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ST. LOUIS AIRWAYS

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TO THE MEMBERS OF AIR HYGIENE FOUNDATION:

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H. B. Meller
Managing Director

Pittsburgh, Pa.,
March 25, 1937



Air Hygiene Foundation of America, Inc.,
4400 Fifth Avenue, Pittsburgh, Pa.,
April 1, 1937

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REFERENCE TO RECENT LITERATURE

A. News Items

174. GREAT BRITAIN FACTORIES BILL. NEW PROVISIONS FOR HEALTH AND SAFETY.
Coll. Guardian, 134, p. 44 (Feb. 5, 1937).
The Factories Bill, made available recently, is to come into force on July 1, 1938, but the Secretary of State is given power to postpone, either for factories generally, or for any class or description of factory, but not beyond Jan. 1, 1940. The portion of most interest is Part IV, on health and safety, which includes improved provisions for dust removal. Details are not yet available.
175. AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS ANNUAL MEETING.
Min. & Met., 13, p. 112 (Feb. 1937).
The meeting was held at the Waldorf-Astoria, New York City, Feb. 15-19, 1937. Health and Safety in Mines, including silicosis problems, were discussed on February 18th. Any published papers of interest will be abstracted later.
176. MICHIGAN LEGISLATION. J. Am. Med. Assoc., 108, p. 648 (Feb. 20, 1937).
Bill No. H 127 proposes to amend the Workmen's Compensation Act, in effect, to make compensable "any disease ----- approximately caused by and arising out of and in the course of employment".
177. KANSAS LEGISLATION. J. Am. Med. Assoc., 108, p. 648 (Feb. 20, 1937).
Bill H 162 proposes to amend the Workmen's Compensation Act and to make compensable any injury or disease which arises out of or in the course of any employment.
178. PENNSYLVANIA LEGISLATION. J. Am. Med. Assoc., 108, p. 650 (Feb. 20, 1937).
Bill No. H 622 proposes a system of compulsory and voluntary sickness insurance whose benefits are to consist of cash and all kinds of medical and dental services. All employees are embraced in this bill except farm laborers and personal or domestic servants of an employer having less than 3 employees in such service.
179. CALIFORNIA LEGISLATION. J. Am. Med. Assoc., 108, 646 (Feb. 20, 1937).
Bill No. A 2029, introduced in California, proposes to amend the Workmen's Compensation Act, to make silicosis, asbestosis and pneumoconiosis compensable under certain conditions.
180. CONNECTICUT LEGISLATION. J. Am. Med. Assoc., 108, pp. 646-7 (Feb. 20, 1937).
Bill No. H 640, introduced in Connecticut, proposes to require every physician having knowledge of any person suffering from poisoning from lead, phosphorus, arsenic, brass, wood alcohol or mercury or from anthrax or compressed air illness or any other disease contracted as result of employment, to report the facts within 48 hours after obtaining such knowledge to the State Health Dept.
181. SILICOSIS CONTROL PROBLEMS. Eng. News Rec. 118, p. 242 (Feb. 11, 1937).
Foundry 65, p. 69 (Feb. 1937).
Silicosis control problems summarized by conference. Four extended committee reports on silicosis problems and regulations were presented at a National Silicosis Conference held at the Department of Labor on Feb. 3, 1937. Labor representatives opposed medical examination of workers and demanded government insurance.

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182. WEST VIRGINIA SILICOSIS SURVEY. Cor. Age, 29, p. 53 (Feb. 1937).
The State Health Department and Compensation Commission of West Virginia are making a survey of silicosis in the ceramic industries of the state in cooperation with the United States Public Health Service. The study is being carried out with a view to the establishment of equitable compensation rates for plants coming under the State Compensation Act for Silicosis.
183. NEBRASKA LEGISLATION.
Nebraska House Bill No. 90, which includes compensation for occupational diseases, was reported favorably by the House on March 16.
184. AIR CONDITIONING A WINDOWLESS BUILDING. Sheet Metal Worker, 28, pp. 34-40 Feb. 1937.
This article describes a system designed by R. A. Hattis, Mech. Eng., with Ambrose C. Cramer, Inc., Architects, Chicago, Ill. The installation was made by Narowetz Heating & Ventilating Co. of Chicago. The heating and cooling of the office was accomplished through insulation, exhaust ducts and thermostat heating control.
185. DISCUSS METHOD TO PREVENT DUST. Foundry, 65, p. 70 (Feb. 1937).
A discussion at the monthly meeting of the Chicago chapter of the American Foundrymen's Association, Jan. 11, 1937. The program was devoted to a description of measures taken by various plants to control dust. It was pointed out that cleaning departments generally require the most attention in dust elimination. Core-rooms produce little dust unless considerable grinding is done. Use of non-silica periting on the molding floor has been found beneficial in restricting dust in that department. Difficulty has been encountered in providing suitable exhaust for swing grinders. American Manganese Steel Company has installed a ventilating system that gives 70 changes of air each ten hours in the foundry. Ventilation presents a heating problem because the heat contained in the exhaust air is lost, no way having been devised so far to return the heated air without the dust particles. Proper heating of the foundries ranks in importance with the correction of the dust problem. To reduce dust accumulation on the floor from newly-made castings, one plant has a water pan installed covered by a grating flush with the floor which traps loose sand and dust.
186. NEW YORK TO HAVE SMOKE PREVENTION CONVENTION AND EXHIBITION. Combustion, 8, p. 38. (February 1937).
This will be held at the Hotel Pennsylvania, New York City from May 31 to June 5 and will include an Air Pollution Exhibition.
187. INSTALLATION OF THE DUST EXHAUST SYSTEM. Foundry, 65, pp. 24,82 (Feb. 1937).
The Packard Motor Company, Detroit, Mich., has remodeled its foundry and installed a dust exhaust system. This article is a detailed account of the method by which this was done, including a description of all new and modern machinery installed, the feeding of the cupolas and the various processes the castings go through in an up-to-date arranged, well-heated, well-ventilated plant.

