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REFERENCES TO RECENT LITERATURE ON INDUSTRIAL DISEASE

This office expects to have information later about reprints in some cases where it is not on hand at present. Copies of Safety Engineering in cases where reprints from that periodical are not obtainable, may be secured from Safety Magazine Publishing Corp., 45 John St., New York, at 25 cents each.

339. INVESTIGATION OF FACTORS INFLUENCING DUST DETERMINATION MADE BY THE IMPINGER METHOD. M. H. Kronenberg, A. N. Setterland and C. H. McClure. J. Ind. Hyg. Toxicol. 19, 198-203 (May, 1937)
Comparison of darkfield and lightfield examination of impinger samples is difficult on account of inconsistencies that develop in both methods, and an extensive study was made by the authors to determine what method is best. With brightfield illumination one source of inconsistency is that with centered light many of the transparent particles, even as large as 10 microns, become invisible. With oblique light, results vary with the obliquity. The authors decided on darkfield illumination, cutting down the substage iris diaphram until the field was at the maximum point of darkness where the Whipple grating was easily distinguished. A fixed distance from lamp to mirror and a fixed diaphragm opening was adopted, although some latitude is allowable.
Two important factors that influence the accuracy of the darkfield count are the condition of the water used for blanks, and the precipitation of tiny air bubbles on the bottom of the Sedgwick Rafter cell, especially in cold weather. Various procedures for preventing this precipitation were tried, and the results are presented in tabular form. The most consistent and satisfactory results were obtained by combined boiling and evacuating of the water and keeping it above room temperature until the count is finished. Details of the procedure are given.
Another factor that may greatly influence the count is the time elapsed between the start and finish of a dust count. A series of counts was made on dust from a plant where waste paper was graded and sorted. From the beginning of the counts, after the customary 20 minutes, the number of particles increased fourfold in 2 1/2 hours, and 19 hours later they were too numerous to count. This was an extreme case, on account of the large amount of organic dust, but the tendency is always present. Further work along these lines is eminently desirable, leading to a standard procedure which all investigators can follow without too much variation in results. (Reprints may be ~~obt~~ained from Dr. M.H.Kronenberg, Illinois State Dept. of Public Health, Chicago, Ill.)

340. MENACE OF DUST IN METAL MINING. D. Harrington. Eng. Min. J. 138, 119-123 (Mar. 1937).
The author emphasizes the importance of dust prevention and control as being the surest means to avoid dust damage and complications in metal-mining industry. Much information is now available relative to the effect of dust on the human body. The maximum harm to health from dust is caused by breathing silica dust, chiefly free silica with its well-known effects on the lungs. There is not a general belief that dust may be detrimental to all parts of the human system, including the skin. Explosibility of some mineral and organic dusts and the harmful effects of dust on vegetation and animals are other reasons for a determined effort to reduce dust evils.

Some years ago the South African authorities set standards of maximum allowable air-dustiness in mines, without reference to silica content or particle size, or any definate idea of preventing occurrences of dust disease. From time to time South Africa announces that air-dustiness is kept fairly rigidly below the standard weight and count of particles and that new cases of miner's consumption are practically unknown. One difficulty in setting a standard is that dust sampling and determination devices and methods are not applicable for every industrial condition, and until methods are so simplified for the use of the intelligent plant employe without depending on the few highly paid technical experts, the regulation on allowable air-dustiness will probably result in confusion and injustice. The quantity of dust inhaled determines its danger, but no one knows what constitutes the quantity-limit, although some of the so-called threshold limits are being embodied in State regulations and laws. It is illogical to predict dust respiratory harmfulness on a sliding scale in proportion to the free-silica content of the dust. No one knows whether a particular dust containing 1 % silica is or is not more harmful than one of 2 %, 3%, or 30%. It also depends on the immunity of the person and the working basis. There are many factors that make unworkable a sliding scale regulation. With so many uncertainties the operating man is likely to be confused as to what constitutes a dusty atmosphere. If dust cannot be abolished entirely, it can be limited, and the best remedy is the universal coursing of currents of air. Wet dust-prevention devices should supplant dry devices. Water should be used in drilling and in sprinkling mine walls, etc. Where it is not feasible to reduce air-dustiness to reasonable proportions, dust respirators should be worn. These are not comfortable but give protection. However, the wearing of respirators is usually evidence that the management has failed to utilize effective dust elimination measures. The writer advises careful and thorough examinations by competent doctors before a worker is employed in dusty occupations. Such examinations should be made mandatory, and a physical examinations of such workers should be given annually. Men working in dusty trades suffer more from respiratory troubles than do men who work in clean air, but at present it is evident that the legal aspects of dust and its health affects are being accentuated before fundamental and sufficient knowledge has been developed on which to base laws and regulations, so that many of the laws now operating will require amendment when dependable data are obtained. (Reprints are obtainable from the author, who is Chief of the Health and Safety Branch, U. S. Bureau of Mines, Washington, D. C.)

