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52
TRANSACTIONS
29th
NATIONAL SAFETY CONGRESS



**GENERAL AND INDUSTRIAL
SESSIONS**

**CHICAGO
OCTOBER 7-11, 1940**

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Foreword

THE Transactions of the 29th National Safety Council, October 7-11, 1940, are published in two volumes. Volume I contains the General Sessions and the meetings of the various Industrial Sections of the Council. Volume II contains the Street and Highway Traffic, the Commercial Vehicle, the Transit, the Child Education and the Home Safety Sessions. Volume I is distributed automatically to all industrial members of the Council. Volume II is sent to members who are believed to be interested chiefly in the sessions it contains. However, other members of the Council may obtain Volume II upon request.

Many Council members have found it advantageous to distribute copies of the Transactions Volumes to the individual executives, foremen and supervisors of their organizations, who make use of the practical safety information the volumes contain to organize accident prevention programs. The volumes contain a vast amount of standard reference material. Extra copies of the Transactions may be obtained as follows: Volume I, one to 10 copies at \$2 each; 11 or more copies \$1.75 each. Extra copies of Volume II may be had at 75 cents each.

THE Transactions are a condensed record of the proceedings of the Congress. The papers and addresses and many of the discussions have been edited to delete extraneous matter, abbreviate the less important portions, and emphasize those parts of particular usefulness in promoting effective safety organization and other accident prevention measures. The volumes are, therefore, a somewhat abridged version, compact, practical, and of particular value to the student, the supervisor and the executive in achieving more thorough accident prevention success. The original manuscripts are available for additional reference, if desired, in the files of the National Safety Council.

THE National Safety Council, at its Congresses, seeks to eliminate from discussion matters which are not pertinent to the aims of the Congress or which may be contrary to the Council's policies. However, it cannot accept responsibility for all the views expressed either in the papers presented or in the discussions based upon these papers.

NATIONAL SAFETY COUNCIL, Inc.
20 North Wacker Drive
Chicago, Illinois

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OFFICERS AND DIRECTORS, Continued

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7. Legislation for Safety. Avoidance of accidents requires the adoption and strict enforcement of sound legislation—legislation on traffic, on industrial matters, on public transportation, on home construction and maintenance, and on many items of personal safety.

4. Engineering Improvements. Many accidents occur because equipment is faulty. The branch areas is encouraged that some-

[illegible]

DISCLOSURE

I feel that the credit union is almost an integral part of the military program. This is because credit unions are the only financial institutions that serve the needs of the military community. If you have a man working in your town on a fairly low rate job, he is not earning a great deal of money and has a number of family responsibilities. His doctor says, "John, you are going to have to have your tonsils taken out." The doctor's bill for that is going to be \$25, \$30 or possibly \$40. He is going to have to go to the hospital and he is going to have to have a hospital bill or pay there. There is a very small fund.

[illegible]

WEDNESDAY MORNING SESSION:

October 9, 1940

Panel Discussion

Dr. Paul Hyman, Superintendent of Industrial Hygiene Unit of Wisconsin State Board of Health at Madison, from being present.

Spray Painting

In the old days of breath as dip or low painting, still today most, without any great velocity, was employed, but to give the workmen who are in the open air. However, when we came to the recently described, in its use in the recently described, we came into a host of new subjects.

The quantities used per year in brewery and saloons in the grain industry in the United States reach astronomical proportions. Many, many tons are used.

The last, but one of the most important, will be "Should Quercetorial Diseases Be Syphilis?" by Dr. M. E. Kanner, Dermatologist and Syphilologist, of Milwaukee, Wis.

SUBSCRIPTIONS.—This work will be furnished free to all who send us their names and addresses.

So far as the field conditions of solvents are concerned in the order of volatility, we have first the solvents which are highly flammable; the petroleum oils and kerosene; varnish with some turpentine and some species of resins and sticky types. The lower the volatility, of course, if it is to be produced, the greater the toxicity. The ordinary paints and lacquers can be considered together because the problem of solvents, largely, is what we wish to do with the solvents used are relatively non-boiling products which volatilize readily, such as acetone, ethyl acetate, benzene, methyl acetate, and so forth.

The next essential part of the liquor is—*the driers, such as ethyl laurate or stearate, stearic acid, zinc stearate, and other chemical products of known and proven toxicities.* Also, there must be a *solvent or a substance giving flow to the mixture.* These are relatively high-boiling low-toxicity products, *ethylene glycol, castor oil, camellia and others, again of known and proven toxicity.*

The toxicities of the various individual ingredients are quite diverse. It is not the toxicity of the pure product, however, that is of concern, but the toxicity of the product as it is used commercially. It is often difficult to determine the relative contribution of the various ingredients to the toxicity. For example, we may say that the toxicity of a product is due to the presence of a certain ingredient, but this may be due to its inherent toxicity. However, there may be so frequently a contaminant, we may have some broad toxicity to be considered.

The methods of control are: First, the substitution of non-toxic products such as insecticides are maintained in getting away from lead-containing pigments in paints. We are fortunate to have short chemicals in the paint industry who are alive to this problem. They are immediately striving and working with the industrial hygienists and the physicians in developing non-toxic products, so far as both pigments and solvents are concerned.

If an individual corporation is alert in observing and controlling the hazards presented by its products, it can avoid the costly and embarrassing side reactions that may be encountered in mass processes. This includes, of course, the use of the most advanced and most accurate of the necessary methods for the individual corporation. When I speak of the industrial hygienist and the industrial physician, I am speaking of an individual who is working in a place where controlling methods are not feasible to control the hazards of the products. He is not in control of the products, and he is not in control of the reports and toxic products, then the in-

I have very briefly outlined some of the action points. Do you choose to pursue this?

Occupational Disease

DR. WALSH: Synovial fluid withdrawn from patients with rheumatoid arthritis is a common procedure. An ethivianal, or simply ethidiamine, is a relatively innocuous drug which has been used in the treatment of rheumatoid arthritis. It is irritating to the respiratory tract and may be followed by a chronic cough. Not infrequently there are complaints of weakness following withdrawal of the drug. This is usually mild and disappears in a matter of a few days; however, it is rather like the drowsiness

X-Ray Examinations

DR. ROBERT M. BUCKEN, Wisconsin State Penitentiary, says:

"It is well known that it is advisable, if not essential, in the process of examining any length of evidence, to have the individual presented to the examiner in a simple draft of air or steam, so as to avoid the possibility of a mechanical draft type separator previously mentioned. In the case of the evidence, it is to be noted that the length of the evidence is to be of very great length of time."

X-Ray Examinations

DR. WALSH: There are those that would answer your question in the affirmative. Most reconnoisseurs, however, rather scoff at the idea of making a diagnosis of thrombocytosis by x-ray. The answers which are seen in the x-ray are barely those of the

However, for the ordinary pigment, so little is absorbed, so few of them produce excessive changes in the hair that early

EDWARD SMITH (New Alloy & Metal Co., Buffalo, N.Y.; No company made such savings.)

