounce the Invocation.

### INVOCATION

REV. ROBERT R. REED, D. D.,

*Indiana Presbyterian Church, Columbus, Ohio*

Almighty and Everlasting God, Thou who art the great worker of the Universe, of Whom Our Lord said, "My Father Worketh hitherto," Thou hast given us those powers of mind by which we have been able to create this great industrial civilization of ours. We confess with shame before Thee that we have not always used it to the highest purpose, that in times past it has seemed that the machine was of more value than the man. But we thank Thee for those pioneers of humane vision who saw the possibilities of a better order, and by their zeal and interest have educated the public conscience and have made us to feel our social solidarity, that the strong ought to bear the burdens of the weak. We invoke Thy Divine Blessing upon all of the workers of the world, and as Thou hast bound them together in their common toil, so may they be led to see their common interests, that the safety of each is the interest of all. Bless also the employers of men. Give them that vision to see themselves as makers of men as well as makers of goods. And may labor and employers see themselves as partners in a great common enterprise in the advancement of brotherhood and of social justice and mutual understanding. Bless, we beseech Thee, Our Father, all of the sessions of this Congress, and grant that during the discussion and through the addresses and all their deliberations, men may be brought closer together, that the Kingdom of God on earth may be promoted, that kingdom in which men should do to one another as they wish men to do unto them. And this we ask in the name and spirit of Thy truth and justice. Amen.

### REMARKS

of THOS. P. KEARNS, Supr. of the Division of Safety and Hygiene,  
*Chairman of the All-Ohio Safety Congress*

I am delighted to, extend to you, one and all, on behalf of the Industrial Commission of Ohio, Division of Safety and Hygiene, the Department of Industrial Relations and the Committee of Arrangements, a hearty and most cordial welcome

## OCCUPATIONAL DISEASES IN OHIO FOUNDRIES

DR. CAREY P. MCCORD,  
*Medical Director, The Industrial Health Conservancy Laboratories, Cincinnati, Ohio.*

Thank you, Mr. Beall.

I have a friend who teaches up in rural Wisconsin. A few weeks ago a school nurse sent a very gentle and discreet note to the parents of a very dirty little school girl, suggesting that the little girl be given a bath. The next day there came back a rather queer note. The mother said, "I think you are quite unreasonable about giving Gladys a bath, I have looked in the kraut barrel and there is still quite a bit of kraut there, and you know I can't give Gladys a bath until the kraut barrel is empty. (Laughter.)"

I know that in times past at least, foundry work has been associated with a whole barrel full of hazards, and I know that you have been dipping down and emptying out various sorts of hazards and getting rid of them. You have achieved remarkable things, and I congratulate you. I am very glad indeed that in your reaching down you have come down upon the problem of occupational diseases. I see evidence of your interest in many ways. One way is in such brochures as the one compiled by one of your National Societies to which Mr. Beall has so helpfully contributed. I see interest in this topic in Mr. Marr's discussion, upon Silicosis. I see interest in this topic in the fact that you permit me to come up here and talk to you about occupational diseases. It is a privilege, and I thank you for the opportunity.

In discussing occupational diseases with predominantly lay groups, it is sometimes helpful to comment upon the bases of differentiation between these states and accidental injuries. Occupational diseases are those physical and mental abnormalities, growing out of work as the cause, resulting from extended exposure. Unlike the swift action of a punch press in cutting off a finger, or molten metal in producing a burn, time—in days, weeks or years—may be required in the production of an occupational disease. The coal miner in England, may work at his trade twenty or more years before developing a miner's nystagmus. The asbestos worker may be so employed for fifteen years before asbestosis arises.

The assumption that time is the essence of distinction between accidental injuries and occupational diseases tends to break down in connection with bacterial diseases. The butcher working with rabbits infected with tularemia, or the tanner working with hides infected with anthrax, are probably swiftly inoculated with the bacteria leading to these diseases. Possibly these conditions should be accepted as accidents, but by general consent they are classed as occupational diseases.

Some substances used in industry may lead either to accidental injuries, or to occupational diseases. The worker who enters a tank car that recently has contained benzol and quickly dies, is ordinarily listed in the accident column; exposure to lower concentrations of the same chemical, such as in tire building, over a long period of time, may lead to a prolonged illness which is a characteristic occupational disease. Again some disease states may be occupational in some instances, and clearly not so in others. A sewer worker who contracts typhoid fever might well believe that his infection arose from sewage, but more than 99 per cent of typhoid fever is unassociated with work as a direct cause.

Thirty five years ago the occupational diseases known to most physicians might be counted on the fingers of the two hands. As an index of present day conditions, may I point out that recently I compiled a list of 507 diseases, and have no feeling that this is exhaustive. Every industry is likely to have one or more hazards, and

hazards. Foundries, like all other industries, harbor some hazards. If it be your pleasure, I wish to discuss some occupational diseases of your industry—some of which states, however, are not compensable in the state of Ohio.

## SALT DEFICIENCY IN FOUNDRYMEN

A common (if not the commonest) occupational affection among foundries is due to the excessive loss of sodium chloride in profuse sweating. In the absence of any physical labor, most of us sweat, on an average day, about one quart of perspiration. A foundryman, under conditions of high temperature, may sweat in a single day as much as six quarts of perspiration. The normal content of sweat is about 0.3 to 0.5 percent minerals, but as profuse sweating continues, the percent of minerals increases, with the net result that a foundryman may lose in the course of 24 hours, as much as 20 grams of salt, which is, as you know, two-thirds of an ounce. This depletion of the body speedily leads to muscle cramps, stomach upsets, undue fatigue, and achilosis. The mere drinking of water does not remedy the situation. In fact, water makes the condition worse. The sudden cramps after water intake on hot days is well known to every foundry worker. The drinking of water is, however, only indirectly the cause of the discomfort. Water further dilutes a blood already deficient in minerals. In England the coal miner is likely to take in his lunch basket a handful of salt herring. The stoker on an ocean liner may be seen to mix a little salty sea water with his fresh water supply. Both of these workers have learned that they work better when they have taken into their bodies more salt than ordinarily comes in their food. In many hot industries, the addition of salt to the water supply has proven to wholly eradicate all fatigue and illness due to this deficiency disease. There may be a few persons in all foundries who are on low salt diets, who would not benefit by this process, but by and large the drinking of salinized water (0.25 to 1.0 percent) is most desirable. One percent saline is not very palatable, but one-fourth per cent or one-half per cent, when cold, leads to little or no objection. The use of tablets of salt is not highly regarded in the belief that the ingestion of a tablet, which may lie for some time at one point in the stomach, may be unduly irritating. In brief then, add to the comfort and capacity of workers by replacing abnormal salt losses through salinized drinking water.

## SILICOSIS IN FOUNDRIES

Silicosis is a direful disease of the lungs, due to the breathing of siliceous dusts. The sands and clays of the foundry industry are practical sources of this disease. In Ohio's foundries there now exists some known and probably much more unknown silicosis. The probability of silicosis depends upon a number of factors, now mentioned: (a) the size of the dust particles (only those particles below 10 microns are important; coarse dusts are unlikely to reach alveolar lung tissue); (b) the percentage of free silica in the dust, (very fine pure quartz dust is the most dangerous; silicate clays are far less dangerous); (c) the density of the dust to which exposure is provided. The body can manage some dust concentrations, but dense ones overwhelm the defensive mechanisms of the body; (d) the daily period of exposure; and (e) the reaction of the individual.

Those foundries using quartz sand in moulding are more likely to provide a danger from silica using foundries. However, it may not be inferred that clays are free from silica. The average clay contains over 60 per cent silica in the form of silicates, quartz, flint, mica, etc. Quartz is one of the commonest constituents of clay. In some foundries it is a practice to face off the finished moulds with

its makers. Recently I had occasion to participate in the inquiry connected with some 129 cases of silicosis, with 21 alleged deaths from this disease, following the grinding of this very fine powder. It appears that unmistakably silicosis may arise after such very short periods of exposure as six or even three months. Apart from moulding, and subsequent shake-out work, dangerous siliceous dusts may arise in the sand blasting of castings. Dust hazards from this process were ably discussed in your program of last year, and need not be repeated beyond the assertion that the danger of silicosis may be a very genuine one.

In foundries several years of exposure are to be expected prior to the development of a disabling degree of silicosis. Once started, the disease is progressive, culminating, in seventy-five percent of cases, in tuberculosis.

In the practical prevention of this disease, the following steps are suggested:

- I. All new employees should be x-rayed to preclude the entry of persons already possessing well established cases of silicosis. There is no good reason for any one foundryman accepting the products of bad work conditions in some other foundry.
- II. Sand blasting should be done with steel grit or synthetic abrasives.
- III. If silica sand be requisite to the proper finishing of the castings, which always is doubtful, positive pressure masks should be provided and worn. I have no faith in the sustained protection of any filter type of respirator.
- IV. Other things being equal, clays low in free silica should be chosen for foundry work.

V. Clay is preferable to sand as a moulding agent, in so far as health conservation is concerned; the former should always be employed if practical.

VI. X-ray examinations, routinely made on foundry workers, may disclose early stages of silicosis in the absence of any discomfort or lessening work capacity. It is for the good of these workmen to shift their occupation at once to non-dusty trades, on a permanent basis.

VII. Enumeration of the number of dust particles and the percentage in the danger zone size should be made and established. The count should be kept below six million parts per cu. ft. of air, but even so some silicosis may develop.

VIII. The routine of the foundry should contemplate just as little dust as possible.

At this point it probably is not amiss to comment upon the anomalous situation in Ohio with respect to compensation for silicosis. While there is far more occupational silicosis than some other diseases occupying a place on the occupational disease schedule, and while the disability from silicosis is just as great or greater than from these other conditions, silicosis has repeatedly been denied recognition. This means that you foundrymen are paying for other manufacturers' occupational diseases, but are denied protection against your own. These distressing cases occupy your pension rolls, or else are unfortunately left to their own devices. Courts appear to have taken the stand that unless an occupational disease is listed on the schedule, the victim is without any legal recourse. In the case of clear cut occurrences of silicosis following long periods of exposure in a single plant, complete denial of recourse seems most unjust. Physicians have lent themselves to the confusion in this situation by alleging that silicosis is not susceptible of diagnosis. Perhaps a background of resistance on the part of physicians to the extension of the occupational disease schedule, resides in the belief that in so doing state medicine is brought that much nearer. State medicine, which is anathema to the medical profession, promises little, and is undesirable. It is, however, inevitable, if genuine injustices to the public are created in an effort to offset this menace.

problems more difficult than those entailed in lead or arsenic poisoning, already on the schedule. The x-ray picture is characteristic and permits of subdivision into three or more degrees of involvement.

#### CARBON MONOXIDE POISONING

The hazard of this gas is too well known to call for any extended discussion in the brief time allotted to me. Moreover, exposure to carbon monoxide usually leads to an accidental injury, rather than to an occupational disease. Widely it is maintained that no chronic form of carbon monoxide exists. To the contrary, there is a growing conviction that repeated exposure causes an illly-defined chronic state boding no good for those affected. Without any attempt to clear up the clinical aspects of this vague state, it is asserted that ventilating devices should keep this gas at the lowest possible concentration in all foundries. A simple and inexpensive device called a "hoolamie" tester, should be known to every foundry.