341. THE SIMILARITY OF THE LESIONS PRODUCED BY SILICA AND BY THE TUBERCLE BACILLUS. Leroy U. Gardner. Am. J. Pathol. 13, 13-23 (1937).
The paper calls attention to the close similarity in the tissue response to silica and to the tubercle bacillus. It is remarkable that a simple inorganic compound such as silica can set in motion a complicated series of cellular reactions comparable to those produced by a living organism made up of proteins, carbohydrates and lipoids, each of which are known to produce definite tissue reactions characteristic of tuberculosis. As the result of a detailed description of the various steps in the development of silicosis and tuberculosis, the author says in summary that "the simple organic substance, silicon dioxide, is capable of exciting every tissue response that can be produced by the complex organism Mycobacterium tuberculosis. The reaction to the latter is more uniform because its constitution is more or less constant and it soon establishes a limited equilibrium with the tissues of the host. The reaction to silica is largely determined by the number and the size of the particles that come to rest within a given focus of the body. Both irritants cause varying degrees of proliferation, exudation and necrosis, resulting in a nodular type of reaction."

By way of speculation on the cause of this similarity it would seem that both irritants are relatively insoluable, but that perhaps both continually liberate minute amounts of irritating substances. Possibly mechanical irritation by the undissolved portion is also a factor. The study of physicochemical conditions in the cells to account for the similarity of effects is suggested. The effect of silica in producing giant cells is at its greatest when the particle size is from 0.1 to 4 microns in diameter, which approximates that of organisms such as the tubercle bacillus. The author also suggests that the dissolved silica forms a physical or chemical combination with collagen, which prevents its diffusion beyond the limits of the nodule. Non-siliceous particles produce no hyaline swelling of the collagenous fibers. The specifity of the tuberculin reaction has again been confirmed, in that the test is negative when the nodule has not been the result of tuberculous infection. Moreover, silica is not antigenic and intracutaneous injections produce the same effects in silicotic and in normal control animals. (Reprints may be obtained from The Saranac Laboratory for the Study of Tuberculosis, Saranac Lake, N.Y.)

342. A BIOLOGIC TEST FOR THE DETERMINATION OF THE FIBROGENETIC PROPERTIES OF DUST. C. P. McCord, J. A. Kasper and W. L. Brosius. C. State Med. J. 33, 394-6, (Apr. 1937).
The authors give instances of the confusion that prevails in the knowledge of silicosis and point out the need of a simple test - chemical, biologic or otherwise - which will accurately mark one dust as harmful and another as harmless. Such a test has been developed by Miller and Sayers and was applied by the authors. It consisted of injecting a sample of the dust in sterile solution into peritoneal cavity of an animal, such as a guinea pig, which was killed after 30, 60 or 90 days, and the reactions were studied. Miller and Sayers found three distinct types of reaction, which they named proliferative, absorptive, and inert. In 77 series of experiments with pure and mixed dusts, the authors found that in some cases the reactions were not as distinct as expected, and they add two types which they call mixed and military proliferative. The distinction of the types in some cases depended upon highly technical criteria. The size of the dust may also affect the cellular response. Therefore the test has not reached the stage of practicability at which an experienced technician man make use of it, and additional work is necessary to eliminate uncertainties. (Dr. McCord may be addressed at Industrial Health Conservancy Laboratories, 10 Peterboro St., Detroit, Mich., for reprints.)

343. DUST CONTROL IN THE FINE CERAMICS INDUSTRY. Fr. Prockat. Staub, #2, 175-201 (July, 1936) (German)
The author calls attention to processes in the ceramic industry which are carried on in dangerous dusts: - (1) refining and comminuting of raw materials; (2), turning, bordering and surfacing of dry crude porcelin; (3) dusting-off of dried porcelain by pneumatic pressure before glazing; (4) turning, shaping and drying of crude porcelain, indirectly producing dust, and (5) spraying for color or glaze. The importance of dust-control in this industry is shown in the fact that the German Pottery Insurance Society paid out more than half its total income in 1933 for persions and expenses of severe silicosis. Prockat emphasizes the point that of a series of mechanisms tested, some where found ineffective in controlling dangerous dust, and urges co-operation between workers and the practical engineer in running the business economically and preventing silicosis. - Ceram. Absts.

344. DANGEROUS DUSTS. J. B. Hawes, 2nd, New Eng. J. Med. 216, 162 (Jan. 28, 1937). The author insists that there is only one dangerous dust - that containing silicon in some form. He shows that compensation for alleged silicosis is often obtained through ignorance on the part of the reputable doctor or his desire to help his patient, or in some rare cases, willingness on the part of a physician to testify to a silicotic condition about which he knows nothing, in order to make a fee and thirdly, through the sharp practice of unscrupulous lawyers and the ignorance of the workingmen. Street dust is not harmful, except for the germs that may be in-it, and dust from cotton and wool manufacture is also not a cause of silicosis. Some people are strongly allergic, and on entering a cotton or wool mill might have an acute rhinitis for a few days, but this does not mean that cotton and wool dusts are dangerous at all. In the soft coal industry a worker may develop anthracosis, but this is not a disabling disease and does not predispose him to tuberculosis. If a coal worker does get silicosis, it is from the granite or rock in which hard coal is imbedded. Silicon is a common and widely distributed element, and it is only when found in excessive amounts that it becomes dangerous. The writer is of the opinion that asbestos dust is the most dangerous of all dusts, but that asbestotis is a relatively new disease about which up to the present very little is known, except that it does not seem to correspond to the laws of silicosis in general, and that it can produce disability in a remarkably short time. The author insists that diagnosis of dust disease shall be used on history of exposure as well as on clinical symptoms, X-ray and if possible an inspection of working conditions. (Reprints may be obtained from Dr. Hawes, at 330 Dartmouth St., Boston, Mass.)

