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ALPHABETICAL INDEX OF ADVERTISERS

*Advertisement appeared in preceding issue.

ADVERTISER'S INDEX

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__ industry warning labels

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__ other

2:00—"Common Injuries of the Chest," by EDGAR W. DAVIS, Department of Chest Surgery, University Hospital, Ann Arbor, Mich. (illustrated with slides).

2:30—"Industry Turns to the Physician," DR. CAREY P. MCCORD, Director, Health Conservancy Laboratories, Cincinnati, (slides, gross specimens, autopsy material and special measuring instruments).

3:30—"Fractures of the Neck of the Femur, Acute and Ununited; Methods of Treatment for the Acute Fractures and Various Types of Treatment Available for the Ununited Fractures," DR. CARL E. BADGLEY. Professor of Orthopedic Surgery, University of Michigan Medical School, Ann Arbor.

4:30—Business Meeting.

5:00—"Vascular Dilatation and Cerebral Stimulation," general discussion.

6:30—Annual Banquet.

8:00—"Clinical Aspects of Silicosis," by DR. ROSS K. CHILDERHOSE, of Allenwood, Penna., (slides and exhibit).

DR. HORACE W. PORTER summarizes the program as follows:

"It was the aim of the Program Committee to get away from the usual symposium on fractures as much as possible, and deal more with the medical side of our specialty of industrial medicine and surgery.

"The address of Dr. McCord was of unusual interest; the various occupational diseases had never been discussed so completely before at any meeting of this organization. Dr. McCord had just returned from Yucatan where he was sent to investigate an occupational disease which suddenly became prevalent among the natives who gather chicle for the chewing gum manufacturers. The disease consisted of an necrosis of the left ear and chin, with the right side of the face uninvolved.

"In addition to discussing occupational diseases in general, Dr. McCord demonstrated, by autopsy of three guinea pigs, one of which was normal, the results of injecting dust containing silica into the peritoneal cavity of these animals.

"Dr. McCord also demonstrated various instruments for the proper and accurate measuring of dust and carbon monoxide.

"The movie on 'Burns' was a clinical masterpiece; the result of considerable work on the part of Dr. Grover Penberthy and his Assistant, Dr. C. N. Weller, of the Children's Hospital, Detroit.

"Another outstanding feature of the day's program was the evening address by Dr. Childerhose, who is associated with Devitt's Camp for Tuberculosis at Allenwood, Penna.

"Situated as he is in the anthracite district, Dr. Childerhose has made the study of silicosis a hobby, and is well able to discuss the subject authoritatively.

"At the business meeting the following officers were elected for 1936-1937:

President—A. H. WHITTAKER, M.D., F.A.C.S., Detroit;

Vice-President — LEON SEVEY, M.D., Grand Rapids:

Secretary-Treasurer — DON F. KUDNER, M.D., F.A.C.S., Jackson;

Directors — L. H. CHILDS, M.D., Flint; CARL E. BADGELY, M.D., F.A.C.S., Ann Arbor; and HENRY J. PYLE, M.D., Grand Rapids."

Clinical Aspects of Silicosis*

By Ross K. CHILDERHOSE, M.D.,
Allenwood, Penna.

SILICOSIS is essentially an industrial disease and as such it has a vital interest for us. Within the past decade especially, the interest in this particular industrial hazard has become so widespread, and the knowledge of the disease so increased, that it has become necessary for us as physicians to have a thorough understanding of the condition. Text books of 10 years ago contain little or no information on the subject, and we must concede that most of our knowledge is but recently acquired. Not only has interest become widespread amongst the medical profession, but legislators also, aided by representatives of labor, are enacting or propose to enact laws of compensation for the disability caused by this disease.

Considerable confusion exists regarding the various names that have been applied to lung destruction caused by dust. For example, the term pneumonoconiosis is the one usually applied to dust diseases in general, and because of this, is the preferable term because most cases are not due to one particular dust alone, but are a mixture of two or more dusts. For instance, the anthracite miner of Pennsylvania is subjected to two dusts, i.e., silica from the rock and coal dust. Thus he has pneumonoconiosis rather than silicosis. The term anthracosis applies to the pigmentation of the lung caused by the carbon. Siderosis is considered as the damage to the lung by the inhalation of iron dust, but I doubt whether any actual damage to the pulmonary tissues is done. As we shall see, the actual destruction is caused by silica, and the term silicosis is now generally applied for all these conditions although, properly speaking, pneumonoconiosis is correct.

Dusts are classified into two groups, i.e., organic and inorganic. We find the first type of dust in many industries, more especially in the textile trades. Carpet and rug weaving factories are noted for their heavy dusts. Tobacco factories also have some degree of dust of this type. These dusts may cause harm to the workers by: (1) carrying inorganic dust particles along the lung, (2) by acting as a vehicle for the entrance of bacteria to the lung and thus causing an inflammatory reaction, or (3) by setting up a protein hypersensitiveness in the body to this particular dust. This latter condition appears in the form of bronchitis, rhinitis, and headache. In the textile industry it is known as "Shoddy Fever," and generally affects the new worker only. While these various disturbances by organic dusts may be serious or trivial, yet at no time do they cause a definite pulmonary tissue destruction, and for our discussion may be dismissed.

We must, therefore, look to the inorganic dusts as the cause of pneumonoconiosis. Any inorganic dust to do this must contain silica, either alone or in combination. It is amazing the number of industries in which silica may be the main constituent of the dust arising in the process of work. May I mention some of them?

Nearly all forms of mining render a silicosis

* Presented at the Spring Meeting of the Michigan Association of Industrial Physicians and Surgeons, Jackson, Mich., May 6, 1936.

hazard to the workmen, such as gold, silver, lead, zinc, copper, iron and anthracite. There is a high degree of hazard in the quarrying and dressing of granite, sandstone and flint. In iron foundries, particularly in the preparation of moulds for casting and the shaking out of these casts, we find a high silica content in the dust. Sand blasting, pottery manufacture, glass making, sand rock drilling for excavating work, all contribute a silicosis hazard at some stage in the work. I have only to remind you that silica is the chief ingredient in most of our abrasives, and this brings to mind scouring and polishing soaps and powders, sandpaper, sandstone and whetstones, sand blasting, and even some forms of tooth pastes and powder contain silica in a very finely ground state. In recent years the asbestos industry has been included, but this will be discussed later.

In order to have a clear understanding of the disease, we should remember several factors upon which its development depends. The *first* concerns the *size* of the dust particle inhaled. To be effective in its destructive action, all dust particles containing silica must be less than 10 u. in diameter, and the vast majority are certainly under 4 u. This means that the dust which is harmful is invisible. Particles larger than 10 u. cannot be phagocyted and are therefore carried off in the bronchial secretions. The *second factor* is the *density or concentration of dust.* Most authorities report this in the number of dust particles less than 10 u. in the cubic foot. Usually the number runs in the hundreds of thousands or millions depending on the clarity of the atmosphere. The standards of safety set up by various official bodies consider that a concentration of dust less than 10 million particles per cubic foot in which the free silica content is 35% or less to be the maximum limits of safety. Later, I shall discuss several industries and give the comparative dust concentrations that may be found when no prophylactic equipment is used. A *third factor* that is equally important in the development of the disease is the *length of time* to which the workman has been exposed. The duration of time necessary to produce silicosis is naturally affected by the other factors already mentioned, and will therefore vary greatly depending on the industry. Approximate time limits will also be mentioned later for some of the large industries.

In some industries the silica dust is contaminated by the presence of other inorganic dusts which seems to have either a stimulating or a retarding effect on the corrosive action of silica on the pulmonary tissues. Typical of these is that of coal dust which has apparently the effect of retarding silica, and that of alkaline soap in the abrasive soap industry where silicosis frequently assumes the acute form. Thus the problem of silicosis is different in different industries. The individual resistance of the laborer must also be taken into account. Many times I have been puzzled by the apparently small degree of fibrosis in a case where I would normally expect an advanced stage. These occasional cases have been explained by an extraordinary ability on the part of nature to excrete the silica before it can be ingested by the phagocytes and carried into the pulmonary tissues.

The action of silica on the pulmonary tissue is that of a foreign body having a corrosive action. The sequence of changes that occur in the lung following the inhalation of silica dust is readily understood by realizing that silica essentially causes an over-production of fibrous tissue and this in turn causes an entire derangement of the lymphatic drainage of the lung. Silicosis is therefore a disease or disorder of the lymphatic system of the lung. The pulmonary lymphatic drainage is slightly different from the venous drainage. Roughly speaking, we may say that the inner ¾ of the lung drainage is toward the hilum through the peri-vascular and peri-bronchial lymphatics, while the outer ¼ is drained through the subpleural cistern which in turn empties into the larger lymphatics along the inter lobar septa and from thence to the hilum. We shall see the importance of this in a few moments. At the bifurcation of each blood vessel lies a minute patch of lymphoid tissue through which pass these peri-vascular and peri-bronchial lymphtics. These lymphoid deposits act as an important filter to the inward passage of the dust particle.

Pathology of Silicosis

WHEN the dust particle reaches the alveolus it is phagocytosed by large mono-nuclear cells of endothelial origin, which for want of a better name have been called "Dust Cells". These cells are able at first to transport the particle to the neighboring tracheo-bronchial lymph nodes where their further progress is arrested, and the first destructive effect of the dust is noted. The present conception of its action is that silica is acted upon by the alkaline body fluids and slowly dissolves to form a complex colloidal silica hydroxide, which in turn has a highly corrosive action on the nearby cells. Thus we have a minute area of necrosis surrounding the dust particle. Because the conversion of the silica into the hydroxide is very slow we have, for practical purposes, a continuous irritant, and this explains why the simple removal of the worker from the dust exposure does not prevent a continued advance of the disease in the formation of scar tissue. This irritating and corrosive action of silica stimulates the formation of scar tissue in its neighborhood to an over abundance. Naturally, this distribution of scar tissue will depend on the lymphatic drainage. Thus, early in the disease we will see an intensification of the trunk markings and a nodular appearance on the x-ray film from fibrous tissue formation along these vascular channels. These small areas of fibrosis will be seen particularly in those minute areas of lymphoid tissue. With continued dusting these nodules become larger and give a "snowstorm" effect on the x-ray film. Should, however, the exposure to silica be so intense or carried out for a long time the lymphatic drainage becomes so disorganized that dust accumulates in the interstitial tissue and massive areas of fibrosis are formed. That portion of the lymphatic drainage that runs peripherally also carries dust particles, and in the course of time a pleuritis results and dense pleural adhesions are formed. The density of these adhesions is often astounding, and at autopsy they make the removal of the lung very difficult. These adhesions, especially at the diaphragm, interfere with respiration and a characteristic finding of the third stage is the marked irregularity and fixity of the diaphragm. With the continued formation of scar tissue, a marked degree of emphysema develops and, especially

along the mediastinal margins, the alveoli enlarges so greatly that emphysematous blebs are often found at autopsy. In the later stage of the disease there is a partial obliteration of the vascular bed and increased pressure results on the right heart. The whole picture is one of excessive proliferation of fibrous tissue with nature making valiant efforts to compensate by emphysema. Naturally the vital lung capacity is lowered and the extra burden put on the heart, bringing the final picture to one of cardiac decompensation.

Clinically, the disease is divided into three stages, but this classification depends more on the x-ray picture than on the actual clinical findings. Several classifications have been advanced, some of which are very complicated. None of them is entirely satisfactory but the one in general use is as follows.

STAGE 1: Physical signs and clinical symptoms are absent, but the x-ray shows a slight increase in the hilum shadows and perhaps there is a slight restriction of the right half of the diaphragm under fluoroscopic examination. Some claim that a slight haze in the mid-zone of the right lung is indicative, but I doubt whether this is entirely reliable. The x-ray diagnosis at this stage is most difficult.

STAGE 2: Physical signs and clinical symptoms are usually absent although there may be a slight bronchitis and the vital lung capacity is moderately lowered. The x-ray appearance is, however, quite characteristic—nodular shadows distributed equally on both sides in the inner ⅔ of each lung field.

STAGE 3: Physical signs are those of emphysema and moderate bronchitis. There may be a low grade fever but the most prominent sign is that of dyspnea on mild exertion, and some cyanosis. The x-ray picture discloses large patches of fibrous tissue in both lungs, distortion of the diaphragm by numerous pleural adhesions and areas of emphysema, particularly in the apex and at the base.

In acute silicosis, the first and second stages are not often seen because the process is so rapid that large masses of fibrous tissue form directly.

Complications

THE only complication of importance is *pulmonary tuberculosis*. It is a recognized fact that if there has been a pre-existing latent tuberculous lesion the inhalation of silica dust will undoubtedly re-activate it. If, however, the silicosis has been well established, then the secondary infection of tuberculosis will be somewhat limited and tends to be chronic. There is a certain similarity between the two diseases in that both have a predilection for the lymphatic system. If the lymphatics are obliterated or badly disrupted by areas of fibrous tissue, then the tuberculous lesion tends to be hemmed in, so to speak, and we have a fibroid type of tuberculosis. Just to emphasize the importance of this complication let me quote the figures of the Massachusetts Special Industrial Commission. Their findings among industrial workers were that the tuberculosis death rate among granite workers was 33%, and among tool sharpeners was 15%, while the proportionate mortality of males over 20 in the general population was only 7%. These figures apply, of course, to cases of pure silicosis, but sometimes the tuberculosis is modified by a contaminating dust. In the anthracite industry tuberculosis assumes a very chronic form with very few symptoms. This has been attributed to the "protective" action of the coal dust, but the exact explanation is still forthcoming. Where an alkaline dust is found in combination with the silica, as in the abrasive soap industry, not only is the action of silica enhanced, but also, the susceptibility of the worker to tuberculosis is increased.

Diagnosis

THE diagnosis of silicosis, like all other diseases, depends upon a well taken history. It is not sufficient merely to inquire whether the man was working in a dusty occupation. One should know the particular type of work, how long he has been at it, what precautions the company has taken to prevent dust, and what his former occupations have been. Frequently, with a well taken history, a diagnosis can be made with a fair degree of accuracy, and the diagnosis can then be clinched by an x-ray. The roentgenological picture is no doubt familiar to you. A combination of the history and the film is in most cases, sufficient for the diagnosis. Unfortunately, the physical examination of the chest is not of much value. The fibrosis, even when in large masses, gives very few signs because of the overlying areas of emphysema. It is this emphysema that acts as an effectual blanket, and hides the underlying pathology.

About the only problem in differential diagnosis is that of tuberculosis, and usually it is a question of whether tuberculosis is a complication or not. Generally, one can say that the distributions of the shadows on the film are those of silicosis because they have an equal and bilateral distribution, and are found chiefly in the mid-zone of the lung. In distinction, the shadows of tuberculosis have a predilection for the apex and are often unequally distributed. The presence of a cavity is a definite sign of tuberculosis, since we never get excavation in a pure case of silicosis. Just a word of caution in the interpretation of cavities in advanced stages of silicosis:—I have often been misled by the presence of areas of emphysema which are surrounded by patches of fibrosis. The appearance is most deceptive, and frequently the only means of definitely determining the presence of the suspected cavity is by autopsy. However, nearly all patients with cavity formation will show tubercle bacilli in the sputum. In all suspected cases of tuberculosis it is necessary to examine the sputum thoroughly. Just to rely on one or two negative sputum examinations is to have a false sense of security. I have seen many cases of silicosis with cough and expectoration, no fever, and normal weight and working, who are open cases of tuberculosis, and who were, therefore, continually infecting their families. It has been my practice to require at least 10 negative sputum examinations and two 24-hour collection specimens which were examined either by concentration methods or by culture or guinea pig inoculation. Every case of silicosis should be considered as a probable tuberculosis patient until proven otherwise, and even then he is a candidate for an acid fast infection.

Individual Industries

THE hazard of silicosis naturally varies in degree among the different industries in which silica is used. Some industries have more dust than others. Probably the greatest concentration

dust is to be found in hard coal mining where ers and miners helpers may be exposed to as as 232 million particles per cubic foot. For- ately, this dust has only 1½% of silica in it, wever, the rock drillers in the anthracite mines an average exposure of 82 million particles per ic foot, and the silica percentage is up to 31. is explained by the fact that the rock in that ion contains about 31% free silica. Usually, it es about 20 years for the regular miner to de- op a second or third stage silicosis, but the rock ller, on the other hand, will show a third stage s short a time as three years. For some reason other silicosis is not seen to nearly the same ent among the soft coal workers as we see it in anthracite region. There are probably 100,000 ers in the anthracite area, and you can under- nd that silicosis is quite a problem with us.

The asbestos industry has come in for much ention in recent years. The action of asbestos the lungs is similar to that of silica and in com- sition asbestos is a magnesium aluminum silic- with traces of iron. The destructive effect is as serious as pure silica, but it is supposed that bestos undergoes changes in the lung quite like ose of silica, only slower and that asbestosis, as it called, is a true silicosis. The most dusty as- stos occupations are to be found in the factories, pecially where the mineral is broken up and fin- ly woven into the numerous materials with hich we are familiar. The disease rarely ad- nces to the third stage. The one unique feature its pathology is the presence of the so-called sbestos bodies". These are highly refractive odies about 20 u. to 100 u. long. They are yellow- -brown in color and do not take any stain. In ape the bodies may be clubbed, and they give a russian Blue reaction for iron. In fact, it is be- ved that they are partly caused by the iron that found with the asbestos mineral. The finding hese bodies either in the sputum or at autopsy, nfirms the diagnosis of asbestosis. There is the me frequency of tuberculosis in asbestosis as in ilicosis.

One of the great uses of silica is as an abrasive. ecause of its hardness, it lends itself particularly ell for this purpose. One of the chief offenders is e sandstone wheel, and under its use there is med a constant stream of silica dust. Metal ust is also formed, but it does no damage. Tool inders may be subjected to a dust concentration as high as 20-30 million particles per cubic foot. ome grinders have shown a third stage silicosis fter five to eight years' occupation. The use of ater on the stone in tool sharpening is of very ittle value. In a British study of 500 grinders who ad worked at this occupation for 21 years there ere 73% who had silicosis. It is now advised hat the carborundum be substituted for the sand- tone wheel because it is not nearly so dangerous, his, because it does not wear away so quickly and s very much less free silica.

Silica is also used in the form of sand blasting. eedless to say, this exposes the worker to a real ilicosis hazard. In the iron foundry, the use of and in casting causes quite a high concentration silica in the atmosphere, particularly in the aking out of the casting and cleaning the casting. n Massachusetts, a study of these conditions re- ealed a dust count as high as 200 million for the and chippers and 84 for the sand slingers. In lass manufacture, the hazard of silicosis may be high and also in certain parts of the pottery works. Each industry is a study in itself.

The more one studies the subject of silicosis the more one is amazed at the innumerable uses that modern science has developed for this seemingly inert substance. All the way from astronomical telescopes to tombstones do we find silica.

Treatment

I THINK we all realize the seriousness of silicosis, and naturally our problem is how to prevent it. This can be done in one way only. That is to remove the dust at its source. Vacuum dust removal equipment is the only way to insure against this danger. Standards of safety require that dust counts be kept under 10 million per cubic foot. The use of face masks, except where a definite supply of fresh air is given continually, is of no use. Those small face masks that cover the nose and mouth and contain a wet sponge are dangerous because they do not prevent the dust from entering the lung, and give a false sense of security.

Once the disease has gained a foothold, the man should change his occupation, but even this will not stop the gradual formation of fibrosis in the future. In the advanced stage, the patient should be put to bed, and if possible, given sanatorium care. In this way the cardiac reserve can be improved, and the patient made more comfortable. The seriousness of silicosis as an industrial hazard requires our careful consideration and study just as much as any other major problem.

Traumatic Derangements About the Ankle Joint

By M. T. KOVEN, M.D., F.A.C.S.,
and
H. E. BELLER, M.D.
Brooklyn, N. Y.

MANY traumatic mechanisms about the ankle joint are incompletely understood and often are inadequately treated. We shall attempt to classify the most important derangements while integrating where possible the manner of their causation and the lesions produced and methods of treatment.

The three chief factors which determine the type of injury in and about the ankle joint are the force of the impact, the obstacle, and the position of the foot when striking the obstacle. Thus, running or jumping proportionately increases the force, while the relation of the position of the foot impacting against an obstacle to a large measure determines whether the foot inverts or everts.

In the discussion to follow, one notes that the astragalus appears to play the most important role in the anatomic consideration. From its position it is the pivoting bone buttressed between the ankle joint and the foot. Hence, it is essential to review some features of the astragalus. Superiorly, its articulating surface narrows from the anterior to the posterior portion and articulates with the tibia. In complete dorsiflexion the wider sides are wedged firmly against both malleoli. In plantar flexion this mortice is insecure because of the space between its posterior lateral walls and the malleoli.

* Read before the Association of Traumatic Surgeons, New York City.

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Industrial Medicine

for

Physicians and Surgeons in Industry

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Thinner	...	2
Trauma	6	9
Trichlorethylene	1	1
Trisod. phosph.	7	5
Turpentine	12	7
Unknown	...	2
Varnoline	1	...
Vegetable	8	...
Water	3	...
Zinc chloride	...	1
Zinc sulfide	3	...
Total	610	566

Dusty Death

THERE is a sinister ghost that stalks every industry — a ghost whose name itself is forbidding. It is called "pneumoconiosis" and it is quite as dangerous as it sounds; dangerous in more ways than one.*

Pneumoconiosis is the general scientific term applied to describe all types of dusted lungs. Its literal translation is "a dusted lung". As a generic or family appellation it embraces the diseases which may result from inhalation of any sort of microscopic particles, common or rare.

In industrial practice, of course, there are four principal sub-divisions of pneumoconiosis which occur with sufficient frequency to make them the subjects of this short general symposium. The first of these types, and perhaps the most commonly encountered is silicosis.

What is silicosis? It is a disease of the lungs in the progress of which there is a gradual replacement of the normal elastic by unyielding inelastic fibrous tissue. Its cause is the intermittent or continuous breathing of microscopic particles of silica dust or sand for varying intervals of time. This causes an increase in the volume of fibrous tissue in the lungs which, in turn, is marked by shortness of breath and decrease in lung expansion with a resultant susceptibility to tuberculosis.

Asbestosis is caused, as the name implies, by the inhalation of microscopic particles of asbestos dust. This type of pneumoconiosis produces a definite and general fibrosis of the lungs. That is to say, a large volume of fibrous tissue is developed in the lungs as the result of the chronic inflammatory condition induced by the presence of asbestos dust. The problem of treatment becomes involved because, instead of normal tissue which is diseased, it is necessary to deal with tissue chronically inflamed by this unusual causation. Fibrosis of the lungs set up by asbestos dust inhalation is as serious to the point of disability as silicosis but, so far as our present clinical experience goes, not nearly so frequent in occurrence.

Cementosis is a vague term which I have been unable to discover in the literature of pneumoconiosis though it has considerable current lay usage. I am of the opinion that it originated in the minds of imaginative lawyers to enable them to bring action against a great industrial organization (Case 1). The physician employed by the attorney gave, as his diagnosis, a statement to the effect that the man's condition was due to inhalation of cement dust during a period of seven years.

Anthracosis, as seen from its composition, is the designation which classifies pneumoconiosis contracted from breathing coal dust or microscopic particles of carbon. These particles are present, of course, in the atmosphere of any populous center where coal consumption is heavy. Men who work in or about mines and coal yards are the logical victims of its attack.

In general, however, it is preferable to use the generic term pneumoconiosis to label any form of dusted lungs. Perhaps it is well to emphasize the fact that silicosis can be contracted only by breathing microscopic particles of sand or silica dust. Clinically and medicolegally, silicosis has no distinct cause or effect relationships with the other forms of pneumoconiosis.

Silicosis makes its appearance among workers in industries whose atmospheres contain microscopic particles of silica. The word microscopic must be repeated frequently in this text because it most aptly defines these extremely minute insoluble bits. It is common practice to consider as harmful only those particles which have diameters smaller than 10 mm. Since a micromillimeter is equivalent to 1/25,000 of an inch, it will be seen they are so small that they must be counted or studied under the microscope.

A great deal of interesting and effective work has been done in industry to protect those employes who devote their entire time to sharpening tools on grinding stones. It was thought, at one time, that water poured continuously over the stones would eliminate the free silica particles which result from such operations. Tests have proved on the contrary, that the application of water actually heightens the hazards because the particles in suspense in the liquid are thrown to distances greater than those attained by the ordinary resultant dust.

Probably the sand-blaster is the worker who undergoes the greatest risk in following his occupation. We have known for a long time that men so engaged must have protection against flying dust and scale. More recently we have realized that the microscopic particles set free by sand-blasting activities are really more dangerous and call for more studied defenses than the visible.

The dusts occasioned by grinding and sand-blasting operations may be divided into two general classes, soluble and insoluble. It is needless to elaborate the divisions excepting to say that soluable dusts are relatively innocuous. Insoluable dusts, unfortunately, are always present and always dangerous because they usually occur in highly concentrated proportions—a fact, previously mentioned, quite as evident when wet process grinding wheels are employed.

It may be interesting to industrialists to know what actually happens to inspired dust. Remember, now, that we are concerned with these micromillimetric particles discovered only under the microscope. This dust is inhaled through the nostrils and mouth into the trachea. Thence it passed into the bronchi and from there into the air cells and the mediastinal glands.

These glands are designed by nature

*R. Rossiter Dyer, in General Manufacturing District Magazine, February, 1933.

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V other BC Notes on Ind. Medicine 1936-1999

April 9, 1997

Re: **Industrial Medicine**

I've spent three days reviewing back issues from 1936, 1938, 1939, 1942, 1949, and part of 1943, probably 3000-3500 pp.

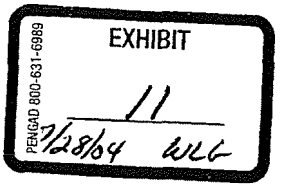
1. To readers in the 1930s there were periodic mentions of asbestosis, in articles on dust diseases and workers' compensation, etc. This is from two years of the journal in the late 1930s, at a time when corporate America was relatively anxious about dust diseases:

AJ Lanza "Asbestosis" 5: 90, 1936.
RW Childerhouse, "Clinical Aspects of Silicosis" 5:224, 1936.
H Behneman, "Silicosis Pneumoconiosis" 5:400, 1936.
LU Gardner, "Essentials in the Diagnosis of Silicosis and Tuberculosis" 5:453, 1936.
JW Reed, "Silicosis" 7:310, 1938.
CO Sappington, "Medicolegal Trends: Occupational Diseases" 7: 331, 1938.
H Higburg, "Occupational Disease Compensation" 7: 364, 1938.
CD Bridges, "Practical Problems Under Blanket Coverage for Occupational Diseases" 7: 390, 1938.
(advance conference announcement) "Industrial Hygiene: A.P.H.A. ... "Asbestosis" talk by Sayers and Dreessen, Lanza leading discussion) 7: 589, 1938.
"Postgraduate Course in Industrial Hygiene" includes two talks on asbestosis, one led by Paul G. Bovard, *Pittsburgh Plate Glass.* 7: 549, 1938. Other talks by EC Barnes and TL Hazlett of *Westinghouse. 7: 549, 1938.*
ER Hayhurst, "New Books" ref to ILO's encyclopedia supplement new/revised chapters on asbestos and pneumoconiosis. 7: 592, 1938.
CO Sappington, "Industrial Hygiene Meetings" reports on RR Sayers' presentation at APHA on his study with Dreessen. Summary of presentation on 727 has cautionary modifier not included in the published report (which defendants sometimes use): " A concentration of 5 MPPCF is considered as a tentative threshold." Another speaker was C Selby, consultant to *General Motors.* 7: 723, 1938.

There was also a long piece on history of industrial medicine by T Legge, first Medical Inspector of Factories in Britain in the 1890s, with this unreferenced sentence: "A Fiel published a report on asbestosis in an asbestos worker in 1872." 5: 375, 1936. Having never heard of Fiel, I have sent word to a former thesis adviser now at the National Library of Medicine, to start looking for it.

2. Company notes:

Chrysler set up Industrial Hygiene Laboratories on Jan. 1, 1936 at the Dodge Main Plant in Detroit (5: 51, 1936)
Chrysler Medical Director in Detroit was John J. Prendergast. (7: 347, 1938)
After Met Life's Fehnel talked on asbestos sampling technique, election of Amer. Ind. Hyg. Assn. officers took place for the first time, and *Chrysler* I.H. Gordon Harrold was elected to a post. (8: 301, 1939)
Selleck and Whittaker 50th anniversary book of IMA in 1962 says Dr. Carey McCord was medical adviser to *Chrysler* in 1937 (p. 280) and 1949 (p. 411).
WJ McConnell of *Met Life* listed an impressive array of non-governmental programs in "investigation and prevention" including 5 employers: *Chrysler, DuPont, General Motors, Union Carbide, and Westinghouse.* (8: 70, 1939)
Saranac's Dr. Gardner spoke on "The Pneunoconioses" at a symposium on industrial medicine also taught by *Chrysler*'s Carey McCord and John Prendergast, *DuPont's* Foulger, *General Motors'* Selby, Brooks, and Bird. (11: 395, 1942)



Westinghouse Medical Director T. Lyle Hazlett and I.H. Edgar C. Barnes were often mentioned (See Postgraduate Course, WJ McConnell above, plus:)

"Medical-Engineering Control of Industrial Health Hazards" article by Hazlett describes removal of the source and protective devices as engineering safeguards against occupational hazards. (5: 232, 1936)

Industrial Hygiene Course offered by *Westinghouse's* TL Hazlett, quite detailed outline. (7: 194, 1938)

Westinghouse X-Ray Co. Long Island City, NY offered "litigation proof" device for taking employee X-rays (is this part of big Westinghouse?). (7: 449, 1938)

National Assn. of Manufacturers "Committee on Healthful Working Conditions" included 10 company docs, among them: Hazlett *(W'hse)*, Gehrmann (*DuPont*), McConnell (*Met*), Selby (*GM*), and Shoudy (*Beth Steel*). (7: 541, 1938)

AAIPS (old name of co. docs' group, Amer. Assn. of Indust. Phys. & Surg.) annual mtg. in 1939 had *Met Life*'s Fehnel on asbestos air sampling in a program with Barnes speaking as well. Another speaker was Frank Patty, who soon after went to *General Motors* and authored a lengthy I.H. text in 1948, revised 1963. Other speakers were Shoudy (*Bethlehem Steel*), Selby (*GM*), Irish (*Dow*), (*GE*), (*Kodak*). (8: 200, 1939)

Hazlett continued to be involved increasingly in industrial medical education in 1942 as part of the War effort. (11: 115, 419 and 484, 1942)

Westinghouse industrial hygienist EC Barnes wrote about "Analyzing Working Environment" in the company's publication, **Safety News** in Sept. 1942. (11: 603, 1942)

Hazlett clearly had access to the Board Chairman of *Westinghouse,* who awarded him the Westinghouse Order of Merit in July 1942 (11: 391, 1942)

(See also last two G.M. entries below)

Bethlehem Steel Dr. Loyal Shoudy and Dr. Floyd Shaffer were on the program of the AAIPS/NSC joint program at the Natiponal Safety Congress in 1936 along with speakers Hunt and Lanza who mentioned asbestosis (BC 4th Ed. p. 735-736). So was Dr. McIver Woody (*Std. Oil NJ*) (5: 441, 1936)

Shoudy and Shaffer were also on the Board of Directors of AAIPS and on the publication committee for **The Bulletin**, which I understand was subsumed by **Industrial Medicine** around 1939. I have never seen this journal and am checking forit at Nat'l Library of Medicine. (5: 275, 1936)

Charnock of *Beth Steel* described the firm's industrial medicine and hygiene activities. (18: 332, 1949)

(See also last two entries above under Westinghouse for ref. to BSC)

General Motors employed Dr. Clarence Selby from 1934 until 1949 as medical consultant. (7; 278, 1938; 18: 6, 1949)

Selby was a pillar of the industrial medicine establishment, see above CO Sappington and last two Westinghouse entries. Also:

Selby was among the speakers at first General Motors Corporation Medical Conference in 1938. (Aug. 1938)

Selby was on the AMA Council of Industrial Health organized in 1937 (along witrh Lanza of *Met Life* and Gardner). (7: 276, 1938)

General Motors gave Saginaw General Hospital in Saginaw MI an industrial medicine library in early 1949, including journal subscriptions and more than a dozen books that spoke about asbestos hazards, including: Hueper's 1942 book on occupational cancer; Wampler's text in 1943 (chapters also contributed by Foulger of *DuPont* and Hazlett of *Westinghouse*); and Collier's 1941 text that cites "maintenance of steam pipes" as hazardous. (18: 107, 1949)

1949 (11th) General Motors Medical Conference included author/industrial hygienists Frank Patty and Vincent Castrop (BC 4th Ed. p. 546), medical consultant and **Industrial Medicine** editor Dr. Clarence Sappington, CD Selby, UK Medical Inspector of Factories T. A. Lloyd Davies, *Westinghouse*'s TL Hazlett, and several dozen G.M. doctors. (9: 353, 1949)

DuPont Medical Director George Gehrmann's presentation "Industrial Medicine and Toxicology" describes many ways toxic substances cause harm. He refers to silicosis as "chronic, progressive, and incurable." (5: 204, 1936)

DuPont Haskell labs director John Foulger was on a program at Harvard where Drinker and Clark discussed asbestosis. (5: 550, 1936)

Gehrmann and Foulger joined other corporate experts, including Hamlin (*American Brake Shoe and Foundry),* Shoudy (*Beth Steel*), Woody (*Std Oil NJ*), and Hall (*General Motors*), as instructors in industrial medicine. (11: 484, 1942)

Gehrmann and Foulger were clearly among the inner circle in industrial medicine and toxicology (see numerous entries above).

Hercules Powder Co. Medical Director Lemuel McGee spoke on "Other Occupational Disease Factors" at the National Safety Congress Oct. 29, 1942 (11: 490, 1942) and at the American Industrial Hygiene Association in 1943 (12: 86, 1943).

Railroads. Editors of **Industrial Medicine** in 1936 included BL Coley of *New York Central System*, JG Frost of *Chicago and Eastern Illinois Ry. Co.*, as well as some insurance industry docs, etc. The journal claimed to be the "official publication" of Amer. Assn Railway Surgeons, Assn of Surgeons of New York Central System, Assn of Surgeons of Southern Railway System. (5: 461, 1936)

Other RR groups whose meetings were announced in the journal were Pacific Assn of Railway Surgeons, Texas Railway Surgeons Assn. (Galveston, 5/9/38)

Another journal I would like to examine is **Medical Bulletin** published starting in 1932 by *Std. Oil NJ* (8: 122, 1939). See ref to Meyer and Church article in this source in 1961, BC 4th Ed. p. 411. Also seeking that at Nat'l. Library of Medicine.

I have just gone through 4 old volumes of **Industrial Medicine** in the Hopkins medical library and have found these things on DuPont:

1. DuP Med Dir George Gehrmann's presentation "Industrial Medicine and Toxicology" shows sophisticated awareness of the ways toxic substances kill people. He refers to silicosis as "chronic, progressive, and incurable". (5:204, 1936)

2. At a symposium at Harvard later in 1936, DuP's Dr. Foulger spoke on a program with others including Drinker and Clark who discussed asbestosis. (5: 550, 1936)

3. In 1938, the National Association of Manufacturers set up a select committee of company medical men, and one of those included was Dr. Gehrmann. Others were Hazlett (Westinghouse), Shoudy (Beth Steel), Selby (Gen. Motors, and McConnell (Met Life).

4. In 1939, McConnell listed the non-governmental programs in occupational health. The 5 "employers" noted were "duPont, Union Carbide and Carbon, Chrysler, General Motors, and Westinghouse." (8: 70, 1939)

It is fair to conclude from this that DuPont was a leading industrial firm in occupational health, that DuPont doctors, including Foulger at the chemical company's Haskell Laboratory for toxicology and industrial medicine, were aware that asbestos was a dangerous dust in the 1930s. DuPont officials were regular speakers at professional gatherings, and the company's leaders and program in this field were accorded the highest recognition by their peers in industry in the late 1930s.