#### LEAD POISONING IN FOUNDRIES

Drs. Pedley and Ward, of Montreal, Canada, recently made an investigation of lead poisoning in foundries. Their presentations are so succinct that I am expressing my own attitude through direct quotations from their report:

"The hazard of lead poisoning among brass and bronze foundries is recognized by those who work in these trades, but does not appear to be common knowledge among the medical profession, and when workers in brass and bronze become sick their cases are variously diagnosed as brass poisoning, copper poisoning and zinc poisoning. Medical literature is singularly devoid of references to the lead hazard in the brass and bronze industries, and when lead is mentioned as a possible cause of some of the disabilities of this trade, it is usually dismissed as unlikely.

We have examined 38 men engaged in the manufacture of railroad bronze. Some of these men were referred to us because they were sick, others came to us on account of accidental injuries. Of these 38 men, 24 were cases of active lead poisoning. Nine were cases of lead absorption without symptoms, and only 5 showed no symptoms of plumbism. The men who were sick showed the characteristic symptoms of colic and constipation and the objective signs of blue line, stippling of the red cells and lead in the urine. One man had a double wrist drop. We also examined 3 brass polishers, each having relieved the other at the same emery wheel. All of these men were poisoned by lead. In addition we examined the blood smears of 26 men working in another brass and bronze foundry where the percentage in the alloy was below 6%. Three of these men showed many stippled cells, (recorded as 3 plus). Two showed numerous stippled cells, (recorded as 2 plus), two showed occasional stippled cells and the rest were negative. One of the three plus men afterwards became a clinical case of lead poisoning.

... The melting point of lead is about 328°C. That of copper 1100°C. We have determined the volatilization of lead at this temperature and find that it is in the neighborhood of 0.2 gram per square inch of molten surface per minute.

At the request of one of the foundries we collected samples of air at various places in the plant and examined them for lead. In the analysis the lead was precipitated as a sulphate rather than as a sulphide in order to eliminate copper, zinc and iron which might have contaminated the specimen. A number of determinations were made, averaging about 0.8 mgm. of lead per cubic meter of air.

In the founding of high lead alloys it is our impression that practically every workman absorbs relatively large quantities of lead, but it is our belief that few

than 6% lead. The danger of slow deterioration of the employees must not be ignored however, in this type of practice. In the chipping and polishing of low lead alloys, on the other hand, the danger of plumbism is probably very considerable. We have seen three men who succeeded each other on the same emery wheel come down with lead poisoning. . . ."

The prevention of lead poisoning in brass and bronze foundries will be served best by the following measures:

1. The elimination of lead as a constituent, wherever practical. Lead is introduced into brass and bronze to cheapen the costs more often than for any other cause. It is recognized that the antifrictional qualities of lead in alloys at times commands its use.
2. The removal of dusts, fumes and vapors, at their source. This is especially needed in pouring, chipping, and polishing.
3. Generalized ventilation of such type as will keep the concentration of lead in the workroom air below 0.5 mm per cubic meter of air.
4. Monthly physical examinations for all exposed workers. The desirability of such medical examinations increase, with the percentage of lead in the alloys made.

#### ARSENIC POISONING

Arsenic poisoning is a possibility, but a rarity, under usual foundry practice in this state. Brass and bronze foundrying are more likely to present this hazard, but even in pig iron 0.2 per cent of this metal may be present as an impurity. In shot metal 2 per cent arsenic is common. Arsenic may be added to zinc to increase the amount of lead that will practically alloy with the zinc. In the smelting of copper, zinc, tin, and silver, arsenic may be widely present, but the greater quantity is separated in the refining process. Arsenic poisoning in silver-smithing is a practical hazard, but silver casting, spinning, and turning are so far removed from the domain of foundrying as here conceived as to make detailed discussion of questionable value. In discussing the use of reclaimed metal in foundrying, Kober and Hayhurst state:

" . . . It must not be overlooked that lead, antimony, nickel, aluminum, cadmium, manganese iron, phosphorus, arsenic and sulphur enter the brass crucible." In galvanizing, arsenic poisoning is a possibility from impurities in the spelter. Hamilton cites Sicard in the following language— ". . . Sicard points out the importance of lead and also arsenic in the industrial poisoning of brass workers, a statement which cannot be too often repeated, and which clears up many a puzzling history."

If, in any foundry work, employees develop digestive disturbances, bronzing of the skin, sores over the body, and particularly around the nostrils, inflammation of the eyes and upper respiratory tract, and neuritis or actual paralysis, do not overlook the part that small traces of arsenic may play in their causation.

#### METAL FUME FEVER

This term is applied to the abnormality caused by the fumes of several metals of which zinc chills is the best example. Zinc shakes, brass chills, brass founders' ague, spelter chills, are all terms for the same condition. The melting point of copper is so much higher than that of zinc as to approach the boiling point of the latter in brass foundrying. This inevitably leads to the formation of a tension of zinc vapor in the atmosphere. If this zinc laden air is breathed shortly after the production of the zinc oxide, that forms from contact between zinc and the air, the susceptible workman will within a few hours thereafter, if not immediately, become unduly fatigued, suffer from severe chills, develop an insatiable thirst; the temperature is likely to rise but not invariably so. The pulse rate may be quickened along with

an increased respiration. After a few hours of acute distress, the patient sweats profusely and drops off into a deep sleep, if at home, which is the rule; as attacks ordinarily come at night after a day's exposure to the zinc fumes. Waking the next morning, the patient is debilitated, has foul tastes in his mouth, and has a complete distaste for food. Commonly, he is able to attend to his duties at work, but may again suffer an acute attack during the ensuing night. No chronic form is known to exist, although respiratory tract inflammation is often complained of by those continually exposed, along with the complaint of constriction of the chest. Persons exhibiting this disease have been found to be below average in general health, which condition is regarded as a result and not a cause of the chills. Of the possibility of a chronic form, Hayhurst states:

"In Chicago the fact that 85 per cent of 1761 foundry workers were under 40 years of age, and only 1 per cent over 50 years, was explained by employers as due to 'sowing up' or beginning inactivity, and by workmen, as gradual incapacitation from the inhalation of brass fumes and the strain of the work. The constant intake and elimination of unusual amounts of zinc and copper from the system along with the repetition of brass chills or the constantly forced immunity to the same are enough to cause degenerative diseases in themselves even though the immediate afflictions above mentioned are overlooked. Chronic bronchitis or 'asthma,' emphysema and pulmonary tuberculosis are very common. Older workers invariably complain of dyspepsia, 'biliousness,' occasionally of gall-stones and they are often icteroid. Constipation is the rule among them and hemorrhoids are frequent complaints. Pyorrhea alveolaris, carious teeth, gastro-enteritis, salivary gland enlargement, ill-nourishment and emaciation, chronic alcoholism, Bright's disease, nervous and heart diseases are all above the average . . ."

In the prevention of these zinc chills, three measures are practical:

- (a) Abstinence from the use of alcoholics.
- (b) Limit the concentration of the zinc in the air of the workroom to a constant below 20 mg per cu. meter for prolonged exposure; and 45 mg per cu. meter of air for brief exposure, such as ten minutes. In general this means forced ventilation.
- (c) During brief periods of pouring it is practical to wear filter masks which may be made at very low costs. Clogging of the masks after short use, such as 30 minutes to one hour, make these devices a nuisance. When worn, however, chills are effectively prevented, even in those who are highly susceptible.

#### MISCELLANEOUS ADDITIONAL CONSIDERATIONS

Pneumatic tampers or rammers and chippers may, from continuous small trauma, bring about inflammation along tendon sheaths of the hand and forearm. This tenovitis may occasion total disability. Recurrences are the rule. Strapping of the wrists affords some assurance of prevention, but is far from infallible. Pneumatic chippers and tumbler machines are conducive to occupational deafness. Just as the noise of boiler making brings about temporary or permanent deafness due to fatigue of the aural apparatus, so in foundry work continued high-pitched noises, beating in upon the ear drums, may be expected to eventuate in deafness. The elimination of the hazard is most difficult. Location of the tumbler room at a distance from the general work force is desirable.

In core making and baking, skin diseases may result from the action of binders. Linsed oil, benzine, kerosene, pitch, and molasses have all been the source of skin inflammation.

In some subdivisions of iron foundrying sulphur dioxide is liberated and sometimes

a practical hazard. Ten parts of this gas per million of air is the maximum tolerated over long exposure without damage.

It may be noted that pneumonia reaches its highest frequency rate among foundries, being more than double the rate for workers in general. Bronchitis, tuberculosis, and heart diseases occur with greater frequency among foundries than is the average for all occupations. It is not implied that these last four mentioned diseases are characteristic occupational states, but work may stand in some relation to their causation.

Finally, may I briefly recount one occurrence of occupational disease, or possibly an accidental injury, in an aluminum foundry in this state:

According to the patient, it was customary in this foundry to reclaim metal from scraps about once in two weeks. In this recovery work all sorts of metals were placed in the crucible, along with zinc chloride. Ordinarily the dross skimmed off of the metal was moulded and saved. On the occasion of the reclaiming process next preceding the gassing, these skimmings were dumped out of the windows upon a pile of refuse. Two days later it rained during the night. At four o'clock in the morning the patient and another worker, being in charge of heating, arrived at the plant to start fires. The mass of skimmings was aglow from some cause, and was giving off dense fumes. Let us use the exact words of the patient at this point—

"My partner and I poked into the mass of skimmings. This caused it to burn a bright red and give off blue fumes. These fumes made my partner and me dizzy, weak, sick at our stomachs, and very thirsty. We drank much water. A little later more men came on the job. They tried to help put out the smouldering mass. We used water and this only increased the fumes. All the men were affected to a greater or lesser degree. At seven o'clock, the superintendent came and told us we could not put out the fire with water. He used lime on the fire and the lime killed it. Some of the boys laid off because of this sickness, and later my partner died. I worked until noon because I was in charge of the furnaces. At noon I became very sick and had to go home. . . ."

This patient thus describes his immediate attack:

"The fumes were very irritating to eyes, nose, and throat; so much so that it was almost impossible to take air into the lungs because of spasm in my throat. Queer feeling all over chest, pains throughout and continuous gasping for air. There was a feeling that my air passages were cut off. I became very thirsty. I also became so weak that I had to drop to my knees at times to keep from falling. Five or six days after the gassing I became even worse; greater weakness and much vomiting. The condition in my chest continued. . . ."

This description is that of pulmonary oedema. It is believed that to this day the patient is still ill. The precise cause of this disaster is not known. It is possible that zinc chloride coming in contact with carbon material in the refuse heap may have led to the formation of phosgene gas. This occurrence is here reported in the hope that an exact explanation may be offered by you much experienced gentlemen.

Any safety program in the foundry should contemplate occupational diseases along with other hazards. Like the old Creole proverb, which runs—"Not just once does the ox need his tail to brush away the flies"—so in the foundry, day by day, thought should be devoted to the elimination and prevention of occupational diseases. (Applause.)

CHAIRMAN BEALL: Thank you very much, Doctor.

I regret very much that the approach of the noon hour has made perhaps the Doctor cut out some of the discussion that he was going to give us on those oc-

cupational diseases at the foundry. It is something that we are not very familiar with. We realize that we have them, but we do not know as the doctor does, what to do for them, and how to prevent them.

