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CERAMIC ABSTRACTS

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The American Ceramic Society

Volume 19, 1940

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Editorial Office: 2525 North High Street, Columbus, Ohio
Publication Office: 20th and Northampton Streets, Easton, Pa.

General

Ceramic laboratories: Georgia School of Technology. ANON. *Ceram. Age*, 34 [1] 12 (1939). Massachusetts Institute of Technology. *Ibid.*, [2] 44. New York State College of Ceramics. *Ibid.*, p. 45. Rutgers University. *Ibid.*, [3] 78. University of Illinois. *Ibid.*, [1] 13.—The laboratories are briefly described and illustrated. F.G.H.

Ceramic schools. Current survey of status and progress. ANON. *Ceram. Age*, 33 [6] 171–91 (1939).—A comprehensive survey of ceramic schools throughout the country is given. The course of instruction, the teaching staff, the research staff, and the student body of each of the following schools are described: Georgia School of Technology, University of Illinois, Massachusetts Institute of Technology, Missouri School of Mines, New York State College of Ceramics, North Carolina State College, University of North Dakota, Ohio State University, Pennsylvania State College, Rutgers University, Virginia Polytechnic Institute, University of Washington, University of Oklahoma, West Virginia University, and Carnegie Institute of Technology. Illustrated. F.G.H.

Contract law for engineers. L. T. PARKER. *Combustion*, 11 [2] 33–34 (1939).—P. explains implied and expressed contracts, as interpreted by the higher courts, with particular reference to the employment of engineers and personal services rendered by them. The liability of employers in such cases is illustrated by a number of court decisions, some of which are cited. H.E.S.

Control of speed is important factor in cement manufacture. ANON. *Concrete, Cement Mill Ed.*, 47, 238–39 (1939).—Early devices were friction driven. Later, variable-speed motors were used. Now a vari-pitch speed changer is used which is operated by a small pilot motor and which is either automatically or remotely controlled. New power self-synchronizing drives may be used to keep a kiln and the kiln feeder in synchronism. W.D.F.

Development of central-heating systems. LUIGI RANZI. *Gesundh.-Ing.*, 60 [50] 753 (1937).—R. describes the development of modern central-heating systems. A new type of installation is explained, and various examples are calculated. W.D.K.

Effect of condensate extraction on efficiency of the heat cycle. W. M. MEIJER. *Combustion*, 11 [2] 30–32 (1939).—M. contends that the value of high superheat as a means of improving the efficiency of steam power plants is being overestimated and recommends the use of high initial steam pressures at moderate initial superheat combined with the mechanical extraction of condensate at appropriate stages of the expansion. H.E.S.

Fatalities from silicosis and asbestosis; their incidence in industry. ANON. *Iron & Coal Trades Rev.*, 139 [3732] 336 (1939).—The annual report of the Chief Inspector of Factories shows that from 1935 to 1938 inclusive, deaths from the two lung diseases in the refractories industries and in the manufacture of pottery have been approximately constant, i.e., 68 in 1935, 56 in 1936, 83 in 1937, and 60 in 1938. Sandstone quarrying and dressing took 40 lives in 1935, 43 in 1936, 19 in 1937, and 27 in 1938. Preventive measures have aided in a generally small decrease; some of these measures are as follows: (1) use of alumina for flint in china bedding, (2) use of alumina for siliceous material in parting powders, (3) use of nonsiliceous abrasives for sand or flint in blasting, (4) use of nonsiliceous material for kieselguhr in the slow cooling of steel, and (5) use of nonsiliceous material for silica brick for lining steel and other furnaces. See "China—," *Ceram. Abs.*, 18 [2] 54 (1939). M.H.

Gas heating installation. H. DIETRICH. *Gesundh.-Ing.*, 60 [45] 677 (1937).—D. surveys the developments of gas heating after the World War and discusses the gas single-heating system, the gas central-heating system, special gas tanks, tanks with built-in burners, reliability and gas prices, and the experimental capacity of a boiler on a low pressure steam-heating system and on a warm water heating system. Results of conducted experiments are stated. W.D.K.