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→ John Crane

Dust as an Industrial Health Hazard

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THE health problem arising from dust in industry is one of increasing seriousness. Socially, economically and legally it has become evident that immediate steps must be taken to combat the hazard represented by wholesale industrial exposure to the pneumoconiosis-producing dusts. Pneumoconiosis, in many of its forms, is incurable. Thus consideration of the problem which it represents is based largely on methods of dust reduction and removal and is therefore as much a responsibility of the engineer as it is of the physician.

Fortunately, medical knowledge and engineering equipment have progressed to such a point that recognition of hazardous conditions and availability of methods for correcting them will now permit a complete, practical and economical solution of the problem. Unfortunately, prejudice and fear have surrounded the entire subject with such an aura of suspicion and distrust that neither workmen nor employers have until recently been willing to acknowledge the hazard or recognize the need for preventive measures. In addition, the slow action of the disease coupled with failure on the part of many physicians to acquaint themselves with the proper diagnostic methods has made it difficult for the worker to establish his claim for compensation in the event of lung injury and equally difficult for the employer to defend himself against fraudulent claims; it has been said that silicosis claims constitute one of the most widespread of legal rackets.

Workmen have bitterly opposed adoption of the exacting employment qualifications and periodical physical examinations of those exposed to dust which are essential to medical control. Yet, it is essential that persons having a predisposition to tuberculosis or a low nasal filtering efficiency be excluded from the dusty trades. Similarly, protection of the worker demands that he be removed from exposure at the first indication of lung damage.

Employers, on the other hand, have adopted the point of view that most claims of silicosis are unfair and an unscrupulous attempt to take advantage of them. The explanation behind an employer's unwillingness to acknowledge the hazard is not unreasonable. The dust diseases are almost invariably of long duration and frequently are not discovered until many years after exposure has ceased. Thus many employers are now in the difficult and alarming position of facing claims for disease which is a result of exposure to conditions that existed in their plants 10 or 15 years ago; at that time they were unaware of the health hazard associated with dusty atmospheres and consequently, though they might have had every desire to furnish their employees with full protection from occupational injury, they did not take the "special care" which is now known to be necessary. Wilson states: "Most well-intentioned employers may be said to have used 'reasonable care' in past years and—considering their lack of knowledge—this is now their best defense in damage suits. However, from now on, with the spread of . . . available knowledge . . . only 'special care' will safeguard the interests of employer and workman alike."

Recent interest in dust diseases has built up an extensive literature; theories have been confirmed with experimental evidence and innumerable case histories of individuals and of entire groups are available. In contrast to the widespread ignorance of ten years ago, it would probably be difficult at the present time to find a worker in the dusty industries who has not at least heard of silicosis, or an employer who is unaware of the crippling damage suits which will face him if his employees, through failure on his part to take the necessary preventive measures, contract the disease.

The cost of dust control is often far less than the cost of one damage suit. Jury awards in silicosis cases of $10,000, $17,000, $22,500, $25,000 and like sums are matters of record. In the St. Louis area alone there were, some time ago, over 2000 suits pending. A Missouri mining company, as another example, faced claims aggregating $5,000,000 and spent $500,000 in out-of-court settlements of a few of them.

The purpose of this article is to review the literature on the physiological effects of some of the hazardous industrial dusts and to summarize present-day criteria acceptable as a basis for the design of dust control systems.

Silicosis

Silicosis is a disease of the lungs caused by the inhalation of dust containing free silica. Some authorities believe, but this fact has not been established, that the inhalation of silicates is also a causative factor.

Incurable and Progressive. The important facts about this disease are that, for practical purposes, it is progressive and incurable. The qualification "for practical purposes" is necessary because recent investigations suggest that uncomplicated silicosis is not progressive; however, the continued existence of a case of silicosis without the onset of complications is so rare that, from the standpoint of social consequences, the disease can in itself be regarded as progressive. In the medical literature the "progressive"

viewpoint is the one which has been most widely adopted but the possible future significance of the recent findings is promising.

With reference to the "incurability" of silicosis, recent work has also indicated the possibility of a solution but it is as yet too soon to hold out hope for satisfactory medical treatment. One promising method consists in the administration of thyroxene; the investigators report that:

> "Thyroid therapy may possibly not only prevent the development of silicosis, but may also arrest its further progress and possibly reduce to some extent the degree of fibrosis already existing."

The above remarks on the "progressiveness and incurability" of silicosis have been included because they show how very far the medical profession has yet to go to achieve a solution of the silicosis problem. In terms of concrete present-day gain, the sum total of the best that medicine can now offer is not of much value. When dealing with contagious diseases such as smallpox and Spanish influenza, it has been possible to achieve a satisfactory treatment as a first step toward the elimination of the disease itself; in the case of silicosis, a non-contagious disease, the only advance of real significance which is possible is an advance which must be brought about by the application of basic engineering principles—the reduction of dust concentrations at the breathing zone to a point such that a health hazard no longer exists; only in this way can silicosis be eradicated.

If permitted to run its course without complication, silicosis will lead to death by suffocation—the lungs becoming incapable of maintaining a gas transfer sufficient to sustain life. Usually, however, termination occurs as a result of complications such as tuberculosis or heart disease; a definite correlation has been established between silicosis and tuberculosis, but an explanation is, as yet, lacking.

With reference to tuberculosis a study of axe grinders and polishers showed a death rate of 1,900 per 100,000 from tuberculosis as contrasted with 150 per 100,000 for the general population of the same state. In this study the death rate of all workers in the dusty trades investigated was used. More striking figures and more significant ones were obtained from a Massachusetts investigation in which the tuberculosis death rate of 961 silicotic quarry workers was compared with that for the general population and found to be forty times as great.

Background and Extent. The name silicosis is of relatively recent origin, but the existence of the health hazard associated with dusty work has been recognized by medical men for many centuries. From the literature of the period we find that the Ptolemies knew of it. Pliny the Elder referred to the "stone cutters' disease" and devised a crude respirator for the protection of miners; Aristotle warned Greek workmen against the inhalation of dust. Hippocrates, three centuries before Christ, noticed that his surgical knives were dulled by dust in the lungs of stone workers. In the 16th century Georges Agricola, a mining engineer, wrote "De Re Metallica" and, with reference to dust, warned his readers to beware because it "penetrates into the windpipe—eats away the lungs—implants consumption in the body." He called attention to the fact that the death rate among Carpathian miners was so great that a wife could often outlive six husbands.

The passage of time has done little to alleviate the hazard. The development of pneumatic tools has led to a great increase in the dust concentrations attending the grinding, polishing and cutting of stone. The death rate among Barre granite cutters, for example, increased from 1.5 per 1,000 in the year 1890 to 19.6 per 1,000 in 1924, an increase attributable to the introduction of pneumatic equipment. When one realizes that a threshold concentration of 5 million particles per cubic foot is required to constitute a silicosis hazard (for dust made up of 100% free silica), it is then evident that there are many industrial operations today which represent health hazards that did not exist prior to the introduction of mechanical equipment.

Many estimates have been made of the number of persons exposed to hazardous concentrations of silica dust, but such estimates are usually based only on industrial exposure. When account is taken of the fact that 60% of the earth's crust consists of silica the likelihood seems great that such estimates are conservative. Lanza and Vane estimated that the number of industrial workers exposed to the silica dust hazard is in excess of half a million in those industries in which the processing or handling of siliceous material is of basic importance; this estimate does not take account of the many workers exposed as a result of the industrial use of silica as a filtering agent.

In one other respect the silicosis hazard has not yet been evaluated. As already mentioned there is a definite relationship between silicosis and tuberculosis. This fact leads to the probability that in any community in which there is a large number of silicotics there will be a decided familial tuberculosis hazard. Fortunately, however, this danger is somewhat lessened as a result of the long incubation period which is found with silicosis—by the time a workman's lungs have reached the stage at which tuberculosis is most likely to set in it is more than probable that his children will have grown past the age at which the danger of their contracting the disease is greatest.

That silicosis is definitely related to a particular kind of occupational risk is demonstrated by the data from examinations (X-ray) of 2500 workmen from all departments of a typical "heavy industry"; 5.8% had silicosis, but 90.0% of those affected were foundry workers. The great importance of the silica hazard is clearly indicated from the following comparative mortality figures (from a 1933 publication of Hollis and Yule):

1000 for standard population (all causes for ages 20-65)
1984 for silica group
967 for non-silica group

The silica group (above) showed only three causes of death (diabetes, appendicitis, digestive diseases) which did not differ significantly from the general group. The significance of these figures is at once apparent when it is considered that an estimated 110,000 workers in the United States have silicosis in some degree.

Development of the Disease. The time required for incapacitation due to silicosis has been the subject of a great deal of attention, but as yet no generally accepted conclusions have been reached. Apparently the period of exposure preceding contraction of the disease is a function of the dust concentration, nature of the dust, nature of the work and individual physical idiosyncrasies. From a study of 9,800 stone-cutters in the Ruhr it is concluded that 13 years exposure are required to show slight silicosis and 20 years to cause incapacitation. This same study reveals that 63% of the deaths among silicotics occur from tuberculosis complications. In porcelain workers silicosis develops slowly but progressively; the second stage is usually not reached until after 10 years. Among sandstone workers the minimal exposure has been found to be 11 years while for iron miners an exposure of 4 to 5 years may be responsible for the appearance of lung changes 4 to 8 years after the exposure has ceased. In contrast to the above relatively long incubation periods are those found among workers engaged in sand-blasting and in the manufacture of abrasive soaps; in these occupations only 3 or 4 years may precede the onset of the disease. Likewise, an examination of 175 men engaged in rock drilling showed that 50% were affected in less than one year.

There is a good reason for believing that under particularly heavy dust concentrations silicosis takes an acute form and may appear after an exposure of only a few months. Not soon forgotten will be the case of the Hawk's Nest Hydro Plant on the New River. Some 4000 workers, mostly negroes, were employed for wages of $3.00 for a 13-hour day; in a relatively short time after completion of the tunnel work 475 of them were dead and an estimated 1500 others incurably ill. This case was investigated by a committee in the House of Representatives before whom witnesses testified that, "In the tunnel 10 drills were in operation at once and you could not see ten feet ahead of you even with the headlight of the donkey engine". Workmen were so thoroughly covered with a silica dust that "you could not tell a white man from a colored man, 15 feet away". It was this case that a senator from West Virginia described as "the most horrible industrial disaster in the history of the world". It was of this case that Representative Marcantonio of New York charged that 169 workers had been buried unidentified because the undertaker had "lost" his records. On the basis of all evidence which has yet been brought forward it would seem to the impartial investigator that the Hawk's Nest Tunnel should remain a tragic reminder to the engineer of the need for consideration of human values in the solution of engineering problems.

The above case is only one of a number of similar but less sensational cases which have shown that there is a real possibility of contracting an acute form of silicosis if work is in an atmosphere having an extremely high concentration of siliceous dust. Experimentally the possibility of acute silicosis has been demonstrated by laboratory tests on animals; for exposures of eight hours a day to concentrations of 200 million particles per cubic foot or more it has been shown that the last stage of silicosis may be expected in a relatively short time.

Size of Hazardous Dust. The importance of particle size in determining the hazard associated with dusts has received a great deal of attention. Particles 25 to 30 microns in size will usually settle out rapidly and are therefore not likely to be breathed in quantities sufficient to constitute a hazard. However, particles of this magnitude (such as pollen of the Giant Ragweed or wood dust in carpenter shops) may be responsible for hay fever or for various types of asthma. In general, particles greater than 10 microns are caught in the trachea, large bronchi and mucous membrane. Particles around 5 microns go to the respiratory tract, but few of them reach the alveoli where the 1 micron particles are most numerous. Policard made a detailed examination of the lungs of two silicotic miners and found that 50% of the particles were less than .4 micron and 75% less than 1 micron; his findings should be used with care, however, because it is very probable that the dust distribution in the lungs is a function of the distribution of particle size in the inhaled dust—thus Policard's findings may be applicable only for the conditions under which the men whose lungs he examined had worked. The smaller particles are obviously the most dangerous since, on a weight basis, they offer a much larger surface than do the larger ones. For this reason dust counts are of more value in evaluating the hazard associated with a dusty environment than are gravimetric dust determinations.

The dust particles that are most effective in the causation of silicosis are of a magnitude so small that they are not perceptible to the human eye. A micron is 1/1000 of a millimeter or about 1/25,000 of an inch. As has been shown, the particles most important in silicosis are in the neighborhood of .5 micron or 1/50,000 of an inch—this represents a dimension of the same order of magnitude as the wave length of that form of radiant energy which we recognize as light. If one cubic inch of quartz were broken into cubes .5 micron on a side enough particles would be formed to create a silicosis hazard in a 250,000 cubic foot space.

The determination of mean dust sizes was the purpose of a series of comprehensive studies conducted by the U. S. Public Health Service: examination of 18,000 outdoor dust particles showed the median size to be .5 micron—nearly all were less

than 1.0 micron; in contrast, only 21% of 6,000 industrial dust particles were less than 1.0 micron, the majority being between 1 and 3 microns and the mean 1.5 microns.

Hatch and Moke investigated foundry dusts and found that composition is a function of particle size: the proportion of combustible matter and acid soluble iron, carbonates, etc., increase with decreasing size; the proportion of clay and other silicates varies without a definite trend with size; the quartz becomes less as the size decreases and for particles under 2 microns (which comprises 90% of the total number) it is from 1/5 to 1/25 of that found in the particles greater than 10 microns. These findings emphasize the necessity of taking dust samples directly from the contaminated air and not utilizing "rafter" or any other kind of settlement sample which does not contain a representative size distribution.

Hazardous Concentration. Permissible concentrations of dust vary with size, composition, and the dust retention characteristics of the individual. The latter factor is one which offers some hope from the standpoint of preventive medicine. Practically all that is known of the dust retaining characteristics of the human nose is attributable to the work of one man—G. Lehmann. This experimenter has shown that the dust fixation in the nose varies from 2% to 75% and is almost completely independent of such factors as the condition of the nasal secretion, the rate of air currents, the degree of concentration or chemical composition of the dust, the width or narrowness of the nasal passages; seemingly, fixation is a function of the vortex formation and rebound after passage through a restriction.

A correlation between fixation and silicosis would seem to follow from the following tests: Of 46 stone cutters with fixations above 40% only two were found to have silicosis; of 31 stone cutters with fixations less than 29% only 2 were healthy. After examining the above data Lehmann concludes that, "applicants for work with poor dust fixation capacity should not be allowed to work where a menace of silicosis exists".

As a result of 418 experiments with magnesium oxide and calcium carbonate, Carlton E. Brown gives the following relationships between dust retention and other factors:

Per Cent Retention is inversely proportional to
1. Respiration rate for rates below 20 per minute. An increase above 20 per minute is apparently followed by no changes in per cent retention.
2. Minute-volume of air breathed. This probably results from increase in respiration rate with minute-volume.

Per Cent Retention is unaffected by
1. Volume per respiration.
2. Vital capacity.
3. Relative humidity.

The same investigator found that the percentage of magnesium oxide retained during normal breathing while at rest varied little from about 60% at a concentration of 10 mg. Above 10 mg. the retention changed but little, but as the concentration dropped below 10 mg. the retention rapidly approached 100%.

The relation between dust concentration and the incidence of silicosis has been studied by many investigators, but no general empirical relationship has as yet been established. One commonly used rule (proposed by Drinker) recommends the acceptance of 5 million particles per cubic foot as the minimal permissible dust concentration for pure silica and 50 million particles per cubic foot for dusts that are very low in silica. Some evidence suggests that this rule is unduly conservative for dusts which contain little silica and an alternative which is widely used is to limit the total dust count to a value such that the product of the dust concentration by the percentage of silica be less than 5,000,000; this rule gives 100,000,000 particles per cubic foot as the minimal concentration for non-siliceous dusts.

Physiological Effect. The lung condition known as silicosis results only from the inhalation of silica-bearing dusts. Why silica possesses the ability to bring about this condition has been the subject of much investigation and theories of silicosis are at present responsible for considerable controversy. Physiologically—excluding the effect of complications—silicosis affects the normal functioning of the body in the same way that the formation of scale affects the efficiency of a heat transfer device. In the heat exchanger the hot and cold fluids are separated by an exchange surface and the deposit of scale on this surface reduces its effectiveness as an exchange medium. If the scale becomes sufficiently heavy it will be impossible to secure the transfer of enough heat to accomplish the purpose for which the exchanger was installed; similarly, the lung is a surface through which oxygen is transferred from the air to the blood. The formation of scar tissue reduces the effective transfer area and eventually the lung is unable to accomplish its purpose—death from suffocation is the result.

Asbestosis

Asbestos dust is second only to free silica in the magnitude of health hazard which it represents. Asbestos is a fibrous material of varying composition, but is usually made up of approximately 43% magnesia, 40% silica and 14% water. Oxide of iron is frequently present and appears as dark particles among the translucent fibers—the fibers are of such length and fineness that cloth weighing less than 8 oz. per square yard has been made from them.

The lung condition resulting from the inhalation of this dust is known as asbestosis and resembles silicosis in its main clinical aspects, but differs due to the enhanced rate of development. Under average industrial conditions the length of employment in fatal cases is only about one-half that which is usual

for silicosis. It is estimated that there are in the United States approximately 10,000 men exposed to this hazard as a result of work in the insulating, asbestos cloth, and similar industries. As is true of the silicosis exposure estimates, this figure does not take into account the number of persons exposed as a result of employment in the process industries where asbestos finds use, under various trade names, as a filter aid. In one respect asbestosis is less deadly than silicosis—that is, there is seemingly a lower susceptibility to the supervention of pulmonary tuberculosis. The danger of contracting the disease is apparently not influenced by either age or sex. Like silicosis, it is incurable and progressive; a case is reported of a patient who was exposed to asbestos dust for one year and whose sputum showed the presence of asbestosis bodies fourteen years later.

Very few data are available on the relation of dust concentration to the incidence of the disease. No minimal safe concentrations have yet been set up and information is scant as to the conditions in those plants where a hazard is known to exist. It has been determined, however, that the asbestos dust encountered in fabricating plants is free of silica when air is floated at the breathing level and that the danger of the dust increases as the quality or length of the fibers increases.

Miscellaneous Siliceous Dusts

Many siliceous dusts other than quartz and asbestos have been carefully investigated. Talc—a silicate containing 62% silica—has been shown to be responsible for a form of pneumoconiosis when inhaled in large quantities. One group of investigators report that 50% of the talc workers whom they examined were affected and about 12% had tuberculosis. The same report shows that talc containing 10% tremolite is much more dangerous than talc containing 40% tremolite, but an explanation is lacking.

The action of cement on the lungs is not definitely known. German investigators say that it produces only an inert deposit in the lungs, but American reports show that the frequency of disability from respiratory diseases in cement plants is about double that found among employees in non-dusty manufacturing plants; absence from work was also twice as frequent. Yet animal experiments show that cement like limestone and gypsum produces an adsorptive reaction; the dust disappears from the peritoneal cavity without the production of scar tissue.

Slate (1/3% quartz) in concentrations of 700 million particles per cubic foot produces a fibrosis and pneumoconiosis, but few cases have been known to progress seriously. On the other hand, there is reason for believing that clay and slate dusts are responsible for a high incidence of tuberculosis.

Italian investigators have studied the dust hazard in cotton spinning mills and report that the silicosis hazard is apparently negligible. Mineralogic analysis of such dusts brought to light the interesting fact that their composition is similar to that of the soil in which the cotton was grown.

Non-Siliceous Dusts

Apparently there is a great difference of opinion as to whether or not non-siliceous dusts are harmful either to normal or tubercular persons. The data are so scant that a review of the literature must consist essentially of a catalogue of the few and scattered investigations that have been made of particular dusts. General conclusions can not be drawn and an extension of available data to dusts of even the same mineral family is hazardous.

German investigators have studied a number of different carbon dusts and rate them in the order of hazard which they represent: lignite, coal, graphite, charcoal, soot.

A statistical study of the health hazard in a large American company which manufactures artificial abrasives led to the conclusion that persons who have had pulmonary tuberculosis should not be allowed to work where they will be exposed to dust from abrasives. The dust in this particular plant was aluminum oxide combined with silicon carbide and the incidence to tuberculosis was 1 1/2 times as great in the dusty departments as in the non-dusty. In this connection it is interesting to note that other investigators had previously reported aluminum oxide as not being a factor in the production of silicosis —thus a distinction must be drawn between the fibrosis-forming ability of a particular dust and its danger through increased susceptibility to pulmonary tuberculosis. This leads to the conclusion that the claim is unwarranted that a dust is not harmful merely because its reaction on lung tissue is inert.

The U. S. Public Health Service has grouped dusts (siliceous as well as non-siliceous) in three classifications:

1. Those causing an inert reaction, the amount of dust in the peritoneal cavity remaining approximately constant: soapstone, carborundum, jeweler's rouge, anthracite coal, bituminous coal and precipitator ash.
2. Those causing a proliferative reaction, nodules continuing to increase in size: quartz, chat and flint.
3. Those causing an absorptive reaction, dust disappears from the peritoneal cavity, but scar tissue is not formed: calcite limestone, precipitated calcium carbonate, gypsum and cement.

A similar list of dusts has been prepared by Haynes who carried on a long series of animal experiments. He arranges them in order of toxicity as follows: precipitated silica, flint, slate, hydroxide, precipitated chalk, magnesium carbonate, carborundum, calspar, emery, colloidal coal (in massive amounts).

All of the respiratory disorders discussed above, together with many others which are caused by the inhalation of fibrosis-forming dusts, are grouped under the one broad term Pneumoconiosis.

Barry Castleman's John Crane File
CD-ROM Document #JC 60 DATE 1946
w/c = with cover memo 0=undated

Type of Document

- peer-reviewed journal article

X trade publication X article advertisement

- newspaper article

- proceedings from annual meeting

- conference abstract talk proceedings

- unpublished or internal report

- meeting agenda minutes report

- letter memo

- asbestos monitoring data

- sales catalog

- book excerpt

- legal _____

- BC notes _____

- other

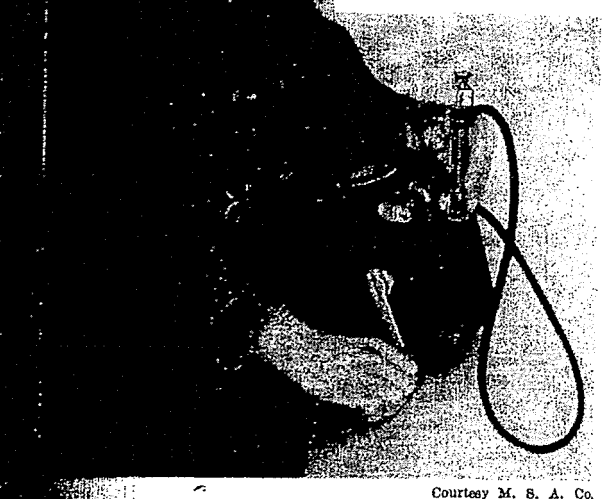
Southern Power & Industry, Nov 1946 p61

Industrial Hygiene Importance of Dust

By N. V. Hendricks

Chief Engineer Industrial Hygiene Service, Georgia Department of Public Health

Nearly all types of modern industry are concerned with dust and its control.



Courtesy M. S. A. Co.

FIG. 1. THE MIDGET IMPINGER USED FOR COLLECTING ATMOSPHERIC DUST SAMPLES.

THE annual cost to industry from uncontrolled dust amounts to a staggering figure. In many cases the problem of dust is dismissed by management as only a nuisance. In other plants, the recovery of certain dusts is economically sound, especially where the particulate matter may contain precious metals or may carry valuable processing stock. Aside from any nuisance or economic loss resulting from the escape of dust, there are certain dust exposures which may result in acute health hazards. This is especially true of dusts containing a high percentage of free silica, asbestos, and other toxic materials. Where health considerations are involved in such exposures, legal aspects present themselves. In most states where occupational diseases are compensable, specific coverage is given to those disabilities resulting from the inhalation of silica dusts.

Definitions

Many times true dusts are confused with fumes, smokes, mists, and fogs. In order to differentiate between the origin of these materials, a definition of them is in order.

DUSTS are formed by the reduction of earthy materials and are usually produced by such operations as crushing, grinding, buffing, etc. The particle size of dusts may vary considerably, ranging from sub-microscopic to visible.

FUMES are formed by condensation and sublimation. Chemically, they are metallic and are usually the oxides of such metals as zinc, and lead. The particle size is usually below one micron.

Smoke comes from the burning of organic material and its particle size is usually less than one-half micron.

Mists and **Fogs** result from the condensation of water vapor on suitable nuclei, and the particle size will vary with given conditions.

General Properties

As a substance is reduced in particle size, there are certain general properties of the material which are changed. On breaking up a solid into finely divided particles, the surface area is greatly enlarged and therefore the space occupied is greatly increased. As an example, a piece of quartz one centimeter on each side when crushed to where the particles of one micron in size will present a system containing 10^{12} number of particles. The total surface area will be 6 square meters. If these dust particles are dispersed onto the atmosphere in such manner that the concentration will be 100 million particles per cubic foot, the space occupied by this dispersed system will be 10 thousand cubic feet.

The chemical activity of a solid is considerably increased by a reduction in particle size. Thus the rate of oxidation is increased as is evidenced by occasional disastrous dust explosions. The phenomena of adsorption becomes more important as gases are more easily adsorbed on the surface of the smaller particle.

From the standpoint of health hazards resulting from dust exposures, the physiological properties of dust vary somewhat with the particle size. It is an accepted fact that with exposures to silica dust, the smaller the particle size, the greater the hazard.

Physiological Response

Drinker has summarized the reactions resulting from the inhala-

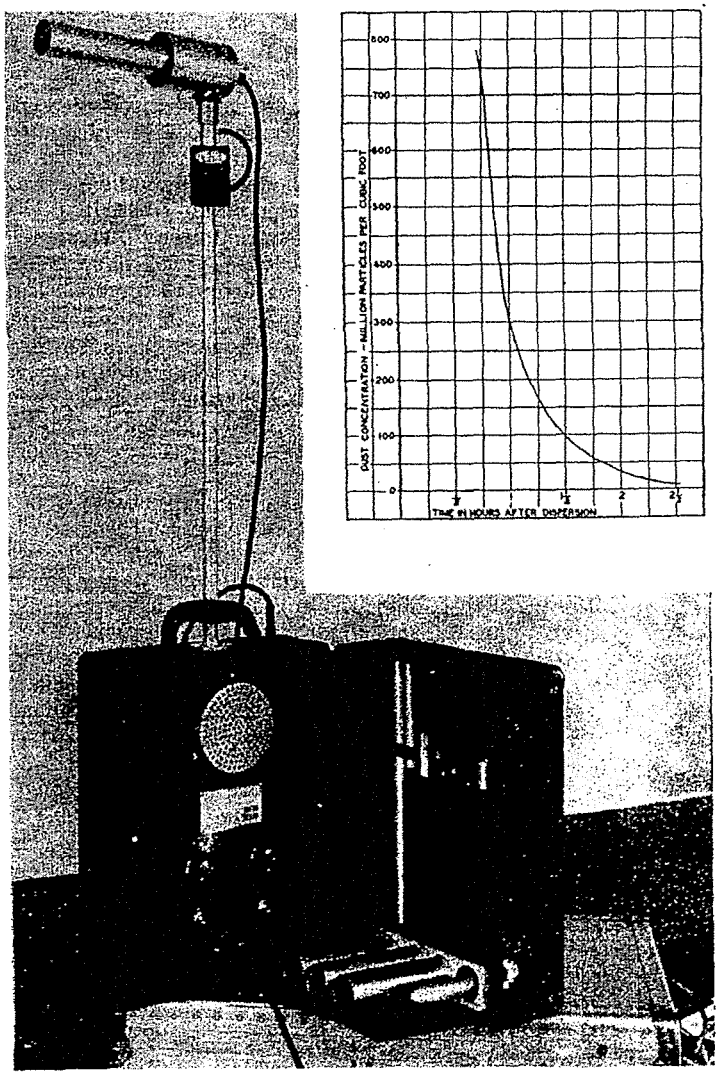
tion of dust by classifying the response into four groups. These are:

(a) Pneumoconiosis—The dusts producing this type reaction are harmful only when inhaled. The principal materials producing this type reaction are free silica and asbestos dust. On inhalation, these two materials produce specific lung pathology and from the standpoint of disability, present the most important of the dust exposures.

(b) Toxic Reaction—(As poisoning by lead, cadmium or radium) These materials produce harmful effects when taken into the body both by inhalation and ingestion. With reference to lead and its compounds which may be present in the atmosphere as particulate matter, it has been fairly well established that entrance into the body by inhalation is more important mode of entry than the same material taken by mouth. This is primarily due to the fact that when such materials are taken into the body by inhalation, the major portion is taken into the blood stream, whereas, a considerable part of that taken by mouth is removed by certain organs of the body.

(c) Metal Fume Fevers—These conditions result from the inhalation of finely divided fume particles. The importance of metal fume fever has been brought to the attention of industry by the great amount of welding which has been an important industrial tool for the past few years. Where burning or welding is done on surfaces which have been galvanized, the problem of metal fumes becomes immediately important.

FIG. 2. THE ELECTROSTATIC PRECIPITATOR AS USED FOR COLLECTING ATMOSPHERIC SAMPLES OF DUST AND FUMES. INSERT SHOWS RATE OF SETTLING OF DUST.



This is also a problem in foun where the pouring of bra done.

(d) Allergy—This type rea is in general produced by p and certain organic dusts.

Common Industrial Dust

Carbonates are usually com ed with either calcium or nesium. They normally occu nature as calcite and magn or as dolomite, which con both magnesium and calciu the carbonate. Limestone marble contain conside amounts of these carbonate do the materials from which ment is made.

Due to the solubility in fluids, these materials are re ed when taken into the bod inhalation. The presence of bon dioxide in such fluids important factor influencing solubility. The same thing ap to the presence of carbon dio in water which comes into con with these materials. In the p ence of carbon dioxide the bonate is converted to the m soluble bicarbonate, thus add to the ease with which it is rem ed by solution.

Experimental and practical servations on carbonate dust dicate that these materials are harmful when taken into the b by inhalation. This is prob due to the fact that they are e ly removed due to their solubil

Sulfates are common indus materials and this general may be illustrated by gyp which is calcium sulfate. Th a common material and is wi used in many industrial op tions. It is generally conside that this type material is non ic and does not present any ticular problem from a he standpoint.

Oxides vary considerably their physiological reaction general the nature of the rea will be dependent on the metal from which the oxide is rived. Where such metals specifically toxic, as would be case with arsenic or lead, a cific toxic reaction could be pected from the inhalation o oxide. However, other oxide pear to be relatively harml particularly where the met of a non-specific type. This is of iron oxide. The mining of results in the exposure of a l number of men to the oxide

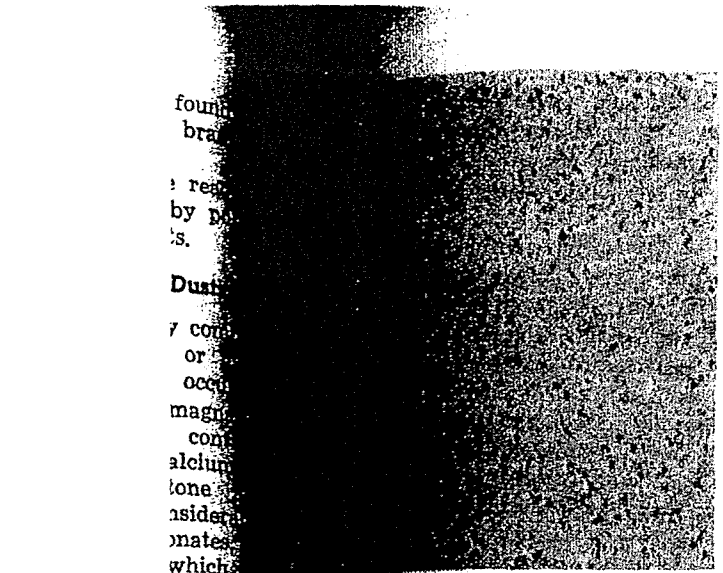


FIG. 3. GEORGIA KAOLIN DUST MAGNIFICATION 130X.

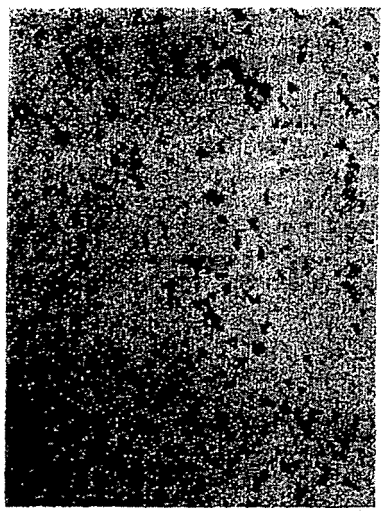


FIG. 4. QUARTZ DUST (SiO_2) MAGNIFICATION 130X.

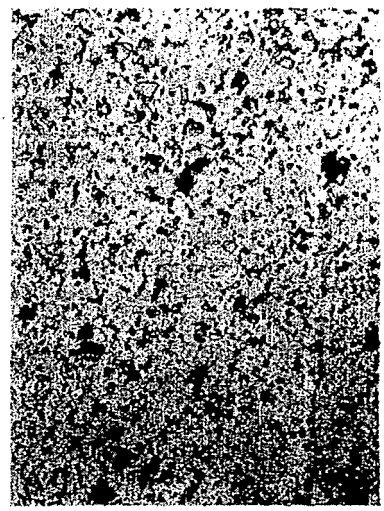


FIG. 5. CALCIUM CARBONATE DUST MAGNIFICATION 130X.

metal. However, it appears exposure to the dust of iron not produce pathology unless such exposure is accompanied the pressure of free silica.

The mining of coal results in exposure to coal dust which contains a high percentage of carbon. Detailed studies of exposure to coal dust have been made by the U. S. Public Health Service and other agencies. It has been found that, in general, coal dust is retained in the lungs only when such dust contains a high percentage of free silica. Although coal dust may be deposited in the lungs of exposed individuals, the condition resulting is usually not considered disabling unless silica is present.

Silicates make up an important class of industrial materials and are used principally in the production of ceramics and similar materials. Talc, kaolin, mica, clays, etc., are chemically silicates and their widespread industrial application results in a great number of employees being exposed to this type dust. With the exception of asbestos, which is a silicate, this general class of materials does not appear to produce a disabling condition, except in isolated cases, when taken into the body by inhalation.

Asbestos is the only silicate known at the present time which produces a lung pathology comparable with that resulting from exposure to silica dust.

Of all the dust found in industry probably the most important is free silica or silicon dioxide. It occurs in the form of quartz, flint, sandstone, and chert; and is associated with many other minerals and ores. The disabling condition resulting from the inhalation of free silica is known as silicosis and has long been a problem with industries such as stone cutting, granite, foundry, abrasive, and the like, where silica is used in processing. There are relatively few industrial operations which might result in direct exposure to pure silica dust. The importance of silica lies in its association with other materials. As an example, in foundry operations the dust generally will contain clay and materials of a nonsilicious character, so that the actual percentage of free silica may be relatively low. This is also true in exposures to coal, iron oxide, and the mining of ores. When hard rock or silica is present, these dusts become important mainly due to the presence of silica rather than to the inherent properties of the parent material.

Factors Influencing Hazards

In evaluating the exposure to a dust there are several factors which should be taken into consideration. The duration of exposure is important, as it will indicate in a general way the total amount of dust which might be expected to have entered the body. Obviously other factors enter into such an evaluation of total dustiness, and these will be discussed later. History of past exposure is important. This is particularly true where an individual is exposed to silica dust. This point is of extreme importance to industry due to the fact that a worker may have contracted silicosis under a previous employment. Where such a condition exists, the desirability of preemployment examination is obvious.