In Sand Blast a year ago we had discussion on what can be done to eliminate a lot of hazards in sand blasting, from the mechanical point of view, but we do not know and did not know until today what the silicosis really means, what it is.

A lot of men who are employed in foundries in sand blasting work, even though they know of the hazards, refuse to be transferred to some other employment. Usually that man gets a little higher pay in the sand blast than he does as a laborer in some other department, and unless he is a tradesman he cannot get as much money as he does in sand blast at ordinary labor. We have known of instances where men would come back and ask to be replaced in the sand blast thinking that after being away three or four months they were perfectly safe, because they felt all right so far as they knew.

From the doctor's discussion I learn that that is not at all probable and that a man, once having received some of that poison causing scarred tissue should not be permitted to renew the hazard because what he takes in afterwards will only increase what he already has. He has not thrown off the trouble that is already there.

This subject is too important to be passed any farther along today without some discussion. I would like to hear from some of the gentlemen here on this or any other questions. The section is now in your hands, gentlemen and I want you to ask questions on anything pertaining to this subject or pertaining to any other of the subjects that have been discussed; if you have a problem in your own foundry that you do not know what to do with or that is troublesome in solution, bring it up here and ask questions. Maybe somebody else has had experience with the same problem and has found a solution.

Gentlemen, the meeting is in your hands. Let's hear from you, and please, anyone speaking or asking questions, or answering one, be kind enough to state your name and your company in order that the stenographer may get it for the record.

Has anybody any questions?

Mr. ALBERT ASPLAGER (Wagner Mfg. Co., Sidney, Ohio): We had a fellow who developed sand poisoning. I came here purposely to hear something about sand poisoning. I did not recognize any discussion or anything about that. We sent the man's shoes to the Industrial Commission and they pronounced it "sand poisoning." Now what could we do? It had developed on his heels.

CHAIRMAN BEALL: I have not heard of sand poisoning affecting the feet. Dr. McCord have you any experience with sand poisoning?

Dr. McCORD: I have, sir, and I would like to answer your question as best I can. Sand, of course, is silica, but any affection that might occur on a heel or foot is not silicosis, or silicatosis, it is merely the abrasive action of sand. This workman presumably got sand in his shoe; it cut the flesh, the flesh became infected, I dare say, and the poisoning was not from sand but from ordinary infection.

I would say very positively that there is no such thing as "sand poisoning" in the sense that it is a form of Silicosis.

CHAIRMAN BEALL: Does that answer you?

Mr. ASPLAGER: Yes, sir.

Mr. J. M. WOLFE (Youngstown Sheet & Tube Co., Youngstown, Ohio): I

would like to ask Dr. McCord whether he has had any experience with the use of dextrose in cases where there has been excessive elimination of salt.

Dr. McCord: If you please, sir, I am acquainted with the use of dextrose but personally have not used it. I am of the opinion that dextrose will go far toward relieving the fatigue that comes from salt deficiency, but it will not replace the salt, and that the use of salt is quite superior in that the salt makes good the loss at the same time relieving the fatigue.

I recognize that dextrose has been used, it has been used successfully, but I favor the salt.

CHAIRMAN BEALL: Anything further?

Mr. WILLIAM M. MARK (Ohio Brass Co., Mansfield, Ohio): May I ask Dr. McCord a question as to whether there are any permanent effects or defects arising out of the condition of brass foundry shakes? We have gotten a lot of those in our place the past few years. So far as I know there was never any permanent trouble. I would like to ask if any permanent trouble may arise.

Dr. McCord: As best I know, there is no chronic form of zinc poisoning subsequent upon "zinc chills" or "zinc shakes." However it has been my experience that when zinc sulphate is formed in the galvanizing room from the combination of the zinc oxide from the molten metal, with the sulphuric acid, bubbling up from the pickling vats will lead to a chronic disease which in no way resembles zinc chills and is manifest largely by irritation of the stomach, eventuating in gastric ulcer in some cases.

CHAIRMAN BEALL: Anything further?

Dr. J. A. TURNER (Worthington Pump and Machinery Corporation, Cincinnati, Ohio): In regard to the zinc shakes, there is some definite damage done to lung tissue, if the form in which the zinc is absorbed is zinc oxide. It destroys the delicate lung cell or the cells in the lungs, and there is an absorption of your body proteins that is the cause of the shakes or the symptoms of the disease.

In guinea pigs this destruction of cells is replaced by some starcky formation, and that is permanent, so that there is some permanent damage, but nowhere near to the same extent that you have in silicosis.

CHAIRMAN BEALL: Thank you, Dr. Turner. We are glad to have that information from your experience.

Mr. WOLFE: May I ask another question? I would like to ask Dr. McCord what safeguards he might throw around the payment of compensation for silicosis if it were included as an industrial disease. That is rather an important thing, it seems to me.

Dr. McCord: I had almost hoped to escape questions of that sort. I am very much in favor of compensation for silicosis, difficult as the situation may be. Contrary to much contention, silicosis, asbestosis, and other forms of silicosis, lend themselves to diagnosis. In fact, they may be diagnosed with greater accuracy than some other occupational diseases, including some cases of lead poisoning. In the diagnosis of silicosis, and kindred pneumoconiotic conditions, an X-ray is requisite. Proper reading of the X-ray films may lead to the accurate classifying of the silicosis as of the first, second, or third stage. The great problem involved with respect to compensation is not that of diagnosis but of fixing responsibility upon some one or more employers. Although a few cases of silicosis are known to have arisen after less exposure than one year, by far the greater number represent the accumulated harm from dusts taken into the chest over such periods as ten to twenty-five years. In order to meet any such unusual situations, the following provisions are tentatively suggested to those who may be made responsible for making decisions in these cases

1. In all industries wherein a hazard to silicosis, or kindred pneumoconiotic conditions, may arise, the employer should be called upon to obtain a physical examination, including X-ray examination of the chest, prior to employment. If at a later time a claim be made by an employee in any one of these dusty industries alleging a pneumoconiotic lung disease, the X-ray film, which must be kept on record, will serve as the determining factor as to the origin of the silicosis in that plant. Failure to have available such X-ray film, or films, would lead to the fixing of responsibility upon this negligent employer. If some evidence of silicosis may be determined in the film made at the time of employment, it would follow that the employer (if maintaining a dusty trade) next preceding would be called upon to participate in the responsibilities of compensation, and so on to that point where no evidence of pathologic fibrosis was obtainable.

This provision may appear to work a hardship on the employer in dusty trades, but after all it is his greatest safeguard. It will prevent any one employer from being saddled with the unwarranted responsibility for compensation for silicosis that may have originated in part or in toto in other plants.

2. Should silicosis be added to the schedule of compensable diseases in Ohio, only two special provisions need to be made with respect to the method of investigating and making of awards. These two features are:

(1) Since a number of other conditions of the chest may present an X-ray picture somewhat similar to silicosis and silicatosis, a special medical board of qualified experts for passing on the merits of claims for these diseases should be created. By no means should the diagnosis and recommendations of the claimant's physician be ignored, but in addition this special silicosis medical board should act upon such claims, and its recommendations should be the final medical authority for the guidance of the Industrial Commission. This silicosis medical board should serve impartially, representing the claimant, or his dependents in case of death, and the Industrial Commission, equally. Payment for services should be made on a case basis, out of special funds provided for this purpose.

(2) The second special provision should make possible awards to workmen, whenever necessary, in dusty trades on a wage impairment basis, whenever X-ray evidence establishes a second or third degree silicosis, even though no disability may appear. Such provisions may make possible work in some industry, whereas continuation of work in the dusty trade will almost inevitably lead to reasonably early total disability, with the prospect of premature death.

3. Tuberculosis in industries presenting a siliceous dust hazard, should not be accepted for compensation in the absence of an antecedent and co-existent silicosis. Silicosis with tuberculosis is a common occurrence. A state of silicosis associated with tuberculosis may be accurately diagnosed and set apart from cases of tuberculosis without silicosis. Compensation for the latter should not at this time be contemplated.

4. At the time when silicosis is first added to the list of diseases compensable in Ohio, it will prove most difficult to fix the responsibility for the causation of silicosis upon any one or a group of manufacturers in dusty industries. It is well within reason to believe that many claimants who may petition the Industrial Commission for awards, on the allegation of silicosis, will have been first affected by dust at a time antedating the original occupational disease law in Ohio. Since no proof as to the time and place of origin of such cases may be expected, awards in properly established cases should be made without any degree of penalization of recent employers.

5. At an early time, and even before the addition of silicosis to the schedule of Ohio, the Bureau of Safety and Health

be called on by the Industrial Commission, or the legislature, to ferret out and classify all Ohio industries presenting a hazard to silicosis and kindred affections. The extent of hazard in each should be classified, the investigators being influenced by such considerations as the extent of free silica, the size of dust particles, dust counts, etc. At no time should such evidence as that from dust counts be accepted as a precise standard for ratings. Appropriate protective procedures should be devised and regulations conducive to protection should be promulgated and penalties provided.

6. The addition of silicosis and silicatosi to the schedule of compensable diseases in Ohio may not be expected to greatly add to the cost of coverage for occupational diseases. The additional cost, if there be any, should be spread over all of the industries in Ohio, just as at the present time the cost for Ohio's twenty-one compensable diseases is so distributed.

This, in brief, represents my ideas at this immediate time as to the peculiar arrangements that must be made in connection with the proper administration of provisions for the coverage of silicosis. It is just and inevitable that silicosis, asbestosis, and possibly other pneumoconiotic diseases, should be added to the schedule of Ohio at some early time. Special and difficult problems will arise, but these are not un-surmountable. Those who are apprehensive that any such inclusion of silicosis and asbestosis to the schedule of Ohio would pave the way for compensation for numerous cases of pleurisy, tuberculosis, and kindred non-occupational diseases, are unduly concerned. It is well within the capacity of an intelligent Industrial Commission, such as now conducts the affairs of employer's liability in Ohio, to manage the problems attending compensation for silicosis without injustice to anyone.

I am wondering if in any way that answers the question that was raised by the gentleman.

Mr. Wourz: It does to a considerable extent, except of course that we all recognize the fact that there are a lot of people who are doctors who are going to be asked to make decisions relative to these conditions who have no practical knowledge of them at all.

Dr. McCord: That is the reason for having the Reviewing Board.

Mr. Wourz: And your suggestion would be quite helpful along that line.

Dr. McCord: I think it can be worked out, very practically, sir.

CHAIRMAN BEALL: Dr. McCord, while you are on your feet, I would like to ask whether or not you believe the use of steel grit would be sufficient along with the other ordinary protections that the men are given, would be regarded as safe as a prevention of silicosis? Do you think that steel grit has any great advantage over ordinary sand blast or sand that is used in sand blast?

Dr. McCord: I am not an engineer and I can make no statement as to the efficacy of steel grit from the point of view of the purpose that it is supposed to serve, but I will say this: that the dust from steel or from iron is practically harmless; it is not entirely harmless, but it is practically so. If silicosis dust might be taken at 100% I would be disposed to place the danger from an equal quantity of steel dust or iron dust at about 5%. Just as Dr. Turner pointed out, the taking in of zinc oxide dust will lead to a small amount of fibrosis, so from practically any dust there may come about a small amount of fibrosis, but if steel grit will do the work, by all means substitute the steel grit for the siliceous sands.