345. THE ETIOLOGIC, DIAGNOSTIC, AND MEDICOLEGAL PROBLEMS OF OCCUPATIONAL DISEASES. C. O. Sappington. Ill. State Med. J. (Feb. 1937); Ind. Med. 6, 157-164 (Mar. 1937)
This paper, presented at a meeting of the Illinois State Medical Society, emphasizes the need of better knowledge of the causes of industrial diseases, a need which is especially acute in Illinois on account of the new Occupational Disease Law. Two errors and fallacies into which physicians, engineers and employers often fall are pointed out: (1) assuming the presence of silicosis when a history of dust exposure is given and (2) reliance on visual conditions to determine the presence of dust, and even of vapors and lead fumes. Both can be avoided by the use of known scientific methods. Diagnosis, also, involves problems as difficult as those of etiology, especially in differentiation of industrial from non-industrial diseases. Specific published procedures for making proper distinctions are cited for specific published procedures for examination of the body and its fluids are now at our disposal, but undoubtedly great impetus will be given to extension of that field. Pre-employment and periodic examinations are really diagnostic problems and must undergo considerable adjustment and improvement if good results are to be obtained in their application to specific problems. The examining physician would be better equipped if he knew (1) the nature of past or expected exposure; (2) the effect of this exposure on the physical states of employees, and(3) the nature and efficiency of the protective devices used. The chief medicolegal issues in occupational disease problems arise because of deficiency in etiological information and consequent errors in diagnosis. This situation must be corrected by better knowledge, because the liability of the employer must be determined fairly to all concerned. The definition of occupational disease in the Illinois law is quoted. By way of summary the author urges progress in the fields already noted, also greater opportunity for study of industrial environment on the part of physicians and medical students, and raising the standards of industrial medicine by the establishment of qualifications of men who are to be leaders in the field and the recognition of industrial medicine as a specialized field. (Reprints are obtainable

346. THE OCCUPATIONAL DISEASE SITUATION, PAST, PRESENT AND FUTURE. C. O. Sappington. An address abstracted in Ind. Med. 6, 85-6 (Feb. 1937).
The author divides the history of the knowledge of occupational diseases into three periods, manely, ancient, medieval and modern. The ancient period extended to the depression, and may be also called the stage of guesswork and hysteria. Occupational disease is not as spectacular as crippling and killing by mechanical forces, and little attention was paid to it. Then came the depression, bringing many spurious cases which placed a great burden on industry. These factors produced bogies of unrest. Our present experience constitutes the medieval period, or the stage of reality, characterized by a swing to the factual, with the introduction of compensation legislation in 40 states, its passage in a few, and the development of plant surveys and X-ray and clinical laboratory tests. The modern period, or stage of progress, is now beginning. The author predicts that occupational disease legislation will be general in the United States within five years, that physical examinations be universal within 10 years, and that there will be an increased use of surveys and studies of industrial environment.
The most important sources of occupational disease are listed as dust, poisonous metals, gases, vapors and solvents, and skin irritants. In an extensive survey made by the United States Public Health Service in 1934, the chief exposures in order of frequency were inorganic dusts, carbon monoxide and lead. The author emphasizes a distinction made in the report of that survey, between the words exposure and hazard. The employer must know the extent of hazard, as well as exposure, in his plant, examine his men before and during employment, correlate cause and effect factors from scientific study, and control or eliminate the hazard or furnish adequate protection. In short, "management must know its men, materials, methods and machines. The occupational disease situation.....presents difficulties no greater than any other industrial problem if same amounts of time and money and quality of brains are used as have been qpplied in the past to comparable industrial situations." (See note on preceding abstract.)

347. PHARMACOLOGICAL INVESTIGATIONS ON COLLOIDAL SILICA. G. Leone and T. Santi. Rass. terap. patol. clin. 8, 176-90,(1936) (Italian)
A report on tests carried out on pure, stable 0.50 % colloidal solutions of silica. In dogs and cats intravenous injection of 5-10 cg. of colloidal silica decreases blood pressure and also the number and amplitude of pulsations, even in atropinized or vagotomized animals. In case of the heart in situ of cold-blooded animals, there is a decrease in rate and an increase in amplitude. On strips of small intestine of mammals the silica first produces a decrease in the contractile amplitude followed by marked hypotonia and paralysis; the same is true of earthworms; in both cases the changes take place after atropinization. From the results obtained as regards circulation the heart and smooth musculature, even after atropinization, it is concluded that colloidal silica exerts a depressing action in small doses and a paralyzing action at toxic doses, on all organs and tissues that were studied. This action is of a muscular nature. - Chem. Absts.

348. QUANTITAVE MINERALOGICAL DUST ANALYSIS. J. H. Helmers and H. Udluft. Zeiss Nachr. (2) No. 1, 1-10(May, 1936) (German)
The minerals in a dust are first ascertained qualitatively under the polarizing microscope. After a comparison of their refractive indices, the sample is introduced into a Zeiss konimeter with attached dust chamber and a 10-field object plate. The first dust spot is photographed under a microscope with a polarizing attachment. After adding one of the suitable embedding fluids the spot is photographed again. A third picture is taken under crossed nicols, and a fourth after turning the object stage 45° . Other spots are treated similarly. A large scale enlargement of one of the pictures and the others are projected over it, marking identified minerals on the enlargement with crayon. (Carl Zeiss, Inc., 485 Fifth Ave., New York, have a limited number of copies of the Zeiss Nachrichten for May, 1936, containing the original German article, with an English abstract somewhat fuller than the above.)