B. General and Scientific Papers

188. COMBATING OCCUPATIONAL DISEASE. Emery R. Hayhurst. Safety Eng. 72, p. 58 (Feb. 1937)
The Ohio Legislature of 1913 passed what is known as the "Occupational Disease Reporting Law", which requires that every physician shall report to the State Director of Health upon a specified form any case which he believes to be occupational in nature. Ohio has always enforced this law. The total number of occupational diseases reported for the 23-year period amounted to 19,343. Since 1921 the yearly list of cases reported has risen. In the first 6 months of 1936, 735 cases were reported. However, there are existent many more occupational diseases than are reported. All occupational diseases are due to exposure to industrial health hazards. The Ohio program is divided into immediate and long range projects. Research, and not intrusive investigation, is to be the character of the policy pursued. Occupational diseases, complaints, reports of doctors, etc., will be given consideration. Examinations of

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workers subjected to prominent hazards, such as dusts, certain poisons and infections will be made. Silicosis has been selected as the first long-range project. The author believes that all industrial health hazards can be eliminated, including industrial poisonings and silicosis.

190. INDUSTRIAL MEDICINE: INTRODUCTION. J. Simon. Practitioner, 137, pp. 257-9, (Sept. 1936).
This paper by H. M. Secretary of State for Home Affairs serves as the introduction to a symposium on industrial medicine. It outlines briefly the developments in organization and practice of industrial medicine in Great Britain during the past 20 years. The remaining papers treat different phases of the subject, but refer very briefly to silicosis and air hygiene if at all.
191. DIAGNOSTIC METHODS IN INDUSTRIAL MEDICINE. Paul A. Davis. Ohio State Med. J., 32, pp. 286-292 (March 1937).
In the State of Ohio there are now 21 compensable hazards and a correct diagnosis is necessary. This paper presents a classification of the forms in which injurious materials may occur, the methods by which they are absorbed by the system, and treats benzene, lead and carbon tetrachloride poisoning, dust diseases and dermatitis in detail, giving an outline of the examination, the primary and secondary symptoms, and clinical laboratory work involved in the diagnosis of each, and including preventive measures for silicosis and dermatitis, and treatment of the latter.
192. THIRD LAW ON THE EXTENSION OF ACCIDENT INSURANCE FOR INDUSTRIAL DISEASES OF DECEMBER 16, 1936. Reichsarbeitsblatt, pt. 4, pp. 353-358 (1936).
This is a digest of a new German law. The most important innovation seems to be the inclusion of "severe" silicosis and silicotuberculosis as accidents, and all "severe or repeatedly relapsing skin diseases which compel change of work or giving up any gainful employment." The first decision regarding an occupational disease is now entrusted to the industrial physician.
193. THE DUTY OF REPORTING INDUSTRIAL DISEASES. A. Feil. Presse med. pp. 31-32 (1937).
A short history of reporting of industrial diseases in France is given, followed by a list of industrial diseases included in the order of Oct. 16, 1935, which is unusually complete, embracing all common poisons and injuries, dust diseases and eye and ear disturbances.
194. PRE-EMPLOYMENT EXAMINATIONS. M. H. Barsky and J. Wolff. Indust. Med., 6, pp. 18-23 (Jan. 1937).
About 1000 pre-employment examinations were made on applicants for work involving excavation, drilling, concrete work and road building. The hazards were severe muscular work and silicosis. The examination was more thorough than is customary, requiring 45 to 60 minutes for each man. Out of 494 men exposed at any time to silica dust, only 26 were found to be silicotic. Their average exposure to silica dust was 17.6 years.
195. CLINICAL, ANATOMICAL AND SPECTROGRAPHIC RESEARCH ON THE CENTRAL NERVOUS SYSTEM IN ACUTE METAL POISONING WITH SPECIAL REGARD TO ITS SIGNIFICANCE IN LEGAL MEDICINE AND INDUSTRIAL PHYSIOLOGY. A. Esser. Deutsch. Ztschr. f. d. ges. gerichtl. Med., 27, pp. 253-289 (1937).
This is a conclusion of the author's previous papers on the subject. More than traces of metal are never found in the central nervous system, and he concludes that the ganglion damage is caused by poisoning in "the sense of a metal stream" rather than by deposition of the metal.