The concentration of dust breathed is important as this, within certain limits, will determine the possibility of development of dust diseases. Considerable research and practical observations have been made in the field of dust exposures to correlate clinical findings with atmospheric concentrations. For free silica, asbestos, and some of the other materials, fairly definite standards have been established. The nature of dust is important primarily from the standpoint of free silica content. This is particularly true of mixed dusts which constitute the majority of industrial exposures. The volume of air breathed enters into the picture as it directly influences the amount of dust which will be taken into the body. The rate of respiration or amount of air breathed in general will be determined by the physical effort required on the particular job. Where heavy work is being done, naturally an individual will require more ventilation than where less physical effort is involved.

Dust Measurements

In addition to the factors influencing dust hazards, it is necessary to make direct dust measurements in order to obtain a true evaluation of any dust exposure. Such measurements are made by the actual collection of dust samples, the counting of the dust particles, and by the identification of the materials making up the dis-

persed system. For the collection of dust samples, several instruments may be employed.

Much of the early work done on the control of silicosis in the mining areas of South Africa was carried out with the Konimeter. This instrument has been used some in this country, however, it has not met with the popularity which is enjoyed by certain other methods. From the standpoint of collecting efficiency, the electrostatic precipitator is probably the choice instrument, however, most of the work done on correlating atmospheric dust concentrations with medical findings has been based on samples collected and counted by the Greenburg-Smith technique. The collecting device employed is an impinger unit which samples at the rate of one cubic foot per minute.

Counting by this technique is done under light field. The percentage of free silica in a dust sample is usually determined by either chemical or petrographic methods.

Permissible concentrations of dust have been established for free silica, asbestos, and other materials. For both silica and asbestos, 5 million particles per cubic foot is considered as maximum working concentration. The U. S. Public Health Service has suggested a procedure by which the total dust concentration in millions of particles per cubic foot is multiplied by a percentage of free silica. If the resulting figure is more than 5 million particles per cubic foot, the condition is considered unsafe. If less than 5 million, the condition is considered safe. There should be considered certain limits of dustiness for any type of dust, whether it be merely a nuisance value or health consideration. To most industrial hygienists, 50 million particles per cubic foot is the maximum atmospheric concentration of dust under which an employee should work. It should be pointed out that the only way of determining both the nature of the dust and the actual concentration is by direct sampling and similar procedures for the counting of dust.

Case History

MANY industries having problems of dust control recognize the existence of such problems to varied degrees. Some take passive attitudes, while others apply sound engineering procedures which result in a real job of dust control. Such modern engineering methods are used by the LeTourneau Company of Toccoa, Georgia.

This particular plant manufactures heavy road grading equipment and its major dust problem lies in operation of a foundry for the protection of basic steel parts. It is interesting to note that this Company considers the control of dust as a part of the general overall production schedule and as a result has its control methods integrated into general plant operations.

Although there are several methods which can be used for control of dust, ventilation, both in the form of general and local exhaust, probably offers the most satisfactory method and it is this approach which has been used by the LeTourneau Company. For general ventilation in the foundry, two 15-foot fans are instal... which handle 500 thousand cu... feet per minute each. Actual... the material removed by these f... is made up principally of smo... rather than true dust.

Two electric arc furnaces ... operated and these are equipp... with roof fans located immediate... above the units. These fans han... 60 thousand cubic feet per minu... each. Again, the major portion ... the material coming from the ... furnaces is smoke rather than t... dust, and comes from the all... and flux material charged into t... furnaces.

A problem of dust control in an... foundry is the shakeout operation... This is particularly true whe... shakeout is mechanical an... handled on a vibrating screen o... grate. Here, a line conveyor sy... tem is used to bring the castin... directly to the shakeout grate. ... canopy type hood is installed im... mediately over the grate itself. ... addition to canopy, side enclosure... are provided which prevent ... leakage. The fan serving this ho... delivers 35 thousand cubic feet p... minute, which results in a hig... capturing velocity at the entran... and discharge ports. An excelle... job of dust control results on th... particular operation.

Sand conditioning in ma... foundries is a dusty job. With th... LeTourneau Company this ... handled by means of local exhau... ventilation and three bag type ... ters handling 6 thousand cubic f... per minute each. Tumbling oper... tions for cast cleaning are also p... vided with local exhaust venti...

(*Continued on page 80*)

FIG. 6. LOCAL EXHAUST ON TUMBLERS FOR CAST CLEANING.

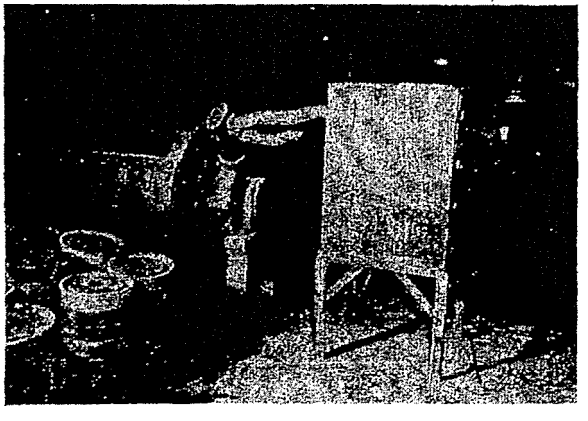
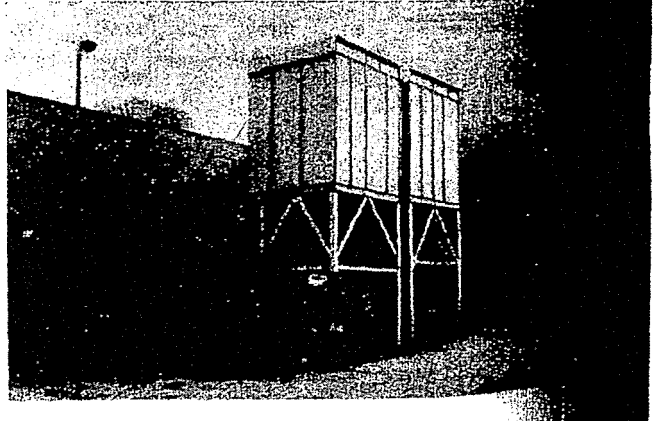


FIG. 7. BAG HOUSE AND SAND BLAST UNIT FOR CAST CLEANING.

Courtesy LeTourne...



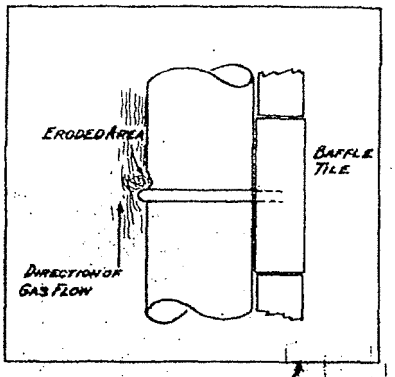


FIG. 3

at least 75%. Figure 2 shows the condition of the tube that failed.

Other tubes were found eroded adjacent to U bolts holding baffle tiles. The U bolts provided sufficient interruption in gas flow to cause eddy currents and localized impingement. (Fig. 3.)

Erosion by particles of fly ash and unburned fuel has also been found in stoker-fired boilers.

At the time of each shutdown for cleaning and preventitive maintenance (at least once every four months), all areas vulnerable to erosive attack should be examined. Areas most susceptible are:

1. Where flow of gases makes a turn, throwing out particles of solids.
2. Behind any cracks, breaks, or gaps in a gas baffle.
3. Adjacent to any projection that might divert normal flow of gases.

Should the boiler be provided with an induced draft fan, observe the condition of the blading. Abnormal wear may be indicative of erosive attack in the boiler.

Careful attention by all engineers to the problem of erosion may well prevent a serious accident.

Candy Making

(*Continued from page 60*)

not be taken for granted, a chemical laboratory is essential.

The Brock Candy Company is now in the process of constructing a modern chemical laboratory and training a technician to perform control analyses. The laboratory, which is located in a large air conditioned room near the candy cooking operations, is equipped with modern stone-topped laboratory benches, the latest chemical glassware, and such special analytical instruments as balances, vacuum oven, refractometer, and pH meter. Provision has been made for such analyses as moisture, invert sugar, viscosity, pH, melting point, and refractive index. Many of the control tests have been developed specifically for the Brock Candy Company, and new procedures will be added from time to time as the need arises.

The Industrial Research Institute of the University of Chattanooga has cooperated with the Brock Candy Company in selecting the equipment, outlining and developing analytical procedures, and training a technician to operate the control laboratory. A research project on improvement of the quality of candy has been sponsored by the Brock Candy Company at the Industrial Research Institute of the University of Chattanooga.

Since all raw materials will be analyzed and tested in the company laboratory, variation in properties will be detected before the material is used. This procedure will assure products of uniform quality, since inferior raw materials will be discarded and formulations will be based on the actual analysis of high grade raw materials rather than on standard procedure which do not make allowance for variation in the ingredients. Analysis and testing will assure high quality of finished products and permit any difference in quality to be detected. In this way, any unavoidable errors in manufacture can be corrected and adequate controls instituted to prevent their reoccurrence.

The facilities of the control laboratory will also be available for the evaluation of research and development work being carried out in the factory. In addition to maintaining the production of uniform high quality products, the personnel and equipment of the control laboratory will be available for many other technical assignments in the plant.

The modernization pro... the Brock Candy Company ... ing place at a time when ... any product, regardless of ... or cost, can be sold. The ... tlenecks today are shortages ... materials and skilled ... However, progressive busi... know that these conditions ... only temporary and that ... few years, companies which ... not guarantee quality will ... able to sell their product... Brock Candy Company ... tinue to be a leader in its ... cause it has refused to ... quality of its products ... days when consumer demand ... greater than the supply of ... terials and because it has ... inaugurated a program of ... and research which will ... constant improvements.

Dust

(*Continued from page 62*)

tion and dust arrestors as is ... in the photograph. Note that ... haust is applied through ... trunnion of the tumbler.

In foundry operations or ... other industrial type process ... housekeeping is an important ... tor influencing the generation ... dust. This foundry employs ... five horsepower vacuum clean... for floor maintenance. By this ... cedure loose dust, sand, and ... like, is removed from the floor ... is not projected into the atm... phere by the movement of ... chinery, scuffing of feet, and ... like. This is one impressive po... in the operation of this particu... foundry. Excellent housekeepi... is combined with a good procedu... for materials handled.

In all of the attempts at dust co... trol at the LeTourneau Compa... employee cooperation is obtain... Employee cooperation co... through planned program of e... ployee education and employ... participation in affairs involv... the health of the worker.

Periodic dust samples collect... in the LeTourneau foundry ... cate atmospheric concentrations ... various operations well belo... what is considered as maximu... safe working limits.

Castleman Asbestos File on CRANE Co.
w/c = with cover letter or memo If DATE = 0, undated
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✓ article __ letter from __ medical ✓ trade journal

__ published presentation from conference

__ published government report __ Fed Register notice

__ government inspection results

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__ unpublished presentation from conference

__ newspaper article

__ letter __ memorandum

__ industry warning labels

__ industry sales literature

__ industry recommended practices

__ agenda ___ minutes ___ attendee list

legal __ deposition __ testimony of _____:

__ other

INDUSTRIAL REVIEW

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Special Session of Legislature Called to Consider Legislation Relating to

Occupational Diseases, Health, Comfort and Safety and Changes in Blower Act

GOVERNOR HORNER has called a Third Special Session of the Illinois General Assembly which began Wednesday, February 5. This session will run concurrently with the first and second special sessions which now have been in progress for several weeks.

Items to be considered in this Third Special Session which are of importance to industry relate to bills providing for remedies in occupational disease situation; legislation relating to health, comfort and safety; and measures making certain changes in the Illinois Blower Act. A digest of the principal provisions of these several bills is subjoined. Copies of any or all of these measures will be sent to members upon request to our Chicago or Springfield offices. It has not been feasible for the Association to send copies of these measures to members at an earlier date because the bills were not in form for submission to the Illinois Legislative Reference Bureau at Springfield until late Tuesday evening, February 4th. As a matter of fact, it is probable that some changes will still be made by the Legislative Reference Bureau before the bills are finally submitted to the legislature. However, as indicated above, copies of the bills as submitted to the Legislative Reference Bureau will be sent to our members upon request.

These measures are the result of extended consideration of this entire subject matter by the Occupational Diseases Committee of the Association under the chairmanship of O. E. Monte. This committee was appointed by the President of the Association early in 1933 to study the occupational diseases problem with a view to determining what remedial legislation was necessary in the state to bring about an equitable and practical system governing the rights, duties and liabilities of employers, employees and insurance carriers with respect to such diseases. At the time the committee was appointed, employers in the state were being flooded with damage suits, most of which were predicated on silicosis, asbestosis, and a variety of real and fancied lung afflictions. Some of these suits were meritorious, but to a large extent they were stirred up and solicited by ambulance chasers for unethical lawyers who, with the aid of doctors of like ilk, developed what for a time was a flourishing racket. The unethical lawyers and doctors, and not the employees themselves, profited from these suits.

The committee has devoted its activities exclusively to the development of adequate and comprehensive occupational disease legislation for the state, and it has actively and conscientiously continued its efforts to this desirable end during the past year. It has had the whole-hearted cooperation of member companies of the Association, which companies have placed at the disposal of the committee the services of legal, medical, engineering and lay members of their organizations. It has also received the cooperation and assistance of a number of the most outstanding legal, medical and lay authorities on the subject of occupational diseases in this country.

Measures Carefully Studied

Careful study and consideration has been given to occupational diseases acts which have been enacted by various states in this country and by foreign countries; and in our study of these various acts especial efforts have been made to determine what has proven satisfactory in actual operation from the standpoint of both employers and employees.

As soon as the first draft of a proposed act was approved by the committee, a copy of such measure was delivered to the representatives of labor for their consideration. We hoped that an agreed bill might be developed and introduced at the 1935 regular session of the Illinois General Assembly. The representatives of labor, however, introduced their own bill, which action placed us under the necessity of introducing our bill. Both bills were referred to the House Judiciary Committee, and by that committee to turn to a special sub-committee. The sub-committee conducted many hearings. Shortly before the end of the regular session, the Illinois Director of Labor requested representatives of employers and labor to confer in an effort to develop an agreed bill. The widely divergent views of the two groups ren-

Legislative Situation at Springfield

There are now three special sessions of the Illinois General Assembly running concurrently. The first special session covers the subjects of old age pensions, unemployment insurance, etc. The second session relates to unemployment relief, and the third, which has just been called by the Governor, covers the subject of occupational disease legislation, and several other items which are not of direct importance to industry.

The status of the unemployment insurance legislation remains unchanged. An unsuccessful effort was made to pass this measure in the State Senate on January 9th. Insufficient votes were secured. Senator Lee, sponsor of the bill in the Senate, secured the consent of the Senate to postpone consideration of the bill. Therefore, he is in position where he can call the bill up at any time for reconsideration. A companion bill is on second reading in the House of Representatives. It is in position where it could be advanced at any time. The Association is carefully watching this legislation and will promptly advise its members in event any further efforts to enact the measures into law are made.

The subject of occupational disease legislation is treated elsewhere in this issue.

The Association is represented at Springfield at all sessions of the legislature by Allan T. Gordon, Director of our Legislative Bureau, and other members of our staff. Detailed information regarding any measure pending at Springfield can be secured by communicating with our Chicago or Springfield offices.

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dered agreement impossible in the limited time available.

The bill finally reported to the House by the Judiciary Committee was considered basically unsound by this committee. We accordingly opposed its enactment and, fortunately for Illinois industry, it failed of passage.

The situation with respect to the liability of employers for occupational diseases has undergone radical change during the past year. The decision of the Supreme Court in April, 1935, holding portions of the existing Occupational Diseases Act unconstitutional, and the subsequent decision of the Appellate Court in July, 1935, holding that no common law right of action exists in this state for occupational diseases, stopped the flood of damage suits against employers. As a result of these decisions hundreds of silicosis claims have been filed with the Industrial Commission on the theory that under further court decisions such claims would be held compensable under the existing law. No one is in position to predict with certainty the outcome of these claims. The situation, therefore, remains chaotic. No intelligent person considers that such a situation will be permitted to continue. Constitutional laws providing a logical solution can, will, and should be enacted. Unconstitutional laws should and must be eliminated.

The governor, recognizing the widespread interest and gravity of the situation, in the early part of September, 1935, arranged for a conference of representatives of labor and employers under the chairmanship of Hon. Peter J. Angsten, chairman of the Illinois Industrial Commission. This conference was called by the governor for the purpose of endeavoring to develop agreed legislation providing for the prevention of, and compensation for, occupational diseases.

Ever since the Workmen's Compensation Act was placed on the Illinois Statute Books in 1912, it has been customary for representatives of labor and industry to undertake to agree to such amendments in said act as seemed necessary or expedient for consideration at succeeding sessions of the legislature. These joint conferences through the years between representatives of labor and industry on the subject of proposed changes in the Workmen's Compensation Act were ordinarily initiated by the Illinois Industrial Commission. Accordingly, pursuant to such custom the Occupational Diseases Committee of the Association when it had completed the first draft of a proposed bill recommending changes in the law relating to that subject matter submitted a copy of such measure to representatives of labor for their consideration. This was done early in 1935, shortly after the Illinois General Assembly had convened in regular session. This action was taken with the hope that an agreed bill might be worked out and enacted at the said regular session. The representatives of labor, however, introduced their own bill bringing all so-called occupational diseases under the Workmen's Compensation Act under what was commonly referred to as the "Wide-open" clause. There was no definition of what constituted an occupational disease. If such a measure had been enacted into law, Illinois employers would have been obligated for claims for so-called occupational diseases which were not in fact related to employment. We would have had a recurrence of conditions which existed in New York State, where, under a law enacted there comparable to the so-called "wide-open" proposal just referred to, many New York employers were obliged to close down their plants and many others were unable to secure insurance except at prohibitive rates.

The Illinois Manufacturers' Association was, therefore, obliged to introduce its own occupational diseases bill. Both measures, i.e., the so-called "wide-open" bill, sponsored by organized labor, and the measure sponsored by our Occupational Diseases Committee were referred to the Judiciary Committee of the House of Representatives and by that committee to a sub-committee.

The committee has had a large number of meetings. In fact the committee has met almost continuously since the date upon which it was called together by the Industrial Commission in September of last year. As indicated above, the bills were not in final form for submission to the Legislative Reference Bureau until the night of Tuesday, February 4th.

The decision of the Supreme Court of Illinois holding portions of the Occupational Diseases Act unconstitutional in effect invalidated the principal features of the Illinois Act pertaining to rules and regulations providing for "Health, Safety and Comfort" in Illinois industry. The proposed legislation relating to that subject, which is a part of this program and a digest of which is subjoined, represents the conclusions of the committee as the most practicable and least objectionable plan that is available under all existing circumstances.

The changes in the Blower Act, which are also contemplated by this series of bills, are the result of extensive study by a group of engineers identified with representative member firms. It was the conviction of the members of that group that the present laws relating to that subject are indefinite and involved and could not, in many instances, be conformed to in practical operation. This proposed measure relating to this subject is intended to more clearly define the rights and liabilities of employers in connection with this subject matter, pending further treatment of this subject by the Industrial Commission pursuant to the authority given to the Commission under the terms of the Health, Comfort and Safety Act.

As indicated above, the various measures included in this proposed legislation are the result of extended consideration of our Occupational Diseases Committee over a period of several years. In this activity we have had the assistance of all of the other principal employing groups in Illinois, all of whom we are informed are in sympathy with and have endorsed this program.

This legislative program has also received the careful consideration of the Illinois Industrial Council and our Board of Directors and has the unanimous approval of both of those groups. We shall be glad to undertake to answer inquiries from our members regarding any features of this program upon which they desire additional information.

Digest of Bills

The following is a brief digest of the five Bills:

1. The first Bill is for a Workmen's Occupational Diseases Act.

This is a Bill covering the subject of liability of employers for injuries or deaths resulting from diseases. It provides for an elective compensation liability, with a liability for damages imposed on non-electors.

Section 2 of the Bill provides for liability for damages to an employe who has sustained injury to health, or death, by reason of a disease contracted or sustained during the course of his employment and proximately caused by the negligence of the employer, unless the employer shall have elected to pay compensation as provided in Section 4 of this Bill. In connection with the liability for damages of non-electing employers, the Bill provides that the violation by any employer of any effective rule or rules made by the Industrial Commission pursuant to the Health and Safety Act, or the violation by the employer of any statute of this State intended for the protection of the health of employes, shall constitute negligence. This Section further provides for the period in which actions for damages must be commenced and removes the common law defenses of the employer.

Section 4 provides that any employer may elect to provide and pay compensation according to the provisions of this Bill for disablement or death resulting from occupational diseases. The Bill provides for the method of making the election, and further provides, that employers electing may have the right to elect out from under the Act on October 1st, 1937, and on each October 1st for four years thereafter, providing, however, that an employer who has elected to come under the compensation provisions of the Act, then has elected not to be under them, and has subsequently elected again to come under the Act, shall not have the right to any further elections.

The employes of any employer who has elected to be bound by the compensation provisions of the Act have the right not to be so bound. Unless an employe files notice to the contrary within thirty (30) days after the election by the employer, he shall be deemed to have accepted the compensation provisions of the Act.

The Bill defines an occupational disease as follows:

"Section 1. In this Act the term 'Occupational Disease' means a disease arising out of and in the course of the employment. Ordinary diseases of life to which the general public is exposed outside of the employment shall not be compensable, except where the said diseases follow as an incident of an occupational disease as defined in this section.

"A disease shall be deemed to

arise out of the employment, only if there is apparent to the rational mind upon consideration of all the circumstances, a direct causal connection between the conditions under which the work is performed and the occupational disease, and which can be seen to have followed as a natural incident of the work as a result of the exposure occasioned by the nature of the employment and which can be fairly traced to the employment as the proximate cause, and which does not come from a hazard to which workmen would have been equally exposed outside of the employment. The disease must be incidental to the character of the business and not independent of the relation of employer and employee. The disease need not to have been foreseen or expected but after its contraction it must appear to have had its origin in a risk connected with the employment and to have flowed from that source as a rational consequence."

The Bill defines disablement as follows:

"'Disablement' means the event of becoming disabled from earning full wages at the work in which the employee was engaged when last exposed to the hazards of the occupational disease by the employer from whom he claims compensation, or equal wages in other suitable employment; and 'disability' means the state of being so incapacitated."

The Bill further provides that no compensation shall be payable for occupational diseases unless disablement occurs within one year after the last day of the last exposure to the hazards of the disease, except in cases of occupational diseases caused by the inhalation of silica dust or asbestos dust, and in such cases within three years after the last day of the last exposure.

The Bill further provides that the employer liable for compensation shall be the employer in whose employment the employe was last exposed to the hazard of the occupational disease claimed upon regardless of the length of time of such last exposure, except that in the cases of silicosis and asbestosis, the exposure during a period of less than sixty (60) days after the effective date of the Act shall not be deemed a last exposure.

The provisions relating to amounts of compensation, and to procedure are incorporated in the Bill in the same language, and by the same section numbers, as they are contained in the Illinois Workmen's Compensation Act.

The Bill, if enacted, shall take effect on October 1, 1936, and shall be administered by the Industrial Commission.

Health and Safety Bill

2. The second Bill is the Health and Safety Bill.

This Bill vests in the Industrial Commission the power to make reasonable rules to provide reasonable protection to the lives, health and safety of employes.

The power of the Industrial Commission to make rules is limited to the following purposes:

(a) The proper sanitation and ventilation of all places of employment to guard against personal injuries and diseases.

(b) The arrangement and guarding of machinery and the storing and placing of personal property to guard against personal injuries and diseases.

(c) The prevention of personal injuries and diseases by contact with any poisonous or deleterious materials, dusts, vapors, gases or fumes.

(d) The prevention of personal injuries and diseases caused by exposure to artificial atmospheric pressure.

Rules of the Industrial Commission adopted in the manner provided in the Bill shall have the force and effect of law.

This Bill would apply to all employers engaged in any occupation, business or enterprise in the State, except farmers and others engaged in farming, tillage of the soil, or stock raising, and to coal mining.

The rules adopted by the Industrial Commission must be clear, plain and intelligible, and must be uniform and general in their application.

The Bill provides that it shall not be construed as granting the Industrial Commission the power to make any rule which will require, the submission of any plan, specifications, or other information concerning any proposed installation, alteration, construction, apparatus or equipment, or in any manner regulate the hours of labor of any employee in the State.

The Bill sets forth the procedure for the adoption of rules by the Industrial Commission.

The Commission may either institute proceedings on its own initiative by a resolution, or upon petition signed by five employes or five employers in a specified industry.

The Commission shall set a date for a public hearing not less than thirty days, nor more than ninety days, after the date of the passage of the resolution by the Commission, or the filing of the petition.

Notice of the hearing must be given at least thirty days prior to the date of hearing, by publication in a newspaper of general circulation and by mailing notice to any employer and to any association of employers or of employers who have filed their names and addresses with the Industrial Commission requesting notice of such hearings.

Any interested party may submit evidence at the hearing.

Upon the conclusion of the hearing, the Industrial Commission shall enter its decision in writing and send a copy of the decision to the interested parties whose names are on file with the Commission, and a certified copy of the decision shall be filed with the Secretary of State.

Within thirty days after the entry of the decision, the Industrial Commission may correct, modify or vacate the decision, rule or rules, and any person affected by the decision may object in writing, stating the specific grounds of his objection.

Any person affected by the decision, whether he participated in the proceedings or not, may file a praecipe for a writ of certiorari in the Circuit or Superior Court of the County in which the subject-matter of the hearing is situated, for review of the reasonableness or lawfulness of the decision or rules.

The Circuit or Superior Court may confirm or reverse the decision of the Commission as a whole, or may reverse and remand it as a whole, or may confirm part and reverse and remand part of the decision.

An appeal from the order of the Circuit or Superior Court may be taken to the Supreme Court within forty-five days, except as to the portions of the decision which are remanded by the Circuit or Superior Court.

The Industrial Commission may fix the date that rules or decisions adopted by it shall become effective, provided that no such decision, rule or rules shall become effective until ninety days after entry by the Industrial Commission, nor shall they be effective during the pendency of any proceeding for review or appeal and upon termination of appeal, no decision, rule or rules shall become effective until a period of time has elapsed after the filing of the Court's Mandate equal to the period of time originally fixed by the Commission.

The Industrial Commission is required to keep a full and complete record of all proceedings, and at least once a year shall publish in printed form all of the rules in full force and effect at the time of the publication.

The enforcement of the rules is vested in the Department of Labor, with the proviso that the Industrial Commission shall not take any part in their enforcement.

The Department of Labor is given power to inspect places of employment affected by rules, subject to a proviso that whenever any secret processes are used, the owner shall furnish an affidavit that he has complied with all effective rules, which affidavit shall be accepted in lieu of inspection.

The Bill provides that the Department of Labor shall give proper notice in regard to any violation of the Act, and any person who fails or neglects to comply with any rules adopted by the Commission after due notice is given, is guilty of a misdemeanor and subject to fine.

This Bill provides for repeal of the Health, Safety and Comfort Act, to take effect July 1, 1937, and for the repeal of Section 4 of the so-called Basement Blower law, to take effect October 1, 1936.

The Bill contains an emergency clause, and is intended to take effect immediately upon its passage.

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3. A Bill to amend Sections 7, 14, and 19 of the Workmen's Compensation Act.

The amendment to Section 7 is a result of the decision of the Supreme Court in the Mowequa Coal Company case, 360 Ill. 194, and adds the following language to the section:

"Whenever four times the average annual earnings of the deceased employe as provided in paragraph (a) of this Section amounts to four thousand dollars and not more than four thousand four hundred dollars and

the deceased employe left surviving him one child under the age of sixteen years the amount payable shall be four thousand four hundred dollars.

"Whenever four times the average annual earnings of the deceased employe as provided in paragraph (a) of this Section amounts to four thousand dollars and not more than four thousand seven hundred dollars and the deceased employe left surviving him two children under the age of sixteen years the amount payable shall be four thousand seven hundred dollars.

"Whenever four times the average annual earnings of the deceased employe as provided in paragraph (a) of this Section amounts to four thousand dollars and not more than five thousand dollars and the deceased employe left surviving him three or more children under the age of sixteen years the amount payable shall be five thousand dollars."

The amendment to Section 14 adds the words "or assistant secretary" in connection with certain duties conferred on the Secretary of the Commission.

The amendment to Section 18 is for the purpose of taking care of the situation which might arise where a claimant misconceives his remedy and files his claim under the Occupational Diseases Act when he should have filed under the Compensation Act, or where he files under the Compensation Act when he should have filed under the Occupational Disease Act. The amendment provides that in such event the application may be amended to assert claim for disability or death under the proper Act, and shall be deemed to have been so filed as amended on the date of the original filing, and such compensation shall be awarded as is warranted by all of the evidence.

4. A Bill to amend Section 44 of the Act in relation to the Civil Administration of the State government to authorize the Department of Labor through the Industrial Commission to administer the Health and Safety Act and the Workmen's Occupational Diseases Act.

5. This is a Bill to compel the using of exhaust systems for removing dust and dirt from grinding, polishing and buffing operations, repealing the present Blower Law, and containing an emergency clause.

The Bill is to remain in effect until July 1st, 1937, by which time it is contemplated that the Industrial Commission will have adopted rules covering the subject-matter.

This is a Bill which was drawn by a Sub-Committee of the Occupational Diseases Committee of the Illinois Manufacturers' Association, and was introduced in the Legislature at the last General Session.

It was drawn by engineers, and contains detailed and scientific requirements to replace the present antiquated Blower Law.

Efficient Committee Service

The Members of the Occupational Diseases Committee of the Association and of the Illinois Industrial Council, which groups as indicated above represented the interests of our members in connection with the preparation of the above measures, are:

OCCUPATIONAL DISEASES

O. E. Mount, Chairman, American Steel Foundries.
L. K. Ayers, Vice-chairman, George S. Mepham Corp.

Members—General

J. R. Allen, International Harvester Co.
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Dr. J. R. DeMotte, Chief Surgeon, Pullman-Standard Car Mfg. Co.
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Dr. J. H. Chivers, Personnel Director, Crane Co.
Dr. C. O. Sappington, Consulting Industrial Hygienist.

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C. L. Blatchford, National Metal Trades Association, Chicago, Ill.
H. D. Sayre, National Metal Trades Assn.
Allan T. Gordon, Springfield, Ill.

SUB-COMMITTEE MEMBERS

The members of the sub-committee, who, during the period of several months, carried on the negotiations and the detailed work associated with the drafting of the bills are: O. E. Mount, Chairman; J. L. Earlywine, T. G. Essington, Walter E. Beebe, Dr. J. H. Chivers, Dr. C. O. Sappington and Mr. E. O. Jones.

Messrs. David R. Clarke and John Harrington of the firm of Fyffe and Clarke, General Counsel for the Association, also participated in the work of the sub-committee as well as Attorney Frank R. Peregrine, an authority upon Workmen's Compensation legislation who was retained as special counsel by the Occupational Diseases Committee to assist in the drafting of such measures.

This activity on behalf of the members of the Association has involved a very substantial expenditure of time, energy and funds. It is the conviction of all of those who have carefully followed the progress of the work that these groups have rendered a genuinely valuable service to the employers of Illinois.

South American Trade

Noah Van Cleef, of Van Cleef Bros., manufacturers of molded rubber products who recently returned from an extensive trip through South America for the purpose of extending the trade of his office, says that goods manufactured in the United States enjoy wide acceptance in South America. In many cases North American manufacturers have found it a decided sales advantage to ship their products bearing the same labels and markings as are used in their domestic transactions. The average South American considers the North American carries a trade mark or guarantee of excellence.

Mr. Van Cleef in an article in the Chicago Credit News pointed out that a handicap to the American exporter is the discrimination in the rate of exchange against the United States in favor of other nations.

The Interstate Commerce Commission has postponed a verdict in its study of passenger fares. Some IGC officials forecast that in the near future railroads will begin charging as little as 2 cents a mile for coach and 3 cents a mile for Pullman coach rides.

How Corporation taxes fall on the investor is indicated by some pertinent data in the January issue of Investing America, published monthly by the American Federation of Investors, at Chicago.

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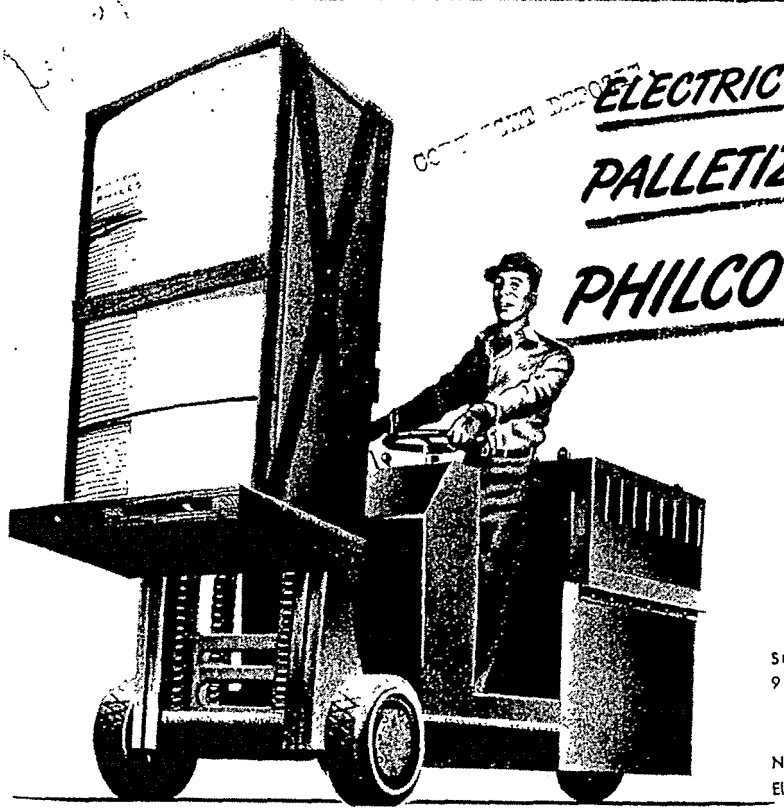

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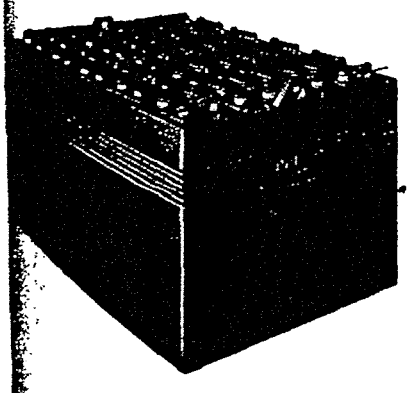

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Editorial and Executive Offices

GRANT BUILDING
ATLANTA, GEORGIA

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PRACTICAL DISCUSSION

DEPARTMENTS

INDUSTRIAL HYGIENE

Control of Working Environment is Important

This third installment is a discussion of the working environment — its problems, their evaluation, and recommended control.

By N. V. Hendricks

Chief Engineer Industrial Hygiene Service, Georgia Department of Public Health

EVERY important factor influencing our lives and one which is given little consideration is the environment in which we work. The general environment dictates our requirements as to the clothes we wear, the food we eat, and to a certain extent our mode of living. The average individual will spend at least eight hours a day at some occupation. The remaining portion of the day is usually spent at home. It is obvious that two distinct problems of environment exist: the home or community, and the working environment.

There are certain safeguards thrown about the community as providing safe drinking water, proper sewage disposal, collection and disposal of other wastes including garbage, and immunization programs. The importance of these protective procedures in a community has been long recognized. Their accomplishment is measured in terms of reduced death rates from various communicable diseases. Some diseases which in the past have taken great toll of life have by these methods been reduced to a point of minor significance. As civilization has progressed with an accompanying complexity in our living, the necessity for public safeguards in the community has been given more and more consideration. It is only through these approaches that the proper public health measures for the community environment can be applied.