[illegible]

MR. KARY (Eastern-Mobility Company). In every painting in recent years, *lead-free* gasoline as a solvent, we have needed as much as 450 parts per million of aromatic, and we find that many *lead-free* gasolines now sold contain a large proportion of benzol, xylol and toluol. I wonder if much attention has been given to the fact?

DR. WALKER: This is a problem, it is true. Certain fields of oil, particularly those having the asphaltic acid salts in their circulating processes, result in bonded or undesirable products. In some instances, in the case of asphaltic acids, the asphaltic acid itself is precipitated from the solution by the addition of water. It is a factor to be considered. It depends largely upon the amount of bonded product. In some instances it has been said so far as high as 10 per cent in certain cases. That is not

DR. ROBERT M. BURNS (American
Soc. Medical Assn., St. Paul, Minn.): Are
there methods by a-ray examination from
time to time or from year to year that will
show the progress of bronchial trouble as a re-
sult of these past inhalations?

DR. WALSH: There are those that would answer your question in the affirmative. Most reconnoisseurs, however, rather scoff at the idea of making a diagnosis of thrombocytosis by x-ray. The answers which are seen in the x-ray are barely those of the

hibited wealth and diverse structures of the thing. It is true, however, if an individual is using some paints which bear silica—and some point that I did not mention is that used in the pottery industry, silica-bearing paint—that is another problem. If you are using a silica-bearing paint, you will get the same kind of abrasion of the surface of the

However, for the ordinary pigment, so little is absorbed, so few of them produce excessive changes in the hair that early

very procedure of the stopped air type, supplied also with a charcoal canister at the man's seat, so that when he breaks the connection temporarily to go back to the room, he will have the protection of the charcoal canister. The connection, when broken, immediately shuts off both the air supply and also the air connection, so that he cannot breathe the room air.

[illegible]

CHAIRMAN PAINE: Can anyone answer the question of Dr. Hambro?

[illegible]

DR. A. L. BROOKS (Fisher Body Division, General Motors Corp.): We do quite a lot of spray painting. I believe there has to be an radical change in the solvent and

elements used in the boilers which we are now employing. The process is very much the same.

There has been some change in the length of time required to dry these papers, but

W. H. KRAUSE (Atty.-General, Michigan)
Company, West Africa, W.A.): There have been recent changes in regard to the fibrousness in paper. Quite a few of the larger oil companies are now producing hydrogenated vegetable oils. These do contain considerable quantities of bound and unbound stearic acid. It has been my experience made with regard to the fabrics?

Element Presented Upon

DR. WALSH: I should have mentioned, when we were speaking of particles of solvents, that the medical profession knows that the use of heroin as a solvent or diluent is in any proportion. We just don't like it, regardless of its percentage, because it is so easy to get out of hand, and the toxic effects of its poisoning come so quickly and so immediately, they creep up on you before you know it. It requires rather close observation whenever there is any kind of abuse.

So far as the hydrogenated naphthalenes are concerned, it has been said that the hydrogenation does not change the chemical structure of the naphthalene, and it does not improve it, particularly for its use as a fuel. It is in relatively small quantities, 400 to 500 parts per million. There is no doubt that the problem of the naphthalenes present in the hydrogenated naphthalene itself is one we would much prefer not to see brought up at all.

CHAIRMAN PAINÉ: Dr. Hamilton, did you wish to say anything else on the subject?

DR. HAMILTON: I think not. My study of the subject is four years old. I thought perhaps very important things had come to the surface since then. Apparently because it still is a thing danger which exists in all sorts of unexpected ways, especially as we use more and more gasoline than we did before. I quite agree that it is something that should be considered.

We always advise the submission of work, when possible, for *hearsay*, but I don't think any industrial physician would be willing to give a *hearsay* of health as a condition.

Occupational Disease

We are beginning to look upon it with more definitions of the term "temporal dis-

[illegible]

The examination of Belgium to be presented to the very numerous expatriation which is not yet clear, and probably never will be clarified with a great deal of investigative work has been done that in the past few years a considerable amount of verifications has been made, even recently at the 1933 and 1934 International Hygiene shows, even that of the bacterium typhoid fever, even that of the

Environ and Occupational Disease

DR. MORBERT ENZER, An authority in the treatment of rheumatism, is of the opinion that the use of the Food of Life will make men healthy, and that it is a matter of healthy life health, and hence, to increase the extent of the individual in terms of his occupation, without sacrificing any quality of his health.

Now, the thing that we lack at present, so far as its applicability to the practice of industrial medicine is concerned, is a valid code of hygiene, the *desiderata* of a valid

[illegible]

Now, monetary of work may be the greatest contributor to fatigue. I used that as an illustration. For example, we found that in one small investigation, that individuals employed in work which called for dexterity and endurance and a high degree of mental and muscular activity were found to be exhausted (fatigued) in less than a twenty-four hour period.

four-hour period. In other words, if a constant number of movements was applied to the working surface work began, the same could be applied at the end of the day, we could determine to almost all individuals so much that they would be tired, and that the experience was definitely related to the ability of their nervous system to regulate their muscular activity in coordination.

Now, in jobs which call for a stationary position, manipulation of instruments, or necessity of exercise, that kind of fatigue must be recognized by the industrial physician.

The occupational disease, conversely, may produce a fatigue which may not be recognized unless the individuals are subjected to constant movements. For example, we have seen that individuals with a mild type of hypertension, increased blood pressure, but in many instances a lower blood pressure, than individuals whose blood pressure is normal. On an enlarged heart, due to valvular disease, a leaky valve, will produce the same phenomena; or individuals with diabetes mellitus, because of a diseased gland, or individuals who are abnormally obese will all show variations in their fatigue thresholds.

The only way that aspect of the subject can properly be investigated is to approach it from the medical point of view first. Examination of the individual becomes the important thing. It is important to supply critical standards of evaluation, then to attempt to correct them by medical program.

The industrial factor of fatigue, which I mentioned first, calls for a recognition, that the kind of work can produce fatigue, and then to supply individuals which will relieve it, I mean to this point.

If we recognize that a certain occupation produces fatigue, we have discovered things which will relieve the fatigue. A man whose job calls for standing at a bench, in whom he has one position, doing the same job over and over again, will have fatigue which can be relieved if he can periodically sit down, because his oxygen consumption in the sitting position is greatly reduced over the standing position, and he performs the work with less effort himself. Consequently he has available greater reserves of energy for his performance.

It has been pointed out, and we have been able to show in some small investigations, that if it could be arranged that this job could be done in the sitting position, the output would be increased and the individual would suffer less fatigue.

It has been shown that, in jobs which call for a stand-free movement between more or less fixed positions, without much opportunity to rest, if the period is broken by a brief rest and one-half intervals, and simply by the fact of being allowed to get out of the range of what he is doing, rest is hastened and fatigue is reduced.

We have been able to show that the application of bathing in certain kinds of individuals, will produce a diminution of fatigue and will enhance the capacity of the individual to resist his industry or his job. These are some of the features of the occupational aspects of disease, or the industrial aspect of fatigue, rather. With that causal investigation we can go on and attempt to suggest some questions.