CHAIRMAN BEALL: Thank you, Doctor.

Are there any other questions?

MR. C. H. STANMER (G. H. R. Foundry, Dayton, Ohio): I think we have all

are liable to set up causes to bring about this effect. I am thinking now of shaking out molds for instance, where the air is more or less filled with sand dust at that time.

CHAIRMAN BEALL: From my own experience I would like to say to the gentleman that I am quite sure that there are serious quantities of dust in any part of the average cleaning room, also in shake-out way, but perhaps the shake-out dust is less harmful than that which you get in the cleaning room or from the grinding and chipping.

I would like to ask Dr. McCord if he has anything further to say however. Over the foundry, how are these hazards distributed?

Dr. McCord: Wherever practical, use clays mixed in with your silica sands. Quartz silica is more or less of an inert, non-irritating dust. When it gets into the bronchial passages, in view of the fact that it is not irritating, there is no effort on the part of the defensive mechanism of the body to extrude it. If however there be clays or other sorts of materials that may be mixed in with the sand, these are irritating. This leads to throwing off not only of this clay dust, or other dust, but with it some of the sand dust, so that the quantity of the hazard is reduced.

Now to answer your question: there probably are several places around the foundry where silica has a use. Hazards exist even down to the point of core making. The answer, to a large extent, is, "How much dust is there at any one point?" If the dust is appreciable, at least if it is in such quantity as six million particles per cubic foot, there is a hazard.

I believe that in shake-out work, in core work, in molding, in facing off the mold with very fine sand, that opportunities for silicosis may exist.

CHAIRMAN BEALL: I think the discussion thus far has brought us to a pretty definite conclusion that Mr. Hoierman and Mr. Marr are both right in insisting, and Dr. McCord also of course, in insisting that the only safe way to take a new man is to give him a thorough examination, and periodical examinations thereafter.

Dr. McCord: Make it more than a \$1.50-doctor. (Laughter)

CHAIRMAN BEALL: If that doctor were able to give us as much service for the amount of money involved as you do, Dr. McCord, we would pay him anything.

However, I am very sorry to say that all of the doctors do not know as much about it as Dr. McCord, and the gentleman from Cincinnati, who spoke. That is why it is to our advantage or any other industry, to have as nearly as possible a doctor on the job who knows something about industrial work.

Of course, those of us who are self-insurers, Section 22 insurers, we have our own salaried doctors, and those men are selected from among those who have had the greatest amount of experience and shown the greatest results in industrial work, but state insurers generally permit their men to go at random to whatever doctor they want to go to, and some of them do not go to doctors at all, some of them go to so-called voodoo doctors, and all kinds of whatnots, or what have you, rather than to a practicing physician, who is qualified to do them some good when they are injured. That is another thought to take home with you, to find ways and means of having your injured men get to a doctor who will give them good attention, good medical care, and it does not hurt to look them over once in a while and see that that doctor is getting a man back to work when he should come back.

I don't want to attack the medical profession, far be it from that but we do find, once-in-a-while a man who is a bit unscrupulous. Those things should be borne in mind, and you get better service if you can get physicians who have had considerable experience in industrial work. You need not confine it to one doctor, spread

their cases, see that they get the very best care, there are plenty of doctors in every city who can and will give them the best care and get them back to work at the minimum time. Sometimes there are men who care more about getting the fees than getting them back in the minimum time.

Mr. Wm. Cowell. (Forest City Foundry, Cleveland): Mr. Marr's discussion contained a phrase referring to goggles. We have experienced quite a difficulty in getting fogging, and have not found a suitable goggle to take care of that condition. It is gray iron we work in. I would like to hear from someone else if they have found a suitable type goggle in that line of work.

It is evidenced, I think, in our writing our Cleveland Industrial Commission Representative that there are only perhaps five or ten per cent of the gray iron foundries in Ohio using that precaution. In other words there may be 90 per cent who are violating that section of the Code.

CHAIRMAN BEALL: I think the statement of the gentleman is well taken. There are foundries where men are permitted to pour without goggles and the excuse frequently is that they have not goggles that will qualify. Another objection is that so many of the goggles do not give them sufficient side vision, and they are liable to stumble and fall or drop a ladle when they are pouring.

If there is any one present who can answer the gentleman's question with reference to where and how and what goggle to get that will not fog, I would like to hear; perhaps Mr. Marr can answer that question.

Mr. Marr: I don't think Mr. Marr should. However, I think I would be glad to tell the gentleman after the meeting just what we are using if he wants to try that one out.

My own notion is, however, that about 90% of this is excuse, the other 10% is possibly a reason. And with 10% excuse you can have a lot of resistance.

We overcame that, we said, "Here is the goggle, put it on and pour." They put them on and for two years they have worn them. We did that in a brass foundry also, where we are pouring considerable brass. This thing went over not because we found the right goggle, I am inclined though to think that we got it over because we got our men to admit that it was safe. They were willing to try it, and they have done it, they are pouring just as well, we handled, in our first year we had goggles, as high as 25 tons out of our malleable furnace in 25 minutes, and I want to tell you it is a hot job. There is a lot of heat and a lot of steam coming out of the mold, but the boys are doing it.

CHAIRMAN BEALL: I can appreciate why Mr. Marr does not like to advertise some particular goggle manufacturer. That is why he would like to talk to the gentleman in private.

Most any of the dealers, jobbers in goggles, I think, handle them, at least they claim to have goggles that will not fog. If they haven't them they will soon dig them up and find a way to provide them if they have demands for them. Those of you who have found where it is necessary to do hand pouring will look into that problem and try to find a way to take care of those men.

I agree also with Mr. Marr that a great deal of it is on the part of the man himself, his lack of safety consciousness, they do not like to wear them.

We had a man over in Springfield who used to put them in his locker every day when he came to work, he said they were too nice to wear in the factory, he wore them back and forth in the car. So you don't only need to provide ways and means for the men but you have to think for them, and use a bit of discipline, and where that discipline is for the protection of the man and his family I do not think

..... can be criticized for having such severe with that discipline

Is there anything further?

Mr. Cowell: I would like to ask: sitting in this room there are gray iron foundries pouring squeeze molds, I would like to know how many here are wearing goggles on squeeze molds, on small machine molds that are not a foot off the floor. About five hands were raised.

I thoroughly believe, on large moulds, four to five feet high, a man should wear goggles. You yourself, passing through a foundry, will detour through when passing the taller moulds, but you do not hesitate to go down by a squeeze mold without any fear.

Mr. Marr: May I add a thought, Mr. Chairman, to this idea of fear?

I think this: you want to get a fellow to try to do something and if you tell him he is afraid to do it he will go ahead and do it. There are plenty of people willing to take a chance, and the foundry, I am sure, has been full of that wonderful spirit, it has been a wonderful spirit, "give me the job and I'll do it," and out goes their chest, and the job gets done. I think, however, that we should temper that feeling of heroism or whatever you call it, with some of the precautions necessary to prevent accidents.

I can recall the old days when I used to admire the fellow who took a chance. We all did. He was some sort of a hero in our eyes. I think now-a-days we are coming to realize that we have got to do it with precaution and guard against the fellow who is willing to take the chance and do the risky job.

CHAIRMAN BEALL: I am very glad indeed to have all this discussion and these questions and answers. I think they are greatly helpful. I wish we could have more time for more of you.

I want to remind you again, if you have not already done so, be sure and get your name on a card and leave it at the door so that you may get copies of these proceedings at your home as soon as they are published. That will be done within the next several months. It takes quite a bit of time. Don't become uneasy, if they have your name they will send you a copy.

Also I want to say, before we think of adjourning, that each of you should constitute himself a committee of one during the next year to do what you can for getting more foundrymen at our sessions, one year from now. I know that you have benefited by coming, and we want to greet our new Chairman next year with a great big crowd of foundrymen.

In the meantime, those of you who know that you are coming to the Congress, if you are not coming yourself, find someone who is and bring up questions such as have arisen this morning, and ask someone to present those questions, and those problems in order that they may be discussed, and if you do, you get more help out of that than anything else.

Now is there anything further?

I see Dr. Oetz is present. Doctor, have you anything to offer this morning?

Dr. Oetz of the Department of Safety and Hygiene.  
Dr. W. E. Oetz (Medical Director): Mr. Chairman, there are one or two points that I would like to emphasize as the result of having heard a couple of papers this morning.

One is that we have to be careful about the diseases, sickness, or developing among the foundrymen. A number of times we have claims filed with the Industrial Commission in which some man has become ill in the foundry and a diagnosis is not made.

Now, Dr. McCord has told you what diseases are liable to come about. It might be lead poisoning, it might be zinc poisoning, it might be arsenic poisoning, it might

hands of a physician who is not familiar with the diseases that are apt to occur in the foundry, and as a result the man's condition is called something else and may be after quite a while it is thought that he might have some occupational disease, probably too late to file a claim, or maybe a great deal of damage has been done to the man himself because his condition has not been properly recognized.

So I want to emphasize upon you the necessity of having the sick man carefully examined, and if possible have them examined with the idea that the illness might be due to some occupational hazard.

Another thing that has been impressed upon my mind is the value of fresh air in our foundries. I have heard quite a good deal said this morning about the presence of dust in the air, about the percentage of lead in the air, or the percentage of zinc. Now if we can not eliminate the lead and the dust and the zinc in the air at the points of creation, we can at least give—dilute it by bringing in more fresh air. So it looks to me like a ventilating system for removing the dust and dirt and bringing in fresh air is an answer to a great deal of the problems that have been presented this morning in the elimination of hazards.

I know that they cannot all be eliminated, but I think a lot of our foundries show the need of better ventilating systems and I think that that will be quite a help in eliminating some of the hazards which we know exist in our foundries today.

In my travels about the state I have found out that there are a number of foundry rooms that are very deficient in ventilation. The ceilings are low; there is no fan, no exhaust system, no air ducts, and there is sometimes not even a monitor in the roof, or a hole in a window through which the fresh air can enter and the fumes and smoke be driven out.

I think there is room for some of our foundries to make quite a bit of improvement by admitting more fresh air.

I believe that is all.

CHAIRMAN REALL: Thank you, Dr. Obetz.

Is there anything further?

We trust that this discussion is going to be of benefit to you and we know in meeting with the employers over the state that the employer as a class, as a whole, is very anxious to do his part in preventing accidents and diseases, as well as taking care of them after they happen, but they do not have as much contact with that as you gentlemen in the shop, so bear it in mind and bring it up at your safety meetings and other meetings, if you do not have regular safety meetings at which you attend, bring it up at some of the other meetings where you discuss welfare or shop practices or production. None of you are overwhelmed with production now. I think the only people who are on the road selling anything now are the boys who sell red ink and plenty of that, so that you have plenty of time now to take care of those things, at least those in which the cost is not prohibitive.

Some day I hope to live long enough, and I am pretty old to talk that way, but I think I have a chance to live long enough to see the foundries have the water blast, or the hydraulic blast instead of sand blast. That is going to be one of the solutions. It does cost a lot of money, but some day we are going to have it. In the meantime we can do what we can by transferring the men, having them examined, to eliminate as far as possible the dust from the cleaning room and sand room,

Have you anything more, gentlemen?