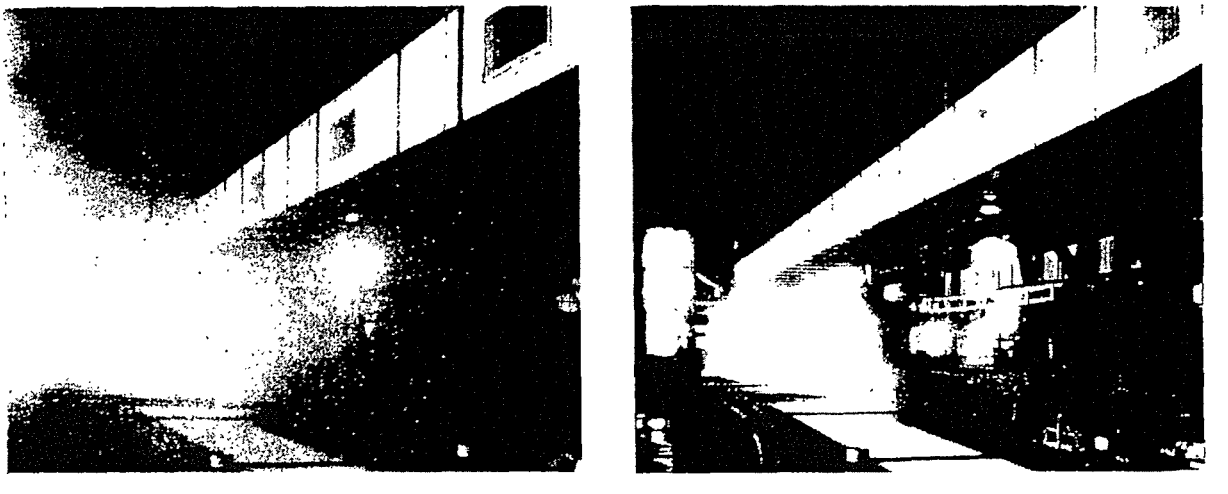
For a number of years, consideration has been given to the development of certain methods by which the working environment of an individual may be modified or adjusted to more healthful working conditions. Many plant operations by the very nature of the materials processed and by the mechanics of the operation produce an atmosphere of toxic or otherwise harmful substances. The final objective in any industrial hygiene program is the alleviation of health hazards incident to industrial operations by the use of scientific methods.

Occupational Diseases

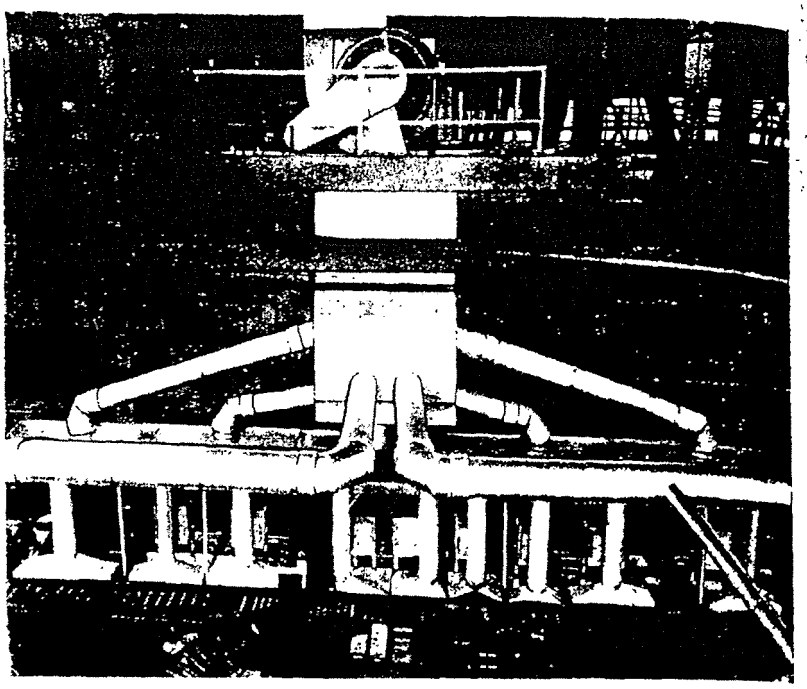
Industrial operations require the use of many materials, some of which are toxic and produce harmful effects on individuals who are exposed to them. In addition, there are certain physical conditions which exercise harmful effects on the worker. The deleterious effects produced by these materials and conditions may, in a broad sense, be termed occupational diseases.

In some states, industry has been legally responsible for the effect on the worker which is brought about from such exposures. Where legal responsibility has been designated, codes or schedules have been established for a rate of compensation covering occupational diseases. Such codes vary from all inclusive loss to those which cover only specific occupational diseases.

BEFORE AND AFTER INSTALLATION OF VAPOR ABSORPTION SYSTEM IN MERCERIZING DEPARTMENT OF BLEACHERY AND DYE WORKS.



In considering the potential development of occupational diseases and the responsibility and cost incident, management cannot escape the fact that the condition of the working environment is an economic factor expressed in terms of the overall cost of production. Proper consideration to the status of the environment, in many cases, will directly lower the cost. Recognizing these facts, management should take every possible means of improving and controlling the working environment. For many occupational diseases there is no known medication and the logical method of control is the adjustment of the working environment in order that the exposure from which occupational diseases result may be removed.



FUME REMOVAL SYSTEM FOR EXHAUSTING FUMES FROM PICKLING TANKS

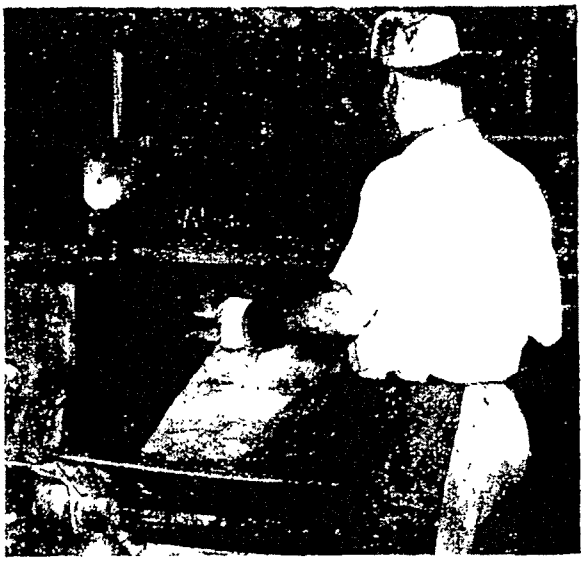
Processing And The Environment

The working environment in any plant will be dependent on these factors: (1) materials, (2) processing methods, and (3) process equipment. Many of the raw and processing materials used in industry are specifically toxic and toxic compounds are often liberated as by-products of certain operations. In any case, the type material and its presence in the working atmosphere will determine the existence of a hazard. Fortunately most processing materials are non-toxic. However, with many industries it is impossible to avoid the use of certain specific compounds which are known to produce harmful effects on individuals exposed to them.

The method of processing is important as it will determine the extent to which materials are dispersed into the working atmosphere. Important factors associated with process methods include: (1) temperatures required for various operations, (2) agitation and other mechanical details, and (3) specific operations where by-products are formed and liberated.

Equipment plays an important role in determining dispersion since the design of such units may call for open or closed operations, rotation at high speed or close or frequent observation on the part of the operator. Specific design would determine the extent to which certain control installations such as local exhaust ventilation might be applied.

OPERATOR EMPTYING BAG OF CARBON BLACK INTO BANBURY MIXER BEFORE AND AFTER INSTALLATION OF DUST AND FUME REMOVAL SYSTEM.



Environment Problems

Of importance to industry is the matter of controlling dust. Fortunately, there are relatively few types of dust which are specifically toxic. The more important from an industrial standpoint are silica, asbestos and finely divided salts of toxic metals, such as lead.

Silica and Dust

Exposures to free silica are more important from the standpoint of population exposed and deserve more consideration than those to asbestos dust. However, asbestos dust is just as toxic as free silica. Wherever sand or materials containing free silica are processed, exposure to the dust is likely to result. This is especially true in foundry operations, abrasive cleaning, blasting, and the like. Sufficient exposure to concentrations of free silica often results in the production of fibrotic growths in the lungs of the exposed individual. This condition is known as silicosis and is one of the prime disabling occupational diseases and has cost industry considerable sums of money for compensation.

Asbestos dust although specifically toxic, does not result in a numerically great number of exposures due to its infrequent industrial applications. However, in the production of asbestos cloth and other products, a serious problem of dust control is presented.

Certain heavy metals and their salts produce specific toxic reactions. Many industries employ lead and cadmium, and their application to plant operation usually results in the creation of an actual or potential exposure. Lead compounds are particularly important in such operations as the manufacture of storage batteries, printing industries, and the production of paints or pigments.

Gases

Gases are usually classified as either asphyxiant or irritant. Industrially the more important asphyxiants include carbon monoxide, hydrogen sulfide and hydrogen cyanide. Of these, carbon monoxide occurs more frequently. This gas is associated with the combustion of carbonacious materials and is extremely toxic. On entry into the body it exerts an affinity for hemoglobin which is about 300 times the affinity of oxygen resulting in a tremendous decrease in the ability of the blood to carry oxygen and produces a condition of asphyxia.

The more common irritants found in industry include sulfur dioxide, chlorine, ammonia, and the oxides of nitrogen. Although these gases are extremely toxic, they are sufficiently irritating so that the individual exposed usually has some warning as to their presence. Under these conditions the worker can normally remove himself from the exposure before too much damage is done. However, these materials do occur frequently in industry and the importance of exposures to them should not be minimized.

Vapors

Vapors come from organic compounds both of the aliphatic and aromatic series. They play a tremendously important part in modern production and their number and use is limited only by the ingenuity of the chemist. They are used widely as degreasing agents, intermediates, solvents and cleaning compounds.

Most of these materials are excellent fat solvents, and on entry into the body tend to go to the nervous system. This is true of the aliphatic series, including distillates and petroleum. From the standpoint of pure toxicity, probably the most important of these materials would include benzol, its homologues and the chlorinated compounds. Sufficient exposure to these compounds results in chronic disturbance and in some cases disability.

Mists

Acid and alkaline mists are associated with plating, stripping and cleaning. Chromic acid mist is probably the most important of this class of material and results from electroplating, anodizing and similar operations. Exposure to such mists may result in perforation of the nasal septum, and if cuts or abrasions are present on the exposed parts, ulcers may develop.

Fumes

Fumes are usually associated with welding, cutting, or other operations where metals are heated to high temperatures. From an industrial standpoint, lead, zinc, and cadmium are probably the most important. Atmospheric fumes of this type are often found around pouring of brass, welding or burning of galvanized metal or on high temperature operations involving surfaces coated with lead bearing paint.

The physiological response to the inhalation of these materials may vary considerably. The less serious condition is known as metal fume fever which carries symptoms of zinc oxide. It is of short duration and no permanent tissue damage is done. The more serious conditions arise from the exposure to fumes or metals which are specifically toxic.

Physical Conditions

Physical conditions such as working positions, temperature, humidity and abnormal pressures, play an important part in the ability of the worker to produce. The correction of such conditions is primarily a problem of engineering and when given proper consideration will do much toward increasing production and lowering costs, through improvement of quality of the final production, reduction of spoilage, and increase in the final plant safety.

Evaluation of Environment

In order to properly evaluate the exposures in an industrial plant, a detailed engineering study and analysis is required. Such a study in the form of an industrial hygiene survey is a mechanical means by which the plant is observed department by department for the purpose of noting occupational hazards and unsafe practices so that they may be appraised. Such a survey should include a work analysis, analytical procedure rating of hazards, analyses of the hazards and recommendations for control.

The work analysis should be made by noting each and every job carried out in the plant. method of process, and hazardous conditions to which each worker

COMMON PROCESSING MATERIALS WITH SAFE CONCENTRATION AND PHYSIOLOGICAL SYMPTOMS

TOXIC MATERIAL	INDUSTRIAL USE	SAFE CONCENTRATIONS	PHYSIOLOGICAL RESPONSE
Acrolein	Organic synthesis; mfg military gases, soap and varnish; fertilizer.	1.0 ppm	Irritation of skin and mucous membranes of eyes and respiratory tract, dyspnea, bronchitis.
Ammonia	Organic preparations; refrigeration; bronzing, dye and color mfg., sugar refining	100 ppm	Irritation of respiratory passages, cough, pulmonary edema, severe eye irritation, caustic action on skin.
Aniline	Organic synthesis; dye mfg; paint and varnish; disinfectants; explosives.	5.0 ppm	Muscular weakness, vertigo, cyanosis, fainting, nervous symptoms, loss of equilibrium, nausea, vomiting, diarrhea.
Arsenic Compounds	Paint and pigments, leather industry; insecticides, mining and smelting, dye and varnish mfg.	0.5 mg/M³	Pains in stomach, vomiting, diarrhea, headache, gastric disturbances, skin diseases, loss of hair, weakness.
Bromine	Organic synthesis; dyes; bromides; explosives.	1.0 ppm	Irritation of air passages, bronchitis, conjunctivitis, skin eruptions, discoloration of skin
Benzol	Solvent, paint and varnish removers, dye; varnish mfg, rubber industry.	100 ppm	Headache and vertigo, gastro intestinal disturbances, hemorrhages, injury to blood forming organs with changes in blood picture, injury to blood vessels, heart, liver, kidneys, etc.
Cadmium	Alloys, cadmium salts, electro plating; storage batteries; lead and zinc smelting	0.1 mg/M³	Loss of appetite, weakness, nausea, inflammation of the lungs, cough, soreness of chest
Carbon Disulfide	Solvent; mfg viscose rayon, varnishes, insecticides; carbon tetrachloride.	20 ppm	Headache, vertigo, weakness, mental disturbances, irritation of skin.
Carbon Monoxide	Mfg iron and steel; enamel; illuminating gas; kiln operations, smelting.	100 ppm	Headache, painfulness of eyeball, throbbing of temples, weakness, nausea, vomiting, increased respiration and pulse, collapse.
Carbon Tetrachloride	Solvent, mfg cleaning compounds, dye, paint and lacquer industries.	100 ppm	Irritation of nose, throat and eyes, nausea, headache, vomiting, confusion, narcosis, injury to liver, dermatitis
Chlorinated Diphenyls	Electrical equipment; lacquer mfg.; paints, wax mfg.	1.0 mg/M³	Acneform skin eruptions, jaundice and atrophy of liver.
Chlorine	Organic synthesis; textile bleaching; water purification; chlorination.	1.0 ppm	Acute cardiac paralysis, burning, blistering, cough, bronchitis, chronic anemia, nasal and bronchial catarrh.
Chlorobenzene	Solvent for cellulose acetate, resins, oils, fats; dry cleaning.	75 ppm	Headache, giddiness. Blood changes.
Chromium Compounds	Dyeing; metallurgy, electroplating, printing, tanning.	0.1 mg/M³	Bronchitis; bronchopneumonia, anemia, nephritis, ulcers of skin and membrane, perforation of nasal septum.
Ethylene Dichloride	Organic synthesis; solvents, thinner for lacquers.	100 ppm	Irritation of eyes and nose, vertigo, unconsciousness and death if exposure is prolonged
Formaldehyde	Organic synthesis; dyes; rubber goods, leather; synthetic resins and lacquers.	20 ppm	Irritation of mucous membranes, conjunctivitis, severe dermatitis, degeneration of liver.
Hydrochloric Acid	Leather industry, organic synthesis; dye stuffs, mfg. chlorides.	10 ppm	Coughing, bronchitis, destruction of teeth, contraction of throat, caustic action on skin.
Hydrogen Sulfide	Reagent; analytical chemistry; viscose rayon spinning; leather tanning, mining and smelting; paper mfg.	20 ppm	Conjunctivitis, exhaustion, pallor, pain in eyes, nose and throat; headache, convulsions, paralysis.
Lead	Chemical equipment lead pigments; alloys; storage battery mfg.; insecticides.	0.15 mg/M³	Weakness, pallor, loss of appetite, lead line, anemia, constipation, cramps, colic.
Mercury	Prep. mercury salts, scientific instruments, chemical processing	0.1 mg/M³	Inflammation of gums and mucous membrane of the mouth, necrosis of the jaw, enteritis, anemia, tremors of the hands and face.
Silica Dust (Free)	Foundries; stone industry; abrasive cleaning, blasting.	5,000,000 p.p.c.f	Fibrotic lung tissue, development of silicosis.
Sulfur Dioxide	Refrigeration, bleaching, cellulose; paper, mining and smelting.	10 ppm	Bronchitis, coughing, laryngitis bronchopneumonia, digestive disorders
Sulfuric Acid	Fertilizers; refining, explosives; organic synthesis; leather; textiles, chemicals.	2.0 ppm	Acute and chronic bronchitis, bronchopneumonia, decay of teeth On the skin, pain, edema and ulceration.
Toluene	Solvent; paint and varnish; organic preparations; dye and varnish; rubber industry.	200 ppm	Narcotic effect, headache, vertigo, gastro-intestinal disturbances, injury to liver and nervous system.
Zinc	Metallurgy; galvanizing, brass foundries—smelting.	15 mg/M³	Metal fume fevers; irritation of respiratory tract, headache, nausea, chills, pain in limbs

NOTE: P.P.M. = Parts of substance per million parts of air by volume
m.p.p.c.f. = Millions of particles of substance per cubic foot of air
mg/M³ = Milligrams of substance per cubic meter of air

is exposed. Toxic materials when present are investigated from the standpoint of the liberation into the atmosphere; physical state, whether or not the employee is required to be in the area where this material is dispersed, and the probable effect on the individual.

Analytical procedures usually include the collection of field samples and their analysis and the completion of other measurements when necessary. Atmospheric samples are collected from the breathing zone of the exposed worker and are taken in such manner as to be representative of average working conditions. Actual sampling and analysis of the atmosphere is the only scientific means by which a known exposure may be accurately evaluated. Some toxic materials make their presence known by odor and other properties, but these do not offer a means of determining their concentrations.

The rating of a hazard or exposure is a measurement to determine the degree of a condition and the effectiveness of existing control methods. Much work has been done in establishing safe permissable concentrations for some of the more common toxic materials These threshold values offer a means of determining the extent of individual exposures. By an analysis of processing methods, rating of hazards and study of efficiency of existing corrective measures, a baseline for adequate **control procedures** may be established. In most cases processing methods will determine the type control indicated.

Application of Data

When the industrial hygiene study has been completed and observations and data analyzed, it is necessary to translate this information into terms of specific control procedures. Unless these data finally result in corrective measures, a great waste of time and effort will take place. Although the plant or process engineer may not be primarily concerned with activities other than strictly processing, this individual should take advantage of information obtained through the industrial hygiene survey. In many cases, a study of environmental conditions under which a job is carried out will offer the production engineer a means of increasing the efficiency of the particular operation.

The plant engineer should also be concerned with the industrial hygiene information because the control procedures applied will be based on an analysis of these findings. The design and installation of such control procedures as local exhaust ventilation should be worked out with the plant engineer in order that the final installation may be entirely consistent with processing requirements.

Control Procedures

Hazards associated with industrial operations can either be eliminated or reduced to harmless limits by the application of public engineering methods. Procedures for the control of such exposures usually consists of one of the following:

Isolation of the process. Frequently a job which is productive of dust or tends to disperse other materials into the work area can be removed and located at a point so that the liberation of such material will not contaminate the general working atmosphere. It is occasionally possible to close off individual operations so as to isolate them from other areas and control the exposure.

Substitution of non-toxic material occasionally offers a good method of alleviating specific exposures. Where toxic materials are used and it is possible to replace them with non-toxic substitutes, the exposure can be removed in the easiest possible way.

Wet methods can sometimes be applied. These are frequently used in the stone industry in drilling, crushing, and grinding. Where materials being processed must be kept in the dry state, this method is obviously eliminated.

Personal protective equipment offers an excellent control procedure where the exposure is infrequent or of a short duration. Where this type of equipment is used, care should be exercised in its selection in order that the equipment used be designed for the particular exposure. Only equipment which bears the stamp of approval of the U. S. Bureau of Mines should be purchased.

Some exposures may be controlled by means of **general ventilation.** By this procedure a sufficient amount of air is introduced into the work area to dilute the contaminant to a point below the toxic limit. This method has certain disadvantages, such as the handling of excessive amounts of air, and the failure to reduce concentrations of the material at its point of liberation. It is usually at or close to the point of liberation where real exposure occurs and general ventilation, in most cases, does not correct this situation.

Local exhaust ventilation offers the most effective and generally the most efficient means of controlling individual exposures. A hood or similar type of collecting device is located as close as possible to the point of liberation of the contaminant and sufficient air handled in order to remove this material in such a manner that it is not dispersed into the work area. This type control should remove the material before it has an opportunity to come into the breathing zone of either the worker on the individual job or the workers in the surrounding area.

In considering the matter of local exhaust ventilation, it is highly essential that these installations be properly designed and engineered. In too many cases hoods and the entire exhaust systems are installed by mechanics or other individuals in the plant and no thought is given to their design or the principles on which they should operate. Unless such systems are based on good engineering design there is no assurance that the installation will operate in such manner as to control the exposure

The next article of this series will cover organic solvents and similar industrial materials, their properties and uses as they influence the environment and health of the worker using them.

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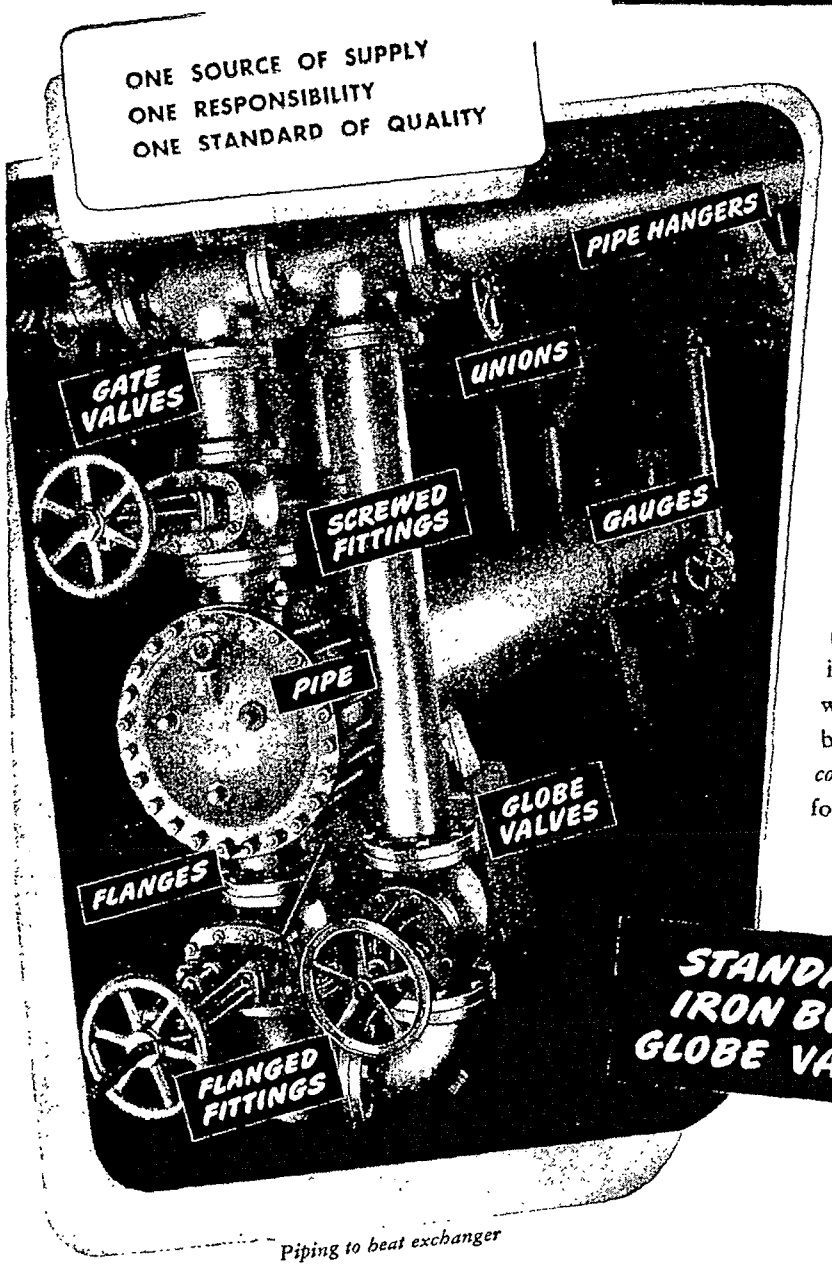

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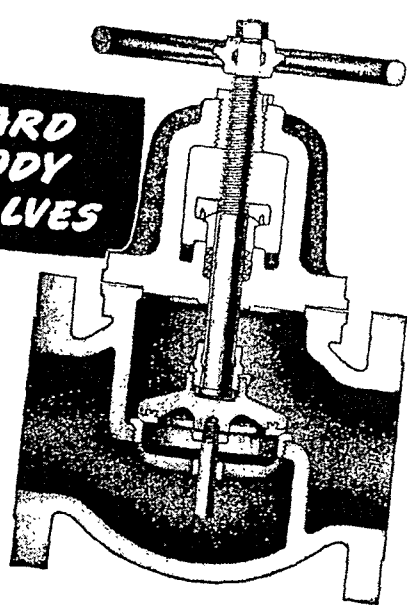

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MEMORANDUM

February 27, 1935

MR. LINCOLN
VICE PRESIDENT AND GENERAL COUNSEL.

Yesterday I suggested that Dr. Lanza and I would like to go over our current activities and certain recent developments in the field of dust in industry, in a conversation with you, so that all angles of the situation could be considered in connection with our routine activities and special appropriations.

Dr. Lanza has endeavored to summarize his views in the attached memorandum, and it occurs to me, if you have time, that it will be helpful to look this over prior to our conference. We could then no doubt get the benefit of your reactions in a very few minutes, and can perhaps present certain angles of the situation more compactly in this memorandum than could be done in conversation.

I suggested a reply to General Cumming's letter concerning the silicosis research with the Public Health Service that indicated the belief that our participation in this particular activity should be terminated, unless the participation of other agencies might later seem to justify our continuation on a modified basis. The field is really of great importance, and a little stake in the research aspect of it, jointly with the leading Government agency in the field, may actually be quite advantageous and logical in view of the significance of the dust problem to our extensive Group and Industrial interests and in view of the routine services now carried out by the Industrial Health Section primarily for Group policyholders, and largely in this dust field, as indicated by Dr. Lanza's memorandum.

D. B. Armstrong, M.D.
Third Vice-President.

DR. ARMSTRONG
THIRD VICE PRESIDENT

With reference to our recent conversation, I will endeavor to summarize the present status of the dust question in industry and our relation to it.

Viewed broadly, the problem of dust in industry is the problem of tuberculosis in industry. Conversely, it may be stated that the problem of tuberculosis in this country today is an industrial one. It is true that the death rate from tuberculosis in general has been steadily falling for a number of years. It is also true that the vital statistics in this country and abroad show definitely an inordinate amount of tuberculosis in what might be summarized as the dusty trades.

The specific action of silica dust is well known as is the fact that those exposed to silica dust have an extremely high tuberculosis death rate. In the last few years, there has been an extraordinary number of damage suits brought by employees against employers on the basis of exposure to silica dust so that at the present time it is estimated that these damage suits are well in excess of $100,000,000. Now there is a very marked tendency of employees who are exposed to dust other than silica dust to bring damage suits against their employers, alleging pulmonary injury and this state of affairs has progressed to a point where whole industries are in a turmoil, handicapped on the one hand by lack of definite knowledge of the action of these dusts on the lungs and on the other by the inadequacy of the law to protect them.

The Metropolitan has had a co-operative agreement with the Public Health Service (formerly with the Bureau of Mines) to carry on dust studies. As the budget was originally set up for the Picher Clinic, the mine operators (Group policyholders) contributed $16,000 a year, the Government $8,000 a year, and the Metropolitan $8,000 a year. Later when the Picher Clinic was turned over to the operators, our relationship with the Public Health Service continued. Both we and the Public Health Service contribute $8,000 a year for co-operative dust studies.

We have also contributed $5,000 a year for several years to the Saranac Laboratory for the Study of Tuberculosis for studies on the pathological effects of dusts. Last year, this office was instrumental in getting both the Association of Stock Casualty Companies and the Association of Mutual Casualty Companies each to contribute $5,000 a year.

The object of these studies, particularly at Saranac, has been to increase our knowledge of the action of silica dust in the body, its relationship to tuberculosis, and the determining of methods of prevention and control of the silica dust hazard. With respect to the Public Health Service, we have been more concerned with formulating accurate and speedy methods of determining whether any given dust is harmful and as a matter of fact, such a technique has been

developed by Dr. Sayers and his associates. All kinds of dust have been tested by this method, including limestone, kaolinite, calcite, tripoli, gypsum, soapstone, carborundum, anthracite coal, bituminous coal, precipitator ash, talc, foundry dust, fullers earth, feldspar, asbestos, and others too numerous to mention, but all representing dusts to be found in various plants of our Group policyholders.

Our Industrial Hygiene Section is being continually consulted on the technical aspects of wording of proposed laws, regulations, and codes dealing with the dust problem. For several years, this Section has been engaged in field studies designed to determine the scope, severity, and the hazard from silica dust and other dusts in industrial plants. Most of these studies have been restricted to the plants of Group policyholders in accordance with our declared policy. Where studies have been made on an industry wide basis, they have included plants not covered by Group insurance. I might mention, for instance, the study of the foundries in Wisconsin and the preliminary asbestos study. The Industrial Hygiene Section is now engaged in completing the final study on asbestos and will then take up the ceramic industry in New York State. This latter study will include some of our important Group policyholders such as the General Electric Company, the Carborundum Company, the Corning Glass Company, and others.

So important has this subject become and so great is the interest taken in it that in January of this year, a conference was held at the Mellon Institute in Pittsburgh, to which were invited representatives of eighty-five industries and manufacturing plants, for the purpose of considering what might be done in the way of concerted action dealing with research into the medical aspects of the dust problem, engineering methods for the control of dust hazards, and legal procedures with reference to laws, codes, and regulations. About two hundred representatives of various industries were present at this meeting and a Temporary Committee was formed, consisting of one representative each from the following industries:

(1) Asbestos, Cork and non-metallic;
(2) Chemical, Abrasives, Alloy and non-ferrous metals;
(3) Foundries;
(4) Glass Sand, Ground Sand and Glass Manufacturers;
(5) Iron, Steel and Iron Ore
(6) Limestone, Cement and Gypsum
(7) Refractories, Ceramics and Clays

The Chairman of this Committee is Mr. Roger A. Hitchins, President of the American Refractories Institute, and the organization work was largely done by Mr. A. W. Sherwood, Vice President of the Owens-Illinois Glass Company, and heading up the glass sand, and ground sand and glass manufacturers.

Last week, Mr. Sherwood and Mr. Hitchins spent an afternoon with me, outlining their plans and endeavoring to formulate their procedure. It was made perfectly plain to me, both by these two gentlemen and others that the industries they

represent are looking to the Metropolitan for advice and leadership in this endeavor to set up a co-ordinating agency to deal with dust problems. Mr. Hitchins told me that he had received a letter from Mr. Gentholtz, Counsel for the Republic Steel Company, stating that his Company would not be interested in this Pittsburgh plan unless I were associated with it; also that he had received a letter to similar effect from Mr. E. O. Jones on behalf of the National Founders Association. I told Mr. Hitchins and Mr. Sherwood that I would be glad to be of any possible help in the way of advice and consultation but that I could not interest myself in this undertaking in any more active way.

Naturally, it is our large Group policyholders who have the most vital interest in this whole dust problem, such as the General Electric Company, the Westinghouse Electric Company, Jones and Laughlin, Pickans-Mather, General Motors, Cleveland Cliffs Iron Company, Union Carbide and Carbon Corporation, the gypsum and cement companies. Since this meeting, I have been consulted by representatives of both the Republic Steel Company and the American Car and Foundry Company, both, incidentally, very active prospects for Group insurance.

Appended to this memorandum is a list of the various persons who participated in the Mellon Institute meeting. I mention all this to show how wide-spread and active is the interest of these large manufacturing companies, many of whom are numbered among our Group policyholders.

In a paper presented before the National Tuberculosis Association two years ago, Lanza and Vane estimated on a conservative basis that there were over half a million industrial workers exposed to silica dust and that the problem of family infection due to incident tuberculosis in many instances is a serious one.

I do not know whether this effort to set up a co-ordinating agency to deal with dust problems in industry will be successful or not. I am inclined to think that there are possibly too many divergent interests represented in the group that was brought together at Pittsburgh to get concerted action from them. But there is no question in my mind that many of the largest industries in the country are looking to the Metropolitan as the one place where they can get accurate and impersonal guidance in dealing with the problem that at present is a serious menace to them from an economic standpoint. This is true also of the casualty insurance companies with whose representatives both Dr. McConnell and I have had many conferences in the past two years.

As you well know, we have been extremely careful to keep away from all litigative and legislative matters and there is a pretty general realization now in industry that we cannot be approached on these two phases of the subject. The effect of this has been, I think, to strengthen our position; there is a general feeling that we have no ax to grind and that our motives are in accord with our general policy of being willing to help as far as practicable, in any undertaking that has to do with the conservation of human life.

With respect to our relationship with the Public Health Service, I can quite understand that it may not be expedient to continue further our present relationship. I do think that we should have some interest in research work in the general field of dust diseases.

February 27, 1935

A. J. Lanza, M.D.
Assistant Medical Director

1/15/25

Representatives at Silicosis Meeting

Aigeltinger, Arthur,
Southern Wheel Company,
230 Park Avenue,
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Allen, C. M.,
Staff Supervisor, Safety & Training,
The American Rolling Mill Company,
Middletown, Ohio.

Allen, W. B.,
Personnel Director,
Simonds Saw and Steel Company,
Lockport, N. Y.

Ames, W. F.,
Manager of Compensation,
Bethlehem Steel Company, Inc.,
Bethlehem, P-

Anderson, M. M.,
Aluminum Company of America,
Gulf Building,
Pittsburgh, Pa.

Atwood, F. H.,
Harbison-Walker Refractories Co.,
Farmers Bank Building,
Pittsburgh, Pa.

Avey, Dan M.,
(American Foundrymen's Assoc.)
Penton Publishing Company,
Cleveland, Ohio.

Ayers, E. M., President,
Ayers Mineral Company,
Zanesville, Ohio.

Banker, E. O., Gen. Supt.,
Penna. Glass Sand Corporation,
Huntingdon, Pa.

Barnum, W. J., Claims Attorney,
Youngstown Sheet & Tube Co.,
Youngstown, Ohio.

Barrett, L. P.,
Jones & Laughlin Steel Company,
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Bartholomew, Tracy,
Duquesne Slag Company,
Diamond Bank Building,
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Beal, Geo. D., Ass't. Director,
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Bennett, R. H.,
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Berg, Dr. Chas. F.,
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Beyer, R. A.,
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Ambridge, Pa.

Bidwell, R. E., President,
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Abingdon, Ill.

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Grant Building,
Pittsburgh, Pa.

Bovard, Dr. Paul G.,
Allegheny Steel Company,
Brackenridge, Pa.

Brandt, A. D.,
Willson Products, Inc.,
Reading, Pa.

Brown, Martin,
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Moundsville, W. Va.

Brown, Vandiver,
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J. K. Davison & Bro.,
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Koppers Company,
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Sun Sand Company,
Thayer, W. Va.

Campbell, John,
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National Silica Works,
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Allegheny Steel Company,
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Crane Company,
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Chormann, O. I.,
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Federal Seaboard Terra Cotta Corp.,
Woodbridge, N. J.

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Edward L. Trudeau Foundation,
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Engel, Dr. P. C.,
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Harvey, Dr. A. M.,
Crane Company,
Chicago, Ill.

Harvey, O. F.,
American Car & Foundry Company,
30 Church Street,
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Hatch, J. W.,
Abingdon Sanitary Mfg. Co.,
Abingdon, Ill.

Hay, Russel G.,
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Zanesville, Ohio.

Haythorn, Dr. Samuel R.,
Singer Memorial Laboratory,
Allegheny General Hospital,
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Hazard, W. G.,
Owens-Illinois Glass Company,
Toledo, Ohio.

Heilman, Dr. M. W.,
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Brackenridge, Pa.