Tests of Fatigue

CHAIRMAN PAINE: Are there any questions from the floor? This is an interesting subject.

DR. WALSH: I should like to ask a question to relatives to various tests of fatigue. The psychologists have all had people standing around a page in upper limbs and all that kind of thing, and they are not precise. That is one method that is not precise. One of the ways to measure fatigue has been to use one point; namely, the reduction of fatigue to the mental status of the individual. Again, the psychological method may be applied. What is the relationship of the intelligence quotient of the individual to fatigue? Does the person using his mind in the work get more tired than one doing physical activity in which no mental effort is required?

DR. ENTER: If I may repeat the question, I think Dr. Walsh really wants to find out whether individuals of I.Q., so to speak, experience the same phenomena of fatigue under the same circumstances as an individual of high I.Q.

DR. WALSH: That is right.

DR. ENTER: I would say he does, always; that is not generally recognized.

sensitive to sound, because we could pick out from a group of individuals people whose hearing their ears were greatly diminished. These people were selected, which suggests, perhaps, that such individuals work best in a quiet atmosphere. That is a hypothesis.

Another type of individual conditionally sensitive to sound, because we could pick out from a group of individuals people whose hearing their ears were greatly diminished, which suggests, perhaps, that such individuals work best in a quiet atmosphere. That is a hypothesis.

The third individual had his higher photometric school; in other words, he was stimulated by sound. I think causal conditions suggest procedures will probably bring to light illustrations of the individual who can concentrate on reading a book while the radio is going on and understand both of them perfectly satisfactorily.

Now, when we fatigue these individuals by their routine work, we find that they conducted the same job; then they did not get a day's work, and we tested them at the end of the day—found that fatigue accumulated the direction of their natural constitutional tendency. In other words, the individual to whom stimulation of the ear depressed the higher photometric school, that depression happened at the end of a day's work.

PAUL M. KARRIS (Western Union Co., Alameda, Ill.): Do the same system have any way to build up fatigue other than the infusion of glucose or the breaking of the concentration?

DR. ENTER: That is a phenomenon known as adaptation in a physiological sense. In the social sense, it is a question of getting used to your job; but the individual part about getting used to your job is you are not the same today as you were five years ago. In other words, the individual body can't get used to the same thing as the body of five years ago. The longer the individual is at a fatigue-producing job, sooner or later there will come a time when his fatigue becomes manifest.

We have found that our so-called fatigue testing standards showed no important factor, so far as age was concerned; but the older individuals had a lower threshold to the thing that produced the fatigue than the younger individuals. In other words, it is

BEN JOHANKE (Cassier Lumber Co., Wabasha, Minn.): Do you not think a lot of this is caused through improper food?

DR. ENTER: We are not recognizing that condition plays an important part in nervous fatigue because we know there are certain changes in food that are important for the intensity of the reaction. One of the tests, but we have been able to show some preliminary experimental way, food intake, energy, and an extreme instance, is not important, but in some instances it is. What do I mean by that? An individual who has been deprived of food for longer than he is usually accustomed, in other words, if his meals are separated by two long periods of time, fatigue will be produced. We have been able to show that individuals who are able to show bounding fatigue.

We were also able to show—and this is with individuals of normal type—there are certain kinds of food which drive some temporary relief from fatigue, most notably the sugar, carbohydrates, and a good deal has been done on the problem of diet. But to the sense that I have tried to say, the same thing, this morning, diet is important, and a diet of individual fatigue. Diet will produce a case of fatigue if we have some acute disturbance in the habits of diet.

Factor of Vision

MISS MARY LOU SCOTT (U.S. E. Chapman & Co., Louisville, Ky.): I would like to know the effect of factory noise in regard to fatigue.

DR. ENTER: Vision is a factor in fatigue. We discussed that objectively in a moment. Vision is a phenomenon, in this manner: We tested individuals for the flicker photometer test which, as I said, constitutes our best test. Afterward, we stimulated their ear with a sound of a regular meter, rhythm and rate, the object being to see whether we could fatigue an individual in the brain and in the body, or whether we could fatigue one coming from the other.

We found that this investigation brought out the fact that the body and the brain are not completely independent of each other. One is that there are continuously, individuals who are

CHAIRMAN PAINE: In order that you may not be fatigued, I am going to change the subject. I am asking Dr. Bachop to take the two next subjects, 3 and 4: "The Toxic Limits of Common Solvents" and "Lead in Industrial Processes," and dwell on those subjects as one.

Toxic Limits of Solvents

I still emphasize a few of the toxic limits of the common solvents, so-called thresholds. While these limits have been more or less agreed upon by authorities in this field, particularly such as Doctors Drinker, Huggard and Hahnemann, there is no threshold that is universally perfect, and the actual decision of whether or not the solvent has been toxic is the observation of the patient who has been exposed to that solvent, by a physician who must determine whether or not there has been a temporary intoxication and whether or not there has been a residual.

As an example of probably the least toxic solvent—yet by least toxic because no solvent is not potentially toxic; in fact, coming so far as to say that all good solvents are toxic—there is gasoline. It has been stated that 1,000 parts per million is a safe limit for continued exposure. The number of contaminations by other substances such as benzene in 5 to 10 parts per million in certain gasoline, usually would alter that safe threshold.

The next group of solvents which are slightly more toxic are the amyl and butyl acetates and ether which are allowable in a 400 parts per million. Some authorities will state that they belong in the 1,000-part-per-million class.

The third group of 200 parts per million include the following: Methanol or wood alcohol which, as you know, may have a serious effect on vision and cause blindness; and styol, tetrachlorethylene, trichloroethylene and turpentine.

The fourth group, which has dropped to 100 parts per million, include carbon tetrachloride and ethylene dichloride.

Then the fifth group of 75 parts per million, because of dischromism; and finally dischromism, which we, fortunately, actually use very rarely as a solvent, is 5 parts per million.

[illegible]

Fortunately, one of the best solvents and one of the most dangerous is not included in the list at all now, the trichloroethylene used in the airplane industry in the past. That had the peculiar ability to attack the fatty part in the body, including the heart muscle. That one is said to be a component of some of our other solvents. It has not been announced that possibly the former circumstance in trichloroethylene was really the reason why trichloroethylene had originally had a rather bad name.

I think one of the most important things to remember in dealing with the control of good solvent is that we are dealing with a potentially dangerous substance and not as my effort to conceal that fact from

anyone in the factory. We of the medical profession have always felt that we are like the rest of the world. We know that it is just our cards on the table. We know that in a great deal similar to follow the ancient maxim, "show us your wounds, and we will save you, and tell the truth. So then I admit, for instance, the board company which puts me on its barrel, the word "Pain." I am not in a position to know whether they were or were not, but because they were told to, but I know they do it.