Handling and disposing of recovered fly ash and dust. J. T. DEUTSCH. *Combustion*, 11 [5] 22–24 (1939).—Three methods are reviewed, including the vacuum, the sump, and the introduction of the dust by means of a water-cooled ram into a slagging-bottom furnace near the level of the molten slag. The last method is discussed in detail. H.E.S.

Health damage by means of industrial dust. OTTO SCHULTZ. *Garmatke*, 11, 57–66 (1939).—Pure coal dust is not dangerous; neither is silicon carbide nor corundum dust. Tin, copper, bronze, and aluminum dust make slight alterations in the lungs, and iron oxide makes stronger alterations, but none of these dusts affects the health. Of the dangerous dusts, free silica usually causes silicosis, which is the most widespread and dangerous disease, after only a 5- to 10-year exposure. Asbestos dust causes asbestosis by mechanical irritation. Lung cancer is caused by radioactive dust. The symptoms are like those of silicosis. Chromate dust or mist causes nasal sores and also cancer. It has a long latent period, up to 24 years. Thomas slag causes a severe lung inflammation, as it reduces the resistance of the body to bacteria. This can occur immediately after exposure and has a high fatality. Pyrolusite causes a different lung inflammation. Glass wool acts in a similar manner to asbestos. Over sensitiveness to flour, grain, hair, etc., causes asthma. Certain fungi can grow in the lungs. Methods of prevention are discussed generally. W.D.F.

Healthy air, a guide for plant superintendents and workmen. OTTO ELSNER. *Gesundh.-Ing.*, 60 [44] 676 (1937).—A review issued by the German Society for Labor Protection gives the various kinds of air contamination and testing. Natural and artificial air-conditioning methods are discussed from the viewpoint of health, and a special chapter describes the airing of workshops, offices, etc. W.D.K.

How benzol poisoning may be avoided. ANON. *Gesundh.-Ing.*, 60 [32] 795 (1937).—Forming benzol vapors must immediately be caught by suction. A good supply of fresh air is necessary during the cold season, and the air should be replenished with prewarmed air. Benzol vapors are heavier than air and, for this reason, sink to the floor. When installing a new air-ventilating system, therefore, suction openings should be located in the floor or near it. Pieces treated with a benzol-containing solution should be dried in a well ventilating drier cupboard or special drying rooms. Benzol-containing vessels must be kept covered. W.D.K.

Improved system in the application of noncondensing or extraction turbines. H. W. CROSS AND E. S. WELLS, JR. *Combustion*, 11 [1] 32–35 (1939).—Since electrical output is definitely established by the energy drop between initial and exhaust conditions and by the quantity of steam flow, increasing the total steam pressure at the throttle for a given pressure increases the available energy and consequently the electrical output. The application of a combined desuperheater and feed-water heater at the exhaust is advantageous in realizing gains from the use of higher temperature steam. Examples demonstrating the possibilities inherent in such systems are illustrated and explained. H.E.S.

Lighting for special industrial purposes. W. R. STEVENS. *Trans. Illum. Eng. Soc.* [London], 3 [1] 3–16 (1938).—S. describes installations requiring special lamp fittings for explosive and moisture-ridden atmospheres and the use of special sources of light, such as carbon dioxide discharge, daylight tubes, special daylight tungsten filaments, and high-voltage fluorescent tubes, for color matching surfaces and special inspections. H.K.R.

Living and working conditions in the tristate mining district. EVAN JUST. *Mining Congr. Jour.*, 25 [11] 44–45 (1939).—Dust in the mines is kept within safe limits by wetting down, spraying, and ventilation. Above ground, dust from "chat piles" is practically nonexistent as they are coarse material. On windy days dust is blown from a few flat accumulations of sand. Road dust, however, ac-

tests water hardness has been developed by the German Society for Chemical Apparatus. W.D.K.