Hensel, H. G., Safety Director,
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Herr, H. T., Jr.,
J. S. McCormick Company,
25th and A. V. R. R.,
Pittsburgh, Pa.

Herron, Dr. Thos. B.,
Mill Doctor,
Pittsburgh Steel Company,
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Hirth, A. C.,
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Hitchins, Roger A., President,
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Hodes, Dr. Philip,
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Philadelphia, Pa.

Holbrook, E. A.,
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University of Pittsburgh,
Pittsburgh, Pa.

Hoyt, C. E.,
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Huggins, G. L.,
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Huth, Gordon C., Manager,
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Universal Atlas Cement Company,
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Johnson, George W.,
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Pittsburgh, Pa.

Johnston, Dr. John,
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National Founders Association,
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Jones, F. Robertson,
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Vandergrift, Pa.

Kaller, J. M.,
Manager of Foundries,
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Kelly, Dr. J. C.,
(McKeesport Tin Plate Company)
219 Sixth Avenue,
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Kennedy, Dr. P. H.,
Youngstown Sheet & Tube Company,
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Keplinger, R. B.,
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Kuechle, Benjamin,
Employers Mutual Insurance Co.,
Wausau, Wis.

Kurtz, Thos. N.,
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United Zinc Smelting Corporation,
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Loxterman, H. B.,
Blaw-Knox Company,
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Lutton, C. L., Safety Director,
H. C. Frick Coke Company,
Frick Building Annex,
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McAfee, W. Keith, Pres.,
Universal Sanitary Mfg. Co.,
New Castle, Pa.

McArn, D. G., Works Mgr.,
Allis-Chalmers Manufacturing Co.,
N.S., Pittsburgh, Pa.

McConnoughy, Dr. J. B.,
Aluminum Company of America,
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McCord, Dr. Carey P.,
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McKibben, A. H.,
Macbeth-Evans Glass Company,
Charleroi, Pa.

Maclachlan, Dr. W. W. G.,
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Pittsburgh, Pa.

Manor, J. M., Vice President,
Consolidated Feldspar Company,
East Liverpool, Ohio.

Marshall, J. G.,
Union Carbide Company,
Niagara Falls, N. Y.

Mather, S. L., Vice President,
Cleveland Cliffs Iron Company,
Union Trust Building,
Cleveland, Ohio.

Matthews, T. C.,
Pennsylvania Pulverizing Company,
Lewiston, Pa.

Mawhinney, Dr. Mort,
Mercy Hospital,
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Meiter, Dr. E. G., Director,
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Employers Mutual Liability Insurance
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Muller, H. B., Chief,
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Department of Public Health,
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Pierce, H. L.,
The M. A. Hanna Company,
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Pierce, W. M.,
Mine Safety Appliances Company,
Braddock, Thomas & Meade Streets,
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Pitt, William J.,
DeVilbiss Company,
Toledo, Ohio.

Poister, R. S.,
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Alan Wood Steel Company,
Conshohocken, Pa.

Poth, J. J., Jr.,
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Prescott, W. H., Jr.,
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Scott, MacLeish & Falk,
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Rose, W. A.,
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Rupert, F. F.,
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Russert, E. J.,
Sharon Steel Hoop Company,
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Saklatwalla, Dr. B. D.,
Vanadium Corporation of America,
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Shoudy, Dr. Loyal A.,
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Bethlehem Steel Company, Inc.,
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Sisson, L. B.,
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Pittsburgh, Pa.

Steffe, Paul R.,
N. & G. Taylor Company,
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Tabor, R. S.,
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Babcock & Wilcox Tube Company,
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Thornton, George, Vice Pres.,
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Industrial Recovery,
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Philadelphia, Pa.

Van Hagan, H. H.,
Certain-Teed Products Corporation,
Beaver & Military Roads,
Buffalo, N. Y.

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W. W. Sly Manufacturing Company,
Cleveland, Ohio.

Voss, J. A.,
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Youngstown, Ohio.

Waters, T. C.,
Pennsylvania Pulverizing Company,
Lewiston, Pa.

Watson, A. L.,
Koppers Company,
Koppers Building,
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Reading-Pratt & Cady Company,
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Yant, William P.,
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Burnham, Mifflin Co., Pa.

MEMORANDUM

February 27, 1935

MR. LINCOLN
VICE PRESIDENT AND GENERAL COUNSEL.

Yesterday I suggested that Dr. Lanza and I would like to go over our current activities and certain recent developments in the field of dust in industry, in a conversation with you, so that all angles of the situation could be considered in connection with our routine activities and special appropriations.

Dr. Lanza has endeavored to summarize his views in the attached memorandum, and it occurs to me, if you have time, that it will be helpful to look this over prior to our conference. We could then no doubt get the benefit of your reactions in a very few minutes, and can perhaps present certain angles of the situation more compactly in this memorandum than could be done in conversation.

I suggested a reply to General Cumming's letter concerning the silicosis research with the Public Health Service that indicated the belief that our participation in this particular activity should be terminated, unless the participation of other agencies might later seem to justify our continuation on a modified basis. The field is really of great importance, and a little stake in the research aspect of it, jointly with the leading Government agency in the field, may actually be quite advantageous and logical in view of the significance of the dust problem to our extensive Group and Industrial interests and in view of the routine services now carried out by the Industrial Health Section primarily for Group policyholders, and largely in this dust field, as indicated by Dr. Lanza's memorandum.

D. B. Armstrong, M.D.
Third Vice-President.

Memorandum

Dr. A. J. Lanza,
Assistant Medical Director

It would be perfectly sound to approach industrial companies, where silica hazard is present, with the thought of selling annuities for those exposed.

However, the cost of an annuity bearing a reasonable relationship to pay is pretty high at age 55 and much higher at 50.

An annuity payable at 60 costs about two-thirds more than annuity at 65. We have a devil of a time to get employers to put up the necessary fund for Group Annuity Plans which have a normal retirement age of 65, so you can see it would be some sales job to get the money for an age 50 plan.

All in all, while the idea is sound enough, I question its salability unless some employer with the silica hazard is particularly sentimental about it.

If you want any actual figures, please advise.

[illegible signature]

[illegible]

[illegible], 1935

MEMORANDUM

October 11, 1935

THE PRESIDENT:

Dr. Gardner was in to see Dr. Lanza and me several days ago, concerning the possibility of our renewing our appropriation for his silicosis work next year. We have already contributed $30,000 to this research.

I frankly and completely discouraged any further participation in silicosis research on our part - hence this statement from Dr. Gardner, without the usual request!

Their work will continue and not suffer a great deal from our withdrawal, for other sources of support, as Dr. Gardner says, have been developed. We shall of course continue practical working cooperation with their laboratory, through Dr. Lanza and our own Industrial Hygiene Section.

I have also written Dr. Gardner, asking for a summary report on the results of the work financed by us - as a matter of record.

D. B. Armstrong, M.D.
Third Vice-President.

Castleman Asbestos File on CRANE Co.
w/c = with cover letter or memo If DATE = 0, undated
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__ article __ letter from __ medical __ trade journal

__ published presentation from conference

__ published government report __ Fed Register notice

__ government inspection results

__ unpublished or internal report

__ unpublished presentation from conference

__ newspaper article

__ letter __ memorandum

__ industry warning labels

__ industry sales literature

__ industry recommended practices

__ agenda ___ minutes ___ attendee list

legal __ deposition __ testimony of _____:

✓ other Book excerpt

OCCUPATIONAL HEALTH IN AMERICA

by Henry B. Selleck

in collaboration with Alfred H. Whittaker, M.D., F.A.C.S.

THIS BOOK WAS PREPARED UNDER THE DIRECTION OF
THE HISTORY COMMITTEE OF THE INDUSTRIAL MEDICAL ASSOCIATION
ALFRED H. WHITTAKER, M.D., CHAIRMAN
*OTTO P. GEIER, M.D. | JAMES I. ROBERTS, M.D. | *ROBERT T. LEGGE, M.D.
*LOYAL A. SHOUDY, M.D. | MCIVER WOODY, M.D.
**ARTHUR J. VORWALD | **EDWARD C. HOLMBLAD
**GEORGE ROSEN

*Deceased **Appointed to replace deceased member.

1962
Wayne State University Press Detroit

berous career. The purely repair shop type of surgical service in industry lasted much too long."[1]

The upward surge of American production was attended by serious, often fatal, injuries, which mounted at a scandalous rate; but for many years little of real or lasting benefit was done to reverse the trend. The annual toll was terrifying in typical industries such as steel, mining, railroading.

Here and there, individual doctors did what they could to protect workers on extra-hazardous jobs, but they left almost no records indicating results. A faded clipping from the *Chicago Daily News* reports that Andrew M. Harvey, chief surgeon of the Crane Company, Chicago, provided safety glasses for operators in that plant "as early as 1897." About the same time there is also mention of the use of leather leggings to protect brass molders from molten metal.

"Safety" was a word seldom heard in the steel mills and other ferrous industries of that day—not because employers were indifferent to death and injury, but because high accident ratios were taken for granted as a hazard of such trades. Though industrial employers commonly provided local physicians to care for injured workers, concerted action to reduce the accident toll was still to come. Individual companies, nevertheless, did what they could with the crude protective devices available in the early 1900's. Results were encouraging, and from these small beginnings there developed industry-wide programs calling for the installation of more and more mechanical safeguards, and requiring in-plant treatment of on-the-job injuries.

Within a few years important steel manufacturers were solidly supporting the work of the new National Safety Council, spearheading the crusade for industrial safety. Faced by shocking statistics on accidental deaths and injuries, corporation heads in large industries became ready converts to the cause. Physicians and surgeons, too, in steadily increasing numbers, were attracted to the industrial field.

Results of this attack were soon apparent. Accident curves were halted in their climb—then started to decline. The over-all trend, for the past forty years, has been consistently downward. Citing long-term figures, the *Labor Yearbook* for 1953 points to these significant contrasts: "In coal mining, for example, approximately five miners were killed in work accidents for every million tons of coal mined in 1913. In 1950 the average was down to slightly over one death for each million tons. In railroading, the reduction was even more pronounced. In 1913 one worker in every five hundred employed by the railroads was killed on the job. In 1950 one was killed for every three thousand. These rates are still too high."[2]

Mining appears to have been the first American industry to use the services of physicians on anything like a full-time basis. There is reference to an unnamed doctor who is said to have been employed in a lead mine in 1770. Others are known to have served in mines during the 1800's, though almost all name and place records have vanished with the years.

Appearance of the industrial physician and industrial surgeon, as we know them, is a twentieth century phenomenon. But there was no distinction in the title in early

years. On the contrary, men in plant practice were commonly the object of professional scorn—poorly paid, respected neither by management nor by labor. This was to be expected. With notable exceptions the doctor in industry was likely to be a man of mediocre ability, performing routine work acceptably but with little awareness of its potentials. The field, by and large, was uninviting, unrewarding.

Writing of the period around 1910, Alice Hamilton sums up the status of the industrial doctor in these words: "For a surgeon or physician to accept a position with a manufacturing company was to earn the contempt of his colleagues."[3]

It is against this background that the story of the American Association of Industrial Physicians & Surgeons unfolds. In the early years it was a drama of men and of the unusual circumstances that brought them together from all parts of the country. They were for the most part young physicians and surgeons, attracted to industrial practice by the new emphasis on safety, public health, and hygiene. They were exceptions to the rule of mediocrity in plant practice at the time; their stature was the more pronounced because of the scarcity of medical talent in the industrial field. They had in common a conviction that health was the most valuable of all national resources and a belief that the way to conserve it was by concentrating on the accident and disease hazards to which industrial workers were constantly exposed.

Andrew Magee Harvey's introduction of protective goggles for workers in 1897 was a mere incident in the evolution of plant safety. But Harvey, the man, had a double claim to fame. He was perhaps the first American physician to practice modern industrial medicine, and he was a leader in the little group chiefly responsible for the founding of the AAIP&S. Harvey joined the Crane organization in Chicago as medical director in 1896, assuming responsibility for the care of some 18,000 employees. Throughout his career he was a tireless worker in organized medicine, in public health activities, and in the development of the new industrial specialty.

In faraway California Robert Legge joined the select coterie of industrial medical pioneers in 1899. Trauma, at the time, was the main concern of the McCloud River Lumber Company, but Legge, as chief surgeon, soon expanded his work into broader fields—a community health and welfare program, construction of a model hospital, and the successful practice of preventive as well as curative medicine. At McCloud, in 1900, he was the first to employ graduate nurses in industrial service.

An inveterate traveler, he periodically toured the East to attend medical conventions and to visit the great surgical centers and teaching hospitals. On these trips he met many other leaders in the industrial field and through these contacts was drawn into the inner circle of founding fathers of the AAIP&S.

Years later (in 1927) Legge spent an afternoon at Georgetown Medical School with the venerable Dean Kober. To the delight of both, they discovered that McCloud, the scene of Legge's early work, was in the heart of the identical terrain covered by Kober, as a United States Army surgeon, in the Modoc Indian War of 1873–74.

One of the earliest recorded efforts at systematic examination of industrial work-

great human laboratory, where a doctor could practice preventive medicine and surgery."

"Hear that, Julius?" interrupted Loeb. "We have become a great human laboratory. We've had several company doctors, but never before have they thought of us as a human laboratory."

"I rather like the idea," replied Rosenwald.

There was more discussion, but no final decision. Mock was on his honeymoon when, on December 28, 1908, he received a telegram from Loeb: "Your human laboratory idea appeals. We accept your proposition. Start January 2."

Mock's "proposition" included immediate examination of old employees, to check and eliminate infectious diseases—and later, examinations for all job applicants, with the aim not only of raising health standards but also of assigning handicapped men and women to suitable work whenever possible. Mock developed, as the creed of his department, the simple slogan: "Physical qualifications, plus occupational qualifications, equal the job." Much later, during World War I, this slogan became the basis of far-reaching recommendations to the surgeon general of the Army for the assignment of handicapped volunteers and draftees.

Within three years, Mock's dream was well on its way to reality. He had no trouble in maintaining ethical standards at Sears. Cut-rate house calls for employees were ruled out. If they wanted the Sears doctor for illness at home, he would see them as private patients, and charge them standard professional fees.

Then, as Mock described it, came a balmy evening in May, 1912, and another chance conversation. Returning from a medical meeting, Mock drove his friend, Harvey, home in his new Maxwell convertible. The two sat in the open car and discussed their common problems—their work as company doctors. Harvey, with sixteen years' experience in the Crane organization, had built an excellent reputation as a surgeon and administrator of health problems involving both accident and occupational hazards. He had done this without antagonizing the medical profession and had maintained a good ethical standing.

Mock spoke of his new quarters at Sears—twelve rooms staffed by eleven part-time doctors and two full-time nurses. An eye specialist was on duty three days a week, and dental service was available for three and a half hours every day. Mock's enthusiasm, too, had grown with his job. He mentioned that that very day Rosenwald had proudly escorted the president of the Packard Motor Car Company through the department. At the end of the tour the visitor said: "This is all pretty nice, Julius, but I can't see how you can afford to give the most valuable space in your merchandising building to your doctor's office." Rosenwald had replied: "Why, sir, this is the most valuable department we have. It deserves the most valuable space."

So the talk went on, in the convertible at Harvey's door. Around 2:00 A.M. Mock started his motor and prepared to go. Then Harvey broke in:

"Do you know, we ought to organize this company doctor business. It's altogether different from what it was when I went into industrial work. Industrial

medicine is here to stay. A lot of good men are doing either part-time or full-time work as company doctors. We ought to get together with those who see a real service in it—both to humanity and to medicine—and form an organization."

There was more discussion before the two men parted to think it over. "So," said Mock, "as far as I know, the first thought of an industrial medical association was wafted in on the balmy spring air on that May night in 1912.

"It was later in that same year that I met Doctor Otto Geier, of Cincinnati. He was a dynamic man, and one of the most likeable personalities I had ever met, with thorough training and ample financial backing that enabled him to select his niche in the medical world and to reach almost any height in his chosen endeavor.

"Geier had organized the first milk commission in Cincinnati and had worked tirelessly for rigid inspection, pasteurization, etc. He came through milk into the field of preventive medicine. His viewpoint was further broadened by other activities in the field of public charities and institutional health, which brought him into contact with the derelicts of society.

"The Geiers had founded and made a great business of the Cincinnati Milling Machine Company. Otto was a prime mover in organizing its first health program, a part-time connection which soon absorbed his entire attention. Hearing of the work we were doing at Sears, he visited our medical department, and left us with many suggestions which enlarged its scope and increased its effectiveness.

"Otto Geier's grasp of the situation and its possibilities in the way of preventive medicine was of the greatest importance in the founding of our association. From the time of his first visit we never lost sight of our ultimate goal—the organization of industrial medicine on a national basis."

From these early contacts and discussions the movement for an association spread rapidly, by chain reaction. Through the efforts of Frank Billings, Thomas R. Crowder was appointed medical director of the Pullman Company. By 1912 he not only was supervising the health of Pullman employees, but also had become a great authority on ventilation, fumigation, and the prevention of contagious diseases by systematic examinations.

Said Mock: "Tom became a wise friend and a man of keen judgment, with a broad vision of the possibilities of industrial medicine and the means by which it could fit itself into the medical world without antagonizing those in the profession who were limiting their work to private practice."

Crowder became familiar with every step in the preorganization thinking of the Chicago group. It was he who wrote the final draft of the constitution of the American Association of Industrial Physicians & Surgeons and set forth its objectives. He later served as its president (1927–1928).

Again, in 1912, Billings recommended the appointment of Wilbur E. Post, a close friend of Crowder and Mock, as medical director of the Peoples Gas Company, of Chicago. Post, in turn, called the attention of the group to Charles G. Farnum, chief surgeon of the Avery Company in nearby Peoria. Farnum had de-

Shoudy (Bethlehem Steel), Cassius H. Watson (New York Telephone Company), W. Irving Clark (Norton Company), and James E. Mead (Ford Motor Company).

Of the entire group engaged in this voluminous correspondence, no less than six were later to serve as presidents of the Association. Drawing its strength from such diverse sources, and from every section of the country, the association-to-be was assured of truly national representation from the very beginning. Most of its supporters were already members of several organized medical groups concerned with various phases of public health and private practice; yet they rallied behind a new association as the *one* answer to vital industrial problems not yet adequately covered by any existing agency.

Encouraged by this wholesale response, the Organizing Committee met frequently during the winter of 1914–1915. "At each meeting," writes Harry Mock, "there were increasing evidences of approval, ending in agreement to crystallize the movement by formal organization.

"Accordingly, under the friendly auspices of the Illinois Manufacturers Association, a 'meeting of physicians and surgeons in industry' was called in February, 1915, at the Chicago City Club, where the proposal was discussed at length. The unanimous expression was that such an organization would be beneficial to employees and employers, as well as to the physicians specializing in industrial medicine."

At that February meeting a committee was appointed, which, "for the physicians and surgeons engaged in industrial medicine, prepared and executed the documents necessary for a corporation (not for pecuniary profit) to be known as the *American Associational of Industrial Physicians & Surgeons*, under an Act of the General Assembly of the State of Illinois."

So reads the record. Accompanying the application was a formal statement of the corporate purposes—as printed in full at the head of Part Two. Writes Mock: "This statement remains [essentially] unchanged. There has been no occasion to change it. Nothing in the developments of the years since 1915 has been added to the comprehensiveness of its definition of industrial medicine, nor disclosed a facet of the subject which it does not cover."

Spring and summer were gone before charter details had been settled to the satisfaction of the committee. Under date of October 12, 1915, Harvey forwarded to Mock duplicate copies of the application with a letter asking him to get the required signatures "as quickly as possible."

The final document, as notarized and forwarded to the Secretary of State of Illinois, bears the signatures of the Incorporating Committee: J. Chase Stubbs (medical director of the National Malleable Casting Company); A. M. Harvey, H. E. Mock, C. G. Farnum, W. E. Post, and T. R. Crowder, all of Chicago; and S. M. McCurdy, of Cleveland.[4] Stubbs served as chairman.

While the preliminary work of organization was moving slowly ahead, busy doctors elsewhere were taking advantage of every opportunity to win further sup-

While the founders set their sights at the highest level with respect to the association objectives and the caliber of membership, they kept their financial program within modest bounds. A standard paragraph in committee correspondence dealt with the matter of cost in these reassuring words: "There will be some little expense connected with the organization, but this will be very slight and can easily be covered by nominal dues of one dollar per member." Actually, first-year dues were set at two dollars, but, since a maximum membership of one hundred and fifty was expected, the working budget gave no ground for charges of extravagance.

One finds a similar note of economy wisely accented in arrangements for the convention itself. Under date of May 25, R. A. Carson and C. C. Schantz, comanagers of the Cadillac Hotel, sent a banquet menu to Mock for his approval. The following exchange of letters is of passing interest as a commentary on those times:

Mock to Cadillac Hotel, May 26: "This menu is very satisfactory with the exception of cigars. Two dollars a plate should include at least one round of some good cigar."

Cadillac Hotel to Mock: "Yours of the 26th to hand with menu as selected for the American Association of Industrial Physicians & Surgeons, at $2.00 per plate—cigars extra."

Mock to Cadillac Hotel: "As we have advertised our banquet for $2.00 per plate, I wish you would kindly make some slight change in the menu so as to include one round of some good ten-cent cigar."

There was no provision for cigars.

There was, in fact, no need for either frills or festivities to whet the enthusiasm of the founding group. To a man, they realized the seriousness of the business at hand, and sensed something of the import of this new milestone in the history of American medicine.

As almost the final step in completing arrangements, Mock dispatched a night letter to Sidney M. McCurdy of Youngstown, a fellow committeeman: "Organization Committee have left it to me to choose toastmaster banquet Monday night. Have chosen one of best scouts in the bunch, namely, you. You can't refuse, for programs go to press tonight. Everything looking rosy."

There appears to have been only one advance notice of the Detroit meeting published in any periodical reaching the medical fraternity. It appeared in the *Journal of the American Medical Association*[1] under the headline:

MEETINGS OF NON-AFFILIATED ORGANIZATIONS
AMERICAN ASSOCIATION OF
INDUSTRIAL PHYSICIANS & SURGEONS

The notice stated that organization of the association was to be completed at a meeting in Detroit on June 12, 1916, and gave the essential facts about the new association, its purpose, and the character of its proposed membership—adding that

the industrial doctors had been meeting during the past few years in AMA sections and with the National Safety Congress. Among the problems to be discussed at the meeting, the *Journal* listed the following:

1. Medical examinations of employees, and the results and benefits of these.
2. The surgeon as an aid in preventing accidents.
3. Emergency surgery and the standardizing of procedure in certain types of cases.
4. Standardizing of records used in this work.
5. Various forms of industrial insurance and the need of a federal health insurance law.

Through the Committee on Arrangements for the American Medical Association meeting in Detroit—with James E. Mead (Ford Motor Company) as an intermediary—reservations had been made for a "minimum of one hundred," who were expected to enroll for the session of the AAIP&S. Actually, about 125 were present when J. Chase Stubbs, as temporary chairman, called for order at 10:00 A.M.

Interest in the purpose and plans of the new organization was unquestionably much broader than actual attendance would indicate. This was evidenced by the flow of letters and telegrams Mock received from physicians and surgeons in all parts of the country, who, because of other pressing business, could not be present. Typical is this telegram from R. C. Cabot of Boston, who was prominent in organized activities of the AMA. "You are pioneers in medical service and medical organization such as the public good demands. You will meet opposition, but you should welcome it and will surely overcome it. I am heartily with you in spirit and in purpose."

Typical, too, was a message from Frank Billings of Chicago: "I congratulate you on the inauguration and first meeting of the American Association of Industrial Physicians and Surgeons because it is one of the most important subjects for the consideration of physicians and surgeons."

The Conference Board of Physicians in Industry fulfilled its promise of support, made earlier in the year by Dr. Moorhead; this organization was well represented at Detroit by leading industrial doctors from the east. The group centering around Chicago, who had engineered the incorporation and preliminary organization, were present almost to a man.

From the far West came Legge (California), Philip K. Brown (Southern Pacific Railway), Alvin Powell (Western Pacific Railroad), and William Brown (Valmora, New Mexico). Among representatives in the public health field were J. W. Schereschewsky and Anthony J. Lanza (USPHS), and F. D. Patterson (Pennsylvania). Others who were to render signal services to the association in later years included Donald B. Lowe (Akron), Clarence D. Selby (Toledo), Loyal A. Shoudy (Bethlehem, Pennsylvania), and Guy L. Kiefer (Detroit). It is unfortunate that no complete or accurate list remains today, either of those who registered at the 1916

meeting or of those officially qualified as founding members. Such records apparently were lost or destroyed in the years before the association established a permanent headquarters office—or lie forgotten in personal files.

The first official act of the convention was to appoint A. M. Harvey as permanent chairman of the meeting—a fitting tribute to a man whose leadership had been largely responsible for the founding of the association. Mock, as secretary, reported on the activities of the Organization Committee, then presented the proposed Constitution and Bylaws, bearing committee approval. This document, after stating the name and object of the organization, established four classes of membership: (a) Active, (b) Associate, (c) Honorary, (d) Fellowship. In essence, it provided:

> *That* only physicians who are actively engaged in the practice of industrial medicine and surgery, or who are engaged in the investigation of industrial medical problems, shall be eligible to active membership.
>
> *That* other physicians might be eligible for associate membership, though they failed to meet the requirement of active industrial practice, but provided they had the personal and professional qualifications entitling them to active membership.
>
> *That* applications for active and associate membership must be made in writing and be accompanied by the fee for annual dues; with the further provisions that the applicant be approved by a member in good standing and be certified as to ethics and good standing by the secretary of his local medical society.
>
> *That* honorary membership might be conferred upon a physician for some definite contribution toward the advancement of industrial medicine and surgery or for the performance of some special service for the association.
>
> *That* associate and honorary members should have all the privileges of active members, except the privileges of holding office and voting for officers and directors or for amendments to the Constitution and By-Laws.

Under provisions of the document the Board of Directors was empowered to elect a candidate to any class of membership by a two-thirds vote. Active members, after three or more years in the association, were permitted to apply for fellowships, to be conferred upon selected applicants who satisfactorily passed an examination by a board of examiners consisting of five members or fellows.

In essence, the original Constitution of the association does not differ greatly from the articles and regulations governing the present Industrial Medical Association, though these have been amended from time to time to meet changing conditions. That the basic provisions have stood the test of the years is a tribute to the foresight of the founders and their grasp of the fundamentals of sound organization.

The business of debate and decision proceeded swiftly, and with remarkable unanimity, at that first meeting in Detroit. The Constitution and Bylaws were adopted promptly, with a minimum of change. Records from the files of William A. Sawyer (president of the organization, 1926–1927) tell us that committees were named to deal with the matter of an association journal; standardization of forms, records, and methods in the examination of employees; and the problems of health insurance.

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The surgical experiences of our own war between the states had been well documented[5] and pictorially recorded by Matthew Brady[6] and Surgeon-General Joseph K. Barnes.[7] Lister,[8] using the research of Louis Pasteur,[9] had demonstrated the principles of antisepsis and cleanliness, and James T. Whittaker[10] had demonstrated the importance of physiological changes and the part played by parasites and bacteria.

The year 1900 found the industrial plants of America, with a few exceptions, totally without facilities to provide even the most primitive first aid other than a meager supply of unsterile bandages, kept in a cigar box on a shelf and supplemented by the proverbial chew of tobacco to be applied to a wound.

The exceptions included the first major prepayment program of record, started in 1868[11] by the Southern Pacific Railroad in Sacramento, California, where a hospital was opened in 1869. This project, financed jointly by employer and employees, provided service by a medical staff through arrangements with surgeons along the railway.

In 1882 the first major employee-sponsored mutual benefit association was formed: as the Northern Pacific Railway Beneficial Association. This organization developed a program of complete medical care and other benefits financed by employer-employee payments. Medical services were provided through group practice in the Northern Pacific Hospital in St. Paul, Minnesota, and through arrangements with surgeons along the line.

Through the years following those humble beginnings, the railroads continued their support of progressive health programs, with the close cooperation of the American Association of Railway Surgeons. It is interesting to note that at the 41st annual banquet of the Industrial Medical Association held in Philadelphia, April 25, 1956, the Health Achievement in Industry Award was presented to the Pennsylvania Railroad for the excellence of its modern facilities in Philadelphia, which developed from one of the earliest medical departments.

Nineteenth-century efforts to safeguard the health of workers were not, however, limited entirely to the railroads. In 1887 the Homestead Mining Company[12] of Lead, South Dakota, established a company-financed medical department, with a full-time staff providing complete medical service to employees and their families. Other mines and kindred establishments in remote areas followed suit with programs of one kind or another.

Andrew Magee Harvey's introduction of protective goggles for workers[13] in 1897 heralded a similar trend in large industrial centers. As medical director of the Crane Company in Chicago, he set an example which profoundly affected the development of truly modern industrial medicine.

Another pioneer of that period was Dr. Robert T. Legge, who in 1899 joined the McCloud Lumber Company of California as chief surgeon.[14] Though traumatic injuries were of first importance among the hazards in this isolated community, Legge soon discovered the need for more basic planning. With company coopera-

to find expression through social or government-social agencies, labor unions, and other lay organizations now and in the reconversion period. Strong guidance will be required by the medical profession to accomplish for industry the most efficient results, while at the same time maintaining the highest scientific and ethical standards." Pleading for a stronger public relations program, the report continued: "The AMA is showing little leadership in this field. Lay organizations such as the National Association of Manufacturers, Princeton University (Industrial Relations Research), the National Conference Board, and Chambers of Commerce are actually doing more promotion work than any medical agency."

There was no doubt even at the time of the report that organized labor was keenly aware of the vast social benefits that could result from a broad expansion of health insurance and also aware of the influence that labor might exercise in that field. Various union leaders were among the strong proponents of a federally sponsored compulsory system; and the United States Department of Labor sought by one means or another to extend its authority in matters of industrial health.

In December 1944, at the Eleventh Conference on Labor Legislation called by the Secretary of Labor, the United States Public Health Service and state health departments were bitterly attacked from the floor for their work in the field of industrial hygiene. Committee reports accused them of operating in a sphere in which they had no authority and, more specifically, of blocking federal legislation which would place industrial hygiene activities in the Labor Department.

Industrial Medicine sprang to the defense of the health services with an indignant editorial branding the charges as "preposterous" and presenting facts and figures to expose what it termed "the smear technique."[12] The legislation in question was not passed in 1944 or in 1945, but the effort persisted. Similar bills[13] were still awaiting action in 1946. Their main provision was the allocation of $5 million to state agencies administering labor laws for maintaining safe working conditions and controlling health hazards.

The AMA went on record in February 1946 as opposing this legislation. At a Board meeting of the AAIP&S on April 9, the directors approved another resolution asking that any tax project of this kind "be developed in such a manner as to provide funds ultimately for the state departments of health in cooperation with the United States Public Health Service." In presenting the resolution President Newquist pointed out that this work in industrial hygiene had always been handled by the USPHS through state health agencies, except in New York and Massachusetts, where the hygiene bureaus were part of the labor departments.

Under different circumstances, this same issue came up again in 1950. The occasion was a hearing before the Schaeffer Commission (known as the Little Hoover Commission) of Illinois on a labor-supported proposal to move the Industrial Hygiene Division from the Department of Health to the Department of Labor. Among industrial physicians testifying were J. F. McCahan (Bausch & Lomb Optical Company), J. H. Chivers (Crane Company), and M. H. Kronenberg

(Caterpillar Tractor Company), who strongly supported the opinion that matters of health should be under jurisdiction of health departments. In spite of opposition from various sources, the Illinois transfer was approved and put into effect.

There were also moves in the same direction in other states during the same period. When a report of the Schaeffer hearing was made to the directors of the AAIP&S in December 1950, members mentioned that in Michigan, without public hearings, the Labor Department was empowered to set the standards for first aid in industry and that the department had authority to go into any Michigan plant and make an inspection.

In these and similar controversies there was no implication that government agencies had no place in industrial medicine or that their functions should be unduly restricted. Medical organizations, since their beginning, have cooperated fully and wholeheartedly with public health services at every level. But they have insisted that government, as such, should not interfere with doctor-patient relations or dictate medical practices and procedures.

It is a matter of record that, at mid-century, there were twenty-five federal health agencies performing nine different types of service; at the state level, sixteen major types of agency and many miscellaneous categories; and a host of city, county, and city-county agencies engaged in health service and supervisory activities.[14] Rarely has there been anything that could be underscored as conflict between organized medicine and this multitude of governmental groups.

Moreover—although federal compulsory insurance projects have been steadfastly opposed, and the transfer of medical authority to government labor units has been strongly resisted—it is significant that organized labor has been neither stifled nor impeded in the constructive promotion of health plans for the benefit of the working force and society as a whole.

It is obvious that no one program, formula or panacea can meet all the health needs of the nation, and, as should be the case in this free economy, a vast number of different medical care plans have become operative within the memory of men still living. A few of these, typical of many, are described briefly here:

Union Health Center, New York City, famous as the first experiment in medical service sponsored by the workers in an industry. Founded in 1913 by Dr. George Price and directed since his death in 1942 by his son, Dr. Leo Price, it presently provides a wide range of preventive and medical care to more than 200,000 members of the International Ladies' Garment Workers' Union and limited services to their dependents. In its first forty years of operation, the total number of individual services rendered annually grew from slightly over 1,200 to well above 5.5 million. Most of the medical services, through collective bargaining, have been paid for by the union's health and welfare fund since 1946.

Railroad Retirement Program, authorized by the federal Railroad Insurance Act of 1936 and administered by the Railroad Retirement Board in coordination with unemployment insurance. All railroad workers covered by unemployment

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whatever feats man may perform in the conquest of space, organized occupational medicine, and the Industrial Medical Association, will play a vital role in their accomplishment.

The American dream hurries on, eager for tomorrow. Man, the Worker, moves with it—as does industry and the medicine of industry—each to keep a date with destiny. That destiny will be the fulfillment of the inspired dreaming of Paracelsus and Ramazzini centuries ago—and the reward of the flaming faith of Andrew Harvey, Loyal Shoudy, Harry Mock, Otto Geier and Robert Legge in our time.

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w/c = with cover letter or memo If DATE = 0, undated
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__ article __ letter from __ medical __ trade journal

__ published presentation from conference

__ published government report __ Fed Register notice

__ government inspection results

__ unpublished or internal report

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__ newspaper article

__ letter ✓ memorandum

__ industry warning labels

__ industry sales literature

__ industry recommended practices

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FOSTER WHEELER ENERGY CORPORATION
110 SOUTH ORANGE AVENUE · LIVINGSTON NEW JERSEY 07039 · PHONE 201-533-1100

July 29, 1983

RECEIVED
JUL 25 1983
J. W. BROMAGE

Crane Company
5000 Executive Blvd.
Elmsford, New York 10523

Attention: William A. Beirne

Subject: ASBESTOS POLICY

Gentlemen:

Due to the proven hazards to human health attributable to even minimal exposure to asbestos and/or asbestos containing products, it is the policy of Foster Wheeler Energy Corporation not to purchase asbestos or any asbestos containing product from any vendor.

Accordingly, please be advised that if asbestos or asbestos containing products, parts or components are utilized in any goods or services currently being marketed by you, such goods or services will not be acceptable to Foster Wheeler in fulfillment of the requirements of any purchase order or contract placed with your company.

In the event you are currently processing an order for Foster Wheeler which contains asbestos or an asbestos containing product, please contact us in writing immediately to arrange for an adequate substitute.

We thank you for your cooperation in this most important matter.

Very truly yours,

FOSTER WHEELER ENERGY CORPORATION

L. A. Mattia

L. A. Mattia
Director of Procurement

cc to DE Frank
cc to WA Beirne
cc to Wilmington
from J W Bromage

PLAINTIFF'S EXHIBIT
CRA-250

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Castleman Asbestos File on CRANE Co.
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__ newspaper article

__ letter __ memorandum

__ industry warning labels

__ industry sales literature

__ industry recommended practices

meeting __ agenda ___ minutes ✓ attendee list w/c

legal __ deposition __ testimony of _____:

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Johns-Manville
TWENTY-TWO EAST FORTIETH STREET
NEW YORK, N.Y.