I think there are many other companies that should put the same bid on their products. In this connection I would like to tell you of a case that I was asked to see, where a young boy, in the middle of the summer, working in a shop which made motors, suddenly became very sick, had severe headache, was dizzy, and had to stop work. He was seeking with a substance which he reported as harmful.

When I first heard of the case I indicated I would want to see the process and use the plan and get any information forwarded rather than attempt to talk to some foreman by telephone. (The medical profession as a whole is learning that it can only fulfill its responsibility by demanding the right to know all about the exposure of the patient and cause into their hands.)

When I went into the shop I found that this weather was using a large gale brush, dipping it into a large bowl of liquid, which he then dipped on the water to get the grease off. On this procedure he day he evolved the idea of using a fan, which ordinarily, perhaps, blew the fumes away from him, directly opposite the bowl of material and blew the fumes directly in his face. He got confused, and then he got sick.

I asked the Germans what was in the material, and he said he didn't know exactly; it was stout material, perfectly safe, as far as he knew. I said, "Well, I would like to know what it is." So there was considerable opening of veils. We finally went out into a shed in the yard, completely dark; we finally got a flashlight, and we found a barrel of brown marked "Poison."

Now, no one in that shop knew what they were doing. There were a dozen other workers each doing the same thing but who, fortunately, had not gotten this brilliant idea of the fan.

The curious thing about this particular show was that in number department, not

more than thirty feet away, they were doing some painting, and they were doing it properly. Instead of exhausting the spray overhead and bringing it right back in the wheel and over the engine, they had their sprayers under the engine, and they were spraying the objects to be painted as well as under. They had good engineering equipment and staff, and when they simply didn't know what they were doing in this particular instance.

I had another experience with a man who was a so-called neurotic. I think most of you can spot the neurotic. If you have had any other experience. This man certainly was. This had been to him a mean doctor. One told him he was going to die, and another case said there was nothing the matter with

[illegible]

Well, this illustrates one other sample. This was a large corporation. Yes, they were using chloroform. Finally, after great difficulty and having to go to the treasurer of the organization and going into the files we found that this was a restaurant which they had bought from a supply house in London, and they did not know what was in it. We finally found out it was carbon tetrachloride.

The course of that individual is interesting in that we put him in the hospital. It is extremely rare that company gets a lot of money. I was in this to find out all I could learn about the actions of that particular substance. I put the man in the hospital three or four weeks and did a number of different tests on him.

Well, he came through, and interestingly we found that he had an opportunity to do

when a cold once or twice. Every time he did, he developed jaundice. Then, of course, we did liver function tests and found nothing abnormal. We found he had a weakening of the heart muscle. We found a definite loss of the reflex in one ankle-joint, showing a definite involvement of the central nervous system.

We were able to get all the physicians to agree that this man was considerably disabled, that it was due to his occupation. You will understand, I was seeing him out for himself but for the company. I think a good many of them thought I had been a little ahead of the game. I don't know. I don't have anything further about the case, but I did hear that the man died and that the death certificate said "cirrhosis of the liver and heart failure." Unfortunately, we didn't have an autopsy to confirm it.

In my opinion, the toxic solvent is one of the most dangerous substances and it can seriously disable and kill.

Lead in Industry

As a physician to the subject of lead in industry, I am not a specialist. I am not a toxicologist. I am one of that increasing group who feel that industrial medicine is not a specialty in itself but is merely a division of internal medicine or diagnosis, the large field of medicine which in private practice corresponds to or is correlated with the field of general surgery. I am glad that a large portion of my practice is still private practice. I am also consulting medical director to one of our industrial concerns in MI. I have an opportunity to see lead and other toxic materials.

When you see a man who has said, "I have lead poisoning," do not forget he may have some other disabilities and diseases, such as acute appendicitis, gallbladder, kidney and so forth. In my private practice my interest has been sharpened so that I always make an effort to take a very careful medical history on a patient, even though he may seem to me purely as a liver case, lung case or what-have-you.

In this particular plant in Milwaukee, which began by having and still has, as a large proportion of its work, storage battery

plants, when I came there about ten years ago we were having an incidence of about 24 lead cases per 100 employees per year, which corresponds pretty well with the average of 15 to 20 reported by the Public Health Service in work about that time.

In five years, by cooperation with the medical department, the engineering department and management, we dropped that to an incidence of 2 per 100, and for the past five years we have had no cases of lead poisoning at all. We are still handling lead, and we are still handling it in large amounts.

I think that in the storage battery industry, probably, men are exposed potentially, at least, to the greatest concentration of lead for absorption directly into their bodies than in any other industry. I am glad to report that my fellow workers in this industry group of workers of about 80 per cent of this industry are healthy and in many respects, I think healthier than the general run of the population. Of course, we have reduced their lead absorption, but at times it will break down the physical resistance and respiratory protection. They occasionally have large doses of lead. Many of these workers were men who had had lead poisoning or serious lead absorption in the period of, disservice.

Lead is one of the most widely used materials in the world. It is used in 200 industries. I think there is no doubt but that in large industry the hazard is well recognized. In fact, of all, it is recognized and then every effort is given. No expense is spared to study the man and to reduce the consumption of any exposure. However, in the small industry, which is the major portion of industry in this country, lead is continually creeping up, and even silently, which get the center of the stage in recent years, certainly in Wisconsin, has now taken a back step and lead has come back into its own, together with the ever increasing use of solvent.

I would like to stress again the danger here is one of non-recognition, that we have our trouble in the small plant, not in the large plant. I will rapidly run through the types of industry where I have seen lead poisoning occur and in which it is an important factor.

The most important is the storage battery industry. Then the streamlining of one automobile and trucks where, after welding,

have seen a great many cases in one particular type of ship industry, cutting up old ships and burning in mid-western, and I have never seen one leaded up so readily. Of course, this is to do duty. The Navy found this out twenty years ago. They scrapped many of its ships. They found that the most important hazard in lead industry is the paint. It is not the lead itself, since paint is made up of many materials, some of which are very toxic on their own work, by reading, and experts have to be made again.

In the smelting of lead or zinc ore and scrap metal, lead poisoning occurs. In pottery making where a glazed surface is used, one must usually be exposed to lead. In the printing industry we have heard a great deal of lead poisoning.

I had an opportunity recently to make a survey of a group of printers with the Wisconsin Industrial Hygiene Unit. They were in an industrial hygiene unit. They were in an analysis of the dirt, and I examined the men. To be sure, our list was large, about 30 men. I found that all of them were in excellent health and as far as I could see, there had been no great deal of turnover.

However, there are one or two spots in the printing industry that are danger spots; that is, of course, the man who runs the old type metal or who sets it. If he uses a machine, I think it is interesting, getting through our records of printers in the State of Wisconsin, for a great number of years past, we have had only three cases, one of which was really a serious case, and that man was one who had been in the first printing press, worked there in the first case, and who had set the type. He had set the type, and there was no poisoning.

In painting, I will simply name soldering, and that occurs very frequently even in the carpenter with industry out of the country; tempering of metal, and so forth, and so on. Making, hand soldering. This is potentially a hazard when it is recognized. The man is leaded about as the final coat, the man who sets the type, and so on. This is the place you should look particularly.