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196. INDUSTRIAL POISONS. D. Hunter. Practitioner, 137, pp. 290-313 (Sept.1936). The principal subject of the paper is lead poisoning. The most important recognizable symptoms are colic, palsy, anemia, encephalopathy and the presence of lead in the urine. Stippling of the red blood cells is an indication but not conclusive. There is danger of attributing to lead poisoning all symptoms occurring in persons exposed to lead. In preventive treatment a high calcium content is needed, aperients must be taken regularly, and cleanliness must be observed. After the acute symptoms have passed, low calcium diet, with potassium iodide, ammonium chloride or phosphoric acid is beneficial. Benzene poisoning is discussed more briefly. Treatment has been largely unsuccessful, and prevention must depend upon avoiding exposure. Poisoning by chlorinated hydrocarbons and toxic gases is briefly discussed.
197. INDUSTRIAL POISONING. W. Brandt. Chem.-Ztg., 60, pp. 901-5 (1936). A review of the most important industrial poisons and injuries.
198. CHEMICAL CONSTITUTION, PHYSICAL-CHEMICAL PROPERTIES AND PHARMACOLOGIC ACTION, A CONTRIBUTION TO THE EXPLANATION OF CHRONIC POISONING. E. Starkenstein. Klin. Wchnschr., 15, pp. 1865-71 (1936). The paper is largely a discussion of theories of the relation of poisonous effect of metals to their place in the periodic system. The periodic group including mercury, thallium, lead and bismuth has the most pronounced effect. Two basic conditions make chronic poisoning possible: the accumulation of poisoning in the body and the summation of injuries caused by small doses. Chronic poisoning is caused almost exclusively by substances having a paralyzing action. Those that only irritate do not produce chronic poisoning.
199. CARBON TETRACHLORIDE POISONING. G. G. Davis and H. A. Hanelin. Indust. Med., 6, pp. 24-29 (1937). A cable-splicer cleaned insulators in a presumably unventilated manhole with a mixture of gasoline and carbon tetrachloride. He became dizzy, with a headache, and entered a hospital 4 days later, suffering from suppression of urine and threatened uremia. Details of clinical findings and successful treatment are given, with a review of the literature and an outline of treatment to be followed. However, the greatest emphasis is laid on prevention, especially the need of ventilation when working with carbon tetrachloride and similar solvents.
200. CHRONIC XYLENE POISONING. De Oliviera. Chem.-Ztg., 60, p. 837 (1936). The paper reports the case of a lithographer who died of aplastic anemia after a long period of exposure to xylene fumes. Severe damage to the bone marrow, atrophy of normal cell elements in the spleen and lymphatic nodes and atrophy of lymphoid tissues were shown by the autopsy.
201. THE TOXICOLOGY OF ORGANIC SOLVENTS: 1-4 DIOXAN (DIETHYLENE DIOXIDE). W. Wirth and G. Klimmer. Arch.f.Gewerbepath.u.Gewerbehyg., 7, pp. 192-206 (1936). This substance is largely used as a solvent for spraying lacquers, but also finds use in cosmetic and medicinal preparations. The experiments reported show that it is not as harmless as is generally supposed. Cats and mice exposed to its fumes for several hours developed inflammation of the lungs, and death followed several days after inhalation of 30 to 40 mg. per liter for similar periods. Dioxan was found to be recognized by its odor and effect on eyes and throat when 5 mg. per liter was present, but toleration was acquired in a few minutes. That concentration, however, is dangerous when exposure lasts for several days. There is no distinction between the pure and commercial forms in their toxic effects. It has no effect on the skin except drying.