January 22, 1935

Mr. M. F. Judd, Secretary,
Raybestos-Manhattan, Inc.,
Bridgeport, Conn.

Re: Mellon Institute of Industrial Research
Symposium on Dust Problems

Dear Mr. Judd:

As I indicated to you over the telephone this afternoon, I am enclosing a copy of a memorandum I prepared for Mr. Lewis H. Brown regarding my trip to Pittsburgh last Tuesday, January 15th, to attend the Symposium on Dust Problems held under the auspices of the Mellon Institute of Industrial Research.

Very truly yours,

Vandiver Brown

Vandiver Brown
Attorney

VB:T
Enclosure

JAN 30 1935

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Rec'd 1-15-35

MEMORANDUM RE:- MELLON INSTITUTE OF INDUSTRIAL RESEARCH SYMPOSIUM ON DUST PROBLEMS - PITTSBURGH- JAN.15, 1935

On or about December 12, 1934 the Mellon Institute of Industrial Research addressed letters to some 85 industries having industrial disease problems inviting them to attend a meeting to be held under the auspices of the Institute on the 15th day of January. One of these invitations was received by the Asbestos Institute and, although the Asbestos Institute did not accept and was not officially represented, Johns-Manville Corporation requested and obtained permission to send a representative. The invitations expressly stated that "attendance at this meeting need entail no obligation".

Johns-Manville was represented at the meeting by the writer of this memorandum. Approximately 250 people were present representing over 50 industries which had accepted the invitation of the Mellon Institute. The Mellon Institute was greatly surprised at the remarkable response and it is my opinion that one cannot find a better indication of the serious nature of the problems it was the purpose of the meeting to discuss.

I was able to ascertain that the Mellon Institute had been prompted to call the meeting by representatives of the sand and glass and the refractories industries. Representatives of these industries conferred with Mr. E. R. Weidlein, Director of the Institute, and after advising him of the nature of their problem, of its wide-spread character and numerous menacing aspects, suggested the need of some form of concerted action on the part of those industries presently or potentially involved. I understand that Mr. F. W. Sherwood, Vice-President of Owens-Illinois Glass Company and Mr. Roger Hitchins, President of the American Refractories Institute, were the persons who presented the situation to the Mellon Institute. Mr. Weidlein, on behalf of the Institute, agreed to cooperate to the extent of calling the meeting and having the representatives spend a day in Pittsburgh as the guests of the Institute. There was some preliminary discussion as to the possibility of using the Mellon Institute as a clearing house for information and research upon aspects of the problem common to all industries but definite commitments were postponed until after the holding of the meeting.

An impressive list of experts specializing upon various aspects of the dust problem attended the meeting and

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delivered addresses. Among these were Mr. A. C. Hirth, a lawyer associated with Williams, Eversman and Morgan, Toledo, Ohio, attorneys for Owens-Illinois Glass Company; Dr. Eugene P. Pendergrass of the X-ray Laboratory, University Hospital, Philadelphia; Dr. A. J. Lanza, Assistant Medical Director of the Metropolitan Life Insurance Company; Dr. R. R. Sayers, Medical Officer in Charge of U. S. Public Health Service; Professor Philip A. Drinker of the School of Public Health, Harvard University; Mr. F. Robertson Jones, General Manager, Association of Casualty and Surety Executives; and Mr. Donald E. Cummings, Assistant Director, Saranac Laboratory for Study of Tuberculosis.

The addresses delivered by these specialists, together with the open discussion that followed them, revealed, among other things, the very menacing character of the problem, its complex nature, the uncertainties attending most of its aspects and the necessity of some form of united action by the afflicted industries.

It was recognized that some aspects of the problem were peculiar to special industries but it was equally evident that other aspects were common to all. For example, only two forms of dust, namely, free silica and asbestos, are definitely known to produce disabling fibrosis of the lung. Even in the case of these dusts the problems resulting therefrom are quite different since the fibrosis resulting from silica is of a much more serious character than that resulting from asbestos in that the former predisposes to tuberculosis and is much more likely to have a fatal termination. On the other hand (and this illustrates one of the most serious aspects of the problem that is common to all dust producing industries) the fact that no other dust is known to produce disability has not prevented entirely groundless claims aggregating millions and even hundreds of millions of dollars being brought against industries which have no silica or asbestos dust hazard. For example, Dr. Lanza pointed out that no one had ever maintained that gypsum dust was harmful and yet, nevertheless, the gypsum industry had suits pending against it covering claims in excess of four million dollars.

It appeared that among the problems common to all industries were the following:

(1) The menace of ambulance chasing lawyers in combination with unscrupulous doctors. The uncertainties surrounding diagnosis of any of the various forms of pneumonoconiosis are so many that a question of fact is presented in every case. Expert testimony can be produced by both plaintiff and defendant and it is for the jury to decide whose experts are

correct in their interpretations. In making this decision, the jury is not likely to favor the opinion of the experts produced by the employer.

(2) The desirability of making various dust diseases compensable under properly drawn workmen's compensation laws. One of the speakers stated that "the strongest bulwark against future disaster for industry is the enactment of properly drawn occupational disease legislation". Such legislation would (a) eliminate the jury and empower a Medical Board to pass upon the existence of the disease and the extent of the disability; (b) eliminate the shyster lawyer and the quack doctor since fees would be strictly limited by the law; and (c) permit the correcting of initial mistakes in the making of awards by providing for hearings to reduce or eliminate awards if proof could be adduced that the claimant was not disabled or that the extent of his disability had been overestimated.

(3) Problems of ventilation, dust collecting and elimination, and respiratory devices.

(4) The establishing of standards (a) for dust counting and particle size determination, (b) for the taking of X-rays for diagnostic use, and (c) for the interpretation of the markings on the films so produced.

At the close of the discussion a Mr. Kurtz, Vice-President of American Refractories Corporation, made a motion that Mr. William P. Yant, Chairman of the meeting appoint a nominating committee who would nominate a group of individuals to serve as a committee for the formulation of ways and means to bring about effective cooperation of some character between the various industries for meeting and combating those phases of the dust problem common to all. This motion was carried and a Nominating Committee appointed which retired and upon returning presented to the meeting the names of seven individuals to act as such Committee. No other names having been placed in nomination, the following were elected to act as the Committee and report back to the various industries and groups represented at the meeting or to whom the invitation had been originally extended:

Vandiver Brown representing Asbestos, Cork and Non-Metallic

Dr. B. D. Saklatwalla representing Chemical, Abrasives, Alloys and Non-Ferrous metals

E. O. Jones representing Foundries

A. W. Sherwood representing Glass Sand, Ground Sand and Glass Manufacture

A. J. Gentholts representing Iron, Steel and Ores

A. J. R. Curtis representing Lime, Limestone, Cement and Gypsum

Roger A. Hitchins representing Refractories, Ceramics and Clays

I explained to the other members of the Committee that I had been sent to the meeting solely as an observer and had no authority from Johns-Manville Corporation to accept membership on the Committee and certainly none from the Asbestos Industry as a whole. I was urged, however, to meet with the Committee and agreed to do so on the condition that I might withdraw if approval of my serving in that capacity should not be forthcoming. I pointed out that members of the Asbestos Industry did not care to be associated in the minds of the public or of employees with those industries whose problem was silicosis and that for this reason I felt there might be some opposition to having a representative of the Asbestos Industry working with them. I did indicate, however, that I realized numerous aspects of our problem were the same and that if cooperation could be worked out without an undue amount of publicity, Johns-Manville Corporation and perhaps the Asbestos Industry as a whole, would in all likelihood be willing to cooperate. It was the opinion of the Committee that this condition would not present any insuperable difficulty.

Mr. Roger Hitchins, President of American Refractories Institute, was made Chairman of the Committee which held a meeting Tuesday evening after the close of the Symposium. Mr. Hitchins was designated to meet with Mr. Weidlein of the Mellon Institute and ask him to make a proposal in definite and concrete form as to the manner in which the Mellon Institute might be able to assist the various industries for a fee of $25,000. When this proposal has been received and approved by the members of the Committee, it will be submitted to the various industries with the recommendation that it be accepted and that the various industries or individual corporations agree to stand good for a proportionate amount of the fee not in excess of a definite specified sum.

I gathered that the proposal which would be made by the Mellon Institute would include, among others, the following:

(a) The compiling of a comprehensive bibliography of all books, treatises and publications dealing with any aspect of the dust problem; and the evaluation thereof.

(b) The compiling, digesting and correlating of data and information from various subscribing industries relative to their particular experiences.

(c) The drafting of approved workmen's compensation legislation covering pneumonoconiosis.

(d) The digesting of the laws of the various states which might affect the operations of industries presenting a dust hazard.

(e) The outlining of problems requiring research or the establishment of fixed standards and the prevention of duplication of effort and expense along these lines.

The interest with which the discussions were followed and the enthusiasm which greeted the proposal for unified effort lead me to believe that the necessary support will be found for some sort of program along the above lines.

VANDIVER BROWN
January 18, 1935

1/15/35

Representatives at Silicosis Meeting

Aigeltinger, Arthur,
Southern Wheel Company,
230 Park Avenue,
New York, N. Y.

Allen, C. M.,
Staff Supervisor, Safety & Training,
The American Rolling Mill Company,
Middletown, Ohio.

Allen, W. B.,
Personnel Director,
Simonds Saw and Steel Company,
Lockport, N. Y.

Ames, W. F.,
Manager of Compensation,
Bethlehem Steel Company, Inc.,
Bethlehem, P-

Anderson, M. M.,
Aluminum Company of America,
Gulf Building,
Pittsburgh, Pa.

Atwood, F. H.,
Harbison-Walker Refractories Co.,
Farmers Bank Building,
Pittsburgh, Pa.

Avey, Dan M.,
(American Foundrymen's Assoc.)
Penton Publishing Company,
Cleveland, Ohio.

Ayers, E. M., President,
Ayers Mineral Company,
Zanesville, Ohio.

Banker, E. O., Gen. Supt.,
Penna. Glass Sand Corporation,
Huntingdon, Pa.

Barnum, W. J., Claims Attorney,
Youngstown Sheet & Tube Co.,
Youngstown, Ohio.

Barrett, L. P.,
Jones & Laughlin Steel Company,
201 J. & L. Building,
Pittsburgh, Pa.

Bartholomew, Tracy,
Duquesne Slag Company,
Diamond Bank Building,
Pittsburgh, Pa.

Beal, Geo. D., Ass't. Director,
Mellon Institute,
Pittsburgh, Pa.

Bennett, R. H.,
The Belden Brick Company,
Canton, Ohio.

Berg, Dr. Chas. F.,
(United Engineering & Foundry)
858 Lockhart Street,
N.S., Pittsburgh, Pa.

Beyer, R. A.,
Central Tube Company,
Ambridge, Pa.

Bidwell, R. E., President,
Abingdon Sanitary Mfg. Co.,
Abingdon, Ill.

Blank, E. F.,
Jones & Laughlin Steel Company,
511 Ross Street,
Pittsburgh, Pa.

Blommers, P.,
H. H. Robertson Company,
2000 Grant Bldg.,
Pittsburgh, Pa.

Bole, Ralph D.,
Engineering Department,
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HEATING AND VENTILATING

A MONTHLY MAGAZINE FOR ENGINEERS AND CONTRACTORS CONCERNED WITH COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL AIR CONDITIONING, REFRIGERATION, AIR SANITATION, PIPING, HEATING AND VENTILATION

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VOLUME 43 NUMBER 1

THIS MONTH'S COVER

The engineer must view the cow as a heating and air conditioning plant in the design of dairy stables. See an engineer's analysis beginning page 81.

Air Fills the Bag

WM. B. FOXHALL
Assistant Editor
HEATING AND VENTILATING

CONTROLLED air was the answer in one plant to the problem of packaging powdered asbestos.

Arthur A. Gardner put the research department of Breslee Mfg. Co. to work on the problem of filling thousands of cotton bags with asbestos for dummy propelling charges required by the Army for practice firing of the 105-mm howitzer. The problem was complicated in several ways. First, each charge consists of seven bags loaded to specified weights ranging from 1.7 oz to 13.1 oz. Second, the tackiness of the asbestos made hand weighing difficult and prevented the use of gravity feed machines. Third, the dust of powdered asbestos is a health hazard.

Mr. Gardner's engineers designed an assembly line of seven filling machines piped into a master vacuum system which both filled and weighed the bags by air.

The operation of filling the bag takes place within an air-tight box opened on one side by a sliding door, the frame of which is lined with sponge rubber to make an air-tight seal when the door is closed.

The operator clamps the empty bag to a nozzle suspended from the top of the box. This nozzle connects outside the box to a flexible transparent plastic tube about 4 ft long. The open end of the tube is used by the operator in picking up asbestos from a hopper resting on one side of a scale. The other side of the scale carries several small metal plates, the total weight of which perfectly balances the asbestos in the hopper. Each plate represents the exact weight of one filled bag.

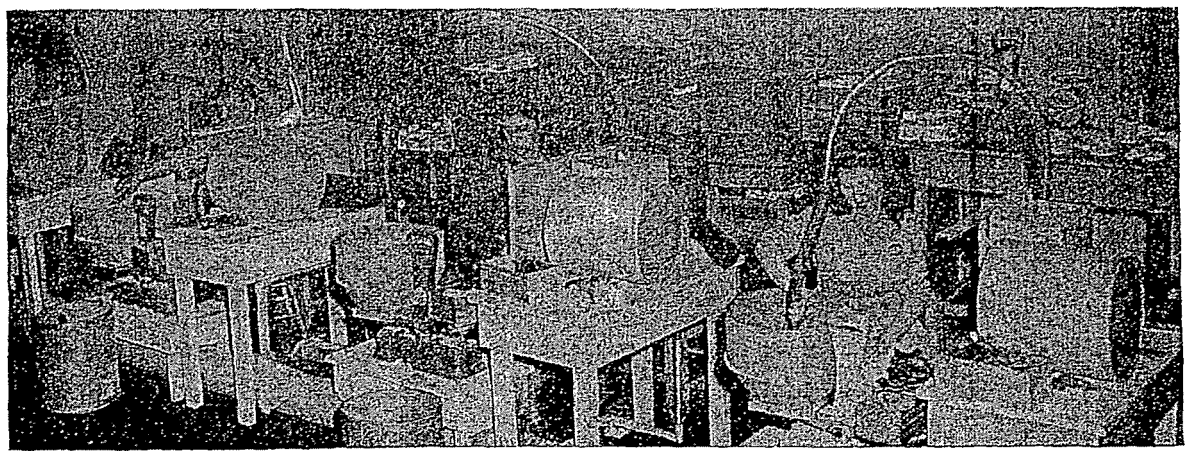
With the scale in perfect balance, the operator removes a single metal plate, throwing the scale off balance the exact amount necessary to fill one bag.

Showing scale arrangement and open door of vacuum box containing bag clamped to end of saran plastic tube.

She then inserts the mouth of the tube into the hopper and steps on a treadle to open a valve connecting the tube and fill-box to a vacuum system. Asbestos is drawn from the hopper and deposited in the bag. As soon as the scale returns to balance, the operator closes the valve and the flow of asbestos stops immediately.

Breslee engineers estimated that their vacuum filling system required 450 cfm through the tube. They installed a Spencer turbine blower powered by a 7½ hp motor at 3500 rpm, which maintained the required vacuum with a volume of 600 cfm, more than sufficient for the proper functioning of the system.

This vacuum method of precision filling resulted not only in extreme accuracy but also in about 600% increase in production over hand weighing and filling. Still more important, however, was the elimination of the hazard to health represented by the manual handling of the finely powdered asbestos.



Part of packaging assembly line. Hoppers of asbestos on scales balance boxes of measured weights. As weights are removed one by one, asbestos is vacuum drawn out of hopper into cotton bag through flexible transparent tube to return scale to balance. Foot treadle controls vacuum.

ALPHABETICAL INDEX OF ADVERTISERS

CLASSIFIED ADVERTISING

Non-display advertisements 10 cents a word per insertion. (No charge for name and address.) Minimum charge $2.00. Payable in advance.

FIELD ENGINEERS: Leading manufacturer has openings for experienced engineers in Refrigeration, Air Conditioning and Heating. College graduates with Sales Engineering Application knowledge desirable. Salary, car and traveling expenses provided. Write, giving full background and qualifications in first letter. Write Box No. 490, HEATING AND VENTILATING, 148 Lafayette Street, New York 13, N. Y.

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EXECUTIVE POSITION WANTED by graduate mechanical engineer with 25 years engineering experience in building construction, heating, ventilating, air conditioning and commercial refrigerating equipments. Professional licensee. Location preferably Eastern Central Seaboard. Salary $7,000. Box No. 487; HEATING AND VENTILATING, 148 Lafayette Street, New York 13, N. Y.

SAVE vital trucks, gasoline and tires. Reduce costs. Not too late to start automatic fuel oil truck deliveries. Write us. Degree Day Systems, 5106-39th Avenue, Woodside, N. Y.

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WE ARE interested in securing the services of a Designing Engineer familiar with Low Pressure Boilers for commercial and household use. Permanent connection. Replies held confidential. Send letter stating age, draft status, education and past experience. Statement of availability required. Box 430, HEATING AND VENTILATING, 148 Lafayette Street, New York 13, N. Y.

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POSITION WANTED—Army Captain, Corps of Engineers, seeks responsible position. 5 years experience in engineering sales, estimating and design of heating, ventilating and air conditioning. References on request. Box No. 483, HEATING AND VENTILATING, 148 Lafayette Street, New York 13, N. Y.

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Silicosis Committee

Illinois Manufacturers' Association

O. E. Mount, Chairman

SILICOSIS and similar diseases caused by the inhaling of dust have created such a problem for all Illinois manufacturers, involving millions of dollars in claims for damages in common-law suits, that the only remedy seems to be to include such cases in the Workmen's Compensation Act.

Several meetings of the Silicosis Committee and its sub-committee were held during the year. At a meeting on September 8, it was unanimously decided to introduce an amendment if possible at a special session of the Legislature, reading as follows:

Amend paragraph 7 of section 3 of the Compensation Act by inserting therein after the word in the second line, "vapors," the following: "silicon dioxide dust or other noxious or poisonous dusts," so that said paragraph shall read as follows:

"In any enterprise wherein molten metal, or explosive or injurious gases or vapors, silicon dioxide dust or other noxious or poisonous dusts, or inflammable vapors or fluids, or corrosive acids are manufactured, used, generated, stored or conveyed in dangerous quantities."

New Provision

Thereafter add to section 3 a new paragraph 7¼ as follows:

"Any disability to or death of an employee resulting from exposure to silicon dioxide dust or other noxious or poisonous dusts, shall constitute an accidental injury for which compensation shall be payable under this Act."

After a brief presentation of the purpose of this meeting, Dr. A. M. Harvey of the Crane Company was called upon to discuss "Silicosis and Dust Diseases from a Medical Point of View."

Silicon and similar dust diseases, Dr. Harvey pointed out, confront Illinois and every other state. A few months ago it was estimated damage claims involving $50,000,000 had either been tried or started. Probably double that amount at the present time confront employers. Compensation is asked of industry for certain workers who presumably are disabled, but in reality a tribute is being levied upon industry by those who are getting the tribute from the persons who claim to be injured. The money is going to smart doctors and lawyers.

"Thirty years ago," said Dr. Harvey, "it was predicted that a gradual increase of lung diseases due to occupational dust might be expected, but no one expected the growth of thousands of cases. It has been called a depression disease—the plaintiff has nothing to lose and may have something to gain.

"Silicosis and similar diseases are caused by the inhalation of microscopic particles of silica which lodge in the lungs and develop slowly—the progress of the disease depending upon the quantity inhaled and the time of exposure. Symptoms appear slowly, with shortness of breath and difficulty in breathing. The appetite is capricious, there is weakness, more frequent colds, bronchitis, influenza and presently tuberculosis following silicosis due to irritation.

"The question ultimately must be settled on a permanent basis with a properly drafted occupational disease law. A state board to pass upon silicosis and similar diseases should be appointed, separate from the present Industrial Commission. The Illinois Industrial Commission does not want a lot of lung cases. Dust will have to be stopped at its origin as a result of more careful methods in factories. Dissemination of dust must be avoided.

"Few industries can cope with this silicosis problem and remain financially sound, even if they settle the cases. There should be physical examinations at least every six months and if the workman shows tuberculosis or healed tuberculosis, he should be put in some other occupation. I know of twenty men who are the apparent picture of health, but x-ray examinations show silicon dioxide."

Dr. Harvey recommended that those present secure the following publications for a study of the effect of dust upon certain diseases:

Report by the Industrial Commission of Wisconsin, on "Effect of Dust Upon the Respiratory System."

Report by the Industrial Commission of Wisconsin, giving general orders in connection with dust fumes, vapors and gases.

Report by a commission appointed by Governor Pinchot on occupational diseases, issued by the Pennsylvania Industrial Commission, Harrisburg.

Journal of the American Medical Association for August 19, 1933.

Legal Aspects

A. C. Hirth of the Owens-Illinois Glass Company, talked on the "Legal Aspects of Silicosis and Other Dust Diseases."

Most cases involving dust diseases constituted a racket, he stated, but the problem had its serious side. While many cases were fraudulent, an employer could not go into court with their fraudulent character as a basis. Many cases were bona fide. There might or might not be liability.

For 200 years there has been knowledge that certain diseases were caused by certain types of dust. The law contemplates that a workman should have a safe place in which to work. For twenty years there has been more or less knowledge of dust diseases in various countries and for fifteen years this country has been studying the effect of dust upon the respiratory system.

Mr. Hirth stated that the subject of special legislation covering dust hazards had been considered in a number of states and in several states laws relating to the hazard had been enacted. In states where such laws were not in effect, plaintiffs took their claims for damage before common law courts. This was exceedingly expensive for employers. The Pennsylvania Pulverizer case had cost $40,000 for legal expenses, including a record of the case. A verdict of $10,000 against the company had afterwards been set aside by the Court of Appeals on the ground that no negligence on the part of the employer had been established, but the expense of the case had to be borne by the employer.

Mr. Hirth thought all such cases should be tried under the Workmen's Compensation Act. There was no need of a jury. The evidence should be presented to commissions, as was the practice in Canada and Great Britain. He referred to 128 cases against one employer in St. Louis, which had netted $100,000 for one attorney. If silicosis cases were tried before a commission, it would be possible to pay the compensation in monthly installments and if the employe went back to work and showed an improved condition, the award could be cut down or discontinued.

J. L. Earlywine of the Illinois Steel Company stated that up to three or four years ago, no employer realized the danger from silicosis and other dust diseases. Twenty years ago no foundry ever had a case of silicosis. If lawyers and doctors were honest, most of the cases could be defeated, he said.

Silicon Dioxide

Mr. Earlywine stated he had defended cases during the last two and one-half years and had reached the conclusion that silicon dioxide was the only dangerous dust. He thought it would be sufficient to amend the Act to cover such cases. Every industrial employer of Illinois was subject to such cases and must be in a position to defend himself against a racket. He referred to damages in which 50 per cent of the fees went to the lawyers and stated that if an employe obtained a judgment of $15,000, he would be lucky if he got $5,000 for himself after all the court costs were paid.

He referred to an unsuccessful attempt to secure an amendment to the Workmen's Compensation Act at the last session of the Illinois General Assembly, the failure being largely due to the fact that the employers were not united. The present plan was to introduce an amendment to the Workmen's Compensation Act, which would include silicon dioxide and other dust diseases, and it would be necessary to obtain an agreement with organized labor to the amendment in order to have the proposal submitted in the Governor's call for a Special Session, and also for the reason that a two-thirds vote of the Legislature was necessary to insure the passage of the proposed amendment in a special session.

David R. Clarke, counsel, talked on the importance of having the amendment included in the call for a special session and proposed that Mr. Earlywine take the matter up with representatives of labor.

W. F. Cracombe of the American Manganese Steel Company, stated silicosis cases involving $20,000,000 in damages were on the court dockets in New York.

F. H. Elam of the American Steel Foundries, stated the increased cost of compensation cases in Pennsylvania covering silicosis amounted to about 8 per cent.

Commonwealth Edison Company, Chicago, has filed with the Illinois Commerce Commission a series of industrial rate changes which should interest many manufacturers in Chicago. The company's contract department is prepared to give full information.

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TIME
IN PARTNERSHIP WITH CNN

Monday, Jun. 13, 1960

CORPORATIONS: The Master Plumber

To build his giant H. K. Porter Co., Thomas Mellon Evans has taken over some 40 smaller companies, molded them into a widely diversified, tightly run industrial complex (1959 sales: $225,956,904). Last year Evans shoved his way into Chicago's old and ailing Crane Co., the nation's fifth-ranking manufacturer of plumbing fixtures, and started out to put together a plumbing-fixture empire with Crane as a base and Michigan's Briggs Manufacturing Co. as a major part.

But last week cocky Tom Evans, 49, suffered his first major setback. In Detroit a federal judge issued a temporary restraining order thwarting Evans' effort to take over Briggs, the nation's sixth-largest maker of plumbing fixtures (1959 sales: $21,502,583).

While Evans was buying into Briggs, he picked up the facilities of four firms—Chapman Valve Manufacturing Co., National-U.S. Radiator Corp., Swartwout Co. and Pipe Fabricators. When Briggs directors flatly turned down his offer to buy Briggs outright, Evans (through Crane) bought 21% of Briggs's common stock, the largest single block. He was all set to elect at least part of an "independent board" of his own choice, which was likely to be more amenable to his taking over. But the court found that Evans' attempt to take over Briggs may violate antitrust laws, blocked him from voting his stock at the annual meeting June 17 unless an appellate court, now pondering the case, reverses the decision.

FTC Charges. Evans' rapid acquisitions of plumbing-fixture manufacturers also brought an antitrust complaint from the Federal Trade Commission. Evans had his own explanation for the complaint. To the New York Society of Security Analysts he said darkly: "Somebody came to me several months ago and said, 'If you don't get out of Briggs, one of the family is married to a Senator from Michigan, and we're going to stir up things in Washington.' " Michigan's Democratic Senator Philip A. Hart,

married to a daughter of the firm's founder, heatedly denounced Evans' innuendo.

Next month FTC pre-hearing conferences begin in Washington. If the FTC proves that Crane's acquisitions are lessening competition, Evans will have to dismantle the plumbing combine he so rapidly built up. Evans answers that American Radiator & Standard Sanitary so dominates the field that it accounted last year for 45% to 50% of all sales in the U.S. "If they want real competition," says Evans, "letting Crane merge with these smaller companies is one way of doing it. Otherwise, it will be a race to see who goes broke first."

Unmoneyed Mellon. Tom Evans, a distant cousin of Pittsburgh's moneyed Mellons, has made a personal fortune on his own estimated at $80 million. After graduating from Yale in 1931, he got a start as a $100-a-month clerk in the office of William L. Mellon, then head of Gulf Oil Corp. Showing budding financial genius, Evans rented Gulf stock from Mellon at 3% interest, used the stock as collateral to borrow money to play the market. His profits he plowed back into Gulf stock, used his returns to buy into H. K. Porter, a faltering manufacturer of steam locomotives. By 1939 Porter was forced into bankruptcy, and Evans became president when it was reorganized.

With the Porter company as a base, Evans set out to acquire others, showed himself a clever and cool reorganizer of corporations. His method is simple: he looks for faltering companies that have potential earning power and whose s tock is selling for less than the company's book value. He also likes to find a company with cash in the till to help pay the purchase cost. Evans never merges his company with others through stock swaps, instead buys the other company's stock and retires it, thus increasing the value of the purchasing company's stock. Per-share value of Porter stock increased from $9.32 in 1950 to $49.43 last year.

Evans states his business philosophy simply: "A chief purpose of corporations is to make money for the stockholders." A major ill in U.S. business, Evans believes, is that not enough directors have their financial fate riding on the company they direct. Says Evans: "Good business is self-interest. If a director does not have as much stock as he can afford, he is simply not involved enough." Evans practices his beliefs: he owns 76% (worth $43 million) of Porter's common stock; in Crane he owns 162,000 shares, worth $8,000,000.

No Heart? When Evans moves into a faltering company, he ruthlessly shakes it up. When he took over Crane, he closed or sold 43 of its 130 branch outlets and fired four vice presidents. Six directors have quit the board. Crane executives who watched him in operation call him "crude and brutal." Pickets striking against Crane carried signs at the annual meeting reading MONEY MAD EVANS HAS NO HEART.

But under Evans' firm hand, Crane is doing better. While sales fell last year as Evans slashed unprofitable lines of products, earnings jumped to $6,517,746 (v. $2,167,345 in 1958). This year the trend continues; earnings for the first quarter were 67¢ per share (v. 38¢ for the same period last year). And although Evans must justify his expansionism to a federal court in the U.S., he has no antitrust worries in Europe. There he has already invested more than $5,000,000 so far this year in three plants for Crane. He expects to add others soon.

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TIME
IN PARTNERSHIP WITH CNN

Monday, May. 11, 1959

CORPORATIONS: Heirloom Collector

The ranking heirloom collector of U.S. business is a Pittsburgh millionaire named Thomas Mellon Evans. His heirlooms are old, family-owned business enterprises that have fallen on hard times, and his specialty is modernizing them. Last week Tom Evans, chairman of Pittsburgh's H. K. Porter Co., Inc., an industrial combine with assets of $57 million, added another heirloom. He took over as board chairman and chief executive officer of Chicago's Crane Co., the nation's largest manufacturer of valves, fittings and pipes, in a shake-up of 104-year-old Crane's management.

Evans cast his collector's eye on Crane in the fall of 1957, when the company's sales were slipping from a record $394 million in 1956 to $378 million. He began buying up stock, asked to get on the Crane board, but was turned down. As Crane sales dropped to $336 million in 1958, Evans decided that the time was ripe to move, called in Proxy-Battler Alfons Landa, boss of Penn-Texas Corp., to help.

Stock Control. Hoping to avoid a proxy fight, Evans and Landa persuaded Gurdon Wattles, chairman of Electric Auto-Lite Co. and a Crane director, to back them with 322,900 shares of Crane stock owned by Auto-Lite. They also went to Mrs. Emily Crane Chadbourne, 89, only living daughter of Crane's founder, explained that Evans' chief argument with Crane President Neele E. Stearns was over Stearns's slowness in expanding the firm's inadequate network of independent wholesalers. Proof of Evans' complaint was Crane's first-quarter earnings (23¢ per share v. 21¢ last year), which did not show the strong comeback from the recession of Crane's chief competitors. Mrs. Chadbourne decided to back Evans and Landa with her 120,759 shares, and they agreed to put Grandnephew Robert Crane on the board.

Meantime, Evans himself had continued buying Crane stock until he had amassed 155,000 shares.

This, together with the Wattles and Chadbourne shares, gave him 25% of Crane's stock, enough to do what he wanted. Evans and Landa placed four new directors on the board, and Stearns resigned when he saw his power drained away by the insurgents.

Cold Cash. Tom Evans, at 48, has amassed a fortune with his knack for changing corporate hard times into good times. He started at 28 by taking over H. K. Porter Co.. money-losing locomotive manufacturer, built it up into a profitable combine of 18 divisions specializing in electrical and steel products. In the last 15 years he has acquired more than 30 companies.

Evans built his pyramid with cold cash. When he won control of a company, he nurtured it until it began to generate cash, then used the cash to buy yet another company. In the first quarter Porter's sales rose from last year's $32 million to $52 million, its profits from 51¢ per share to $1.30, after a merger with one of its subsidiaries. For Crane, Tom Evans hopes to turn a similar trick.

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TIME IN PARTNERSHIP WITH CNN

Friday, Feb. 19, 1965

A Letter From The Publisher: Feb. 19, 1965

THEY traveled most of the way in a chartered Air France Boeing 707, the plane used by Charles de Gaulle on overseas trips. In fact, it contains a king-size bed for the general. The travelers did not meet De Gaulle, but they met just about everybody else of importance along their route—one king, three presidents, five prime ministers, Cabinet ministers, generals, princes, ambassadors and assorted specialists.

The trip was TIME'S News Tour of Asia, and it took 28 U.S. business and professional leaders to a crucial theater of world events. The purpose was to give the travelers—as concerned, responsible U.S. citizens—the best possible journalistic view of that theater, enabling them to seek information for themselves with the best facilities and from the best sources available to TIME.

Our first such tour, a little over a year ago, covered Western Europe and Russia, where Nikita Khrushchev spent seven hours talking to his American capitalist visitors. In the judgment of all concerned, the first trip was such a success that an encore, with another set of business participants and in another part of the world, became inevitable. Traveling with a TIME Inc. contingent headed by Editor in Chief Hedley Donovan and President James Linen, TIME'S News Tour of Asia included:

William R. Adams, president, St. Regis Paper Co.

Harry O. Bercher, president, International Harvester Co.

Gene C. Brewer, president, U.S. Plywood Corp.

Donald C. Burnham. president, Westinghouse Electric Corp.

Owen R. Cheatham, board chairman, Georgia-Pacific Corp.

Norton Clapp, president, Weyerhaeuser Co.

Gaylord Donnelley, board chairman, R. R. Donnelley & Sons Co.

Thomas M. Evans, board chairman, H. K. Porter Co. and Crane Co.

Frank M. Freimann, president, Magnavox Co.

Robert Lee Gibson Jr., president, Libby, McNeill & Libby

Rodney C. Gott, president, American Machine & Foundry Co.

William P. Gwinn, president, United Aircraft Corp.

Floyd D. Hall, president, Eastern Air Lines

George Harrar, president, Rockefeller Foundation

Frank E. Hedrick, executive vice president, Beech Aircraft Corp.

Henry J. Heinz II, board chairman, H. J. Heinz Co.

Harry Bulova Henshel, president, Bulova Watch Co.

J. Ward Keener, president, B. F. Goodrich Co.

Norman R. King, president, Miller Brewing Co.

Lewis A. Lapham, chairman of executive committee, Bankers Trust Co.

Andrew McNally III, president, Rand McNally & Co.

Maurice T. Moore, partner, Cravath, Swaine & Moore

Charles H. Percy, board chairman, Bell & Howell Co.

E. Claiborne Robins, president, A. H. Robins Co.

Dorrance Sexton, president, Johnson & Higgins

E. Carroll Stollenwerck, president, Laird & Co.

Jack D. Taylor, president, Phoenix of Hartford Insurance Companies

Thomas R. Wilcox, executive vice president, First National City Bank, N.Y.

These men's companies employ more than 600,000 people and represent annual net sales of more than $10 billion. Though well traveled, many of the tour members—who paid their own way—had never been in Asia before, and none had previously visited all eleven cities on the 23,120-mile itinerary.

It was an exciting time to be in Asia—the group heard about the U.S. air strikes against North Viet Nam halfway through the tour. While Saigon had to be dropped from the itinerary for security reasons, the Vietnamese war was one of the chief topics of inquiry.

The tour started in Washington, with a briefing by John McCone, head of the Central Intelligence Agency. After a stop in Paris, where TIME'S principal Asia correspondents joined the party, the first visit was to Pakistan. At his Karachi residence, Sandhurst-educated President Ayub Khan, a red rose in his lapel, bluntly discussed the problems facing his country and the U.S. Chief among these is Pakistan's bitterness over American military aid to India, which Ayub feels will sooner or later be used not against the Communists in Asia but against his own country. As a result, Pakistan has lately edged away from its once solid pro-Western position and moved closer to Red China—a move which Ayub insisted was not against U.S. interests.

Flying on to India, the travelers heard the other side of the India-Pakistan dispute from diminutive Prime Minister Lai Bahadur Shastri. He called Indian relations with Red China "as bad as they can be," but advocated Peking's admission to the U.N. and shrank from endorsing the U.S. position in Viet Nam. He also discussed India's gravest problems—economic stagnation and inadequate food. When asked what his country was doing about its population explosion, Shastri smiled: "I hesitate to give advice because I have six children myself."