As I said the important point of entry is through the nose. If we know that to lead poisoning is caused by the absorption of lead poisoning is really not difficult. If, of course, you or others reduce the exposure to 1.5 milligrams, I don't think you will have a case of

cause, as many of you know, they were at first somewhat off by lead paint which, after it dried, was then ground by machine of grinder and produced a great amount of finely divided, insoluble dust. This brings up the fact that the most important hazard in lead industry is the paint of fabrication. Remember that lead dust is not a solid, more dangerous than lead paint, and that the dust, perhaps with the one exception of barbiturate dust which is an organic and fat soluble substance.

It is rather amazing that many plants, smaller plants, particularly, have had to give up machine grinding of welded joints. Here is a return of modern industry to the hand filing stage. They are going back to hand filing where, of course, the particles are heavy and are too large to be inhaled. The problem can be solved, however, even by machine grinding if one uses respirators. It has always been said that lead poisoning was very common in painting. My experience in ordinary painting, with the exception of lead paint, is that it is very rare, particularly with the use of modern lead paint, and by other workers such as fishermen, since lead is so forth, which are hazardous. On the contrary, however, lead is still used in many instances, because it is the one substance that will stand the weather.

Here we come again to the question of finely divided, insoluble dust where men burn off old paint in private houses; not in the large institutions, of course, or not, either by machine sanding or by hand sanding. There we have the condition of finely divided dust which is inhaled. You must remember that dust when inhaled passes directly into the system and immediately circulates throughout the entire body.

I make a recommendation, therefore, that any worker that has gotten his lead by burning off or sanding, he give a respirator for that purpose, even though he is an outside worker.

In the welding of old buildings and old ships, of course, there is the constant presence of lead absorption when the dust has been coated with several coats. If leadly forms a film which is so fine that it is almost invisible and it is absorbed into the system. The only way to prevent a worker doing that on really poor lead, in my opinion, is to get an air-line respirator. I

head poisoning. However, as a matter of practical interest, I think it is very difficult to get there in ordinary ladyship, and I would move or less formulate it as a safe level. I think it has also been found by other writers. However, if you get over it you certainly have the possibility of serious head absorption.

I want to emphasize that nerve lead abnormality does not mean the man has lead poisoning. He may have a lead time, may have lead in the urine, 30 milligrams per liter, but that does not make lead poisoning. That is merely evidence of absorption. He may have, in addition, clinical symptoms of one of the three types of lead absorption.

As a final word in regard to the role of the medical profession in its cooperation in industry, it seems to me that the medical profession should first of all be responsible to the highest men in authority in the plant, so that he can go direct to him with any problems that arise, and before any new procedure is used or any new chemical, have a conference with the physician to see whether there is any possible danger, whether there are any valuable salvages or lead, so that the danger to the man may be prevented before happens.

I am now making a plea for absolute submission for and avoidance of the use of machinery. I think industries cannot get along without the use of lead, cannot get along without the use of a number of these solvents; but the industry is forewarned and if the worker informed correctly so he will cooperate in the use of protective devices and, finally, the medical profession is alerted to see the patient as often as they see fit, perhaps every two or three weeks, then there need occur no accidental disease in industry.

CHAJMAN PAINE: Are there any persons on either one of these subjects that you would like to ask?

MR. HUTTER: What is the effect of the bell of heroin on the worker? Is that a permanent effect or just temporary?

DR. BELKNAP: As far as I know, there is no effect from the inhalation of hero-

R. S. SKYER (Employers Liability Assurance Corporation, Boston): Would Dr. [illegible] recommend the direct venting of [illegible] and pots on linotype machines where the [illegible] are electrically heated and [illegible]

statistically controlled so the temperature of the head does not exceed 500 degrees?

DR. BELKNAP: That is a good practical question. As we know, head winds at a much lower temperature when Robinson. In my experience, head does not really reduce tiller until around 1,000 or 1,100 degrees.

In this group of workers that I am following, some years ago, large lead pots, one or three feet in diameter, were introduced because of certain changes in technical procedure, and the plans never got around to change. I discovered of that and re-learned that they would have cases of lead poisoning results in a mean way. I was afraid to say so, but I was sure. I am sure, I am here to say we have had no lead cases develop on the point of disability, and we have had very little lead absorption result from that. Some lead has worked there for ten years, dipping lead out of the pot, incidentally, at temperatures ranging usually from 650 to 950 degrees. This group of hydraulic workers, we found no evidence of lead poisoning, and I am sure that we were right on that point. I would not say in my own experience that handling is unnecessary at 500 degrees.

MR. CARR: I wonder if there is any evidence to indicate the toxic limit for butyl alcohol could be raised above that given? We had experience over some twenty years with the same group of men, working in concentrations from 200 to 400 parts per million, and under careful examination they have shown no indication of trouble.

One other question is whether much work has been done on toxic fumes of arsenic?

DR. HAMILTON: Dioxane is the trade name for 1,2-dioxane. It is the same as hexachlorocyclohexane. No toxic limit has been established for dioxane. We considered it a fairly safe solvent until some very disastrous cases occurred in England from over-exposure, causing five deaths. Since then we have looked upon it with a good deal more suspicion. There has not been much work done on it to establish any maximum allowable concentration.

DR. BELKNAP: In regard to butyl alcohol, the butyl radical acetate is much less toxic than ethyl or methyl, particularly. So it would be interesting in your point of view.

I think probably it could be made at safe
times.

MR. CUMMAR: I want to endorse completely the principle of minimum standards of safety standards to engineering, but they should be based on factual data. As regards tobacco, there have been numerous studies which have shown that the tar and nicotine used in the liquor industry have been used in the paint industry and even in the paint industry came into use. It is sprayed into the air as fine mist, and even though it is inhaled as a shorter mist than that, it is inhaled the mind, you get severe effects if it is inhaled.

I have employees in four states, New York State, New Jersey, Ohio and Connecticut, who for the past sixteen years have not had any reported cases of chronic arsenic poisoning; yet Ohio in the past sixteen years has had over 60 cases of poisoning from arsenic in the medicinal industry.

As to the experimental results, I can say that the experimental data indicating the existence of a low value of the correlation coefficient should be such a low value that the correlation arises from the influence of the confounding between chronic and acute poisoning. It is a fact that in generally high concentrations, chronic and acute are more or less commensurate; that is, if you go into a house where there are 20,000 quarters per liter, you would be unconscious quarters from chronic and acute than you would from acute and acute than an entirely separate with chronic, but that is an entirely separate phenomenon from the slow chronic poisoning.

CHAIRMAN PAINE: The next topic will be "Sister Affections" and that will be read by Dr. M. J. Rogers.

Brain Affections.