Please remember we are going to have a new chairman next year and he is going to always make an improvement over the old and be here and firing your friends along, and see to it that he has the most generous support you can give him. If there is nothing further we will stand adjourned. I thank you.

## PUBLIC UTILITIES

### OFFICERS FOR 1932-1933

Chairman: H. L. Meade, Ohio Bell Telephone Co., Cleveland, Ohio.

Vice-Chairman: E. E. Grover, Columbus Railway, Power & Light Co., Columbus, Ohio.

The Public Utilities Section of the Fifth All Ohio Safety Congress was called to order at 9:30 o'clock, by Chairman Ray S. Metzger, Director of Claims and Safety, Toledo Edison Company, Toledo, Ohio.

CHAIRMAN METZGER: Will the meeting come to order, please? We are a little bit late in starting, but I have always thought that nine o'clock is too early; after a banquet especially, and after all of the little affairs that go along with the banquet. So we are starting about 9:30.

I wish the gentlemen in the rear of the room would come forward, because it is really hard for the speakers to speak to empty seats. I know from experience once before here, and speakers won't hurt you at all. In fact, they like to see the shining countenances.

In opening the Public Utilities Section of the Fifth All Ohio Safety Congress, I want to welcome the members who are attending. We are very pleased with the turnout. We would like to have more, and I believe there will be more coming in later on. But since the usual cry this time or at least this year has been on account of the times, we are grateful for those who are attending. We have a very good program and the speakers have gone to considerable effort to prepare the messages for you.

I would ask first that all of those in attendance who have not registered please not forget to do so at the desk. At the same time, I would ask that they fill out the registration cards that are being passed among you at the present time. We do want a complete record of everyone in attendance, and it will benefit you because you will receive the proceedings of the entire congress and especially of this meeting that you are attending.

It is customary for the congress to appoint a chairman for the sections for next year, and I would ask that several men serve on a committee to arrange for the appointment and election of a chairman of the Public Utilities Section. May I ask that Mr. Schnerer and Mr. Crain, and Mr. Alberty consult and report before the end of the session this morning the names of the men who have been selected to lead the section next year?

The Public Utilities Section consists principally of representatives of the electric light and power, the gas industry, the electric railway, the telephone, and other public utilities, such as water and ice, that are prominent here in Ohio.

Our representatives this morning are from the telephone company, the gas company, and the railroad. I might say, in explanation of the railroad, we had a request from the railroad industry to include them in our program this year. They sort of feel that they are public utilities. Naturally they are, but due to the fact that they do not come under the direction of the Industrial Commission in the larger sense that most of the other utilities do, they have never been included. We do not wish to exclude them, but we welcome them into the deliberations of our section, and we

and that is to make those laws workable and enforceable for the common good through the medium of injecting into our people proper respect for law.

I thank you, sir. (Applause.)

CHAIRMAN GRECOVY: Mr. Johnson, you certainly have favored us with your presence and your very instructive talk. We trust that you will be with us on many occasions in the future.

As the feathered warblers return to us each spring, we find the fair sex con-nected with the Department of Industrial Relations beginning to sing. One of them is here this morning to lend us her talents. We now will hear from Miss Butler.

## SOLO

"There's a Tear in Your Eye".....Miss Lucile Butler  
CHAIRMAN GRECOVY: Someone desires to ask Mr. Johnson as to whether he feels that the universal public licensing of drivers would be of value or not of value.

Mr. JOHNSON: Mr. Chairman, I would say unhesitatingly, if I understand the gentleman's question rightly, that the state licensing is proving a forward step in promoting safety, and I believe the records of the states in which licenses are re-quired show a much better situation than those which do not.

Mr. SMITH (Baltimore & Ohio Railroad): I knew that to be a fact, but I simply wanted the Chairman to ask Mr. Johnson why, if it was such a great factor, it was not brought out more prominently.

CHAIRMAN GRECOVY: I notice from our program that we now deal with one of the most elastic industries in our country. It has to do with the medical side of the subject. I am sure if this next speaker in his profession associates the science of medicine with the rubber industry, it may explain some of the expert medical opinion that we receive every once in awhile.

I notice here his subject is "Industrial Medicine." Sometimes we are led to believe that there are a few of the profession like a few of other professions, who are industrializing medicine. But it is one of the phases connected with the industrial compensation movements that is exceedingly interesting and of very great importance. We rely tremendously upon the medical profession.

And I sometimes wonder if we could just make them properly understand this keen sense of responsibility. I fear many times in industrial cases that the profession is inclined to deal with them but lightly. This is important, not only to the departments that must administer the fund, but it is important to every in-dividual that is injured.

Sometimes we are led to believe, that is, circumstances lead us to believe that when an industrial case appears, it is "just one more industrial case," and it is rushed down the line.

Those of you that have not taken cognizance of the treatment of industrial cases may be somewhat surprised to know the hundreds and thousands of cases where medical expense reaches or exceeds a thousand dollars per case. Now, how many of us at large in private cases could stand the price of such medical service? We have cases that have exceeded—the medical and hospital service—\$20,000.00. But, as I say, there are hundreds and thousands of them reaching a thousand dollars and in excess thereof. And this is a very important subject.

I do not know how the speaker is to deal with it, but he is associated with one of the largest industries in the state. No doubt he has a real message for us. And

are eagerly waiting for a message of guidance along the line of medical care of industrial cases.

We have with us Dr. Paul A. Davis, connected with the Goodyear Tire & Rubber Company, of Akron, Ohio. (Applause.)

## INDUSTRIAL MEDICINE AS A SPECIALTY

PAUL A. DAVIS, A. B., M. A., M. D.,

*Goodyear Tire & Rubber Company, Akron, Ohio.*

Mr. Chairman, Members of the Ohio State Safety Congress, and Members of the Industrial Commission:

Probably most of you have had a lot of contact with the medical men in our own industry, but in the end they are not a bad lot, and they attempt to help solve your problems for you. And the subject, "Industrial Medicine," is a specialty.

Ten or twelve years ago this subject would have been an easy assignment but today it is not an easy task for many factors have entered into industry that have made Industrial Hygiene and Health a definite department.

- 1st. Industry has placed the human mechanism on an efficiency basis of pro-duction.
- 2nd. Compensation Legislation compels industry to do certain things.
- 3rd. State and Federal legislation has compelled certain Safety procedures to be followed.
- 4th. Industry and Labor have realized that health is the greatest factor in the production of all things.

From all of these various factors it has evolved that the human unit must fit in as an efficient productive unit and that this human unit must have the same care as that given to a mechanical machine and in addition much special extra care because it is the intellect of all operations.

Mechanical devices, machines and materials are procured on specifications and tested as to their efficiency by the mechanical, engineering, chemical and research departments.

The human unit is also procured on specification and in return receives a wage. The human unit is selected as to the type of work he is to do, whether it be manual labor, supervision or mental work. This selection is allotted to the physician. After this human unit has been accepted he must be kept in a productive and efficient condition, this also is allocated to the physician. Should anything happen to this unit during his work he must be repaired and put back to normal with a minimum of lost time, this also is allocated to the physician. The conditions which prevail for a mechanical device are controlled by certain factors designated by the Engineer-ing department and so with the human unit the working factors must be controlled by the Medical Department. We may now designate the several functions of the Medical department as follows:

1. Examination as to physical qualifications and recommendations as to the type of work which is best for the physical and mental construction of the individual.
2. Supervision and control of working conditions.
3. Maintenance of a dispensary or hospital for the treatment and correction of conditions that affect the efficiency of the human unit.

4. Examination and advice bureau for all employees for conditions other than occupational.
5. Plant sanitation and education of employees.
6. Medical Research.
7. Supervision and maintenance of mutual benefit associations.

#### PHYSICAL EXAMINATIONS

This subject has had much discussion as to an efficiency measure both pro and con. It is still being argued as to what extent the strictness of the examination should be maintained.

Would you purchase and install a pump with a leaky valve? No, neither would you accept an individual with a leaky heart except under certain strict specifications. Would you accept a boiler if you knew it had one plate that was weak or had a slight bulge in it? Neither would you accept an individual with a hernia except under very strict specifications.

However certain physical defects do not reject for certain types of work, for example an employee of the legal department can do his work if he has a hernia and is otherwise physically O. K.

The thoroughness of examination depends on certain factors, such as type of work done, nature or scope to be covered by examination such as acceptance for group insurance and Relief associations, and the provisions of the State Compensation laws.

The conference board of Physicians in Industry has given three causes for rejection.

1. Menace to himself.
  2. Menace to fellow employees or others.
  3. Menace to property.
- I desire to add a fourth cause which in my experience has proven to be correct.

4. Reject those liabilities which may fall under the Compensation laws or involve later legal battles.

From the four reasons for rejection as listed above one can see that the initial employment examination must be thorough enough to determine these factors.

Selective placement often times reduces the percentage of rejections and experience has shown that most individuals have a certain productive factor if given the proper environment.

Many industrial concerns become lax in their examinations during prosperous times and when the labor turnover is very great.

My opinion is that examinations should be very thorough and applicants classified according to the Conference Board of the Physicians in Industry as follows:

- Class I. Physically fit for any work.
  - Class II. Physically undeveloped or with some slight anatomical defect, otherwise fit for any work.
  - Class III. Fit only for certain employment when approved and supervised by the medical department.
  - Class IV. Unfit for any employment.
- During the last four years a certain industry has examined 33,790 men for

This conforms with industrial experience statistics which varies from 2 to 4 per cent as being unfit for any industrial work. A good physical and healthy individual is efficient, intelligent, happy and is less of an industrial hazard, while one in poor health with a physical or mental defect, is not efficient, is susceptible to many industrial hazards and the competitive pace of today shortens his life. After the examination and acceptance there develops a problem which only one trained in industrial medicine can solve. Because an individual is in a normal physical condition it does not follow that he can do any and all kinds of work, for example,

1. A tall lanky individual with a disproportion of distances between shoulders and pelvis, and pelvis and feet, should not be put on a job where he has to do lifting from the level of his feet.
2. Light weight individuals should not be placed on heavy lifting jobs, especially where the weight to be lifted is three-fourths or more of their body weight. Lifting of objects is done by the muscles of the body and they function most efficiently if their factors are calculated as fulcrums and levers. If this is out of proportion strains result.
3. Light complexion and fair individuals should not be placed where there are irritating substances as a dermatitis develops.
4. Blond hair individuals are more susceptible than dark hair individuals.
5. Individuals with chronic bronchitis should not be placed where there are volatile irritating substances or where there is a dust.
6. Female workers should not be placed where there are lead, benzol, arsenic, aniline and various other compounds for they develop menstrual disturbances.
7. Persons with nose and throat conditions must not be placed in dusty or irritating vapor surroundings.
8. Individuals with flat feet should be placed where they do not have to stand or walk all day.
9. Individuals with focal infection in teeth, tonsils, sinuses and etc., should not be placed on any work where there is a chance for strains for a secondary myositis or arthritis develops and they become liabilities.