In Thailand the TIME group was received by King Bhumibol Adulyadej at his Bangkok palace, surrounded by green lawns and hedges neatly fashioned into the shapes of elephants, alligators and birds. In the Gomain Room (so named for a red precious stone, said to be clearer than a ruby), the King spoke of the closeness of Thai-U.S. relations. Then he showed the visitors some of his canvases —the monarch is a dedicated amateur painter. The pictures included one showing a blur of writhing demons in browns, greens and reds titled Subversion.

Subversion, Communist variety, was also taken up by Prime Minister Thanom Kittikachorn. "Those who talk about U.S. withdrawal from Viet Nam," said he, "are those who do not share the responsibility." A stirring appeal for U.S. commitment in Asia came from Foreign Minister Thanat Khoman, who said: "We in Thailand have no place to retreat to, so we will make our first stand and our last stand here." But he was optimistic: "If we draw up a balance sheet of our strengths and weaknesses and those of our antagonists, we would find it very much in our favor."

Next stop was Malaysia, the thriving federation threatened on the outside by Indonesian aggression and on the inside by racial conflicts. At Singapore's Raffles Hotel, that famed and slightly faded remnant of empire, the tour members heard Lee Kuan Yew, Prime Minister of Singapore, offer sharp though sympathetic criticism of U.S. policy in Asia. He also put forth a striking definition of "the real problem" in the Far East: "How to give the human being in Asia the same zest, the same incentives which make a prosperous society, without being cold and dedicated and zealous like the other chaps, who are cold-blooded and ruthless in the process."

Later, in Kuala Lumpur, the travelers met Malaysia's Prime Minister Tunku Abdul Rahman and his Deputy, Abdul Razak. It happened to be the Prime Minister's 62nd birthday and so, with more serious matters disposed of, he ambidexterously cut a birthday cake and heard his visitors spontaneously burst into "Happy birthday, dear Tunku, happy birthday to you."

Everywhere in Southeast Asia the presence of Red China looms, and nowhere is that presence more carefully observed than in Hong Kong. There, the TIME group received what U.S. Consul General Edward E. Rice described as "the fullest briefing on Communist China we have given here."

Perhaps the most dramatic view of the conflict with Red China was afforded in Taiwan, where indomitable Generalissimo Chiang Kaishek, 77, still rules over Nationalist China and still dreams—though with diminishing assurance—of some day freeing the mainland. Before meeting the generalissimo and Madame Chiang, the visitors flew to Quemoy, the tiny, heavily fortified Nationalist island just off the mainland, which again and again has bravely stood up against heavy Red shelling. On the way back to Taiwan, one engine in a Nationalist air force plane gave out and the craft had to

return to Quemoy. While repairs were made, some of the visitors passed the time on a parched nine-hole golf course; one player nervously hooked a drive off the fairway into a machine-gun emplacement.

By the time the tour officially wound up its final and 26th briefing, the businessmen had learned to toss interview questions like old pros and to assess answers with the required caution. "I thought I had these things all figured out," summed up one traveler, "but now I realize things are both simpler and not so simple as I thought." Thai Foreign Minister Thanat Khoman described the tour as "an international public service"—and we of TIME hope it was.

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The New York Times

Business Day

Thomas Evans, 86, a Takeover Expert, Dies

By NICK RAVO
Published: July 18, 1997

Thomas Mellon Evans Sr., a financier who was one of Wall Street's most feared corporate raiders in the 1950's and 1960's and later the breeder of champion thoroughbred horses, including a Kentucky Derby winner, died yesterday at his home in Manhattan. He was 86.

The cause of death was complications from a recent fall, said his secretary, Pamela McKay.

Mr. Evans, who was also a philanthropist, earned fame and fortune as a master of mergers and acquisitions, an asset stripper whose takeover tactics were a forerunner of those employed by many of the leveraged buyout artists of the 1980's.

During the days when Wall Street was as boring as a gray flannel suit, Mr. Evans was one of its more daring and rapacious characters, waging waves of takeover battles. Sometimes, he was victorious, as with the Crane Company, and a cement maker, the Medusa Corporation. Sometimes, he was defeated, as he was with Anaconda and Westinghouse Air Brake.

After shutting down several companies in New Jersey in the 1960's, a Democratic Congressman there, Representative Frank Thompson Jr., called Mr. Evans "the corporate embodiment of Jaws, the great white shark."

More often, though, he was called a financial genius.

"He was never really an operator; he was a financial guy -- a balance sheet buyer," one of his sons, Robert Sheldon Evans, told Forbes magazine in 1995. "He would buy something for less than book value and figure the worst that could happen was he would liquidate it and come out O.K. What he didn't want to do was lose money on the deal. If he knew his downside was covered, then he figured the upside would probably take care of itself.

"It was a very shrewd policy in the 50's and 60's, when there were highly inefficient markets: buying undervalued assets, running them for cash and selling off pieces. The 80's leveraged buyout guys were just taking a lot of his deals to their logical extension."

A native of Pittsburgh, Mr. Evans began his financial career at the bottom, despite his gilded middle name; his grandmother's first cousin was Andrew Mellon, the famous banker. After graduating from Yale University in 1931, Mr. Evans landed a $100-a-month clerk's job at Gulf Oil, then owned by the Mellon family. He invested shrewdly, and along with a small inheritance, bought bonds in a troubled steam locomotive manufacturer, H. K. Porter.

The company eventually went bankrupt and in 1939, when it was reorganized, Mr. Evans, as its largest bondholder, became its president. H. K. Porter did well during the next decade, diversifying into steel, construction material and hardware.

Later, in 1959, he won a bitter proxy fight and acquired the Crane Company, which traded mainly in plumbing supplies and became a conglomerate consuming some 30 other concerns captured by Mr. Evans. For a time, he also owned his own stock brokerage company, Evans & Company, to save fees on transactions.

Known for his candor and cantankerousness, Mr. Evans even battled in the board room with his sons. In 1994, for example, he backed a leveraged buyout of the Crane Company by outsiders to keep Robert Evans from taking control of the company. The board, however, sided with his son, and the senior Evans sold what was left of his shares back to Crane.

Similar treatment also befell Robert's older brother, Edward. In the late 1970's, Edward ran H. K. Porter, which had grown into a conglomerate of businesses bought by Mr. Evans. That group of businesses included a stake in Macmillan, the publisher. Edward Evans moved to Macmillan after being dismissed from H. K. Porter. His father, irritated by the move, impulsively demanded that Macmillan buy out H. K. Porter's shares in the company. It did, for about $50 million. Unfortunately, afterward, Macmillan was bought by the rogue financier Robert Maxwell for an amount that would have netted Mr. Evans about $500 million.

Patience, however, was never a virtue of Mr. Evans. He did, though, spend his last years on a farm in Virginia, breeding horses, a pastoral pursuit he entered decades earlier for pleasure rather than profit. In 1956, he bought a 495-acre Gainesville, Va., cattle ranch from the owners of Gallagher's Steak House in New York. He switched the ranch, Buckland Farm, from Black Angus to thoroughbreds in 1964.

He also owned a 360-acre farm in Lexington, Ky., and bred many horses over the next four decades, including Pleasant Colony, winner of the 1981 Kentucky Derby and Preakness Stakes. Although he raced dozens of other stakes winners, Mr. Evans said the 1981 Derby was the most

exciting moment in racing.

Pleasant Colony also won the Wood Memorial and the Woodward Stakes in 1981, and was honored with the Eclipse award as the nation's top 3-year-old that year. He was the first of three champions to be ridden by jockeys wearing the Buckland Farm silks of dark blue with a white triangle and white sleeves. A decade later, Pleasant Stage won the 2-year-old filly championship after winning the Breeders' Cup Juvenile Fillies race at Churchill Downs in 1991, and the following year Pleasant Tap was voted top older horse, having won the Suburban Handicap and the Jockey Club Gold Cup at Belmont Park and finishing second in the Breeders' Cup Classic.

Among Mr. Evans's other stakes winners were Dance Colony, winner of the 1989 Adirondack Stakes at Saratoga; Stage Colony, winner of the 1991 Fort Marcy Handicap at Belmont Park, and Cherokee Colony, winner of the 1988 Flamingo Stakes at Hialeah. His trainers included Leroy Jolley, John Campo, Christopher Speckert and Angel Cordero Jr., the former jockey.

A member of the Jockey Club, the Thoroughbred Breeders and Owners Association and the Virginia Thoroughbred Association, Mr. Evans was also a member of the Board of Directors of the National Museum of Racing and Hall of Fame in Saratoga Springs, N.Y. In 1981, along with Mr. and Mrs. Bertram Firestone, he received the award as the year's outstanding breeder as voted by the New York Turf Writers Association. Besides his work with thoroughbreds, Mr. Evans was active in numerous charities and arts organizations including the National Gallery, the National Portrait Gallery, New York University Hospital and Carnegie-Mellon University.

He is survived by his third wife, Betty Barton Evans; three sons, Thomas Jr. of Vermont, Edward of Manhattan and Robert of Greenwich, Conn.; four grandchildren, and two stepchildren.

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Thermoid Merger in Effect.

Under the plan for the merger w
the Thermoid Company approxima
ly 90 per cent of the outstandi
stock of the Southern Asbestos Co
pany has been deposited and the pl
has been declared operative, it w
announced yesterday. Deposits
Southern Asbestos stock were 29,
shares, which together with 51,
shares formerly owned by the Th
moid Company, amount to 80,
shares or 89.6 per cent of the 88,
shares

The New York Times
Published: October 16, 1929

Castleman Asbestos File on CRANE Co.
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DR. GARDNER DIES; SILICOSIS EXPERT

Leader in Research on Disease Headed Saranac Laboratory —Won Several Awards

DR. LEROY U. GARDNER
Associated Press, 1935

Special to THE NEW YORK TIMES

SARANAC LAKE, N. Y., Oct. 24—Dr. Leroy Upson Gardner, director of the Saranac Laboratory and the Trudeau Foundation, and an international leader in the research of silicosis and other industrial diseases, died here this morning in his home. His age was 57.

At his death, Dr. Gardner was in the midst of a program for the expansion of the laboratory and the development of a $1,000,000 medical center in Saranac Lake. He had raised more than $100,000 for an addition to the laboratory and was planning for the development of the medical center. As a director of the Trudeau Foundation, he also was interested in the expansion program planned for Trudeau Sanatorium that will call for an expenditure of more than $1,000,000.

Dr. Gardner leaves a widow, the former Carabel McKenzie, whom he married in June, 1915, and two daughters, Mrs. Benjamin Downs of Washington, D. C., and Mrs F Levering Neely of Atlanta, Ga.

Won Knudsen Award in 1940

Dr Gardner received in 1940 the William S Knudsen Award for his research on the control of silicosis which was credited with determining what take place in a workman's lungs as a result of breathing silica dust and with making possible the prescription of preventive measures for industrial plants. In 1935 he received the *Trudeau Medal for important* work in the pathology of tuberculosis and the relation between tuberculosis and silicosis.

As director of the Saranac Laboratory, Dr. Gardner used its facilities in seeking the answer to questions he posed as a young medical student "Why are some stone cutters in the Barre, Vt., granite quarries highly susceptible to tuberculosis? And why, in the near-by Proctor, Vt marble quarries, are the cutters not similarly affected?'

He began his investigations in 1911 Twenty-six years later his research had made him an international authority on the subject Silicosis research took Dr. Gardner to industrial plants and mines throughout the nation.

Born in New Britain, Conn., son of Irving Isaac and Inez Baldwin Upson Gardner he received a B.A. degree in 1912 and an M D degree in 1914 from Yale, and took postgraduate work at Boston City Hospital and Harvard Medical School from 1914 to 1917

Taught at Harvard and Yale

During the first World War Dr. Gardner served as a lieutenant in the Army Medical Corps in 1917. He was instructor in pathology, Harvard Medical School, in 1916-17, and assistant professor of pathology, Yale School of Medicine 1917-18

In 1919 he became pathologist of the Trudeau Foundation at Saranac Lake. He was appointed director of the Saranac Laboratory in 1927 and director of the foundation and Trudeau School in 1938. He was a trustee of the Village of Saranac Lake in 1932-33, a member of the water board in 1929-30 and a member of the Village Planning Commission.

In 1940 he received an honorary M S degree from Yale He was the author, with S. A Petroff, of "Tuberculosis — Bacteriology, Pathology and Laboratory Diagnosis" and contributed to medical publications on silicosis and related diseases due to dust

The New York Times
Published October 25, 1946

Castleman Asbestos File on CRANE Co.
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Porter President Elected White Motor Co. Director

T. M. Evans
Trinity Court Studio

T. M. Evans, president of the H. K. Porter Company, Inc., was elected a director of the White Motor Company yesterday. H. K. Porter is a Massachusetts manufacturer of bolt and wire cutters, special purpose tools for industry and automotive body tools and repair equipment.

The New York Times
Published: March 2, 1951

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CD-ROM Document #: Crane JJ DATE = 1951

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CRANE CO. REPORTS 96% GAIN IN INCOME

Net for 1950 $15,766,171, or $6.48 a Share as Compared With $8,011,887, or $3.17

SALES SHOW GAIN OF 25.8%

$220,066,910 Total Is Second Best in Company's History —Other Company Earnings

The ninety-fifth year of operations of the Crane Company, manufacturers of plumbing and heating equipment, produced the second highest sales in its history and an increase of 96 per cent in earnings, the annual report disclosed yesterday.

Net profit after all charges and $7,900,463 in taxes, amounted to $15,766,171, equal to $6.48 a common share last year, compared with $8,011,837, or $3.17 a share for 1949 when taxes amounted to only $4,263,992. Net profit from domestic operations, before a $979,000 allotment to go toward higher costs for replacement of machinery and equipment, was $12,068,184, a 109 per cent increase from the 1949 figure of $5,770,422, before a special appropriation of $832,000.

Sales totaled $220,066,910, or 25.8 per cent above the previous year's volume of $174,894,798. Sales of jobbed products (products manufactured by others) accounted for about 52 per cent of the total sales against 51 per cent in 1949, J. L. Holloway, president, reported.

During 1950 replacements and additions to property, plant and equipment amounted to $3,829,534 compared with $2,555,332 the year before. The amount for the current year is placed at $3,819,534, while an estimated $3,000,000 is expected to be spent for modernization and expansion of the facilities of the Canadian subsidiaries.

Net working capital on Dec. 31, last, was $87,836,313, an increase of $9,104,273. Year-end inventories totaled $42,692,586, up $9,989,698 from the close of 1949. The company's investment in foreign subsidiaries in Canada and England is carried in the balance sheet at a cost of $12,000,000.

John H. Collier, chairman, and P. R. Mork, vice chairman of the board of directors, announced their retirement as of Jan. 31, and April 23, 1951, respectively.

The New York Times
Published: March 24, 1951

Castleman Asbestos File on CRANE Co.
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Trudeau Director Resigns

SARANAC LAKE, N. Y., July 7 (AP)—Dr. Arthur J. Vorwald has resigned as director of the Trudeau Foundation and the Saranac Laboratory, Dr. J. Burns Amberson, president of the board of trustees of the Trudeau Sanitarium, said today. Dr. Vorwald has accepted another position, the nature of which was not disclosed. He had served at Trudeau for twenty years and had been director since 1947.

The New York Times
Published: July 8, 1953

Castleman Asbestos File on CRANE Co.
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PORTER IN CONTROL OF LACLEDE-CHRISTY

The H. K. Porter Company, Inc., has announced that it has acquired a substantial majority of the common stock of the Laclede-Christy Company.

The latter concern, which had sales of $13,671,104 in the fiscal year to Nov. 30, 1953, makes refractory products. H. K. Porter makes industrial rubber products through a subsidiary acquired earlier this year and also makes fire brick. Its consolidated sales last year amounted to $64,448,725.

T. M. Evans, president of Porter, said his company was making arrangements to call a special stockholders' meeting of Laclere-Christy, if necessary, to elect its representatives as directors. He added: "We have requested that a majority of the board resign."

J. D. Strett, president of Laclede-Christy, advised stockholders in a telegram late last month to withhold tendering their shares for purchase by H. K. Porter.

The New York Times
Published: September 16, 1954

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2 RUBBER MAKERS SCHEDULE MERGER

H. K. Porter Would Be the Survivor in Deal With Thermoid, if Approved

H. K. Porter Company, Inc., announced yesterday it would merge with the Thermoid Company under a plan which would make Porter the surviving company.

The plan, agreed on by directors of the two companies but still subject to approval by the respective stockholders, would give Thermoid shareholders one share of 5½ per cent cumulative preference stock in the surviving company for each six shares of Thermoid common.

Holders of Porter common stock and 4¾ per cent preferred will receive similar shares in the surviving corporation on a share-for-share basis.

H. K. Porter and its subsidiaries make industrial rubber products, forged steel fittings and electrical devices. It had sales last year of $153,503,048 and net income of $6,351,284.

The Thermoid Company and its subsidiaries make automotive friction and rubber products, and hard and soft rubber molded goods and plastic products. Its net profits last year amounted to $996,930 on sales of $39,528,158.

ELECTRIC AUTO-LITE

225,200 Shares of the Crane Co. Acquired Thus Far in '58

The Electric Auto-Lite Company has acquired 9½ per cent of the outstanding capital stock of the Crane Company, the Auto-Lite nine-months' report disclosed yesterday.

Auto-Lite said that it bought 226,200 shares of Crane stock this year through yesterday. The company said the stock was bought "as an investment at an aggregate cost of $6,997,552." Auto-Lite had previously announced that it was seeking diversification.

The Crane Company makes valves, fittings, fabricated piping and accessories, plumbing fixtures and accessories. Electric Auto-Lite is a leading manufacturer of lighting, starting and ignition equipment for motor cars, trucks, and tractors.

NEW TEXTRON PURCHASE

Precision Methods Aquired, Second Deal in 2 Days

Textron, Inc., announced yesterday its second acquisition in as many days. It said it had purchased Precision Methods and Machines, Inc., of Waterbury, Conn., for 61,027 shares of newly-issued Textron common stock.

On Thursday, Textron reached an agreement to purchase the American Screw Company of Willimantic, Conn., for $5,897,600. Stockholders of American Screw will meet on Nov. 12 to vote on the proposal.

Precision Methods designs and manufactures precision components for the Sendzimir Rolling Mills, parts for radar antennae and accessories for atomic reactors. Textron makes textiles, aluminum products, industrial batting, metal parts and other items.

OTHER SALES, MERGERS

Avco Manufacturing Corp.

About half of the facilities of its AK Division, Connersville, Ind., have been sold by the Avco Manufacturing Corporation, effective Dec. 31. Sam N. Regenstreif of Connersville is the purchaser. The facilities affected have been making dishwashers for other manufacturers, prefabricated service stations and porcelain panels. The remaining facilities will be devoted to

Continued on Page 26, Column 3

The New York Times
Published November 1 1958

Nov 1, 1958

COMPANIES PLAN SALES, MERGERS

Continued From Page 24

manufacturing under Government defense contracts.

Badger Manufacturing

The Badger Manufacturing Company, Cambridge, Mass., contract engineers, has acquired the remaining 50 per cent interest in Badger-Comprimo N. V., Amsterdam. It is now the sole owner following the purchase from Comprimo N. V. The name has been changed to Badger N. V. The Netherlands concern was formed in September, 1956, to provide engineering, procurement and construction services to the petroleum, chemical, pharmaceutical and nuclear power industries.

Hunt Foods and Industries

An agreement on the merger into Hunt Foods and Industries, Inc., Fullerton, Calif., of nine subsidiaries and associated companies was approved by stockholders yesterday. Stockholders of the other companies already have approved the merger. Harold M. Williams, vice president, said the merger will simplify the present corporate structure and reduce costs. It also will permit further diversification, he added.

Pittsburgh Plate Glass

The Pittsburgh Plate Glass Company said yesterday it would acquire the Barium Reduction Corporation, a maker of barium chemicals, related by-products and carbon bisulfide. The company said it would make the acquisition through a stock deal, the terms of which were not disclosed. Pittsburgh Plate Glass is tt become the new owner on Nov. 17.

Shelton-Warren Oil

All of the assets of Lutah Uranium and Oil, Inc., Roswell, N. M., have been purchased by The Shelton-Warren Oil Company of the same city. Stockholders of both companies will vote on the purchase the middle of this month. When the acquisition is completed, Shelton-Warren witll have 1,550,000 shares of $1 par value stock outstanding. Authorized capitalization consists of 5,000,000 shares of capital stcok.

The New York Times
Published November 1, 1958

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PORTER, THERMOID PROPOSE A MERGER

PITTSBURGH, Nov. 2 (AP) —The H. K. Porter Company, Inc., of Pittsburgh plans to merge with the Thermoid Company of Trenton, N.J., it was announced yesterday. The merger is subject to approval of the stockholders of both companies.

Under the plan the Pittsburgh company would be the surviving corporation and would take over Thermoid's listing on the New York Stock Exchange.

H. K. Porter is an industrial complex with assets of some $90,000,000. Thermoid has assets of about $23,000,000 and is a large producer of various asbestos, textile and soft-rubber molded goods.

Magnolia Petroleum

Final papers have been signed transferring the Freeport Sulphur Company's interest in the Lake Washington, La., oil field to the Magnolia Petroleum Company, a division of the Socony Mobil Oil Company, Inc., Charles A. Wight, Freeport president, announced yesterday. Approximately $100,000,000 was involved in the sale of these oil properties.

Marquardt Aircraft Co.

The Marquardt Aircraft Company of Van Nuys, Calif., announced over the week-end the completion of negotiations for the purchase of the Cooper Development Corporation in exchange for 60,000 shares of its stock. Cooper Development, engaged primarily in the manufacture and development of space rockets, will be operated as a wholly owned subsidiary.

The New York Times
Published November 3, 1958

Castleman Asbestos File on CRANE Co.
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President of Crane Co. Resigns; Head of Porter Named Chairman

CHICAGO, April 28 (AP)—Neele E. Stearns resigned today as president of the Crane Company and Thomas M. Evans was elected chairman and chief executive officer.

The shift in top management was announced by Alfons Landa, president of the Penn-Texas Corporation. Mr. Landa had been named earlier in the day to the enlarged directorate of the plumbing supplies concern.

L. H. T. Clegg, president of Crane, Ltd., Montreal, a wholly owned Crane subsidiary, was named acting president of the parent corporation.

Mr. Evans, chairman of the H. K. Porter Company of Pittsburgh, was elected to one of the four new directorships. The board was increased from seven to eleven members to stave off a proxy fight for control of the company.

This agreement was reached in January after heavy buying of Crane stock by a syndicate headed by Messrs. Evans and Landa.

The other new members of the board are R. B. Crane, representing the Crane family, and E. A. Locke Jr., president of the Union Tank Car Company.

Mr. Stearns also resigned as a director. He will remain with Crane as a consultant.

Mr. Evans said the change in management was the result of a difference over policy. He said Mr. Clegg's appointment was temporary and that a president should be elected within a few months.

The new chairman reiterated an earlier statement by Mr. Stearns that Crane had no intention of abandoning its Chicago operations. Fear of such a prospect developed among members of a United Steelworkers local after a division of Crane in Chicago was shut down.

The union informally tried to obtain a voice in today's stockholders' meeting but the campaign came to naught.

Handbills were passed out in the neighborhood of the Crane plant. The union asked that any stockholders among employes give their voting rights by proxy, to David McDonald, international president of the union, so that he could represent employe interests at the stockholders' meeting. Mr. McDonald took no part in the campaign and did not attend the meeting.

In his report to stockholders, Mr. Stearns said Crane's sales dropped from $378,000,000 in 1957 to $336,000,000 in 1958. He attributed the drop to the general business recession.

The New York Times
Published: April 29, 1959

Castleman Asbestos File on CRANE Co.
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Personality: A Self-Confident Reorganizer

Evans Believes Own Thinking Is Best—and It Has Been

By ROBERT E. BEDINGFIELD

Thomas Mellon Evans undoubtedly irritates a great many of his fellow business men.

He is firmly of the opinion that his views on any situation in which he may be involved are far more farsighted, sensible, feasible, profitable and generally more meritorious than the other fellow's. And, to make this attitude even less palatable, so far he has been right.

To a person who meets Mr. Evans for the first time and doesn't have to remain in a business relationship with him and watch him be right, he is a very outgoing and affable man, who appears to have tremendous vitality.

At the moment, he is busily rounding out his latest industrial rejuvenation, the Crane Company of Chicago, by setting out to acquire for that company the Briggs Manufacturing Company of Warren, Mich. For all his bustling, this is one time that Mr. Evans, who became chairman of Crane last spring after accumulating 155,000 shares of Crane stock at prices in the thirties—it's now in the sixties—isn't in a great hurry.

Bigger Stake Eyed

Crane, said to be the nation's largest manufacturer of valves, fittings, fabricated piping and accessories, also is a leading producer of plumbing and heating appliances. Since September it has acquired 136,000 of Briggs' 1,078,834 shares of common stock. It has paid about $12 a share, which is only slightly below the $12.30 book value on Dec. 31, 1958. Mr. Evans is willing that his company buy all Briggs' assets for the $12,900,000 that this price would call for.

Briggs would fit nicely into the Crane setup, Mr. Evans explained in a recent interview. It is a leading manufacturer of vitreous china plumbing fixtures and brass plumbing ware fittings and, in addition to its Warren plant, near Detroit, it has plants in Cincinnati, Cleveland and Abingdon, Ill.

Crane's pottery manufacturing facilities are in Colton, Calif., and Trenton, N. J. Acquisition of Briggs plants, Mr. Evans notes, would extend his company into the Middle West. "We have the distribution facilities," he said, "and we think we could save some money with it" (Briggs).

"It is a good name and has lots of fine assets, but it has been run sleepily for a long time. Our interest in it is its plants. We are not planning any proxy fight for control. Our talks with the company have been friendly. Our only request to them is that our proposal be submitted to stockholders to vote upon."

Thomas M. Evans, a specialist in industrial rejuvenation, currently chairman of Crane Company, Chicago.

Mr. Evans is purely a financial man. As head of Crane he draws no salary and insists that his chief interest is as an investor. "It is the only reason for anyone being on a corporate board," he said. In almost all of his ventures he hires specialists to do specialists' tasks. He has become increasingly disenchanted with one specialist he hired last year to help him protect his interest in Crane, before he was a director.

This is Alfons Landa, Washington, D. C., attorney and an old hand at corporate takeovers. Mr. Evans said that when he retained Mr. Landa, he assisted Mr. Landa in purchasing 10,000 shares of Crane stock.

At the stockholders meeting of Crane last April, when Mr. Evans gained two places on Crane's board, he took one seat and gave the other to Mr. Landa. Mr. Landa, while he has voted at board meetings for most of Mr. Evans' proposals, has been publicly quoted in the press in the Midwest as disagreeing with some of the ungentle methods that Mr. Evans has used in reorganizing Crane's operations.

Cutting a Wide Swath

Mr. Evans' streamlining of Crane included the dropping of vice presidents summarily, in the fashion for which Sewell Avery, former chairman of Montgomery Ward & Co., was noted; retiring a third of Crane's stock, shutting of scores of the company's branches and sales offices and slashing inventories drastically.

Mr. Evans doesn't hesitate to point to recent published statements attributed to Mr. Landa as the reasons for now considering his attorney "disloyal." These statements have included threats of pushing Mr. Evans out of office. As a result, Mr. Evans has suggested that Mr. Landa might well resign his directorship.

Mr. Evans would seem to be in a relatively safe position in making this suggestion. In addition to his own stock holdings, which he has increased by 7,500 shares since spring to 162,500 shares, he holds an irrevocable proxy for another 140,000 shares owned by Mrs. Emily Crane Chadbourne, the only living daughter of the founder. This gives Mr. Evans close to 20 per cent control. Meanwhile Crane, under the Evans management, has definitely come awake.

Dividend Raised

The quarterly dividend has been raised from 20 cents to 30 cents a share. Although sales fell by $10,000,000 in the first nine months of this year, operating expenses were slashed $17,000,000. The result was that net income leaped to $4,300,000 from $1,700,000 in 1958, as the company's return on sales after taxes rose to 2.1 from 0.7 per cent.

At a luncheon with a group of security analysts the day before Thanksgiving, Mr. Evans remarked that management "is obligated to show a fair return on assets, or stockholders might as well invest in postal savings." When asked if this meant Crane might soon be realizing a 5 or 6 per cent return, Mr. Evans grinned and said:

"Let's don't spoil the stockholders by making them expect too much too soon."

Crane Chief Wields Heavy Hatchet on Staff, Outlay

Mr. Evans, as his middle name suggests, is one of the Pittsburgh Mellons—although the relationship is a distant one. While he is a millionaire many times over, his own father and mother were not wealthy. Mr. Evans was born in 1910. He worked his way through Yale, graduating in 1931 after majoring in economics.

He acknowledges that he started out in the chairman's office and "worked down." His first job was as a clerk at $100 a month in the office of William L. Mellon, then head of Gulf Oil Corporation. Mr. Mellon, in addition to giving Mr. Evans a job, urged him to try to strike out for himself. This was easier said than done at the time because of the deepening depression.

But Mr. Evans did hit upon a way of gaining business independence. By trading in Gulf stock on borrowed money, he participated fully in the market recovery of 1936 and 1937. He used his profits to purchase at 10 cents on the dollar the defaulted bonds of the H. K. Porter Company of Pittsburgh, a steam locomotive manufacturer, which had gone bankrupt.

Exchange of Securities

In the reorganization of Porter, Mr. Evans received stock in exchange for his bonds. His stock holdings were sufficient for him to get elected president. He was only 29 years oolod. In 1939, when he first took office in Porter, the company grossed only about $700,000 a year selling spare parts to former locomotive customers. The company today, with 75 per cent of its stock held by Mr. Evans, through twelve divisions formed from acquisitions of many old-line concerns makes a broad range of industrial products and in the first nine months this year cleared $5,200,000 on sales of $168,000,000.

Mr. Evans, in addition to being chairman of Crane, also holds that office in Porter, but doesn't consider himself overworked. "Crane is well on its way, now," he said, "and after all Porter pretty well takes care of itself."

Other than week-end golf and some hunting and fishing, his chief diversion outside of his business life, he said, is traveling. "I never get to travel enough," he remarked. Mr. Evans has three sons by a first marriage that ended in divorce. He and his second wife, the former Josephine Mitchell, make their home on Round Hill Road in Greenwich, Conn.

The New York Times
Published December 6, 1959

Castleman Asbestos File on CRANE Co.
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H. K. PORTER CO.

The H. K. Porter Company, Inc., Pittsburgh diversified industrial concern, is entering the paint business through purchase of more than 90 per cent of the stock of Patterson-Sargent Company of Cleveland, Ohio, T. M. Evans, Porter chairman, announced yesterday.

Patterson-Sargent makes house paints, industrial, railroad, marine and product finishes and specialties under the BPS trade-mark. It operates plants at Cleveland and Long Island City, Queens. Sales exceed $10,000,000 a year. The company employs close to 700 and has assets exceeding $5,000,000.

The stock was acquired for $22.50 a share. The transaction would involve about $4,000,000, based on the 200,000 shares

Continued on Page 33, Column 4

The New York Times
Published: January 13, 1960

COMPANIES PLAN SALES, MERGERS

Continued From Page 27

outstanding of an authorized 500,000.

Porter has 55 plants in the United States, Canada, Mexico and Europe. Porter divisions produce steel equipment, rubber and friction products, asbestos textiles and other products.

The New York Times
Published: January 13, 1960

Castleman Asbestos File on CRANE Co.
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BUYS SOUTHERN ASBESTOS.

Thermoid Company Acquires Controlling Interest.

A controlling interest in Southern Asbestos Company, manufacturers of asbestos cloth and yarn, has been acquired by the Thermoid Company, manufacturers of brake linings for automobiles and industrial machinery, it was announced yesterday. Public financing is being arranged through a banking syndicate composed of Schluter & Co., Inc.; Eastman, Dillon & Co. and Oliver J. Anderson & Co.

The plant of the Southern Asbestos Company at Charlotte, N. C., has sufficient orders to keep in full operation for a year. Its total assets on Oct. 31, 1927, amounted to $1,816,055. The Thermoid company was founded in 1897. In addition to its principal product, brake linings, it manufactures clutch rings, rubber belting and hose, asbestos packing and other products.

R. J. Stokes, president of the Thermoid company, said the acquisition of the Southern Asbestos Company would insure Thermoid of a steady supply of asbestos yarn and cloth.

The New York Times
Published: March 20, 1929

Castleman Asbestos File on CRANE Co.
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CRANE CO. TO REVAMP

Five Independent Units of Companies to Be Set Up

CHICAGO, Feb. 2 (UPI)—Crane Company today announced a decentralization program that will integrate five newly purchased companies into the Crane organization.

Wesley A. Songer, president of the concern, said the program would establish five groups that would operate as independent companies. Each division will have its own manufacturing, engineering, sales and control departments.

Mr. Songer said the decentralization would result in more rapid service to wholesale distributors and industrial customers.

The new divisions include: industrial products group, Chicago; plumbing-heating-air conditioning group, Johnstown, Pa.; Crane Supply Company, Chicago; systems and controls group, headquarters yet to be named; and the international group, New York City.

The New York Times
Published: February 3, 1960

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meeting __ agenda __ minutes ___ attendee list

legal __ deposition __ testimony of _____:

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CRANE CO. DENIES CHARGES BY F. T. C.

WASHINGTON, April 29 (AP)—The Crane Company, Chicago, today denied Federal Trade Commission charges that it had violated antitrust laws by acquiring an interest in five competitors. It asked dismissal of the complaint.

The company said its acquisitions had "encouraged competition and benefited the public" rather than tending to create a monopoly as the F. T. C. alleged.

The five companies involved were Chapman Valve Manufacturing Company National U. S. Radiator Corporation, Swarthout Company, Inc., Pipe Fabricators, Inc., and Br Manufacturing Company.

Meanwhile, Eversharp, and its advertising age Compton Advertising, asked dismissal of F. T. charges of unfair advertisin

The two New York con nies denied F. T. C. allegat of using deceptive televi demonstrations to sell Scl safety razors.

They asked dismissal o March 10 complaint, which c lenged a TV commercial which a competing razor used to slash a boxing gl worn by the heavyweight ch pion Ingemar Johansson.

The F. T. C. charged t this was not a valid portra of any danger involved in sh ing with the competitive ra

The New York Times
Published: April 30, 1960

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Porter Suit Names Missouri Portland

By HERBERT KOSHETZ

The H. K. Porter Company, owner of 52 percent of the Missouri Portland Cement Company, has filed suit in Federal Court in St. Louis to compel Missouri Portland to seat two Porter executives on its board. At the annual meeting of Missouri on May 25, T. M. Evans, chairman of Porter's executive committee, and his son, E. P. Evans, Porter chairman, were elected directors.

Merger News

Another measure that was passed at the meeting was a Porter proposal to amend Portland's bylaws to require it to hold monthly instead of quarterly directors' meetings.

Missouri Portland's management accepted the Porter elec-

Continued on Page 57, Column 3

The New York Times
Published: June 2, 1976

H. K. PORTER SUES CEMENT COMPANY

Continued From Page 53

tion of the directors "under protest subject to review" by a Federal Court.

In its suit, filed last Friday, Porter asked for the amended bylaws to be put into effect.

Porter has also challenged the re-election of Maurice R. Anderson and Ralph R. Rau, both vice presidents, to the Missouri Portland board.

In its complaint, Porter charged that Missouri Portland in its solicitation of votes for the management slate violated Federal securities laws because it had not amended the proxy material to include the fact that the United States Court of Appeals for the Eighth Circuit in St. Louis had upheld a lower court's denial of an injunction against Porter's tender offer of 500,000 Missouri Portland shares, most of which it had purchased at $26 a share.

A spokesman for Portland said that it would take three years for Portland to gain parity on the Missouri Portland board, even though it owned a majority of the shares. There are 12 directors on the board.

A spokesman for Missouri Portland declined to comment on Porter's action.

NJB Prime Investors Extends Tender Offer

NJB Prime Investors, a financially troubled real estate investment trust in Clifton, N.J., said yesterday that its tender offer to buy its 6¾ percent convertible subordinated debentures and its 7 percent subordinated debentures had been extended to June 18.