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INSTRUMENTS

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MINI REVIEW ABSTRACTS

202. COMPARATIVE RESEARCH ON THE ACTION OF VARIOUS STIMULANTS IN POISONING BY CARBON MONOXIDE AND BY BARBITURIC ACID DERIVATIVES. K. Thiel. Z.f.d. ges. exp. Med., 100, pp. 1-19 (1937)
Various stimulants were tried on a dog poisoned by carbon monoxide, and determinations made of the speed of separation of carbon monoxide and the improvement in circulation and respiration. A mixture of cardiazol and sympatol was found better than a somewhat similar mixture suggested in an earlier paper.
203. QUESTION OF CHRONIC CARBON MONOXIDE POISONING. K. Wotzka. Klin.Wehnschr., 16, pp. 24-28 (1937)
A review of development of symptoms of chronic carbon monoxide poisoning, with some attention given also to acute poisoning.
204. CARBON MONOXIDE AND THE ANTERIOR LOBE OF THE PITUITARY. Arch.f.exp.Pathol. u. Pharmacol., 184, pp. 152-5 (1937)
From experiments on guinea pigs the author concluded that the thyroid is activated by repeated light exposures and that the thyrotropic hormone content of the anterior lobe of the pituitary gland is decreased.
205. LUNG IRRITATION FROM CHLORINE. O. Schulz. Aertel.Sachverst.und.-Ztg. 43, pp. 14-15 (1937)
A physician used as a disinfectant for a room, a mixture of lye, boric acid, glycerine and chlorine. Sickness after a half-hour's exposure was followed by inflammation of the lung 3 days later. The author thus affirms the connection between inhalation of chlorine and irritation of the lung.
206. MANGANESE POISONING. . C. V. Loebe. J.f.Psychol.u.neurol., 47, pp.220-1 (1936)
Two cases of manganese poisoning reported and described in 1932 showed marked improvement in 1936..
207. NERVE DAMAGE IN INDUSTRIAL MANGANESE POISONING. O. Crouzon and H. Desoille. Paris med., 26, pp. 361-5 (1936)
A description of a typical case of manganese poisoning in a worker who had pulverized raw materials in a storage battery for four years.
208. DISTRIBUTION OF MERCURY AFTER ITS INHALATION. W. Wirth. Arch.f.exp.Pathol. u. Pharmacol., 184, pp. 91-92 (1936)
It was shown by experiments on dogs that the lungs quickly absorb mercury in large quantities and quickly eliminate it. Kidneys and liver store it for longer periods. Some is taken up by the brain.
209. HISTOCHEMICAL DETECTION OF LEAD IN THE DIGESTIVE TRACT. H. Schoenlebe. Arch. f. exp. Pathol. u. Pharmacol., 184, pp. 289-295 (1937)
Various portions of the digestive organs of guinea pigs chronically poisoned by lead were tested for that metal, first by fixation with alcohol and hydrogen sulfide. Lead was found in the goblet cells of the small and large intestines and in the epithelium of the large intestines and stomach, especially in the pyloric gland. The most massive deposits were found in the connective tissue framework of the mucosa and submucosa with the greatest density of the cecum. The conclusion derived is that these points where the lead is found are the points from which the greatest effort to eliminate the lead is made.
210. EXAMINATION OF LEAD IN CEREBROSPINAL FLUID OF NORMAL AND LEAD POISONED PERSONS. F. Schmitt and W. Basse. Klin.Wehnschr., 16, pp.65-66 (1937)
In the cerebrospinal fluid of 13 normal persons, 15 to 38 micrograms % of lead were found. In 5 cases of lead poisoning the quantity rose to 80 to 493 micrograms %. This is not parallel to the ratio quantities in the blood.
211. LEAD POISONING IN FRANCE ACCORDING TO OFFICIAL STATISTICS. A. Feil. Presse med. p. 32 (1937)
The number of cases of lead poisoning in France is falling steadily; for example there were 1525 cases in 1928 and 674 in 1934. Of the latter, the greatest number were in storage battery plants, followed by metal enameling and lead foundries. The number found in lead dye factories is strikingly low. The greatest number of cases affected the digestive tract. In most cases the disability lasted 8-15 days.

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212. THE EFFECT OF LEAD ON TISSUE METABOLISM. D. Dolowitz, J.F.Fazekas and H.E.Himwich. J.Ind.Hyg.&Tox., 19, pp. 93-4 (Feb. 1937)
The paper is a study of lead effects on oxidation dehydrogenation and glycolysis of some tissues affected in lead poisoning such as brain, kidneys, liver, testis. The respiratory quotient of the brain was also tested and, although sodium acetate had little effect, lead acetate disturbed tissue oxidation so much that results were unpredictable. It was found that lead causes a decrease of oxygen consumption of all four organs. Tests on the brain created most attention due to interest in encephalitis. The experiments suggest an underlying pathogenesis for varied lead poisoning manifestations.
213. GEOLOGICAL ASPECTS OF THE SILICOSIS PROBLEM. G. W. Tyrrell. Coll.Guardian, 154, pp. 20-21 (Jan. 1, 1937). Also Iron and Coal Trades Rev. Jan. 1, 1937.
No stronger contact exists in the borderland field of science than that between petrology and pathology in respect to the subject of silicosis. According to present British law, a miner must prove that he has been working in "silica rock" (including quartz, quartzite, gneiss, sandstone, gritstone and chert) in order to obtain compensation for silicosis. The established effect of asbestos, and possible effects of other silicates, have led to the suggestion of the term "silicatosis" for dust diseases not due to free silica. The author discusses the sericite theory and stresses the need for further investigation.
214. SILICOSIS AND SILICO-TUBERCULOSIS IN A WESTPHALIAN AX GRINDING PLANT. M. Frese. Tuberk.-Bibliothek, 59, p. 28. J.A.Barth., Leipzig, 1936.
Silicosis was found in many workers engaged in grinding with sandstone wheels containing 91.5% free silica, and giving a dust count of 1226 particles (presumably per c.c. equivalent to 70 million particles per cubic foot). In some cases silicosis occurred after 2 to 4 years' work. With another type of wheel, containing 62.3% free silica, and giving off only about a fifth as much dust, silicosis was much less frequent. X-ray pictures and autopsy material are presented in 18 cases. It is interesting that a lung expert, familiar only with coal miner's pneumoconiosis, denied that silicosis was present.
215. WHAT IS SILICOSIS? P. Heffernan. Tubercle, 16, pp.397-405 (June, 1935)
Pneumoconioses that are materially differing from "classical" silicosis are far more frequent and serious than was formerly supposed. For most of these conditions the dust of silica or silicates is at least partly responsible. The author suggests the following classification of these conditions: (1) simple silicosis; (2) infected silicosis (tuberculous or non-tuberculous); (3) mixed silicoses (silico-anthracosis, silica-siderosis, etc.); (4) silicatosis (e.g. asbestosis, "sillimintosis", "sericitosis"); (5) non-silicotic pneumoconioses (e.g. "cardroom disease" anthracosis, etc.); and (6) pulmonary fibrosis not due to dust (gas fibrosis, syphilitic fibrosis, and fibrosis due to microorganisms, molds, etc.). The author believes that the interaction that produces silicosis is electro-chemical and is caused by free silica in a state of electro-chemical activity, acting upon certain cells of the pulmonary tissue. Freshly powdered silica is active electrochemically, as are probably some silicates, e.g. asbestos, to a more limited extent. The harmful properties of these dusts are much modified by the presence of certain other dusts. By way of illustration, the silica sand used in making silica bricks in Derbyshire has a free silica content of 91%, but each grain of quartz is surrounded by a pellicle of clay-like material, and fine dust from the sand contained only 38% of free silica, which is no greater than in harmless shale dust.
216. AN IMPORTANT ITALIAN INQUIRY INTO SILICOSIS. L. Glibert. Bruxelles Med., 17, pp. 429-434 (1937)
A brief report on a general discussion by G. Pancheri in the Italian journal "Securitas" on silicosis and its incidence in Italy.