One of the greatest bugbears that the medical profession has is a condition which is diagnosed as hypertrophic arthritis. I think the Industrial Commission will bear me out on that. It is a condition which is a slowly developing process, with probably no symptoms at all, yet this individual who has had this for twenty or thirty years may be in your factory, and he may bend over or lift something, and he gets a pain in his back. The X-Ray shows that that man, if he is X-Rayed at that time, has spurs, enlarged growths, off of the spinal process or off of the body of the vertebrae. Yet you cannot disprove that that man did not hurt himself some way. And as a result he becomes a compensation case. We have hundreds of those cases over the State of Ohio drawing compensation simply because of what the man had, the predisposing condition of hypertrophic arthritis. He bends over, gets a pain in his back, and you are stuck with him. I don't know how you are going to get away from it. There is no legislation at this time which gives you a loophole to get out of paying a man with a long standing condition of that type. Yet he becomes an employee of yours. He may work two days and then he is a compensation case of yours the rest of your life.

10. Individuals with defective vision should not be placed on inspection jobs. Several years ago I made an investigation on near vision and found that in some cases as high as 30% material defect was due to poor vision.

but do not show anything at the examination should not be placed where there is a possibility of causing a recurrence.

12. Epileptics are a liability.
13. Individuals with dilated inguinal rings should not be placed on heavy lifting jobs as they are potential hernias.
14. Asthmatics or those individuals who have allergic reactions must not be placed in dusty places. These are only a few of the problems which the industrial medical men should solve. After the individual is accepted and correct placement is made it is the duty of the industrial physician to keep him in an efficient working condition. The factors which are vital for this are as follows:
  1. Education and Instruction.
  2. Correct illumination.
  3. Correct ventilation.
  4. Re-examinations.
  5. Correct sanitary conditions.
  6. Opportunities for relaxation and athletic indulgence.
  7. Efficient Medical service.
  8. Co-operation between labor and management.

Time will not permit a discussion of each of these factors but I assure you each one is of vital importance. Every employee should be instructed concerning his job and he should have it impressed on him as to industrial hazards and how to avoid them. In large organizations this should be conveyed to the worker by the supervisors who have been instructed by the medical department. For example, men working with benzol, carbon tetrachloride, lead, arsenic and numerous compounds should be instructed as to the hazards and how to avoid poisoning.

The industrial physician should be a chemist or have had sufficient chemical training to efficiently investigate the toxic hazards. He should have a working knowledge of mechanics and physics to co-operate with the Safety Engineers.

Illumination should be studied as to its effect on eye efficiency. My investigations have shown that visual acuity has in some cases been increased 25% by establishing artificial daylight.

Correct illumination has in many cases increased productive efficiency in a normal individual 18% over the previous sodium yellow light rays. Defective vision and illumination are responsible for a large percent of accidents. The Travelers Insurance Company report that 24% of 9,100 accidents were due to improper lighting.

Proper ventilation is a vital factor in all closed areas. The industrial physician should know what type of ventilation should be used in removing dust and fumes. For example he should know that to ventilate for heavy gases the ventilation should be placed at the lowest levels and be a suction ventilation. That the disposition of exhaust gases if they are toxic must be dispatched or absorbed. Poisonous dusts such as arsenic, lead, chromium, cyanides and many others must be removed and collected and disposed of according to law.

## RE-EXAMINATIONS

All executives, foremen, supervisors and key men should be given a thorough examination every year.

All employees working with toxic substances or in dust should be X-Rayed

All others should be examined as often as it seems advisable according to their work.

All restaurant employees should be examined every 90 days and blood tested yearly or oftener if it seems advisable.

Your state law says that anybody connected with the serving, dispensing or preparing of food should be free from infectious, contagious or venereal diseases. So in your factory, where you are feeding a lot of people, you must see that your people are free from any venereal or infectious diseases.

At these examinations the individual should be told of any defects and advised to have them corrected. If they are caused by his work the employer should correct them. If they are not caused by his work he is referred to his own physician.

## PLANT SANITATION

The industrial physician must know sanitary laws and he should inspect the plant and make recommendations for the correction of any unsanitary conditions which may cause spread of disease. He should also issue frequent bulletins as to prevention and care during various seasonal diseases.

## MEDICAL SERVICE

This can be of two kinds and depends on the size of the industry.

1. Arrangements can be made with local hospitals and physicians on call to handle all cases where the personnel is small. This method is not efficient.
2. Maintenance of an industrial hospital and medical service. There are several important factors which must be considered and which must be decided upon before this service can be conducted efficiently.
  - a. The medical service must be efficient. A dental service should be maintained.
  - b. The policy of the management as to where the medical service should stop, by this I mean should it extend to the employee's family.
  - c. Ethical cooperation with the local medical profession and hospitals.
  - d. Equipment must be adequate to handle all kinds of cases.
  - e. Cooperation between the medical department and all other departments for the benefit of the individual's health.
  - f. The medical department should consist of the following services:
    1. Surgical service
    2. Medical service
    3. Physiotherapy service
    4. X-ray service
    5. Dental service
    6. Laboratory service

At our meeting a year ago the American College of Surgeons who dictate as to how a hospital ranks over the country, whether it is a recognized hospital, whether the staff of the hospital, the men who are connected with it, are efficient men, are reliable men, the American College of Surgeons formed what is known as the Association of Industrial Hospitals under the American College of Surgeons. In a few years all industries will have to have their hospitals either recognized by the American College of Surgeons or the rating of the hospital will be so low that before a month in local opinion the standing of your hospital will be questioned. That

The primary function of the medical department of course, is to treat and correct all conditions resulting from occupation and these may fall under two headings.

#### A Industrial Injuries B Industrial Diseases

### INDUSTRIAL INJURIES

The kind of and average industrial accident is best illustrated by the following data, which represents 38,854 cases treated.

And I refer you to the first chart on the standard. It is pretty hard sometimes to get the percentage of cases over a period of years, in which you get different numbers, and to work out the percentage on these cases. This represents a period of nine years in a hospital which treats several thousands of cases a year.

If you will notice, there were fractures treated, 6,445, and then strained backs, 3,621. I should say with 90 per cent. of those strained backs physical findings and X-ray findings show, so far as we can determine, that they are not strained backs, but they are simply an exostosis of an arthritis which the individual has had for years and years and years. And yet your state holds that the exacerbation of any previous condition is compensable, and you are stuck, and you have to pay compensation for that 90 per cent. of those cases. What happens if you do not? This fellow goes out and gets an attorney and sues you. And then you are stuck. You may as well pay it anyhow.

Then strains, all kinds of strains, 615. Infections, 1951. Then you come on down until you get to eye cases, 2,040. The largest per cent. of these are due to the fact that the individual does not listen to or follow out his instructions. About 80 per cent. of these eye cases are due to the fact that the man should have worn goggles but did not. He would take off the goggles and would not wear them. I do not know what you were going to do about it. He got away with it once in your factory. He is a liability. You must do something. If you discharge the man, he will immediately bring suit against you. So the best thing to do is to take care of him.

This is the largest factor, 15,037 cases of contusions, lacerations and abrasions, which does not mean that those were lost time cases at all. This is simply a breakdown of 38,854 cases over a period of nine years, which is an average, which you will find in your own industry will correspond very closely to that, unless you have some particular industry in which you are dealing with toxic substances, in which case your toxic substances will run high—poison from these cases will run high.

### BREAK DOWN OF INDUSTRIAL ACCIDENTS

|                      |     |     |     |     |     |      |     |     |       |
|----------------------|-----|-----|-----|-----|-----|------|-----|-----|-------|
| Fractures treated    | 373 | 672 | 722 | 796 | 979 | 1090 | 984 | 829 | 6,445 |
| Strained backs       | 300 | 327 | 314 | 591 | 475 | 601  | 654 | 352 | 3,621 |
| Strains              | 660 | 647 | 585 | 673 | 697 | 862  | 950 | 342 | 5,116 |
| Tenosynovitis        | 131 | 253 | 121 | 39  | 30  | 24   | 20  | 17  | 615   |
| Infections           | 152 | 282 | 140 | 280 | 249 | 310  | 386 | 142 | 1,911 |
| Dislocations         | 20  | 14  | 4   | 15  | 12  | 21   | 22  | 9   | 147   |
| Traumatic amputation | 24  | 91  | 111 | 103 | 113 | 139  | 20  | 33  | 634   |
| Hernias              | 53  | 129 | 77  | 96  | 123 | 132  | 153 | 218 | 981   |
| Bursitis             | 17  | 47  | 21  | 10  | 11  | 13   | 4   | 6   | 129   |
| Occupational         |     |     |     |     |     |      |     |     |       |

|                                       |      |      |      |      |      |      |      |      |        |
|---------------------------------------|------|------|------|------|------|------|------|------|--------|
| Arthritis                             | 11   | 33   | 16   | 8    | 6    | 12   | 6    | 20   | 112    |
| Peristitis                            | 8    | 6    | 2    | 2    | 2    | 3    | 4    | 2    | 20     |
| Varicose                              | 0    | 11   | 3    | 0    | 9    | 3    | 3    | 2    | 31     |
| Hydrocele                             | 0    | 3    | 0    | 1    | 4    | 2    | 4    | 1    | 15     |
| Eye cases                             | 227  | 200  | 209  | 300  | 268  | 319  | 277  | 282  | 2,040  |
| Puncture wounds                       | 50   | 80   | 70   | 80   | 81   | 75   | 42   | 22   | 500    |
| Neuritis                              | 2    | 2    | 3    | 1    | 1    | 1    | 0    | 1    | 11     |
| Myositis                              | 4    | 6    | 9    | 13   | 12   | 2    | 2    | 1    | 49     |
| Contusions, lacerations and abrasions | 1290 | 1300 | 1602 | 2279 | 2407 | 2330 | 2338 | 1881 | 15,037 |
| Burns                                 | 105  | 100  | 109  | 177  | 132  | 244  | 115  | 102  | 1,084  |
| Synovitis                             | 10   | 11   | 21   | 1    | 13   | 12   | 7    | 5    | 80     |
| Total                                 |      |      |      |      |      |      |      |      | 38,854 |

In one industrial hospital during the last eight years there have been treated 1,863,020 cases and they are classified as follows:

|                                |         |
|--------------------------------|---------|
| New injury cases (lost time)   | 22,968  |
| New sick cases (lost time)     | 24,834  |
| Injured cases (no lost time)   | 325,973 |
| Sick cases (no lost time)      | 565,532 |
| Patient days in hospital       | 14,998  |
| Examinations and dental visits | 911,920 |

The personnel and hospital should be capable of giving service to all kinds of injuries from a small cut to a major operation.

Now I have attempted to break down the number of hospital days or the patient days in the hospital for eight years. 7,393 patient days. That is what we call a patient day, one day, one patient, and the same patient two days is another patient day from the time the individual enters.

You will find out that fractures is, of course, the largest number of total patient days. After treating several thousand fractures, we have found out that the average time that an individual, the average—not the time for a fractured leg or anything like that—that the average of all fractures was 20.9 days. That takes in all fractures that had to be hospitalized.