DR. M. I. REUTER: When we consider to what extent the skin of the worker is exposed to injuries, the action of chemicals, the various infections, irritants and the various infections agents, it is not surprising that occupational skin diseases are a major problem in industry. The United States Public Health Service estimates 90 per cent of occupational diseases are skin diseases. They carried in the course of a year, that one per cent of these workers in 100,000 workers and found that one per cent were afflicted with it. This did not include the quantities of acids and alkalis, and the quantities of infections of scratches and abrasions.

The problem confronting the physician is to determine the relationship between the disease and the occupational environment, to discover the nature of the offending agent and to adopt measures designed to avert the condition and prevent its recurrence.

There are many predisposing causes of occupational dermatitis, such as mechanical, chemical, and thermal. The use of many different kinds of clothes and of personal protective devices, for example, can prevent occupational dermatitis. In fact, it occurs in an ancient form, because individuals who work in hot environments wear hats and other clothing that causes more susceptibility to external irritants than susceptible individuals. The skin of the young and old is more susceptible to irritation and infection than the skin of persons in middle life. Dry skin is more vulnerable to irritants than oily skin.

The skin of certain parts of the body is especially sensitive for infectious diseases, especially those of the skin, which have a cyclic and periodic character. The factors which bring the organism to the threshold of resistance to the skin diseases of dermatitis and of infectious diseases of dermatitis and of infectious diseases. These factors include bacteria, metabolic products, and concentrations, prolonged exposure of the skin to water and especially to alkalis and repeated scratching of the skin. These agents tend to remove the natural protective coats of the skin, that is the outer heavy layer, and thus expose the sensitive epidermal cells directly to irritating agents. A recent study by common medical dermatologists of the skin of patients with infectious diseases of the skin, especially the infection of the skin, has shown that the infection of the skin is a condition which is

The actual causes of occupational dermatoses are mechanical, physical and biologic agents and chemical irritants. Mechanical agents produce bruises and lacerations, as well as friction and pressure resulting in various inflammations and thickening of the skin.

The physical agents which may produce an occupational dermatosis are heat and cold, either dry or wet, electricity, ultraviolet rays, either from the sun or artificial sources, or radiation.

The biologic agents are the common bacterial agents or viruses.

For the most part, however, occupational affections of the skin are the result of contact with irritants of a chemical nature.

As a subject for discussion, I might say that probably changing agents used by the workers are one of the most potent factors in the creation of exceptional decisions.

CHARLIEAN PAINE: This is a subject in which there are a number of non-interested. Will you explicate your question?

DR. FAZLER: I would like to ask Dr. Bester to say a word about also expert in occupational illnesses.

Media Contact

DR. MEUTER: Ewing has not found free substances which may be isolated before conception, trauma as the cause of given cancer. Ewing states: "First, the authenticity and adequacy of injury must be established." That is, the patient's statement regarding injury must be substantiated and there must be actual tissue damage.

"Second, the previous integrity of the wounded part before the injury must be established.

Third, the cross on timber land after is the point of injury.

"Fourth, there must be a reasonable time elapsing between injury and the development of the tumor." That is, if the tumor develops within two or three days after the injury, it isn't reasonable that in that short a time a tumor could have developed.

"First, the positive diagonals may establish that there is an actual tumor present and the nature of the particular tumor."

CHAIRMAN PAINE: Dr. Ems, do you want to speak to the point?

DR. EVANS: I thought Dr. Renter might have some ideas to suggest to the group. I was a good deal worried about the increasing tendency of some of our people to be highly complex conditioned persons which have the property of including in their conditioning a great deal of the conditioning of the environmental animal. We know that certain species which have that property in the human. The consummatory behavior in the human. We know also of certain online producers which would produce some of the behavior of the ordinary leader, and so on. I think that this makes it highly complex, but I think it should be brought to your attention in the determining of body we deal with as only with arguments but also deal with

MR. REUTER: I have had very little opportunity to pass on a question of competency in this case. I have not been in direct contact with the defendant agent.

C. T. DENSMORE (Kappers Co., St. Paul, Minn.): I would like to hear a little more about the effects of coal tar and creosote on the skin in relation to cancer and what extent also the absorption of the creosote re-

DR. REUTER: Regarding the development of cancer from coal bit and cigarette.

most of their friends can tell and even have had no experience. We do know that hair is the nearest to the skin and does reduce an inflammation through the hair follicles called folliculitis. It is undoubtedly due to the plugging of the follicles with the sebum and perhaps some inflammation of the epidermal layer of the skin upon the sebum. This sets up the inflammatory reaction around the hair follicles. I think the same is true with warts with warts. Regarding the actual development of hyperkeratosis of the skin, particularly cancer, I have had no ex-

perience.

DR. BELKNAP: As for creosote, I have used no actual cases brought to my attention. As far as I know, the fumes would be as more irritating, probably, than causing an irritative cough. I know of no cases, really, of acute chronic bronchitis or other catarrhs, resulting.

CHAIRMAN PAYNE: We will leave by other questions to the end of the session and hear Mr. H. A. Ketchum, Industrial Commission of Wisconsin, on the question: Should occupational diseases be considered industrial injuries?

Disclosure Vs. Infancy

H. A. NELSON: Mr. Chairman: The question which I have been assigned to introduce is, "The question of compensation for treatment in several ways. We are on trial in a highly political way and it is desirable that the court composition of the jury be made up of persons who are not liable to be prejudiced by the question of 'justice' or we can even go in a political way and ask whether constitutional provisions should be interpreted. That is the heart and crux of the question under."

Occasional Dinner

employers who have this natural of damage. They say that in periods of depression the expense to him will be rather great for the time being, and that must be taken into consideration. Employers are these things but they would the opinion with each other, and they are also in that must be here and required for the compensating of occupational disease. If the job is to be done in a satisfactory way.

Now, scientists are usually designed so that there is no very gross way in which they can be wrong. Generally you will find that the more important the question is, the more care is taken on the one component of the answer, and the more care is taken on the other, which causes the more probability of error. For example, scientists is hit out of a park every day by the state bars with the most sophisticated of the state bars, and it is a surprise or a shock to find that the state bars are not competent. Therefore, scientists are not competent.

[illegible]

Can Stream Out Disasters

But the most obvious thing that has been accomplished by convalescent homes is to remove the burden of convalescent care from the family. The fact that they can remove the patient from the home and place him in a convalescent home is a great relief to the family. In Wisconsin we have particularly seen this in the case of the family of a man who was injured in a fire. The family was unable to care for him, and he was placed in a convalescent home. The family was able to return to their normal life, and the patient was able to recover and return to his home.

I think there is no question but that the public is demanding that occupational dis-

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"First, the positive diagonals may establish that there is an actual tumor present and the nature of the particular tumor."

CHAIRMAN PAINE: Dr. Ems, do you want to speak to the point?

DR. EVANS: I thought Dr. Renter might have some words to say about the increasing tendency of our being asked to highly complex chemical questions which have the property of including the human factor in the experimental animal. We know that certain species which have that property in the human. The consummally human one is the cancer. We know also of other entities, such as the various producers which would produce cancer of the skin, of the urinary bladder, and so on. I think that the subjects in highly complex, but I think it should be brought to your attention in the determination of body we deal with not only with carcinomas but also deal with

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Disclosure Vs. Infamy

[illegible]

case be compensated. The trend is causing me to believe that industry and society will be provoked when the problem has been solved by whatever methods may be adopted and related to the different states.