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217. PNEUMOCONIOSIS CAUSED BY TITANIUM. L. Lenzi. *Rass.di med.appl. lavoro indust.*, 7, pp. 301-18 (Oct. 1936)
Titanium oxide was found to produce an inflammatory reaction in the lungs of guinea pigs exposed to the dust for periods ranging from 2 hours to 4 months. The effect is similar to pneumoconiosis, and the author proposed the word "titaniosis" to describe this condition.
218. PATHOLOGY OF PNEUMOCONIOSIS; SILICOSIS; SILICOSIS AND TUBERCULOSIS; ASBESTOSIS; SIDEROSIS; ANTHRACOSIS. O. Auerbach. *Indust. Med.*, 6, pp. 39-48 (Jan. 1937); *Quarterly Bull. of Sea View Hosp.*, 11, pp.3-27 (Oct.1936)
A general paper, reviewing briefly some of the literature on pneumoconiosis. The evidence for and against the mechanical and chemical theories is given briefly, and the sericite question is similarly discussed. The effective particle sizes and time necessary for exposure are discussed. The appearances in the lungs are described, with illustrations. Asbestosis is considered briefly.
219. SANDBLASTING AND SILICOSIS. W. Bergerhoff. *Arch. f.Gewerbepath u.Gewerbchug.*, 7, pp.156-181 (1936).
This paper refers to the situation in Germany. In clinical and x-ray examinations of 175 sandblasters, 100 were found fit and 75 unfit for the work; definite pulmonary tuberculosis was found in 24. Most of the workers give up the work after a few years, so estimation of the hazard is difficult in comparison with that of grinders and stone hewers. The author considers sandblasting the dustiest of all occupations and does not believe that methods for removing the dust have so far been very successful, to the extent that masks and positive pressure helmets are unnecessary.
Diagnosis of silicosis caused by sandblasting is difficult. In the early stages, the author says, it may be confused with the diffuse fibrosis often found in healthy people. Tuberculosis present with silicosis, as in other cases, changes the whole picture. Susceptibility to silicosis has been claimed to depend largely upon the filtering action of the nose (e.g. see next abstract). However, this has not been found true in sandblasters, in a rather small number of observations. Electrical precipitation for laying dust has been found effective in some occupations and is worthy of trial in this one.
220. PROTECTION AGAINST INJURIOUS DUST IN INDUSTRY. W. R. H. Kranenburg, I. F. Groeneveld and E. Doerma. *Arch. f. Gewerbepath. u. Gewerbchug.*, 7, pp.133-155 (1936).
In healthy persons the action of the nasal mucous membrane in arresting dust particles varies from 80% down to 5%, but is quite constant for the same person. The filtering action even remains unchanged after several hours' passage of dusty air through the nose. In observations made on 62 miners in the Ruhr district who had worked for 10 years or more, the most silicosis was found in those with the poorest nasal filtering. It is suggested that only miners with well-filtering noses should be accepted for work.
It is difficult to estimate the efficiency of respirators, because different testing methods give different results. The capability of any kind of filtering material depends upon the kind of dust. No filtering material can take up 100% of the dust without great resistance to respiration, but the limit of bearable resistance varies greatly with individuals. One-way breathing is preferable for very fine respirators. Colloid filters have been found very efficient for metal fumes. Sandblast helmets are now made to give perfect protection against dust.
221. ANTHRACOSIS AND ITS DIFFERENTIAL DIAGNOSIS FROM SILICOSIS AND OTHER PNEUMOCONIOSES. R. Hollman. *Aerzt. Sachver.-stand.-Ztg.*, 42, pp.1-13 (1937)
This article is of interest in that the author makes a strong claim that pneumoconiosis may be caused by carbon dust. He observed workers in different dust for over a year and concluded that most dusts, including iron and silicon carbide (carborundum) are harmless, and that only two dusts cause pneumoconiosis: quartz and carbon. (The list is not available in our source of information, and presumably does not include asbestos). The firm where the investigation was made produces a