Hernias. All hernias are operated on. That is if a man can show that he has received any injury which may result in a hernia, there is no question. We operate on him. We are not compelled to operate on him. We can give him a truss and send him about his way. But we find that that man's efficiency has been decreased so that once or twice a week he will be off, because his truss hurts him. We give the man the benefit of the doubt. If he states he has a hernia, we get hold of the foreman or superintendent, and if he has a history of injury, we operate on him. We don't argue with him. And we find today, after doing 180 cases during the last few years, the average stay in the hospital is 14 days.

For burns the average is twelve days. We find out that sprains will average more than do hernias by a day. So the average patient days on which industry must figure as being a cross to them over a period of eight years is 14.15 days, which is the average of all of those total cases which had to be confined.

The patient days in the hospital are as follows:

## PATIENT DAYS IN HOSPITAL

|                                      | Total patient<br>days | No. of cases | Average patient<br>days |
|--------------------------------------|-----------------------|--------------|-------------------------|
| Fractures .....                      | 3014                  | 150          | 20.9                    |
| Hernias .....                        | 2820                  | 180          | 14.0                    |
| Burns .....                          | 673                   | 56           | 12.0                    |
| Misc. Operations .....               | 1335                  | 108          | 12.3                    |
| Cont. and Lac. ....                  | 1075                  | 88           | 12.2                    |
| Infections .....                     | 1190                  | 74           | 16.0                    |
| Sprains .....                        | 407                   | 27           | 15.0                    |
| Lead poisoning .....                 | 31                    | 3            | 10.3                    |
| Aniline Poisoning .....              | 2                     | 1            | 2.0                     |
| Total patient days for 8 years ..... |                       |              | 11,393                  |
| Total ward cases for 8 years .....   |                       |              | 804                     |
| Average patient days .....           |                       |              | 14.15                   |

The chief thing that causes lost time is fractures. One industrial hospital reports that during the past sixteen years there has been 5503 fractures with an average lost time of 30 days.

Hernias come next in lost time, this includes the post operative convalescence of 6 to 8 weeks.

I am convinced that traumatic hernias are a rare thing for in practically all cases there is a fetal sack.

What are some of the chief causes of industrial accidents? After much experience and collecting data the following causes are found to be the predominating ones.

After several thousand accidents and so on we have attempted to break this down in percentage so that you get some idea as to what are the principal things which may cause your accidents which you should correct.

For instance falling material, 18.3 per cent. is the cause of your accidents.

Then handling material comes next with 13.53 per cent. of all your accidents due to handling material.

Hand tools, 10.55 per cent.

Lifting 7.67 per cent. Of course, in there comes your strains and your hernias.

Falls, falling down over objects and so on, and then trucks, compounds, toxic substances.

The toxic substances, if properly guarded and taken care of, are a very small percentage.

Illumination, four per cent, you will notice.

Physical disabilities, 3.51 per cent.

Eyes, 3.75; vision, 3 1/2 per cent.

Burns, 2.9 per cent.

Materials on floors, bumps against material and so on, comes here.

That is a breakdown, as near as possibly can be figured, over a number of several thousand accidents.

The average cost to the industry including compensation for patients in their own hospitals is \$5.17 a day. If they are on compensation and receiving treatment

## INDUSTRIAL DISEASES

This is a special branch of medicine and includes all those conditions which are mentioned by the Industrial Commission and a good many more. The industrial physician must be a toxicologist, physiologist, chemist and research man. Suppose the development management of your concern goes to your medical department and says, "We have a new process of making a certain thing and this entails the usage of certain chemicals, but before we use it we must know if this is a hazard for the workmen." He has come to you because you are supposed to know or to find out and give him your opinion. The medical department will give him an opinion if it is efficient. You may not be able to give an opinion at once if it is a chemical that has not been used in industry or is a new compound, but you should start to work at once on the problem and have an answer in due time. How are you to do this? By research. The first thing to do is to find the chemical structure of the compound. A well versed industrial physician knows chemistry and has had enough experience to tell that certain chemical grouping have certain toxic properties. The next step is to experiment with animals and determine that toxicity. Several individuals should be patch tested to see if a dermatitis develops.

You should find out what changes the compound undergoes during the productive process and if it is broken down into some toxic substances. The particular substances that you are experimenting with may never have been thought of by the Industrial Commission as an industrial hazard, but industry is liable for any detrimental results. You can see that industrial medicine is a special branch of medicine and much work must be done constantly to keep abreast with industry. Much work has been done on the common chemicals and the incidence of poisoning has been reduced to almost a negligible factor, as an example I will cite you some data on one poison that has had more work done on it than almost any other, that is, lead and its compounds.

For several years all investigators have attempted to describe the various conditions associated with lead as lead absorption and not lead poison, because individuals develop a condition where the output of lead is equal to the intake and very few symptoms develop. The chief diagnostic factors for lead absorption are:

1. Exposure to lead compounds
2. Symptoms of indigestion and abdominal distress
3. Blood examinations
4. Urinalysis

We should not have any more lead poisoning if certain preventive measures are followed, and treatment is instituted at the earliest symptoms.

To treat a case of lead poison one should use intravenous calcium salts and drive the soluble lead out of the circulative fluids into an insoluble form and then produce a low grade acidosis over a long period of time with an efficient elimination.

This represents four cases, four individuals working in lead over a period of four years. It shows exactly how your medical department should take care of all of our toxic cases. This happens to be one of our toxic substances, which is lead. This represents the man's blood count. This man started to work in March, had a normal blood along there, dropped a little bit, went up again, dropped down, clear on over to there.

The way we do that in this one particular poison is this. Lead, like all metallic poison, is absorbable, either through the digestive system or slightly through the skin. Lead in particular affects the blood system. By that we are able to have a very good check. We are able to make tests of these men simply by taking a drop of blood out of their ear

And we sometimes do. It should be done every thirty days. They are not doing it. I went over this country four years ago and visited practically all of the lead plants in the country. And I should say 50 per cent. of the men working around lead bodies and lead processes are not examined. They were not recognizing it. They said, "We are carrying it with the insurance company. Let them worry."

You cannot do that in the State of Ohio. You must take care of these things. This man started to work and worked there March, April, May, June and July. He started to show a little absorption. As long as his absorption was something like that, it was not bad. We examine his blood and we find one particular little cell, which we call the basophil, which is one of the degenerative cells of the blood, which becomes apparent when lead poisoning occurs. We count those cells. If a man has one to 150, you better think about removing him from that lead, otherwise he is going to develop acute lead poisoning. So we examine him again in two weeks. We follow them right through.

We find over here that he develops a few symptoms, pain in his stomach. We took him off of the job, gave him treatment. His blood goes back to normal. Then he varies like that for awhile. As long as the blood count gets only that low and he has no symptoms, we let him work.

This man here worked a short time and then his blood came down, got down to one in 100 cells. He was taken off of the job, transferred awhile, came down again, stayed here for a long time, was taken off the job, went back up to normal, and was put back on the job again and he stays there.

Here is another case that went along for a good many months without showing anything at all. He had a little trouble with his stomach, which probably was psychic and not from lead, because some of them who work in lead think they are getting it right away. And he was taken off of the job here, and his blood cleared up.

This man who had come from another department started here and was transferred out of the department, started back in here, went along here. He has little trouble, was taken off of the job, and came back all right.

For several years all investigators have attempted to describe various conditions associated with the lead as a lead absorption and not lead poisoning. That is one thing the medical men have been trying to get across to the public and to the other individuals, that lead poisoning is not the term to use. It should be called lead absorption, because there are various stages and it is determined entirely by your blood condition.

And the reason for that is because individuals develop a certain condition where the output of lead is equal to the intake of lead. Equilibrium is reached. If a man takes in five milligrams of lead and excretes four, and the next day he takes in three and excretes four, he has restored a balance.

There is no condition that shows poisoning. It is absorption. We have tried to get that terminology before the public and before the medical profession as a whole, and call it lead absorption and not lead poisoning.

If that is followed and your medical men in your industry follow your blood charts, you should not have any lead poisoning. It is uncalled for, because a lead poisoning case can be relieved of its symptoms in 20 minutes if you will give intravenous calcium therapy. You cannot clear it all up, but by doing so, all his pains will be dissipated as suddenly as giving him a shot of morphine. Then over a period of weeks they can be cleaned up without acute symptoms developing. So I say lead poisoning simply should not be.

Basophilic degeneration of the red cells in conjunction with lead output of the urine should be the controlling factor in lead absorption.

The Industrial Commission has listed 21 conditions which are compensable and the industrial physician should be well informed on all of these. These are not the only conditions which are compensable. There are several hundred chemical compounds used in industry and a large percent of them are toxic or produce a dermatitis. For example carbon tetrachloride is being used considerably today and while it is not so toxic it produces very distressing nausea and vomiting. Urotropin was used to a great extent a few years ago in the rubber industry and while its toxicity is very small it produces in many individuals, a serious dermatitis. The industrial physician must keep up with the industrial chemical knowledge and familiarize himself with the chemistry of the various compounds used not only in his particular industry but those used in other industries.

One condition with which the medical department must be familiar is a dermatitis. This condition may appear in several different forms.

1. Absence of any visible manifestations but the skin itches and burns constantly.
2. Erythematous condition with burning and itching.
3. Vesicular with serum excretion.
4. Papules and pustules.
5. Roughened skin with plugged sweat glands.
6. Dry, scaly, eczematous skin.
7. Discoloration of the skin by dyes.

The cause of these conditions are as follows:

1. Excess heat or cold.
2. Dust.
3. Chemical compounds.
4. Friction and mechanical irritation.
5. Idiosyncrasies to certain non-toxic substances.
6. Inhalation of certain chemicals.
7. Exposure of skin to certain light rays.
8. Absorption of certain compounds through the alimentary system.

Most of these conditions can be eliminated and in the case of chemical compounds and other substances, a skin test or patch test will prove valuable.

Industrial dermatitis are compensable and it behooves the medical department to make a correct diagnosis and co-operate with the safety department for the correction of the hazard. Experience has shown that dark skinned individuals are less susceptible than blond skinned ones. Individuals with hyperthyroidism are more susceptible than others. Individuals with an acidosis are more susceptible than those with a normal Ph content.

Suppose an individual is injured or contracts an industrial toxic condition and is required to lose time, what provisions are made for his maintenance while not at work.

1. He is given medical or surgical care at no cost to himself but at a cost to industry varying from small establishments with less than 250 employees of \$9.95 per year per employee to \$5.10 for larger organizations, and if hospitalization is necessary \$3.01 per day and with compensation \$5.17 per day.
2. State compensation.
3. Benefit associations maintained by the industry.

The disabled worker is well provided for if he has carried his insurance wisely, oftentimes he makes more by being injured than while working.  
Some data from an industrial benefit organization is very interesting.