349. PNEUMOCONIOSIS IN SOUTH WALES COAL MINERS AND ITS RELATION TO TUBERCULOSIS. Prafulla Kumar Sen. J. Ind. Hyg. Toxicol., 19, 225-257, (June, 1937)
The author reports an extensive study of 100 cases of pneumoconiosis in the South Wales coal field, including analysis of industrial, family and previous histories, physical and radiological examination, blood counts, and sputum tests. The patients included 47 hardground workers, 43 hewers, 7 screeners and 3 without detailed history. Since hardground workers constitute a small minority of the men employed, the high incidence of pneumoconiosis among these workers is striking. Previous complaints of bronchitis, pleurisy and influenca were common among the men examined. Tuberculosis was present in a number of those reporting those diseases. Dyspnea was the most frequent of the present symptoms. Once it started, its progress was very rapid while the miner was working. The average period from the onset of dyspnea to disability was 2 years. Clubbing of the fingers was present in 15 % of the cases. Pulse-rate was higher than normal, especially in hardground workers. In general, physical chest signs were meagre compared with underlying pulmonary lesions; persistent crepitation, however, was very significant.
In the radiological examination, mottling in various stages was present in all cases. Eight presented features of active tuberculosis and the bacilli were detected in 4 more, while tuberculosis was suspected in 18 additional. In the blood tests, Von Bonsdorff's count generally was lower and sedimentation rate lower than normal. Blood tests supplrted by other findings indicated the possibility of tuberculosis in 23 % of the "probable" cases, in addition to the "definate" cases.
Of the 12 "definite" cases of tuberculosis, 7 had no constitutional symptoms, suggesting that the disease was somehow modified. If the "probable" cases are included, the incidence of tuberculosis is 35%, which is high, but the evidence on "probable" cases is not conclusive. This investigation shows that there is a high incidence of tuberculosis among the pneumoconiotics of the South Wales coal field and supports the theory that coal dust modifies the toxicity of tuberculosis, leading to failure to recognize the disease or to the mistaken diagnosis of 'bronchitis'." (Reprints are not obtainable. The June number of the Journal for Industrial Hygiene and Toxicology may be obtained from Williams & Wilkins Co., Baltimore, Md. for 57 cents.)

350. MINERS' PHTHISIS MEDICAL BUREAU, SOUTH AFRICA, 1933-1935. L. G. Irvine, Chairman. Johannesburg, June 30, 1936), 76 pages.
The "new Rand miners", that is, those who have entered the industry since the initial examination system of 1916 went into effect, now constitute nearly 72% of the total miners but contribute only 12% of the 193 cases of silicosis detected. The average age of new cases is steadily rising, exceeding 49 1/2 in 1935. These facts demonstrate the great improvement in working conditions that has taken place at the Rand Mines has been attempted on a much greater scale than in the United States or elswhere. For instance, 22,000 European miners were examined in 1934-5. Tables are given showing the relations of number of the cases to age and length of service.
The relation of silicosis to nature of the work was also studied, with special reference to men operating machine drills. "The liberal application of water has not prevented, to the extent that had been hoped, the dissemination of the finest dust particles (from 1 or 2 microns downwards) which are produced by drilling." Additional investigation of drilling dust problems is now being conducted. The effects of high temperature and humidity must always be kept in mind. A large percentage of the deaths are from "simple silicosis", in contradiction to frequent statements that simple silicosis is rare. (So far as we know at present, the original report can be obtained most easily through G. E. Stechert and Co., 31 E. 10th St., New York City. The price given is 5 shillings.)

351. REPORT OF MINERS' PHTHISIS MEDICAL BUREAU OF THE UNION OF SOUTH AFRICA FOR 3 YEARS ENDED JULY 31, 1935. L. G. Irvine, Chairman, Government Printer, Pretoria, 1936. Reviewed in Lancet 232, 764-5 (Mar. 27, 1937).
This report is apparently a different publication from the preceding one but covers much the same ground, calling attention to the elaborate records kept since the Bureau was inaugurated and the improvements that have taken place during that time. Native laborers undergo initial, periodical and final examinations, which are carried out by 42 medical officers on the medical staff of the mines. The task is onerous because 90 % of the labor force is replaced each year. On account of the preponderance of active tuberculosis cases, Dr. Irvine emphasizes the importance of using every possible effort to eliminate cases of communicable tuberculosis among mine workers and to control every condition that fosters infection. Although prophylactic measures have accomplished much, there is still much to be done, and any further improvement will have to come from the technical side of dust prevention The entire problem is now being reinvestigated, and the thermal precipitator is proving efficient in this work. Tables of occurrence of occupational disease are given, including silicosis, tuberculosis, and silicosis with tuberculosis. (See note on preceding abstract. Price is not given for this one.)

352. REPORT OF THE MEDICAL RESEARCH COUNCIL FOR THE YEAR 1935-36. H.M Stationery Office, London, 1937.
This report contains references to a number of investigations bearing on industrial health.. One is work of Pransnitz on the allergic effects of cotton dust, which is still prevalent in the textile industry, in spite of remedial measures that have been undertaken. Desensitization does not promise to relieve the situation, and the solution probably depends either on the use of respirators or the application of some new means for collecting the smaller particles (under 2 microns) before they enter the general air of the room.