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wide variety of carbon articles. The raw material contains less than 1% ash, of which a large portion consists of silicates. A few cases (26) of pneumoconiosis which differ in no way from silicosis have been found among 547 workers using this carbon, and they were in men who had worked for 14 to 40 years. Three of these victims were in what corresponds to the third stage of silicosis. The author claims that there are fewer cases among men working with carbon dust having a slight admixture of silica. Tuberculosis among the carbon workers was much milder and more inactive than in silica workers. The author concludes that anthracosis can be caused by pure carbon. The effect of silicates (free silica being absent) must be shown by further study.

222. FUNDAMENTALS RELATING TO THE DESIGN AND OPERATION OF EXHAUST SYSTEMS. T. Hatch and others. American Standards Exhaust Code Comm., No. ASA-Z9, 29pp. Amer. Standards Assoc., N. Y. (1936) (Price 40¢)
This preliminary report contains specifications to guide those intending to install and use exhaust systems, as well as to the manufacturers and designers of such systems. The code is divided into seven sections: (1) definitions; (2) plant layout, building construction; (3) exhaust hoods; (4) exhaust piping; (5) air-cleaning plant; (6) exhaust fan and (7) construction, maintenance. The first section distinguishes between dust, fumes, mists, vapors and gases. The section on exhaust hoods is both mathematical and practical, including minimum air velocities to avoid dispersion, and design of hoods to accomplish the result with the least expenditure of energy. The need for much further investigation is indicated. The section on exhaust piping gives calculations of the size of piping necessary, pressure losses, etc., on theoretical and practical bases. The code is completed by an outline of a method for testing the exhaust system for efficiency of operation.
223. TENTATIVE CODE OF RECOMMENDED PRACTICES FOR GRINDING, POLISHING, AND BUFFING EQUIPMENT SANITATION. J. R. Allan, chairman. Am. Foundrymen's Assoc. Industrial Hygiene Codes Comm., A.F.A. Preprint 36-38, Dec. 4, 1936. (Price \$2.)
The bulletin includes a series of definitions followed by specifications for hood and branch-pipe requirements, details of design of abrasive wheel and belt enclosures, and minimum air velocity standards, with illustrations of each type of hood application. Wet-grinding operations are exempt from the provisions of the code, unless they give rise to a noticeable quantity of spray or mist in the surrounding atmosphere.
224. TENTATIVE CODE OF RECOMMENDED PRACTICES FOR TESTING AND MEASURING AIR FLOW IN EXHAUST SYSTEMS. J. R. Allan, chairman. Am. Foundrymen's Assoc., Industrial Hygiene Codes Comm. A.F.A. Preprint No. 36-27. (Price \$2.00).
This code prescribes the general type and proper use of instruments for measuring air flow in exhaust systems. It covers the application and testing procedure for pitot tubes, manometer gages, revolving vane anemometers, and swinging vane direct reading velocity meters. Eleven illustrations are included with a graph of air velocities corresponding to water-gage readings for use with the pitot tube.
225. INDUSTRIAL DISEASES OF THE LUNGS WITH SPECIAL REFERENCE TO SILICOSIS. W.E. Cook Practitioner, 137, pp. 314-323 (Sept. 1936).
This paper is a brief survey of the field of dust diseases, presenting most well-known facts, but in a well summarized form. Only free silica and asbestos dust have been proved to be biologically active and to cause extensive disease in workers, although temporarily harmful effects may be attributed to many others. In the case of asbestos, possibly the fluids of the lung dissolve the magnesium and calcium, leaving the fiber pure silica. It has been claimed that silicosis is due to sericite and not to free silica, but out of the controversy has come general acceptance of the view that sericite is not the primary cause of silicosis. Siderosis and anthracosis are names given respectively to the red solid lungs of ironstone miners and the hard black lungs of coal miners. In each case, however, silica has been shown to be

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primarily responsible, and the disease is fundamentally silicosis. This is illustrated in the situation in British coal mines. In South Wales, where the percentage of free silica is high there are many more cases of "anthracosis" in proportion to the working population than in North Wales, where there is little free silica.