CHAIRMAN PADGE: Are there any questions you want to ask Mr. Nelson before we go into the general discussion?

ADOLF MURRAY (Harris & Co., New York City): We passed a comprehension law in New York State some two or three years ago. Perhaps you recall that law as passed in more illigible law, the all-inclusive act which acted almost disastrously not only to industry itself but to the workmen. You are another, after the history and the result of it, are you? I dare say to a number of states is absolutely right and proper the compensation act should include citizens, but it would include citizens on a schedule basis. I think is the case in Illinois.

MR. NELSON: All states are not as fortunate as some other states. I think we are showing generally throughout all of the states that the problem can be solved.

Protection for Women

CHAIRMAN PAINE: We have a few minutes. Anyone in the audience has the privilege of asking this panel of doctors any questions they want to raise on these main subjects.

J. R. GREENE (Saginaw Steel Co. chairman, Ph. 1.) would like to ask to whom an ordinary welder in a small plant would be promoted? Once in a while there will be a hardworking man who has accumulated enough money to buy a car, but he is not getting off on a probation which will raise some money problems. To what extent would a welder or a cutter have to be educated?

CHAIRMAN PAINÉ: The question is, are we going to protect and what is the exposure to robbery as are covered by an old material that has been pointed out by Dr. Walsh in answer this question.

DR. WALSH: Within the past couple of years we have had occasion to go over a group of about 1,000 embryos. Of that group, some 500 have been ending for tax or other reasons. They were gone over from the clinical point of view. Ninety of the those were

even who might boast of a 99½ per cent recovery rate from a specific operation, the individual who happened to belong to that ½ per cent constitutes 100 per cent mortality for the individual. There is a very sharp contrast there.

Now, when we talk about safe limits of toxic stressors, safe limits of toxic exposures, safe limits of an industry, we must remember that the problem is not going to be solved by a blanket prohibition of a profession, but by a careful and systematic analysis and study of the individuals exposed to the industry. I know of no other way that this can be done except that the industry realize that the professions of medicine forms the key to the solution of these problems.

DR. BELFONAP: I simply wanted to notify what has already been mentioned, and that is when a welder or cutter works on material that has been painted or coated with lead, he, of course, probably will acquire some lead absorption in a serious fashion about as quickly as if not quicker than, in any other way.

It is very simple now, with the respirators we have available, for a shop welder, whenever he is doing that type of work, to use such a respirator. In my own particular series of cases one of our cases of head absorption was a welder who had been wearing breathing some cases containing a large amount of lead.

Also, I had occasion recently to see half a dozen cases of centers who were coming in to make in a large chemical plant. These centers had been found with lead. They were not understood why the centers were coming back. They went through the lead with a search 1000 or 4000 through the lead, but they had something really. It is not a difficult question to solve at all but it is a matter of having perfect confidence in what you are doing and having for it.

MR. CARR: In connection with welding, we have had inspectors of steel shells from work on submerged iron. We have also had inspectors from poisoning from the use of submersible electrodes.

I would also like to call attention to a relatively new development, that of the staining of metals before painting, by the use of a special oxy-acetylene torch. This includes previously painted metals as well

R. J. WOODHOUSE (Continental Casualty Company, New York City): I had a case a short time ago that I was called upon

to investigate. The man worked in a printing plant where he was assumed to have contracted lead poisoning. After making inquiries were which proved negative, an award was given by the consolation to the widow in the amount of \$11,000. The lead was melted around 630 to 720 degrees and the experts proved that toxic fumes were not liberated.

I wonder what yardsticks the referees used to measure those cases in the face of such expert testimony.

MR. SKVRAM: I would like to know the relation of handset pointing and point-
ing to skin disease.

DR. SELTZER: Polseum lvy, of course, is the most common plant that causes dermatitis. Hensckel is occasionally the cause. Polseum lvy is an intense irritant to most people's skin. It is a question of whether in itself it is not an irritant to all people's skin.

We need to think we know the cause of poison ivy dermatitis, but more rounds went has yielded rather to disprove that we do know the second cause of what it is the plant that produces dermatitis. Apparently it is a water-soluble fraction rather than an oil.

Its relation to occupational diseases depends on what the individual is doing. If he is exposed to it in his occupation, for example, as a farmer, WPA worker, lumberman or any occupation that keeps an individual out-of-doors, and he sustains pneumonia, it certainly would be an occupational disease. Pneumonia by definition is not to be taken as a much more serious condition than that from smoke.

CHAIRMAN PAINE: Mr. Gomer,

P. W. GUMMER: The question was, what is the basis of the comparatively low cocaine consumption of India in the absence of any reported exceptional disease states, and are there any experimental data to support such a low consumption where such experimental data deals with chronic poisoning and not with acute poisoning?

MR. GUNAWER: Yes.
DR. BELKNAP: As far as the official authority of this is concerned, it is taken from the code for safe concentrations of certain toxic substances used in bacteriology. The authors are Bowditch, Drinker, Hargraves and Alice Hamilton which appeared in the June 1940 issue of the Journal of Industrial Hygiene and Toxicology.

DR. HAMILTON: May I speak to that or just a moment? That presentation to which Dr. Bellamy refers was put on simply because a small group of us felt that we might as well let the public know that we are best geared at the present moment with regard to maximum allowable concentrations of the most commonly used solvents. It is founded very largely on gener-

The quantity of 1,000 parts per million for radon in gases, and so is 200 parts of radon. We are hoping that we shall be able to give more accurate figures presently.

We are now trying to deal with twelve workers which are going to be increasingly important in the chemicals industry. We hope to be able to give our accurate figures then. But it is a very difficult problem. You see the only way we can get any accurate figure is by having a combined inquiry made by the physicians, the chemists and the ventilation engineers, because they are the people who know how easy canst develop a given workman at a given concentration, and also at what concentration do no more come.

CHAIRMAN PAINE: May I, in your behalf and in behalf of the National Safety Council, thank the gentlemen on the platform who have so kindly led us in this discussion? Will you express their thanks by giving them a rising vote?

ADDITIONAL INFORMATION

WEDNESDAY MORNING SESSION

October 9, 1940

CHAIRMAN HARVEY: It is a pleasure to welcome you here this morning. By way of introduction, I simply want to make clear that when I speak for the National Safety Council as called by the phrase "Off-the-Job Accidents," I am not speaking in a partisan sense. All of you frequently in various sections of this kind there has been a feeling

Harry E. Roth, Director, Commercial Safety Council, Inc., 1000 Commonwealth Ave., Boston, is president of the Industrial Safety Council, 1000 Commonwealth Ave., Boston, and president of the South Coast Fire Safety Council, 1000 Commonwealth Ave., Boston.

Elmer W. Prudden, Assistant General Manager, Massachusetts Safety Council, Boston.