Surface heat losses from outside furnace walls. J. G. COUTANT. *Heat Treating & Forging*, 25 [9] 463 (1939).—Aluminum paint reduces heat loss from furnace walls. See *Ceram. Abs.*, 19 [1] 16 (1940). S.S.

BOOKS AND SEPARATE PUBLICATIONS

A.S.T.M. Standards, 1939. AMERICAN SOCIETY FOR TESTING MATERIALS. Philadelphia, Pa. Price to nonmembers $8.00 one part, $15.00 two parts; $22.00 three parts.—*The book is in three parts: I, Metals: Ferrous and* nonferrous metals are discussed; methods of chemical analysis are not given. General testing methods are presented. II, Nonmetallic materials—constructional. This part includes cementitious materials, concrete and aggregates, masonry building units, ceramics, refractories, pyro and tile, thermal insulating materials, timber preservatives, paints, varnishes, and lacquers, road materials, waterproofing and roofing materials, and soils. General *testing methods and thermometers* are described. III, Nonmetallic materials—general. Fuels, petroleum products, electrical insulating materials, rubber textiles, soaps and detergents, paper, plastics, and water are covered. General testing methods are given. Available from Amer. Soc. Testing Materials, 260 S. Broad St., Philadelphia, Pa. F.F.

Finding List for United States Patent, Design, Trade Mark, Reissue, Label, Print, and Plant Patent Numbers. M. RANDALL AND E. B. WATSON. University of California Press, Berkeley, 1938. 31 pp. Price 35¢. Reviewed in *Mech. Eng.*, 61 [5] 402 (1939). F.G.H.

Report of the Department of Scientific and Industrial Research, 1937–1938. H. M. Stationery Office, London. Price 3s. Reviewed in *Pottery & Glass Record*, 21 [4] 89–90 (1939).—Methods have been developed for assessing weathering characteristics of clay products fired under various conditions. Work on clay roofing tile has been continued. Investigations on refractory materials include (1) the pressing process and its relation to the texture of clay, silica, and sillimanite brick; (2) the drying of clayware; and (3) the firing operation. A careful study of the smoke emission from various intermittent kilns firing blue and brindled heavy clay products has been made, and suggestions are advanced for its reduction and control. Laboratory work aiming at relating the conditions of atmosphere and temperature with the color of blue-firing clays has also been undertaken and has progressed satisfactorily.

Drying cracks are due to differences in moisture content established in different parts of the clay body, especially between the surface and the interior. Differential shrinkage thus occurs as drying proceeds, and stresses are produced. The direct method of studying the problem consists in determining the fastest rate at which particular shapes of a given clay can be dried with safety, and the variation of that rate with such factors as the temperature and the size and shape of the body. There is an optimum temperature at which drying is most readily carried out; the smooth nature of the relationships between greatest safe rate of drying and the dimensions of the test pieces suggests that an ultimate understanding of the phenomenon of cracking will be achieved.

A theory of the mechanism of the flow of water through plastic clay during drying has been developed, in which the force causing the flow is regarded as a repulsion between the clay particles which are separated in all directions by water films. A measure of this repulsion is obtained from the moisture contents assumed by the clay when various pressures are applied through porous pistons into which the water is allowed to escape. This pressure is an exponential function of the moisture content as is also the "aqueous conductivity" or the rate of flow of water through unit volume of the clay under unit pressure. On this basis the distribution of moisture content at any time throughout a drying shape can be theoretically calculated, the analysis being analogous to that of heat diffusion. A strict solution is not possible, but experiments on a number of clays show a means of approximation which permits the calculation of moisture-content distribution in bars drying from one end only. The experimental verification of the theoretical results confirms the hypothesis.

Many years' study of electrical insulation and the materials used therefor has greatly improved the reliability and the advantageous selection, preparation, and use of insulating materials. Better insulators have been developed, thus reducing the size and eventually the cost of electrical apparatus of all kinds without loss of quality.