Several years' exposure are generally required in order to bring on silicosis, but excessive exposures, as in sand blasting, and the presence of free alkali, as in scouring powders, accelerates the action of silica. Individuals vary in susceptibility, females and those over 40 acquiring the disease in a shorter time than others. Several other diseases predispose to silicosis. To produce disease silica must be soluble, but probably electrochemical properties are also important. At least 75% of silicotic patients contract tuberculosis, and other infections are not uncommon. The earliest x-ray evidence is an increase in the density of the shadows of the vascular tree. Later the small arteries appear to have buds along their course. The parenchyma looks hazy, and nodules appear and later coalesce. The earliest indications are in the mid and lower lung zones. Increase in the root shadow due to involvement of the glands is constant. Shortness of breath increases to a point where it is static. Working capacity is impaired, but without distress in working. With tuberculosis, loss of weight, fever, night sweats, hemoptysis and more abundant sputum are noticeable. Tubercle bacilli may be difficult to find in sputum, and guinea pig inoculation may be necessary. The blood sedimentation rate is useful in diagnosing silico-tuberculosis. Physical signs are not characteristic of silicosis and do not bear any relationship to the extent of lung involvement. Diagnosis is based on good x-ray film and history of exposure. When diagnosed the silicotic should be removed from the silica hazard and as far as possible from risk of infections. The real treatment lies in the prevention of dust at its source.

- 226 DUST RESPIRATORS. E. Szolcyn. *Gasmasko*, 2, pp. 121-9 (Sept.-Dec. 1936). The wide use of respirators dates from the World War, although simple forms such as handkerchiefs have been used for centuries in the Sahara. The development of good respirators largely occurred in the decade 1920-1930. The author states that there are two ways of obtaining an effective filter: (1) increasing the thickness, and (2) increasing the area; thereby increasing the length of time for the air to pass through. (The last statement is open to grave doubt.) Since the resistance is increased by thickening the filter, the second method is preferable. The advantages of positive air helmets are discussed. There is increasing need for good respirators. The article is well illustrated.
- 227 RESPIRATORY PROTECTIVE DEVICES. Carlton E. Brown *J. Ind. Hyg. & Tox.*, 19, pp. 95-107 (Feb. 1937). Although the use of other preventive or control methods is preferable to the use of respirators the latter are desirable if not essential in many situations. The history of respirators dates back earlier than the time of Pliny, the Elder, who describes the use of loose bladder skins for the purpose. The hose type was also known in ancient times, and positive pressure devices were known at the beginning of the 17th century. Modern respirators are classified according to the material from which protection is necessary, as follows: (1) irrespirable atmospheres far from a source of fresh air; (2) gaseous contaminants in low concentrations; (3) irrespirable atmospheres near sources of fresh air; (4) particulate contaminants, such as dust, and (5) high concentrations of gaseous and particulate contaminants. The first type requires a supply of oxygen and a regenerator or chemical for removing carbon dioxide. It must be carried by the wearer, and therefore its length of use is limited. No respiratory equipment will protect against absorption of harmful gases through the skin or irritation of the skin. This type is used in mine rescue work. The second type includes the gas masks for war use, and other forms for all kinds of gases used in industry. The third type is the positive pressure device similar to that used in sandblasting operations, but hand-operated, for use with benzene and other organic poisons. The fourth is the ordinary dust respirator, of which a number of satisfactory forms are now developed. A simple practical test of efficiency is given. The fifth is the positive pressure helmet used in sandblasting.

References to Recent Literature - 10

There is still room for improvement in all types of present respirators and developments are listed. A four-page table of types, protection, service periods, weights and approximate prices is included.

228. THE MINERAL CONTENT OF THE SILICOTIC LUNGS OF AN EARTHENWARE WORKER. N. Sundius, A. Bygden, and T. Bruce. Trans. Ceramic, 35, pp.167-81 (Apr.1936). The distribution of dust in the lung of a worker who had died from silicosis was examined by first destroying the organic tissue with the aid of hydrogen peroxide. The dust was found to be distributed fairly well throughout the lung. The quantity in the lymphatic glands, referred to the dry weight, is about the same as in the remainder of the lung, but it is more finely grained. All components of the raw materials are present in the dust, but the proportion of quartz and feldspar is somewhat decreased, with a corresponding increase in kaolinite and mica. The average diameter of the dust is below 2 to 4 microns. When the atmospheric dust in the factory is separated according to size by suspension in water, the fine dust is found to have the same composition as the lung dust. It is concluded that no chemical decomposition of dust in the lung can be proved.
229. MEMORANDUM ON THE REDUCTION OF DUST DURING MINING OPERATIONS. J. I. Graham. British Colliery Owners' Research Assoc., 1936. 20 pp. The author states in the introduction that "the breathing of dust in high concentration is definitely harmful if the dust contains a high percentage of free silica and, even if the latter is not the case, repeated exposure to very dusty atmospheres will probably produce bronchial trouble..... It is obviously most desirable that the atmosphere breathed by men in underground operations should be as free from dust as is reasonably practicable." A brief discussion of the nature of silicosis and safety limits for dust is followed by a description of the various safety measures used in mines - wet drilling, suction hoods, dust traps and respirators. Wet drilling prevents dust, but the use of compressed air with water gives off fine dust with the spray. Suction hoods (local exhaust hoods) are successfully used, and rotary drilling is better than percussion drilling. Mist projectors are used after blasting to remove dust and injurious gases.
230. ATMOSPHERIC POLLUTION- THE PRESENT POSITION. C. M. Opie. J. Roy.San.Inst., 57, pp. 437-43 (Jan. 1937). The author is Chief Smoke Inspector for the City of Liverpool. The question is discussed mainly from the standpoint of smoke pollution. Less progress has been made in abatement of air pollution than in any other aspect of public health work. The domestic chimney is the chief culprit. The author urges increasing the efficiency of the domestic fire, the use of smokeless fuel, and correct furnace management in industry. Acid gases from industrial chimneys can be decreased by pre-treatment of fuels.
231. HYDROGEN SULFIDE, THE CAUSE OF EYE DISEASES IN THE VISCOSE-ARTIFICIAL SILK INDUSTRY. W. Hortsch. V. eroeffentl. a.d. Geb.d.Volksgesundheitsdienstes., No. 41 66 pp. Berlin (1937). A thorough investigation of an eye disease prevalent in a viscose rayon factory, and a consideration of all possible causes, leads to the conclusion that hydrogen sulfide is the only cause. This fact has been known, but the value of this volume is that it finally settles the question. A full review of the literature is included.
232. AIR-BORNE INFECTION. H. C. Wells and M. W. Wells. J. Am.Med. Assoc., 107, pp. 1698-1703 and 1805-1809 (Nov. 21 and 28, 1936). This is a general review of Mr. Wells' notable contributions. He has demonstrated that bacteria remain suspended and viable for many hours in droplets in the atmosphere. The period of survival of the influenza virus is much briefer. Sneezing may produce heavy atmospheric contamination with mouth bacteria. The best bactericidal agent in air is ultraviolet radiation, best between 200 and 300 millimicrons in wavelength. This method is in experimental use in hospitals and food preserving establishments. Its application to factory workrooms would require much further experimentation, as there are many unsolved problems.