Edward P. Dorfan, Assistant Manager,
Insurance Department, Consolidated Edison
Company of New York, Inc., New York
City.

accidents occurred to employees after they had left the job, as compared to those which occurred while they were at work.

I recall one illustration in the East, where I had been national organizations with many thousands of employees was planning a job of safety work in its plants. During that fact, during a five-year period, 17 of their employees had been killed while at work. So during the same period 208 of the employees had been killed. 208 of the

Value of the Process

E. P. DUKES, "McChesman, I don't know how the title 'top job' is defined, but I do know that our present company program has what we consider real value. It dates back about four or five years when our general manager, one day, was saying his words on my shoulder. He told me that if I ever had an idea, I should try it. He said that if my idea was paid for, approximately 3 per cent of our total annual payroll, which is \$300,000,000. The thought

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and the Universal Safety Emblem, which were given to every first place in the contest. The contest was held at the headquarters of the National Safety Council, and the winners were given a handsome medal and a certificate.

In the first place, twenty (20) first prizes were given to winners of second and third prizes.

are indicated by the following numbers of second and third prizes by the number (2) and (3) respectively.

Manufacturing Department Group A

1. Standard Oil Company of Louisiana, Baton Rouge, La. 7,571,585 hours, 6 injuries.

2. Standard Oil Company, Indiana, Chicago, Ill. 12,445,793 hours, 23 injuries.

3. Humble Oil & Refining Company, Houston, Texas, 8,941,060 hours, 24 injuries.

Manufacturing Department Group B

1. The Ohio Oil Company, Findlay, Ohio, 1,197,707 hours, 3 injuries.

2. Fox American Petroleum Corp., New York, N. Y., 400,023 hours, 1 injury.

3. Indian Refining Company, Lawrenceville, Ill., 1,184,977 hours, 3 injuries.

Wholesale Marketing Department Group A

1. Continental Oil Company, Ponca City, Okla., 4,681,046 hours, 8 injuries.

2. General Petroleum Corporation of California, Los Angeles, Cal. 2,412,414 hours, 4 injuries.

3. Standard Oil Company, Indiana, Chicago, Ill. 20,660,276 hours, 88 injuries.

Wholesale Marketing Department Group B

1. Texas Pacific Coal and Oil Co., Fort Worth, Texas, 227,465 hours, no injuries.

2. Globe Oil & Refining Co., Wichita, Kan., 154,758 hours, no injuries.

3. Petroleum Refining Company, Wichita Falls, Texas, 737,664 hours, 2 injuries.

Wholesale Marketing Department

1. Shell Oil Co., Inc., Mid-Continent Territory, St. Louis, Mo., 3,151,045 hours, no injuries.

2. General Petroleum Corporation of California, Los Angeles, Cal., 25,135 hours, no injuries.

1. Hope Construction and Refining Company, Pittsburgh, Pa., 228,417 hours, no injuries.

Oil & Gas Pipe Line Department Group A

1. Standard Pipe Line Company, Tulsa, Okla., 3,540,000 hours, 13 injuries.

2. Humble Pipe Line Company, Houston, Texas, 4,148,090 hours, 22 injuries.

3. Magnolia Pipe Line Company, Dallas, Texas, 2,771,114 hours, 21 injuries.

Retail Marketing Department

1. Humble Oil & Refining Company, Houston, Texas, 184,718 hours, no injuries.

Oil & Gas Pipe Line Department Group B

1. Kew Pipe Line Company, Tulsa, Okla., 264,028 hours, no injuries.

2. Tide Water Pipe Line Co., Ltd., Bradford, Pa., 288,577 hours, no injuries.

3. Sinclair Wyoming Oil Co., Tulsa, Okla., 201,678 hours, no injuries.

4. Charleston Oil Company, Charleston, S. C., 108,120 hours, no injuries.

5. Union Oil Company of California, Los Angeles, Cal., 4,314,672 hours, 28 injuries.

Producing Department Group A

1. Continental Oil Company, Ponca City, Okla., 2,720,567 hours, 12 injuries.

2. Standard Oil and Gas Company, Tulsa, Okla., 1,777,451 hours, 23 injuries.

3. Gulf Oil Corp., Gulf Production Division, Houston, Texas, 17,647,314 hours, 25 injuries.

Producing Department Group B

1. The Atlantic Refining Company, Dallas, Texas, 1,140,394 hours, 4 injuries.

2. Hope Construction and Refining Co., Pittsburgh, Pa., 491,730 hours, 2 injuries.

3. Texas Pacific Coal and Oil Company, Fort Worth, Texas, 416,596 hours, 2 injuries.

Drilling Department

1. Standard Oil Company of Louisiana, Shreveport, La., 123,919 hours, 1 injury.

2. Cities Service Gas Company, Bartlesville, Okla., 120,682 hours, 2 injuries.

3. Gulf Oil Corporation, Gulf Production Division, Houston, Texas, 1,162,357 hours, 29 injuries.

Power Press Section

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ADJOURNMENT

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TUESDAY AFTERNOON SESSION

October 8, 1940

The opening session of the Power Press Section of the Section during the year, and the work of the Section to serve the interests of the power press industry, was discussed by the officers of the Section to serve during the year. The officers of the Section were elected, as listed above, in this room. The Chairman then introduced the first speaker.

The Safeguarding of Fast Punch Presses

By W. A. VOLLMER

Safety Engineer, Employers Mutual, Wausau, Wis.

Before the most practical methods of punch press guarding can be applied, it is necessary to realize why and how accidents happen.

It is understood that about 85 per cent of all accidents that occur are due to either human or mechanical failures. If this is true, then the superior and mechanical safety features can be relied upon to prevent accidents. If methods of die construction and of guarding for supervision and the use of the most modern equipment to a minimum, the accident rate will be reduced to a minimum, and there will be a minimum of potential hazard.

In order to accomplish this, it should be the duty of those responsible for designing dies to try and think of some method of die construction that will enable the operator to feed the die and have some method of automatic ejection to unload the finished piece without making it necessary to place the hands at the point of operation. This time during the cycle of the operation, the die can be doing a large percentage of the time.

After this has been done, a basket or closure guard can be used. This guard, when properly made and adjusted, is as heavy as the die and the die on two sides of the front and both high enough to contain all of the potential hazards from the die. The die is placed up to above the clamping bolts on the ram. No moving parts being exposed, there is little chance of the operator being injured.

In most cases where basket guards are used on dies constructed as just mentioned, the operator is not only protected against being injured but the speed of the operation is increased.

There are different types of practical ejectioners that can be used, such as air ejectioners, pick-up ejectioners, etc. The ejectioner, by bringing the finished piece to the top of the frame and discharging it from the punch by means of the knock-out bar in the ram or by ejection with a plate stripper or any other device.

One method of feeding is to use a gravity chute. An apron with side guides is attached to the front of the die. The die is then placed on an inclined press. The piece to be worked on is placed on the apron and slides under the basket guard that surrounds

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