Continuation of the experiments on exposure of mice to dust from tarred roads showed that tar-free dust does not have the tumor-producing effect found with the original dust. The experiments are being extended to rabbits and guinea-pigs. Similiar experiments are being undertaken on the effects of carbon deposits from internal combustion engines using heavy oil fuel. Other investigations include the study of medical after-histories of old and retired coal miners. The symptomless type of tuberculosis in elderly pneumoconiotics has been found to progress rapidly when it reaches the stage where bacilli are found in the sputum. The effects of pneumoconiosis is being studied. An iniquiry into the substitution of alumina for silica as a placing material in pottery work shows no evidence of fibrosis from alumina. (This is treated more fully in another abstract.) (Obtainable from the Medical Research Council, London, or through G. E. Stechert & Co., price 3 shillings).

353. ESTIMATION OF DUST IN MINE ATMOSPHERES. A. M. Bryan and J. Smellie. J. Roy. Tech. Coll. (Glasgow) 3, part 4 (1) 671-81,(1936).
There are two ways of determining the amount of dust in the air in mines: particle counting and filtration followed by weighing. The first method, although rapid and convenient, is not a very exact one, because the particles are very small and often very dense so that it is impossible to make a complete and satisfactory count; also one cannot determine the proportion of combustible matter. The second method of filtering is longer but much more exact. Tables of results are given.

354. THE SUPRESSION OF DUST DURING DRILLING UNDERGROUND. Colliery Guardian 154, 589-92 (3-25-1937).
It has been shown that the leakage of air into the water supply used in wet drilling produces excessive dust and nullifies the advantages that wet drilling is supposed to provide. This article includes brief descriptions of several forms of apparatus claimed to avoid that difficulty by supplying a constant stream of water through the drill. (No reprints are obtainable. A copy of the magazine is obtainable through G. E. Stechert & Co., 31 E. 10th St., New York City).

355. ROAD DUST. T. B. Loftheim. Medd. Verdirektren, Oslo, 1936, 65-68 (Norwegian).
In dust from different roads more than 50% of the particles had diameters too small for ultramicroscopical measurement; the remainder had a mean size of 2-3 microns and were composed of pear-shaped or spherical forms of pyroxene, feldspar, quartz and hornblende. The content of organic matter was 7.67 - 10.75% - Brit. Chem. Absts.

356. DUST. Ed. Smolozyk. Gasmaske 8, 16-19 (1936) (German)
A brief but excellent review of the dust problem. Among the points discussed are the sources of dust, the amount of dust in various locations, the loss of valuable products in the form of dust, the properties of dust particles, the physiological damage caused by dust, the body mechanism to protect against dust, and diseases due to dust - Chem. Absts. (We have as yet no information on reprints, but the issue of the periodical containing the pages mentioned may be obtained through G. E. Stechert & Co.)

357. HOW TO PREPARE, FILE PLANS FOR EXHAUST AND VENTILATION SYSTEMS. John H. Vogt. Ind. Bull. 16, 138-140 (April, 1937).
The author calls attention to the requirements for prevention of pollution of air in workrooms, in the new Labor Law of New York. All machinery creating dust and other impurities must be equipped with proper hoods and pipes connected to an exhaust fan of sufficient power to remove adequately such dust or impurities. The fan must be in constant operation while the machinery is in use. Furthermore, all gases, fumes, vapors, dusts or other impurities must be removed at their point of origin where practicable. The employer can make adequate plans for the necessary changes by submitting proposed plans to the Labor Department and get the benefit of disinterested and competent advice from experienced engineers. Directions for preparing the plans and specifications are given.
(The March number of the Industrial Bulletin is obtainable from the Industrial Commissioner, State Office Building, Albany, N.Y. for 10 cents each, or a reprint of the article may be obtained from the same source at that price or less.)

358. DUST CONTROL RULES NOW EFFECTIVE IN ROCK-DRILLING OPERATIONS. (In New York) Ind. Bull. 16, 171-174 May, 1937)
The rules for dust control and testing of apparatus became effective May 1 and are embodied in Industrial Code Bulletin No. 33. Silica-bearing rock is divided into two classes, containing under and over 10% free silica, respectively. In working with Class I rock (under 10% silica) 100 million particles per cubic foot, as determined by the impinger, are permitted; while in Class II the maximum permissible count is 10 million per cubic foot. Dust control methods are specified as suction or exhaust, wet or others approved by the Industrial Board. Notice must be given the Industrial Commissioner advising as to the location and date of starting work. All approved dust control equipment and methods must be tested and approved in the specified manner, and full directions for conducting the test are included. The test period for dry drilling consists of two three-hour shifts, and 3 dust samples are to be taken with the impinger during the last 2 hours of each shift. For wet drilling only one shift is necessary. The operations to which the new rules apply include all public as well as private works in New York State, and the driving of the tunnel for the Delaware Aqueduct supplementing New York City's water supply will be the largest single operation affected. (Industrial Code Bulletin No. 33 is obtainable from the Industrial Commissioner, State Office Building, Albany, N. Y., presumably free to New York residents at least, and the May number of Industrial Bulletin may be secured from the same office for 10 cents cash).

359. DUST CONTROL DEVICES TESTED. Safety Eng. 73, 43-4, (June, 1937).
A description of the tests being made at Letchworth Village, N. Y. by the New York State Department of Labor. Specifications for equipment and information to be furnished are given in briefer form than in the Bulletin mentioned in the preceding abstract.