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233. OCCUPATIONAL CANCER OF THE LUNG. L. Teleky. J. Ind.Hyg.&Tox., 19, pp.73-83 (Feb. 1937)

The author doubts many current statements that cancer has increased within recent years, attributing the appearance to better recognition of the disease. The same is true of silicosis. Street dust is given as a cause of increased cancer, but in spite of increased traffic there are no such clouds of dust as there were years ago. There have been many reports of isolated cases in the scientific literature, linking cancer with silicosis and other industrial diseases, but the rarity of such cases and the variety of the diseases do nothing to prove any connection. Some animal experiments tend to establish a relationship, but even if the results turn out to be more positive than they now are, they would not prove the case for human beings.

On the other hand, there are two occupations, in one of which cancer may be strongly suspected as a result of exposure to certain materials, and in the other there is no doubt of the connection. The first is the chromate industry. Some cases of cancer have been found in workers in old factories, usually after 20 years of work. In the newer factories no cancer has been reported. It is possible that improved hygienic conditions may prevent its development. The other dangerous occupation is radium mining, and several pages are devoted to a discussion of that industry. Other possible causes, such as arsenic, have been eliminated, and there is no doubt that it is traceable to the radium compounds, especially the gaseous emanation. The question of prevention among these miners is difficult. Charcoal-filled respirators cannot be worn continuously, and ventilation is only partly successful. The only effective means are shortening of the work day and entire period of work, and alternation of work.

234. EXPERIMENTAL INVESTIGATION OF ANILINE CANCER. J. Serenblum and G.M. Bonser. J. Ind.Hyg.&Tox., 19, pp.86-91 (Feb. 1937)

It is an accepted fact that a prevalence of bladder cancer exists in the aniline industry, although the cause of the disease is still obscure. The substances most probably responsible are the intermediates, benzidine and a- and b- naphthylamine. The tumors develop after a long latent period, usually 10 to 25 years in man. The investigation involved 2 aspects:

(1) the induction of bladder tumors by long continued administration of some of the suspected products used in the industry, and (2) a search for the presence of carcinogenic substances in the urine of workmen employed in the dye industry. Intraperitoneal injections, feeding, and inhalation were used as means of introducing the suspected materials into the bodies of animals (rats in some instances, rabbits in others). The results were entirely negative, confirming the work of most investigators, but disagreeing with that of two others. The results, of course, are not conclusive in disproving the effect in man.

235. OCCUPATIONAL DISEASE LEGISLATION IN THE UNITED STATES, 1936. Charles F. Sharkey, Chief, Labor Law Information Service. U.S.Dept. of Labor, Bur. of Labor Statistics, Bull. No. 625. Washington, D.C, 1937, 58 pp. The introduction also appeared in U. S. Monthly Labor Rev., 43, pp. 1096-1101 (Nov. 1936). Establishment of the compensation principle for occupational disease has been much slower than for industrial accidents. In the past 2 years, however, legislation providing compensation for silicosis and other occupational diseases has been passed in a number of states. A summary of the substance of recent laws is followed by copies of all statutes or sections relating to occupational disease. This bulletin may be useful to members as a supplement to the Legal Bulletins and may be obtained from the Superintendent of Documents, Washington, D. C. for 10 cents.

Corrections on March abstracts. Abstract 107, on ATMOSPHERIC CONTAMINATION FOR HIGH TEMPERATURE LEAD BATHS, should have been credited to B. D. Tebbens. The number 170 was duplicated. Please refer to the article by Angus and Stewart as 170a.

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