## ANNUAL EXPERIENCE

|                                        | 1926         | 1927         | 1928         | 1929         | 1930         |
|----------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Average Members....                    | 16,463       | 17,643       | 18,897       | 19,932       | 17,838       |
| Number of Sick Claims                  | 2,542        | 2,187        | 2,149        | 2,176        | 1,468        |
| Amount Sick Claims..                   | \$78,098.25  | \$62,039.75  | \$73,661.77  | \$88,019.33  | \$76,810.00  |
| Number Injury Claims                   | 1,616        | 1,705        | 1,233        | 878          | 726          |
| Amount Injury Claims                   | \$59,892.50  | \$49,351.50  | \$59,873.25  | \$44,920.00  | \$46,431.00  |
| Number of Deaths....                   | 68           | 75           | 74           | 80           | 51           |
| Amount of                              |              |              |              |              |              |
| Death Claims .....                     | \$114,000.00 | \$124,000.00 | \$140,500.00 | \$140,500.00 | \$105,000.00 |
| Number of Total Disability Claims..... | 15           | 19           | 19           | 26           | 24           |
| Amount of Total Disability Claims..... | \$30,500.00  | \$31,500.00  | \$37,500.00  | \$54,000.00  | \$45,000.00  |

## DISBURSEMENTS SINCE ORGANIZATION

| Year             | Members | Disability Benefits | Death Benefits | Life Insurance | Total Disbursements | Per Member |
|------------------|---------|---------------------|----------------|----------------|---------------------|------------|
| 1909             | 186     | \$ 110.00           | \$ 285.00      |                | \$ 395.00           | \$ 2.12    |
| 1910             | 429     | 698.50              | 1,260.00       |                | 1,958.50            | 4.56       |
| 1911             | 714     | 1,804.00            | 5,881.00       |                | 7,685.00            | 10.76      |
| 1912             | 1,187   | 2,395.00            | 8,983.00       |                | 11,378.00           | 9.58       |
| 1913             | 915     | 1,785.50            | 3,993.00       |                | 5,778.50            | 6.31       |
| 1914             | 921     | 1,825.00            | 2,825.00       |                | 4,650.00            | 5.05       |
| 1915             | 807     | 2,175.00            | 7,612.00       |                | 9,787.00            | 12.12      |
| *1916            | 3,645   | 8,206.00            | 736.00         |                | 8,942.00            | 2.45       |
| 1917             | 8,476   | 26,525.00           |                | 39,000.00      | 65,525.00           | 7.73       |
| 1918             | 6,207   | 22,612.35           |                | 49,500.00      | 72,112.35           | 11.62      |
| 1919             | 10,197  | 26,796.75           |                | 47,000.00      | 73,796.75           | 7.24       |
| 1920             | 7,698   | 84,385.50           |                | 90,500.00      | 174,885.50          | 22.70      |
| 1921             | 8,520   | 51,351.00           |                | 63,000.00      | 114,351.00          | 13.30      |
| 1922             | 10,534  | 73,318.00           |                | 54,000.00      | 127,318.00          | 12.18      |
| 1923             | 11,350  | 90,006.50           |                | 63,000.00      | 153,006.50          | 13.50      |
| **1924           | 10,735  | 82,639.00           |                | 43,000.00      | 125,639.00          | 11.70      |
| 1925             | 14,161  | 128,474.75          |                | 99,500.00      | 227,974.75          | 16.10      |
| 1926             | 16,463  | 137,990.75          |                | 144,500.00     | 282,490.75          | 17.10      |
| **1927           | 17,643  | 111,991.25          |                | 155,500.00     | 267,491.25          | 15.10      |
| 1928             | 18,897  | 127,535.02          |                | 179,000.00     | 306,535.02          | 16.20      |
| 1929             | 19,932  | 133,539.33          |                | 184,500.00     | 318,039.33          | 16.40      |
| 1930             | 17,838  | 122,241.00          |                | 180,000.00     | 302,241.00          | 16.90      |
| Grand Total..... |         | \$1,238,375.20      | \$22,632.00    | \$1,375,000.00 | \$2,636,007.20      | \$14.40    |

\*Overlap due to deaths occurring prior to granting of life insurance as of December 31, 1915.

\*\*Amendment July 21, 1924, provided \$8.00 for first week of disability.

\*\*\*Amendment Jan. 10, 1927, provided for a waiting period of one week in event

In most of the years since the Relief Association was organized, more money has been received by the membership per member (including insurance) than dues paid into the Association per member.

A mutual protective association such as this is given an initial fund by the corporation with which to start its business \$150,000.00, \$200,000.00, \$300,000.00, a fund to start on. And then they attempt to maintain a normal relation between expense and income by charging the individual so much per year, nine dollars, ten dollars, twelve dollars per year per member, for the maintenance of this outgo, due to various conditions. However, that does not always work out. Sometimes they run behind and they have to have more money donated from industry to make the organization safe.

These figures practically tell the story except the disbursements seem high, but this is much less because the company furnishes certain insurance free of charge because of a man's service up to \$2,500. Industrial insurance organizations after several years of operation experience the same change as all life insurance companies and that is a gradual increase of permanent total disabilities. The medical department must supervise and be conversant on insurance matters especially on industrial accidents and disease disabilities.

The industrial physician should know whether it is better to remove an injured hand or try to repair it. He must determine the per cent of disability that will result in either case and he must know what the compensation and insurance regulations are in regard to this disability.

From this brief general dissertation it has been my aim to impress on you the value of an efficient and well organized medical department, not only the value in dollars saved for your organization but for the good will and help you give to your personnel.

The number of days lost in one month in 1922 as reported by the Industrial Commission of Ohio was 649,577 and was caused by 10,736 accidents. If the average worker receives \$5.00 a day this amounts to a loss in money to the wage earner of \$3,947,865 in one month.

The cost to industry is also stupendous. If these days lost were not hospital days the cost to industry would be \$2,680 per day plus about .50 for daily treatment which would amount to \$2,065,654.86 and if they were all hospital days it would amount to the sum of \$3,867,362 in a month. These enormous amounts must be reduced and it is up to the Medical Department and Safety First Department to do it. That means that industry has originally to start this benefit association, and then it must be maintained as near as possible at the lowest cost possible by the industrial workers themselves. If it falls below that, industry, if they are doing the right thing, must reimburse the fund to bring it up so that it does not show a default.

Now, I would like to refer you to this next chart. This is the number of days lost by employees from accidents in 1927, 1928, 1929, 1930 and 1931. After a very strenuous accident campaign, prevention of accidents and so on, the number of accidents was reduced from 2,654 in 1927, to 425 in 1931. But the number of days lost by those particular accidents has been 39,040 as against 34,554. The severity of the accidents has not decreased. The number has decreased.

There may be something to industrial fatigue. I am inclined to believe that the human organism can do a certain amount of work. Then he develops fatigue. He is more liable to accidents, and his accidents are more serious than otherwise.

This is only statistics, but statistics is the only thing we have to work with. You have decreased your number of accidents to this but your number of days lost has

And as I say, the reason for that is not because of more accidents, but because the accidents have become more serious, and the medical profession is leaning more and more at the present time to the fact that there is such a thing as industrial fatigue.

I do not believe it is the thing to do for a man to work a double shift consistently two or three days a week. I don't believe it is the thing for a man to work a shift at one place and go out and do a day's work at his farm, or go out and do a day's work trucking on the side, in order to make ends meet. I think what we will have to do is to increase the man's wages, pay him more for his time when we really use him, and decrease the seriousness of your accidents.

Such things, of course, fall under this condition which we call industrial fatigue, which is just in the beginning. We are going to hear more about industrial fatigue. You are all going to hear it. Industrial fatigue is the thing which we are going to have to listen to for quite a long time yet, especially in times of depression. In conclusion may I say that I have attempted to stay away from the technical side of this subject and present to you the following facts for your thought and consideration.

1. The value of physical examination and placement of individuals.
2. The place in industry of the medical department.
3. The costs involved in treating industrial cases.
4. The research that a medical man must do in order to be a leader.
5. Co-operation with the safety department to reduce accidents.
6. The supervision and maintenance of benefit organizations.
7. The value and economy of maintaining a hospital for the treatment of industrial cases.
8. The last but not least important is the advisory capacity of the medical man on the question of health, sanitation, exercises, prevention of fatigue, industrial accidents and toxicosis.

Co-operation with all the departments is for the benefit of the individual and happy and healthy workers produce industrial efficiency.

The enormous lost time and its value in money points a way for greater and more intense work both by the medical department and its associated departments. Now is the time for all of you to take an invoice of various operations and personnel, confer with your medical department on all matters relative to it, and with your safety first department on all matters relative to it and you will show a profit not only to your organization but to your personnel.

CHAIRMAN GREGORY: Ladies and gentlemen, do not rush away now. We want to conclude this program. We are indebted to the doctor for the painstaking effort that he has put forth to be here, the preparation of his address, the illustrations that he has presented here, which are of material value to industry and workmen of this state. Doctor, I sincerely hope that we may have an opportunity to call upon you some time to help us out in our troubles.

Dr. DAVIS: I will be glad to help if I can.

CHAIRMAN GREGORY: As we are coming to a close I think it is altogether fitting and proper that the Commission should recognize the efforts of Mr. Kearns and his staff in carrying on this conference. We owe a great debt of gratitude to all these distinguished speakers who have come here and given us the benefit of their talents and experience.

This applies to all classes of records, but is of peculiar significance to the Department of Industrial Relations here in Ohio, because it is from these records that the merits of all claims are determined, and we gather our statistics for future guidance as to accidents, injuries and disability.

We now will hear from Mr. S. H. Ingberg, who is Chief of the Fire Resistance Section of the Bureau of Standards, of Washington, D. C. (Applause.)

#### FIRE PROTECTION OF VALUABLE RECORDS\*

S. H. INGBERG,

Chief, Fire Resistance Section U. S. Bureau of Standards  
Washington, D. C.

Mr. Chairman and Ladies and Gentlemen of the All Ohio Safety Congress:

The protection of records is one phase of fire protection and fire prevention, and I am tempted to digress a little from the specific subject to indicate the difficulties that may be more or less basic in all work pertaining to safety and fire prevention. Our fire loss statistics indicate a fire loss, property loss, for unprotected property generally of about two-tenths of one per cent. per year, which, with good protection and other conditions, can be greatly reduced, perhaps to one-tenth of that percentage.

The two-tenths per cent. loss is on its face not a large ratio. If we interpret it in terms of the individual's experience with fire, it means that each one of us will come in serious contact with fire as a destroying agent perhaps not more than once in a lifetime. And it is because of this infrequency that it is so difficult to impress on the great majority of us the importance of safety and fire prevention.

I am not certain that this audience is in that class, being as you are in daily contact with incidents that are the result of the acts of perhaps thousands of individuals. But your problem is to bring home to the individual the community experience, which, as far as the one individual is concerned, may affect him only once in his life. And it is a matter of approaching the problem from as many standpoints as possible to get the individual's reactions in as many ways as possible in order that the teaching may come home.

I feel in fire prevention we have not progressed quite as far as in some divisions of industrial safety, and we are learning from the excellent work that is being done in these fields to make our work in fire prevention and protection more effective.

I will read a rather brief paper—are these papers published?

Mr. KEARNS: Yes.

Mr. INGBERG: I will read only a portion of the paper. I aim to present in rather sketchy outline the subject.

The subject presents at first sight some of the dry uninteresting aspects of a record storage room. The vital value of important records is often not appreciated until loss such as by fire occurs. Other values of more apparent intrinsic worth may receive more thought and care in regard to methods of handling and safe disposition. An appeal for greater appreciation of the hazards to records may find its response than one relating to conservation of life and limb, and tangible, readily evaluable values. Yet on the fact of preservation or loss in a destructive fire may depend the decision as to whether or not the establishment will be rebuilt and its business resumed. The multitude of human interests hanging on this circumstance