360. EFFICIENT FLY-ASH COLLECTION. Stanley Brown. Power Plant Eng. 41, 121-22, Feb., 1937).
There are two methods of estimating the value of a fly-ash eliminator; its overall collection efficiency, regardless of particle size, and it efficiency with the minimum size stated. Some engineers in this country use the first method, but on the Continent, where many more eliminators have been installed, a lower limit of 30 or 20 microns, corresponding to the 'nuisance range', is specified. A table shows that a 20-micron particle will travel 3.5 miles at a wind velocity of 5 mi. per hour, while falling 200 feet,

360. cont. while a 2-micron particle will travel 428 miles under the same conditions. The author argues for consideration of the "nuisance range" in the estimation of the efficiency of collectors, when the object of collection is removal of the nuisance hazard. When the dust is collected for its value, the overall efficiency should apply. (Mimeographed copies are obtainable from the author, Buell Engineering Co., 70 Pine St., New York City.)

361. THIRD ORDINANCE INCREASING COMPENSATION OF OCCUPATIONAL DISEASES IN GERMANY. M. Bauer. Reichsarbeitsblatt, No. 36, pt. 4, 47 pp. Berlin, 1936. (German) The new ordinance relating to occupational diseases in Germany went into effect April 1, 1936 superseding the second ordinance of Feb. 11, 1929. Several industries are added to the list of compensable diseases, including all the ceramic industries, sandblasting, and operations for cleaning castings and molds; asbestosis in the asbestos trades and lung cancer in the chromium industries. "Severe" silicosis is still the only form of silicosis insured against, but characteristics of the disease for clinical roentgenological and judicial estimation are definitely specified, thus abolishing hitherto vexatious complications. Severe silicosis accompanied by pulmonary tuberculosis requires only the establishment of the severe silicosis in diagnosis. Silicosis has stood at the peak of claims for occupational disease compensation since 1929. In 1934 out of 1043 cases, 522 were silicosis; in 1935, out of 1161 cases, 627 were silicosis, with 146 deaths from this cause in 1935. - Ceram. Absts.

362. SIZE DISTRIBUTION OF CERAMIC POWDERS AS DETERMINED BY A PARTICLE-SIZE AIR ANALYZER. Paul S. Roller. J. Am. Ceram. Soc. 20, 164–174 (May, 1937). The air separation method for powders has a number of advantages over the use of liquids, and the author has made an extensive study leading to the development of an accurate air separator, the latest form of which overcomes the difficulties encountered previously. The essential features of the present apparatus lie primarily in the dynamic relationship between the powder sample and the air jet such that the powder is in constant uniform motion against the force of the jet, and secondarily in the means for baffling the jet before it enters the settling chamber. Construction of the apparatus, method of operation, and operating characteristics are described. Particle-size analyses beginning with the 0 to 5 micron fraction are given for flint, feldspar, pyrophyllite-quartz, two English china clays, and talc. The size distributions are compared, and the time of fractionation, accuracy, and precision are discussed. Some properties of the size fractions are described, and the use of the instrument in the control of grinding is indicated. From the author's summary. (Reprints are obtainable from the author, Nonmetallic Minerals Experiment Station, U. S. Bureau of Mines, New Brunswick, N. J.)

363. LIGHTING IN MINES: NOTES ON THE EFFECT OF DUSTS. T. D. Jones and W. ~~Ev~~ Gyles. Colliery Guardian 154, 769-71 (4-23-1937)
The authors present the results of experiments on a phase of the dust hazard that has not been considered so fully as others, that of effect of dust on illumination. The illumination in one case was reduced by nine-tenths after 5 minutes' hard continuous shoveling by 9 men. The importance of keeping the well-glass clean is also shown. A loss of lighting efficiency was brought about by substituting cadmium yellow or daylight blue bulbs under both normal and dusty conditions. Incidentally it was shown that although limestone is much harder to get into suspension than coal dust, a mixture of coal and lime dust settles out more slowly than coal dust alone. It was also learned that the dust raised by shoveling was of a smaller particle size than that resulting from the introduction of artificially prepared dust into the blower section. (Obtainable only in the above magazine.)

364. USE OF SOUND AND SUPERSONIC WAVES IN METALLURGY. EXPERIMENTS IN CLEARING FUME, FOG AND SMOKE. V. H. Gottschalk and H. W. St. Clair. Mining and Met. 18, 244-6 (May, 1937).
The use of acoustic waves for precipitating smelter smoke has been under investigation in the Bureau of Mines for several years. This paper gives a brief but clear explanation of the principle, a brief history of the development of apparatus, uses of the principle in metallurgy and summary of the results accomplished so far. The principle has not reached the stage of practical application, but it is effective on a laboratory scale. Earlier uses of these waves in metallurgy include making dispersions of metals in melts, modifying the structure of metals crystallizing from melts or being deposited electrolytically, uniform distribution of carbon and other materials, and removal of gases in molten metals before solidification. In the work on coagulation of smoke, the vibrating nickel tube has been used, but the air-jet generator has been found most effective. Both forms of apparatus are described. (Reprints are obtainable from Dr. Gottschalk, U. S. Bureau of Mines, College Park, Md.)

365. DISTRIBUTION OF RESPIRATORY GASES IN A CLOSED BREATHING CIRCUIT. I. IN NORMAL SUBJECTS. II. PULMONARY FIBROSIS. H. C. Lassen, A. Cournand and D. W. Richards, Jr. J. Clinical Invest. 16, 1-16 (Jan. 1937).
Breathing tests were made in a closed room, showing the content of inspired and expired air, the carbon dioxide excreted and oxygen absorbed per breath, and the composition of inspired gases within the lungs. The cases of fibrosis included one of pulmonary emphysema and one of chronic sinusitis. In both cases tests showed an unequal distribution of gases in the lung, which made it practically impossible to obtain reliable measurements of residual air with the method of quiet breathing in a small circuit, as used in the investigation. Charts and tables are given. The experiments are being continued.