The offer, however, is contingent on the trust's ability to obtain necessary funds from banks to purchase the debentures.

The trust said it believed the willingness to fund the tender would depend primarily on the number of debentures tendered, the completion of an exchange of real estate assets with banks to reduce the debts, and a renegotiation of the revolving credit agreement with the banks.

So far, the trust has been unable to borrow funds necessary to pay interest last March 31 on its 7 percent debentures and interest last May 1 on its 6¾ percent debentures.

Meanwhile, the American Stock Exchange said it intended to remove from listing the trust's share-of-beneficial-interest 7 percent subordinated debentures and 6¾ convertible subordinated debentures.

The Amex indicated that a substantial question existed as to whether the trust could continue its operations as a going concern and meet its obligations as they occurred.

The trust, with real estate assets of $100 million, has requested a 30-day extension of its revolving credit agreements with its banks. The agreement expired May 31. The trust said it expected the extension would be received soon.

The New York Times
Published June 2, 1976

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__ industry recommended practices

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legal __ deposition __ testimony of _____:

__ other

October 27, 1948

No. 1 - American Brake Blok Div. of A.B.S.A.F.
No. 2 - Celtex Corporation x
No. 3 - Keasbey & Mattison Company x
Asbestos-Manhattan, Inc.
No. 5 - The Russell Mfg. Co. x
No. 6 - Thermoid Company (Southern Asbestos) x
No. 7 - Union Asbestos & Rubber Co.
No. 8 - United States Gypsum Co. x

Saranac Laboratory
Asbestos Dust Experiments

With the request that you treat it with the utmost confidence and make it available to no one outside your organization, I am enclosing what purports to be 'Part I' of a report by the Saranac Laboratory entitled 'Asbestos Pneumoconiosis'.

My own comments after a preliminary study of the report are contained in the attached memorandum, which will likewise refresh your recollection as to the origin of the experiments covered thereby.

Saranac will undoubtedly wish to publish the report either independently or in conjunction with the proposed report on 'Human Asbestosis', and it would likewise appear desirable from the point of view of the industry that the report be published provided some of the speculative comments are omitted.

As a preliminary to a discussion with representatives of Saranac, a meeting of representatives of the companies which financed the experiments is indicated. I am therefore inviting the companies to which this memorandum is addressed to be represented at a luncheon in the Johns-Manville Corporation Board Room on Thursday, November 11, at 12:30 p.m. During and following the luncheon the report can be reviewed. If you are unable to have a representative attend, it would be desirable for you to designate some representative of another company to act for you in connection with decisions that will have to be made.

Please advise me as promptly as possible whether you will be able to attend and give me the name of your representative.

In any event, please see that the draft of the report is returned to me on or before November 11 either by mail or by your representative. It is obviously undesirable that the report in its present form receive any distribution or publicity outside a limited number of people in our respective organizations.

Very truly yours,

Vanderver Brown,
Secretary and
General Attorney

VBrB
Enc.

bl cc A. H. Fisher
L. C. Hart
J. P. Woodard

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legal __ deposition __ testimony of _____:

__ other

Johns-Manville
TWENTY-TWO EAST FORTIETH STREET
NEW YORK, N.Y.

January 22, 1935

Mr. M. F. Judd, Secretary,
Raybestos-Manhattan, Inc.,
Bridgeport, Conn.

Re: Mellon Institute of Industrial Research
Symposium on Dust Problems

Dear Mr. Judd:

As I indicated to you over the telephone this afternoon, I am enclosing a copy of a memorandum I prepared for Mr. Lewis H. Brown regarding my trip to Pittsburgh last Tuesday, January 15th, to attend the Symposium on Dust Problems held under the auspices of the Mellon Institute of Industrial Research.

Very truly yours,

Vandiver Brown

Vandiver Brown
Attorney

VB:T
Enclosure

JAN 30 1935

PLAINTIFF'S EXHIBIT
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__ industry warning labels

__ industry sales literature

__ industry recommended practices

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legal __ deposition __ testimony of _____:

__ other

Raybestos

MEMORANDUM RE:- MELLON INSTITUTE OF INDUSTRIAL RESEARCH SYMPOSIUM ON DUST PROBLEMS - PITTSBURGH- JAN.15, 1935

On or about December 12, 1934 the Mellon Institute of Industrial Research addressed letters to some 85 industries having industrial disease problems inviting them to attend a meeting to be held under the auspices of the Institute on the 15th day of January. One of these invitations was received by the Asbestos Institute and, although the Asbestos Institute did not accept and was not officially represented, Johns-Manville Corporation requested and obtained permission to send a representative. The invitations expressly stated that "attendance at this meeting need entail no obligation".

Johns-Manville was represented at the meeting by the writer of this memorandum. Approximately 250 people were present repesenting over 50 industries which had accepted the invitation of the Mellon Institute. The Mellon Institute was greatly surprised at the remarkable response and it is my opinion that one cannot find a better indication of the serious nature of the problems it was the purpose of the meeting to discuss.

I was able to ascertain that the Mellon Institute had been prompted to call the meeting by representatives of the sand and glass and the refractories industries. Representatives of these industries conferred with Mr. E. R. Weidlein, Director of the Institute, and after advising him of the nature of their problem, of its wide-spread character and numerous menacing aspects, suggested the need of some form of concerted action on the part of those industries presently or potentially involved. I understand that Mr. F. W. Sherwood, Vice-President of Owens-Illinois Glass Company and Mr. Roger Hitchins, President of the American Refractories Institute, were the persons who presented the situation to the Mellon Institute. Mr. Weidlein, on behalf of the Institute, agreed to cooperate to the extent of calling the meeting and having the representatives spend a day in Pittsburgh as the guests of the Institute. There was some preliminary discussion as to the possibility of using the Mellon Institute as a clearing house for information and research upon aspects of the problem common to all industries but definite commitments were postponed until after the holding of the meeting.

An impressive list of experts specializing upon various aspects of the dust problem attended the meeting and

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delivered addresses. Among these were Mr. A. C. Firth, a lawyer associated with Williams, Eversman and Morgan, Toledo, Ohio, attorneys for Owens-Illinois Glass Company; Dr. Eugene P. Pendergrass of the X-ray Laboratory, University Hospital, Philadelphia; Dr. A. J. Lanza, Assistant Medical Director of the Metropolitan Life Insurance Company; Dr. R. R. Sayers, Medical Officer in Charge of U. S. Public Health Service; Professor Philip A. Drinker of the School of Public Health, Harvard University; Mr. F. Robertson Jones, General Manager, Association of Casualty and Surety Executives; and Mr. Donald E. Cummings, Assistant Director, Saranac Laboratory for Study of Tuberculosis.

The addresses delivered by these specialists, together with the open discussion that followed them, revealed, among other things, the very menacing character of the problem, its complex nature, the uncertainties attending most of its aspects and the necessity of some form of united action by the afflicted industries.

It was recognized that some aspects of the problem were peculiar to special industries but it was equally evident that other aspects were common to all. For example, only two forms of dust, namely, free silica and asbestos, are definitely known to produce disabling fibrosis of the lung. Even in the case of these dusts the problems resulting therefrom are quite different since the fibrosis resulting from silica is of a much more serious character than that resulting from asbestos in that the former predisposes to tuberculosis and is much more likely to have a fatal termination. On the other hand (and this illustrates one of the most serious aspects of the problem that is common to all dust producing industries) the fact that no other dust is known to produce disability has not prevented entirely groundless claims aggregating millions and even hundreds of millions of dollars being brought against industries which have no silica or asbestos dust hazard. For example, Dr. Lanza pointed out that no one had ever maintained that gypsum dust was harmful and yet, nevertheless, the gypsum industry had suits pending against it covering claims in excess of four million dollars.

It appeared that among the problems common to all industries were the following:

(1) The menace of ambulance chasing lawyers in combination with unscrupulous doctors. The uncertainties surrounding diagnosis of any of the various forms of pneumonoconiosis are so many that a question of fact is presented in every case. Expert testimony can be produced by both plaintiff and defendant and it is for the jury to decide whose experts are

correct in their interpretations. In making this decision, the jury is not likely to favor the opinion of the experts produced by the employer.

(2) The desirability of making various dust diseases compensable under properly drawn workmen's compensation laws. One of the speakers stated that "the strongest bulwark against future disaster for industry is the enactment of properly drawn occupational disease legislation". Such legislation would (a) eliminate the jury and empower a Medical Board to pass upon the existence of the disease and the extent of the disability; (b) eliminate the shyster lawyer and the quack doctor since fees would be strictly limited by the law; and (c) permit the correcting of initial mistakes in the making of awards by providing for hearings to reduce or eliminate awards if proof could be adduced that the claimant was not disabled or that the extent of his disability had been overestimated.

(3) Problems of ventilation, dust collecting and elimination, and respiratory devices.

(4) The establishing of standards (a) for dust counting and particle size determination, (b) for the taking of X-rays for diagnostic use, and (c) for the interpretation of the markings on the films so produced.

At the close of the discussion a Mr. Kurtz, Vice-President of American Refractories Corporation, made a motion that Mr. William P. Yant, Chairman of the meeting appoint a nominating committee who would nominate a group of individuals to serve as a committee for the formulation of ways and means to bring about effective cooperation of some character between the various industries for meeting and combating those phases of the dust problem common to all. This motion was carried and a Nominating Committee appointed which retired and upon returning presented to the meeting the names of seven individuals to act as such Committee. No other names having been placed in nomination, the following were elected to act as the Committee and report back to the various industries and groups represented at the meeting or to whom the invitation had been originally extended:

Vandiver Brown representing Asbestos, Cork and Non-Metallic

Dr. B. D. Saklatwalla representing Chemical, Abrasives, Alloys and Non-ferrous metals

E. O. Jones representing Foundries

A. W. Sherwood representing Glass Sand, Ground Sand and Glass Manufacture

A. J. Gentholts representing Iron, Steel and Ores

A. J. R. Curtis representing Lime, Limestone, Cement and Gypsum

Roger A. Hitchins representing Refractories, Ceramics and Clays

I explained to the other members of the Committee that I had been sent to the meeting solely as an observer and had no authority from Johns-Manville Corporation to accept membership on the Committee and certainly none from the Asbestos Industry as a whole. I was urged, however, to meet with the Committee and agreed to do so on the condition that I might withdraw if approval of my serving in that capacity should not be forthcoming. I pointed out that members of the Asbestos Industry did not care to be associated in the minds of the public or of employees with those industries whose problem was silicosis and that for this reason I felt there might be some opposition to having a representative of the Asbestos Industry working with them. I did indicate, however, that I realized numerous aspects of our problem were the same and that if cooperation could be worked out without an undue amount of publicity, Johns-Manville Corporation and perhaps the Asbestos Industry as a whole, would in all likelihood be willing to cooperate. It was the opinion of the Committee that this condition would not present any insuperable difficulty.

Mr. Roger Hitchins, President of American Refractories Institute, was made Chairman of the Committee which held a meeting Tuesday evening after the close of the Symposium. Mr. Hitchins was designated to meet with Mr. Weidlein of the Mellon Institute and ask him to make a proposal in definite and concrete form as to the manner in which the Mellon Institute might be able to assist the various industries for a fee of $25,000. When this proposal has been received and approved by the members of the Committee, it will be submitted to the various industries with the recommendation that it be accepted and that the various industries or individual corporations agree to stand good for a proportionate amount of the fee not in excess of a definite specified sum.

I gathered that the proposal which would be made by the Mellon Institute would include, among others, the following:

(a) The compiling of a comprehensive bibliography of all books, treatises and publications dealing with any aspect of the dust problem; and the evaluation thereof.

(b) The compiling, digesting and correlating of data and information from various subscribing industries relative to their particular experiences.

(c) The drafting of approved workmen's compensation legislation covering pneumonoconiosis.

(d) The digesting of the laws of the various states which might affect the operations of industries presenting a dust hazard.

(e) The outlining of problems requiring research or the establishment of fixed standards and the prevention of duplication of effort and expense along these lines.

The interest with which the discussions were followed and the enthusiasm which greeted the proposal for unified effort lead me to believe that the necessary support will be found for some sort of program along the above lines.

VANDIVER BROWN
January 18, 1935

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HULTON HOUSE
161-166 FLEET STREET
LONDON EC4A 2HB, ENGLAND

December 13, 1988

VIA TELECOPY

Steve Wright, Esq.
Skelton, Taintor and Abbott
95 Main Street
Auburn, ME 04210

Re: Dr. Pratt/Abex Corporation

Dear Steve:

As mentioned by telephone a couple of weeks ago, we represent Abex Corporation in various asbestos-related claims, with particular focus on the conspiracy issues being addressed by Dr. Castleman. We would like to arrange an interview with Dr. Pratt concerning his recollection of any interaction that American Brake Shoe Company, Abex's predecessor, had with the Saranac laboratory. I should think that we would be able to conclude our interview in less than two hours. Could you assist us in arranging a convenient time?

In addition, we are very much interested in reviewing the opening and closing arguments to the jury in the case that was successfully defended on behalf of H.K. Porter involving conspiracy allegations. Would you please send me those portions of the transcripts? Also, to the extent that either Dr. Castleman testified or Dr. Pratt testified in that case, could you also send me excerpts from the transcript containing their testimony?

Please charge my firm for any time and expenses.

Best regards.

Sincerely,

Joseph W. Dorn

JWD:lam

AB001277.

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A New and Dynam
Concept for Growt
H. K. Porter Company, I
THOMAS MELON EVA

"Were American Newcomen to do naught else, our work is well done if we succeed in sharing with America a strengthened inspiration to continue the struggle towards a nobler Civilization—through wider knowledge and understanding of the hopes, ambitions, and deeds of leaders in the past who have upheld Civilization's material progress. As we look backward, let us look forward."

—CHARLES PENROSE
Senior Vice-President for North America
The Newcomen Society of England

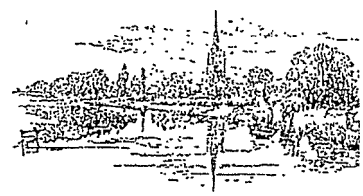
This statement, crystallizing a broad purpose of the society, was first read at the Newcomen Meeting at New York World's Fair on August 5, 1939, when American Newcomen were guests of The British Government

"Actorum Memores simul affectamus Agenda"

A NEW AND DYNAMIC CONCEPT FOR GI

H. K. Porter Company, Inc.

An Address at New York



AMERICAN NEWCOMEN, *through the years,*

numerous industrial organizations whose a

have been notable, both in the United States

and in Canada. Such a Newcomen manuse

dealing with a corporate enterprise unique l

graphical and economic diversity—one wel

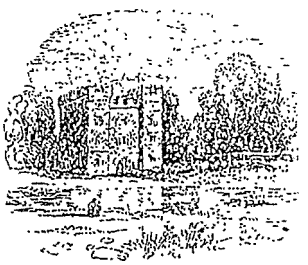
the designation: "A New and Dyna

Concept for Growth!"

First Printing: April 1955
Second Printing: April 1955

This Newcomen Address, dealing with the history and contributions of H. K. Porter Company, Inc., was delivered at a National Newcomen Dinner of The Newcomen Society in North America, held in Ballroom of The Pierre, at New York, N.Y., U.S.A., when Mr. Evans was the guest of honor, on April 21, 1955

SET UP, PRINTED AND BOUND BY THE UNITED STATES OF AMERICA FOR THE NEWCOMEN PUBLICATIONS IN NORTH AMERICA BY PRINCETON UNIVERSITY PRESS



INTRODUCTION OF MR. EVANS, AT NEW YORK ON A
BY GEORGE S. MOORE, EXECUTIVE VICE-PRESIDENT,
TIONAL CITY BANK OF NEW YORK; MEMBER OF T
COMMITTEE, IN THE NEWCOMEN SOCIETY IN NO

My fellow members of Newcomen:

THIS evening we shall hear an unusual i
told by an unusual individual. H. K. Po
Inc., the concern he speaks for, is almost
age, yet, in a sense, is merely sixteen years old. T
Evans will tell of the various divisions of this gro
organization, which range in age from five to more
dred years, is extraordinary. It will be told by o
in his early forties.

The story of the rebirth and growth of Porter is o
achievement rarely matched in these United Stat
in recent years. Yet, while the vision was, and is,
Evans, the organization he has built and is mana
any sense a one-man effort. Behind him is a group of
burgh, and at each of the respective divisions, who
their fields and who complement Tom Evans in th
versification that makes his organization outstanding
business.

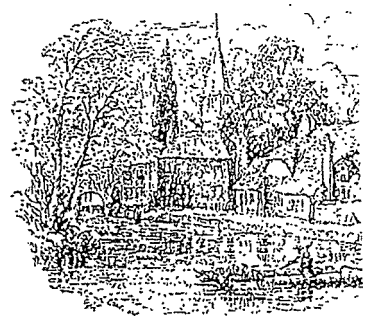
Tom Evans is a Pittsburgher by birth and his business headquarters are there, although his various enterprises spread throughout the Nation. His friends say that while attending Shadyside Academy he preferred to read financial and industrial manuals, while they read fiction. At Yale, he majored in economics and was graduated into a world sorely dislocated by economic difficulties in that eventful year, 1931.

Tom Evans got his first job as a clerk with the Gulf Oil Company in Pittsburgh that same year. It was not long before he decided to forsake the possibility of a lifetime career with Gulf to go into business for himself.

It was in 1939, while still in his twenties, that he was able to do this. But the story of how he acquired the then-bankrupt Porter company and changed it from a concern manufacturing steam locomotives to one of the most highly diversified in our land, is for him to tell.

I have been able to watch the literal unfolding of this story—a unique part of our American scene. It is my belief that Porter—and Tom Evans—really are only at the beginning of what is certain to be an even more interesting tale to be told at some future date.

Gentlemen, I am pleased to present to you the President of H. K. Porter Company, Inc., my friend: THOMAS M. EVANS.



My fellow members of Newcomen:

OUR Company was founded eighty-nine ye Kirke Porter with twenty thousand doll his father. Mr. Porter had considered istry before receiving his father's gift; by this que our Company started. Today it has very little re concern formed in 1866, except that now, as t business is serving industry.

The span of Mr. Porter's life—eighty-one study for the ministry, service with the Massachu in the Civil War, a two-year term in the House tives in Washington, and fifty-five years in the i He left behind him not only an outstanding rec and financial success but a fine reputation for charitable, civic, and religious activities.

During his entire business career the Comp name of Porter & Bell, manufactured steam swi tives used in factories, mills and mines, and, inc

to haul the old "el" trains here in New York. The original plant capacity was fifteen to twenty-five locomotives a year.

Towards the end of the Nineteenth Century the name was changed to H. K. Porter Company and it had grown to be one of the largest in the world in its highly specialized field, having one hundred employees and a net worth of nearly a million dollars. At the time of Mr. Porter's death, in 1921, the shop capacity had reached six hundred locomotives a year, and the concern's net worth was in excess of two million dollars. But the founder's death, the changing economy, and an era of inventive progress, which saw steam locomotives give way to electric and then diesel, combined to effect a long decline which in ten years reduced the Porter staff by half and finally required a complete reorganization in 1939.

At that time the only product Porter manufactured was the small locomotives. The long-term outlook was not bright considering the competition of off-the-highway trucks, lift trucks, and conveyor belts. We tried manufacturing other products in the old locomotive plant in Pittsburgh, but, as you can imagine, it is very difficult to adapt such a plant to the efficient production of other types of equipment. I can recall the time we tried to develop a new type of hydraulic locomotive. It would run backwards but not forward. Another time, when we were manufacturing special orders of process equipment, we took an order for a specially designed large pressure vessel for an oil refinery. When it was built, we found it was too big to get out of the door of our plant.

Until 1945, we continued to manufacture the small switching engines, in both steam and diesel. However, after a few years it became more than ever apparent that competition was too difficult if a company remained small, particularly in a "feast or famine" business like locomotives.

In searching for new products to manufacture
of the dying locomotive business, we came to th
one of the quickest, and probably the most eco
to add new products by the acquisition of good,
By combining this method of acquiring new p
with research and development from within, v
the character of our business from that of prin
facturer of switching locomotives and freight ca
the war in 1945, doing an annual business of less t
a year, to a business now doing more than $80
divided approximately twenty percent in industr
ucts, twenty percent in refractory materials; tw
electrical equipment, thirty percent in rolling a
copper and copper alloys, and ten percent in mi
products.

When we made this decision we felt it advis
family-owned or closely-held concerns for the sim
they were not popular investments with larger in
national investors. We have found that frequentl
often than not, family-held corporations are u
in their development and growth programs; they
to accept the *status quo*. And, as all of us know,
tax problems involved with inheritances and dive
vestments.

The period from 1945 to 1949 was one of
for H. K. Porter Company, Inc. We tried our l
fields. We had moderate success in some, we fa
When we acquired the Jarecki Manufacturing C
fifteen oil field stores, all of which were losing m
to try to correct this situation, we bought fifteen
from another concern which wanted to withdraw
ness. Instead of fifteen stores losing money, we t
oil field stores losing money, and finally decide
from this business entirely since we couldn't m

At present Delta-Star is doing considerable work in the field of atomic energy. Its most recent effort in that field, completed in late January, involved equipment used in supplying power to the Atomic Energy Commission's new Portsmouth, Ohio, project. There, Delta-Star's 330,000-volt switches and 6000-ampere metal-enclosed bus went into operation.

❦ ❦

Our next acquisition was Connors Steel in Birmingham, Alabama. When the opportunity was presented for us to purchase Connors Steel, we felt that the rapid growth of the South and the relative shortage of steel-making capacity in that area made it an extremely attractive one.

❦ ❦

Connors was founded by George W. Connors, Sr. in Helena, Alabama. Previously, in 1901, Mr. Connors had been one of the founders of the Atlantic Steel Company in Atlanta, Georgia. But he wished to have his own company and so moved over to Alabama in 1908 to form Connors Steel. The original products of Connors were cotton ties, barrel hoops and light mine rails. Connors later expanded into hot rolled strips, then into concrete reinforcing and merchant bars, and light structural shapes. After considerable experimenting, Mr. Connors discovered that rail steel products could be rolled successfully on a continuous mill; the process was patented by him. Later, Connors Steel expansion increased rolling capacity and added electric furnaces.

❦ ❦

Within eight weeks after our purchase of Connors, we received a Certificate of Necessity for facilities costing more than two million dollars. It was applied to a four-fold objective: increased capacity, enlarging the product range, improved quality, and modernization of existing facilities. Today, Connors is a shining example of Southern business progress with a fine plant, a fine future in a fast growing industrial area. A current phase of Connors' expansion program is the manufacture of cold-drawn electric furnace steel which will be the first such material to be produced in the South.

Towards the end of 1950 we had three geograph separated divisions in Philadelphia, Chicago, and Bi three different fields: industrial rubber, steel, and ele ment. Our next decision to be made was: "Where de here?" And that question brings us to our second sion in point of years, founded in 1848, and purchas in 1952.

❦ ❦

The Watson-Stillman Company was founded in 18 alet Lyon, who built a small factory on New Y Street, on the lower East Side, to make steam engin jacks, lever punches and shears. Mr. Lyon died in 1 of his employees, Messrs. Watson and Stillman, for nership which pioneered in the design and manufacture equipment.

❦ ❦

Old advertisements tell us that back in the early hydraulic presses gave purchasers "an easy and rapid pressing oil from fish, cider from apples, and wine fr Their capacity rating was in terms of fish: for instan vertised one machine which was capable of "pressing to THREE HUNDRED THOUSAND Fish in ten hours."

❦ ❦

On a Sunday afternoon in late March 1904, in New Madison Square Garden, Messrs. Watson and Stillm their first national fame—or is it notoriety? That da cooperation of the Barnum & Bailey Circus, and with t of millions of people riveted to their newspapers, T Stillman Company's hydraulic weighing cylinders he mine the "relative pulling strength of men and anima in the experiment were horses, camels, elephants, and newspapers reported that one hundred men, pulling c registered a combined pull of 6700 pounds, while tw two camels pulled about half that, and *one* elephant 4

For more than half a century The Watson-Stillman Company continued to manufacture in New York City, but in 1904 it was decided by Francis H. Stillman, the surviving partner, to move to the present site in nearby Roselle, New Jersey. Once there, the scope of product activities was vastly enlarged.

❦ ❦

Watson-Stillman justifiably is proud of its contributions to Science and Engineering. The diving bell used by renowned Professor William Beebe in his record-breaking ocean descent in 1930 was engineered and manufactured by the Company. When engineers were building New York's Queens-Midtown Tunnel through the bed of the East River, Watson-Stillman hydraulic jacks forced and guided the tunnel shield, while a Watson-Stillman hydraulic erector arm positioned the tunnel lining.

❦ ❦

Other design and construction achievements by Watson-Stillman engineers are the largest plastic injection molding machine ever built; the most powerful stretcher of its kind ever manufactured for aluminum plate, with a pulling power of four *million* pounds; and the largest direct-drive brass extrusion press.

❦ ❦

The Watson-Stillman Fittings Division is an offshoot of its parent. There we manufacture forged steel fittings in carbon, stainless and alloy steels for use in the chemical, petroleum, power, and other industries, particularly where high temperatures, high pressures or corrosive conditions exist. After Porter purchased the parent company it was decided to expand the Fittings plant and make it a separate division.

❦ ❦

The eighteen months from mid-1953 through 1954 saw the period of Porter's greatest expansion to date. During that time we purchased the St. Louis firm, A. Leschen & Sons Rope Company, manufacturers of wire rope; Alloy Metal Wire, a Philadelphia concern serving the chemical, electrical and electronic in-

dustries; The McLain Fire Brick Company, of I
the Laclede-Christy Company of St. Louis, two old e
lished firms in the refractories field; Pioneer Ru
Pittsburg, previously mentioned; and The Riversid
pany, a New Jersey concern which produces non-f

❦ ❦

Leschen Wire Rope is now ninety-eight years
Adolph Leschen, the founder, did most of the mani
selling of its only products, hemp rope and twine. T
provided his first impetus as he began making ropes a
the Army; the increased traffic on the Mississippi R
his second spurt. His sons joined him in the 1870'
with production and sales.

❦ ❦

Leschen's best known product, Hercules Wire F
troduced in 1886. In those days it was difficult to o
ently good wire since torsion and tension varied. Her
a long stride forward in the science of wire rope mak
producing greater strength and greater resistance t
out sacrificing other essential properties such as cla
bility, and toughness.

❦ ❦

Leschen rope played an important role in the bui
Panama Canal, the New York State Barge Canal,
New York all the steel work on Manhattan Bridge w
place with Leschen rope. Among other landmarks
whose builders utilized Leschen products were the C
St. John the Divine and the Municipal Building.

❦ ❦

Today, the modernized Leschen plant turns out w
construction work, dredging, coal and metal mining,
oil well drilling, marine, elevators, airplanes, bridge
and even ski-lifts.

Alloy Metal Wire, founded in 1919 in Yonkers, New York, moved to its present location in Prospect Park, a suburb of Philadelphia, in 1924. It produces stainless, nickel, Inconel and Monel wire, rod, and strip in a wide variety of sizes.

The McLain Fire Brick Company is an outgrowth of a concern founded in the early part of this Century. Its six mines and plants are located in Pennsylvania and Ohio, with headquarters in Pittsburgh. McLain is the largest producer of "pouring pit" refractory brick in the United States of America. It has pioneered in the development of hot tops used on ingot molds in the production of quality steel.

While most of our divisions have been established for many years, the one-hundred-and-eleven-year-old Laclede-Christy Company is our oldest. Its greatest period of growth was in the late years of the Nineteenth Century when it developed a radically new process in the manufacture of fire brick—the dry press method. Considered impractical by the industry at the time of discovery, it now is one of the most economical means of fire brick manufacture. Laclede-Christy pioneered in research among refractory manufacturers. In combination with McLain, we have the third largest refractory business in a field of forty-three.

And that brings us almost up to date. Last November we purchased The Riverside Metal Company, also more than a century old. Actually, this is an instance of the child becoming more prominent than the parent, for the original concern of which Riverside is an outgrowth was the Keystone Watch Case Company, now its subsidiary.

In 1853, Keystone's James Boss filed patents on his process for making gold-filled watch cases. Boss felt that watch cases could be both less expensive and more durable. He combined sheets of metal—gold and brass—and stamped watch case parts from them.

In this way he laid the foundation for the m
Riverside—supplying high-quality, non-ferrous al
ety of uses. An interesting sidelight in the Riversi
manufacture of pennies and nickels for the Unit
The rounded pieces of bronze and cupro nickel w
Philadelphia mint where the final impression th
During the Second World War, Riverside made
for our military. Riverside is the world's largest n
phosphor bronze wire and is a major supplier of c
alloys.

That is the picture of H. K. Porter Company, I
ment. But, before telling you something of our
future, it would be amiss for me to let this evening
a few words about the men who make all this possi
an organization is no better than those persons wh
most important elements. Time does not permit me
the names of all key personnel; suffice it to say
pointed out earlier this evening, each of our Di
Managers is an expert in his field and must accep
sponsibility for his divisional activities from pers
duction and sales. Similarly, we have a fine staff i
offices in Pittsburgh. I *do* want to single out just
officers here tonight: C. R. Dobson, our Executive V
Frank A. Rehorst, our Secretary; and James C. Lesl
urer. These are the men who coordinate the affairs
divisions, and who are invaluable to our Company

At this time, I want to say a few words on our the
agement. We are firm believers in de-centralizatio
head-office staff consists of less than forty persons,
counting and secretarial personnel, even though en
all of our divisions now totals more than 6,000 pers

Naturally, there are certain instances where combi
various divisions, and in those cases we have done

give you a specific example, certain sales personnel with Leschen also sell the Quaker products in their territory; our export departments at Quaker and Watson-Stillman are now operating as a single unit. But, by and large, we have found that in a diversified business *de-centralization* is the answer.

The question frequently is asked of me: "What is your goal?", or perhaps: "Do you have a definite spot at which you are aiming?" The answer isn't simple. Today, in order to survive, we feel that a company must be relatively big to compete with the giant corporations. In this economic era if you stand still you are actually falling back. If you go ahead slowly you are doing little more than standing still. With the tremendous resources in selling, research, planning, and manufacture of the very large organizations, smaller companies are faced with only two alternatives: growing, or remaining as they are, which we feel eventually means falling behind, if not finally going out of business.

So far, we have found that it is easier and less expensive to buy a company and to develop its potential than to start something brand new. As long as this condition continues to exist we expect to continue our acquisitions from time to time. The very obviousness of this evidently blinds people to its practicality. Think of the tremendous expense and effort, if, for example, any of us today wished to start a new steel manufacturing concern in Birmingham, or elsewhere, similar to our Connors Steel Division. Actually, our Connors plant in Birmingham does not occupy a great deal of space, less than 15 acres. Its research laboratory is less than the size of this room. It has some 500 employees. To start such a company would take considerable time and money merely to staff its upper echelons. It would take, no doubt, close to two years to build and put into operation such a plant, and then, of course, customers would have to be developed.

How much quicker and usually more economic chase a concern in a given field and thus secure ove neering staff, technical knowledge, plant, products,

The pattern that our business has followed is to s All of our products are sold to industry or public u garden hose and plastic pipe, which are really by-p industrial rubber business.

By a rough rule of thumb, we have pointed out equipment, industrial rubber, refractory materials, count for about eighty percent of our sales, the othe cent being in the miscellaneous metal fabrication fie

We feel that Porter is contributing something to when we inject new life and very often new capital in established concern. Because of the difficulties in rais tal for improvement or expansion in a smaller, clos cern, combining with a stronger concern is often about the only available solution for the continuation of the company.

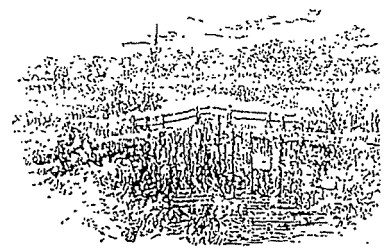
We do not think it is unusual that we manufacture variety of products. We feel it actually adds stability pany. When one division or line of products is su price wars, overproduction, or lessened demand fro and consequently has no earnings, other divisions m very well. In an economy based on high corporate ta division is presently more than 50 percent subsidized eral Tax laws. The banding together of our compan

not only provides safeguards for employees, but also for our customers as well as our stockholders.

In closing, may I thank you for your attention, Mr. Moore for his kind introduction, and Dr. Penrose, who made it possible for us to tell our story to you.

THE END

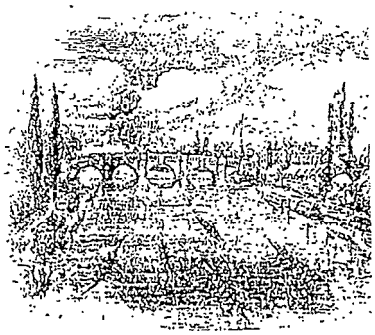
"Actorum Memores simul affectamus Agenda!"



THIS NEWCOMEN ADDRESS, *dealing with the his*
contributions of H. K. PORTER COMPANY, I
delivered at a National Newcomen Dinner of T
comen Society in North America, held at Ne
N.Y., U.S.A., on April 21, 1955. MR. EVANS, *t*
of honor, was introduced by GEORGE S. MOORE,
tive Vice-President, The First National City Bank
York; Member of the New York Committee, in
can Newcomen. The dinner was presided over
SENIOR VICE-PRESIDENT FOR NORTH AMER
in this international Society.

"During Henry Kirke Porter's entire business career the Company, under the name of Porter & Bell, manufactured steam switching locomotives used in factories, mills and mines, and, incidentally, even to haul the old 'el' trains here in New York. The original plant capacity was fifteen to twenty-five locomotives a year."

—Thomas Mellon Evans



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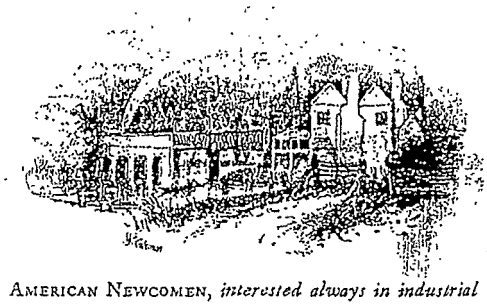
—Thomas Mello



AMERICAN NEWCOMEN, *interested always in industrial and economic history and in the contributions made by leaders in fields promoting America's material progress, takes satisfaction in this highly informative, consistently human, and altogether satisfying Newcomen manuscript. American Industry and American leadership, from early days, have gone forward as a result of brilliant initiative, rare courage, and mellowed judgment—whatever the enterprise. Such is the corporate life-story you have read!*

THE NEWCOMEN SOCIETY
in North America

MORE THAN *30 years ago, the late L. F. Loree (York, then dean of American railroad president now known as "American Newcomen" and interes tory, as distinguished from political history: Its objectives cen growth, development, contributions, and influence of Indu Communication, the Utilities, Mining, Agriculture, Banking Insurance, Education, Invention, and the Law—these and fields. In short, the background of those factors which hav contributing to the progress of Mankind.*

The Newcomen Society in North America is a volunt headquarters in Uwchlan Township, Chester County, wit countryside of Eastern Pennsylvania and 32 miles West of the Here also is located The Thomas Newcomen Library, a refe for research and dealing with the subjects to which the tention.

Meetings are held throughout the United States of Americ at which Newcomen Addresses are presented by leaders in th These manuscripts represent a broadest coverage of phases involved, both American and Canadian.

The approach in most cases has been a life-story of corp interpreted through the ambitions, the successes and failure achievements of those pioneers whose efforts laid the foun ticular enterprise.

The Society's name perpetuates the life and work of T (1663-1729), the British pioneer, whose valuable contributio to the newly invented Steam Engine brought him lasting fa the Mechanic Arts. The Newcomen Engines, whose period of to 1775, paved a way for the Industrial Revolution. New genius preceded by more than 50 years the brilliant work in Sc famous James Watt.

Members of American Newcomen, when in Europe, ar by the Dartmouth Newcomen Association to visit the Thomas Newcomen at Dartmouth in South Devonshi land, where the festival of "Newcomen Day" is c each year on the anniversary, August 16th, of hi