366. PNEUMONIA AND TUBERCULOSIS AMONG INDUSTRIAL WORKERS AND THEIR DEPENDENTS. C. H. Kibbey. Am. J. Pub. Health 27, 555-559, (June, 1937).
This paper presents the results of a statistical study of pneumonia and tuberculosis among the employees of one company and their dependents, over a period of 11 years. Many of the existing state compensation laws are far in advance of precise knowledge and are based on opinion rather than scientific fact; therefore such studies as the one reported are much needed. The population of 77,000 persons over the period covered was divided as follows; (1) dependents, including all males under 16 years and dependent females of all ages; (2) surface workers; (3) coal miners, and (4) ore miners. The number of workers was known from the pay rolls, but the number of dependents was estimated at 3 for each wage earner. The incidence of pneumonia in the dependents, surface workers and coal miners did not differ greatly from the percentage of the total population. The ore miners, however, who constituted 2.3 % of the population, contributed 5.2 % of the pneumonia cases. The death rates are expressed in a way which makes the picture vived: "It has taken 1,554 dependents each year to furnish 1 pneumonia death and 2, 965 for each death from tuberculosis: of each 663 surface workers, 1 has died annually from pneumonia, and it has required 1, 769 to furnish 1 tuberculosis death. Coal miners have had 1 death per year from 803 persons and 1 for tuberculosis from 687 and while 385 ore miners have contributed 1 annual pneumonia death, it has required 807 ore miners for each death from tuberculosis." In separating the data for white and colored workers, some curious discrepancies appear in that although white surface workers have a somewhat higher pneumonia death rate than colored, the reverse is true among coal

miners and in ore miners the rate for colored workers is several times greater than for white workers. (Reprints are probably obtainable from Dr. Kibbey, Dept. of Sanitation, Tennessee Coal, Iron and Railroad Co., Fairfield, Ala.)

367. HEALTH ENEMIES OF INDUSTRY. Leverett D. Bristol. Safety Eng. 73, 29-31, (March, 1937).
This is a general article on health conservation, sickness and accident prevention at work, at home and on the road. More personal injury accidents occur off duty than on, and employers, employees, home and family groups should co-operate to dispel ignorance and indifference in the use of home facilities and equipment. Communicable diseases should be faithfully reported and controlled, examinations and diagnoses of tuberculosis should be more complete and through, and prevention of occupational diseases should receive expert attention; because these are often slow in onset and very difficult to treat. Constant guard must be maintained against the various poison hazards in industry, and personal hygiene must be stressed. However, preaching health conservation the the employe is not of much use if the foreman or supervisor is not health-minded; therefore the key person in the industrial health program should be the supervising foreman or local manager. (Dr. Bristol is Health Director of the American Telephone and Telegraph co., New York, but we have no information about reprints.)

368. COMPENSATION AND INDUSTRIAL DISEASE. Thomas N. Bartlett. Safety Eng. 73, 59-60 (March 1937), 59-60 (April 1937).
The basic principles of compensation go back to the year 634 when King Rothari of the Lombards codified a set of rules to give compensation to his subjects hurt in brawls, fights and feuds. The development of industry in the United States gave birth to our workmen's compensation laws, first for accidents and later for occupational diseases, now often including silicosis and asbestosis. There is great difficulty in estimating compensation for occupational disease, often through ignorance, conflicting testimony, misrepresentation/and various other factors. Where life, limb and disablement are involved, prevention and not remedy is the solution. Preventive legislation should be enacted at the same time as compensation legislation. Records of employment should be kept, and periodical examinations, strict enforcement of rules and instruction should be included. Many accidents happen through a violation of express rules. With the cooperation of the employer and employe and the education of both parties in a well-organized movement of prevention, much progress in better health conditions will be effected.

369. CHEMICALS AND INDUSTRIAL HEALTH. Manfred Bowditch, Safety Eng. 73, 13-14 (March 1937).
A brief report of a survey of various industries made by the Massachusetts Division of Occupational Hygiene, including storage battery, paints and varnishes, wood heel covering, boot and shoe woolen and worsted goods, rubber products, and chlorinated naphthlene. (Mr. Bowditch, Director, Department of Industrial Hygiene, Massachusetts Department of Labor, Boston, Mass., will supply reprints of this brief review, but the official report, to be published later, will treat the subject more fully.)

370. CHROMIUM PLATING - A HEALTH HAZARD. Safety Eng. 73, 20(Mar. 1937).
The process of chromium plating involves serious hazards for the workers, but health risks may be eliminated if ventilating and sanitary measures are observed. Chromium compounds produce ulcers of the skin and affect the mucous membrane of the nose and throat. These are painful injuries and difficult to cure. Proper protection and adequate and prompt medical attention must be provided. Testing of the air is important, and is made with the impinger, collecting the chromate spray in a sodium carbonate solution. The United States Public Health Service is in a position to render complete information concerning the proper practices to prevent injury to health in the chromium industry. Two bulletins for plant display, giving precautions and treatment, are illustrated.

371. THE POSSIBILITY OF MANGANESE POISONING IN MINING PYROLUSITE. H. E. Buettner and E. Lenz. Samm. v. Vergiftungsf., 8, 1-2 (1937).
Forty-four manganese mine workers were examined. Parkinsonian tremor showed in 25 % of the cases, among which was one severe case and eitht cases of mask-like expression (this was rather a large number of abortive forms of manganese poisoning). Five cases showed a retarded pulse, and in six cases there was vestibular extrasystoles. Of 40 miners who died during a period of 10 years, 23 died of lung inflammation, and the course of the disease was unusually malignant. Silicosis, first and second stages, was found in 26 of the 42 examined.

372. OCCUPATIONAL HAZARDS AND THE PAINTER WITH SPECIAL REFERENCE TO NEW YORK. Adolph B. Gersh. N. Y. District Council no. 9, Brotherhood of Painters, Decarators and Paperhangers of America, New York, 1937.
The hazards discussed include accidents, with statistics from compensation records and occupational diseases. The high death rate for painters, which is twice as high for house painters as for factory painters, is largely explaind by the excessive exposure to poisonous substances such as lead, benzene, turpentine, aniline, alcohols, toluene, xylene and arsenic. The abnormally high rate occurs, especially in heart disease, tuberculosis, pneumonia, nephritis, cerebral hemorrhage and ulcer. The effect of the development of the spray machine and the official investigations regarding it are discussed. The last half of the bulletin is devoted to a discussion of costs of these hazards to the worker and to society and a critical study of compensation problems. (Copies are obtainable at the above address, possibly at a small charge.)

373. THE PROBLEM OF THE FATE OF MERCURY FUMES AND MERCURIAL COMPOUNDS IN THE ORGANISM. I. Gelman and G. Dorviz. J. Ind. Hyg. Toxicol. 19, 215-24, (June, 1937).
In the clinic, two types of mercury poisoning must be distinguished: (a) chronic mercurial poisoning produced by inhalation of mercury fumes, and (b) mercury intoxication with injury to the excretory organs (saliva, kidneys, etc.) observed in poisoning with mercuric salts. This difference is caused by the difference in physical-chemical states of mercury and in the fate of fumes and salts in the organism. This difference is established experimentally. Mercury fumes are preserved in the blood in a state of atomic dispersion for a long time, the length of which requires further study. Mercury salts, on the other hand, enter into complex combination with blood albumins. (Reprints are not obtainable. See note on abstract No. 349.)

374. PREVENTION OF LEAD SICKNESS IN MANUFACTURE OF TILE AND POTTERY GLAZES. C. Stuermer. Keram. Rundschau 44, 465-6 (1936) (German)
Some large German firms have developed lead silicate compounds of known composition and very small tolerance, intended for every kind of ceramic glaze. Manipulation of these compounds is free from danger. Although the lead content of some of these mixtures is lower, the appearance is better than with former mixtures.

375. THE USE OF A GEIGER-MUELLER COUNTER FOR DETECTING SMALL AMOUNTS OF RADIUM STORED IN RADIUM WORKERS. E. O. Braaten and J. D. Leitch. J. Ind. Hyg. Toxicol. 19, 193-7 (May, 1937)
The Geiger-Mueller counter, which has been successfully used in locating lost radium, was used in an investigation of workers employed at a radium extraction plant. The results have little significance as far as the storage of radium in the body is concerned, but they show a greater contamination of the clothing than was expected, and a further examination of that point will be made, when more exacting precautions will be taken. It is suggested by the authors that exposure to low intensity gamma radiation may play an important part in causing the anemia reported among radium workers. (Reprints may be obtained from the author, Division of Industrial Hygiene, Ontario Dept. of Health, Toronto, Ont.)

376. CARBON MONOXIDE IN HAT INDUSTRY. May R. Mayers & Wm. J. Burke. Ind. Bull. 16, (March, 1937).
The hat-blocking industry in New York City has for some time presented a special problem in industrial hygiene, as a number of workers have been overcome by carbon monoxide gas. The chief source of carbon monoxide is the gas-heated hydraulic blocking machine. The machines were originally designed for steam heating, but the steam jacket is used as a combustion space for the gas, with specially adapted types of burners. Since the illuminating gas supplied contains 25 % of carbon monoxide, atmospheric contamination may arise either from unburned gas or incomplete combustion. The three types of burners used are described and evaluated. The earliest and most used, the "pipe stem" is especially productive of carbon monoxide. The "barber jet" burner offers some improvements, but is not entirely satisfactory. The "bat wing", in which the flame does not impinge on metal parts has been found to be perfectly safe. It is also recommended that no alterations be made in the adjustment of the burners, when they are once installed, and that they be kept in repair through the cooperation of the gas company. (The Industrial Bulletin is obtainable for 10 cents, cash, from the Industrial Commissioner, New York State Department of Labor, Albany, N. Y.)

377. INDIRECT EFFECTS OF CARBON MONOXIDE. John P. McNabb. Safety Eng. 73, 47-8, (March, 1937).
The writer shows that accidents through carbon monoxide poisoning are increasing and questions whether the many accidents attributed to poor driving judgment are not attributable to carbon monoxide. According to the U. S. Bureau of Mines, 0.04% is the maximum to which a person can be exposed for an hour. Enough gas emanates from every car, no matter how well constructed to kill a human being in less than six minutes. It is notable that traffic policemen after several hours on duty, often become irritable, and in busy sections often complain of headaches. Taxidrivers and others have been found dead in their cars, with the engines running. There are more deaths now than in the pre-motor age, from heart ailments, and motorists who have been