The suitability of certain glasses for use in the manufacture of telephone insulators is shown. The degree of homogeneity in optical glass is almost completely determined by the temperature conditions prevailing during the annealing process. An investigation has been made of the maximum temperature gradients in an annealing oven consonant with the production of substantially homogeneous optical glass. The cooling schedules of the annealing process were experimented with *to determine* the minimum period of annealing for glass of high optical quality.

Methods of producing light etch marks on glass have been developed, and an optical system to enable the degree of polish of a glass surface to be assessed has been devised. The preparation of filling materials for etched lines, required to be unaffected under specified conditions, is described. A.B.S.

Silicosis and Asbestosis. Edited by A. J. LANZA. *Oxford University Press, New York*, 1938. 439 pp. Price $4.25. Reviewed in *Mech. Eng.*, 61 [5] 405 (1939).—The medical and public-health aspects of these industrial dust diseases are comprehensively presented in this book, to which several physicians have contributed. The history of the diseases, their symptoms and diagnosis, their pathology, and their prevalence in various occupations are discussed, as well as methods of prevention and control. Each section has a bibliography. F.G.H.

composition and properties of the solid and liquid phases, and the gas phase. P.B. & E.S.

Prevention and treatment of lead poisoning. IMRE HELLER. *Orvosi Hetilap*, 83, 639–41 (1939); *Chem. Abs.*, 33, 8329 (1939).—In Hungarian Pb works, Pb poisoning occurs in 100 to 200 of 10,000 laborers annually. Lead accumulated within the human organism can be mobilized by modifying the Ca/P balance cautiously. This was done in clinical experiments by a diet *poor in Ca and 3 to 10 gm.* Na phosphate given each second day for 3 to 4 weeks. Any secondary effects of phosphate can be balanced by the administration of thiosulfate from time to time.

Silicic acid gels: IX. CHARLES B. HURD AND HARRIS W. PATON. *Jour. Phys. Chem.*, 44, 57–62 (1940).—The effect of a change of pH on the time of set of gels produced by mixing solutions of sodium silicate and acetic acid is discussed. For Part V see *Ceram. Abs.*, 15 [3] 109 (1936). R.A.G.

Theory of light scattering. S. PARTHASARATHY. *Phil. Mag.*, 29 [193] 148–53 (1940).—P. shows that the scattering of light observed by Krishnan in binary liquid mixtures ("Molecular. . .." *Ceram. Abs.*, 17 [3] 119 (1938)) is purely molecular, while no scattering arises from clusters, if any, at the *critical solution* temperature. No new theories as, e.g., those of Frenkel, Gans, or Müller, appear to be necessary to explain Krishnan's results. R.H.

BOOK

Science Front, 1939. F. SHERWOOD TAYLOR. Cassell & Co., Ltd., London. Price 7s 6d. Reviewed in *Times Lit. Supp.*, 39 [1984] 79 (1940).—T. describes recent developments in science, including theoretical researches and technical inventions. Illustrated. K.W.W.B.

PATENTS

Cadmium-red manufacture. WALTER F. MEISTER (Interchemical Corp.). Can. 387,430, March 12, 1940 (June 18, 1937; in U. S. July 9, 1936). G.M.H.

Enamels and glazes and method of producing. CARL OBERLÄNDER AND F. H. ZSCHACKE (Siloto G.m.b.H.). U. S. 2,194,246, March 19, 1940 (May 20, 1938).—A preparation for improving enamels, glazes, etc., comprises a magnesium borosilicate having substantially the following composition: silicic acid 30 to 50, boric acid 10 to 30, magnesium oxide 15 to 35, and alkali compounds 10 to 20%.

Magnesium titanates and method of making. J. A. PLUNKETT AND EUGENE WAINER (Titanium Alloy Mfg. Co.). U. S. 2,196,325, April 9, 1940 (March 5, 1938).—A calcined synthetic magnesia-titania composition containing chiefly finely divided magnesium titanate chemically combined with 3 to 12% of silica and alumina, the ratio of silica to alumina ranging from 3:1 to 12:1, of particle size substantially all within the range of 0.5 to 2 microns, and having a refractive index of about 2.15.

Production of beryllium compounds. CARLO ADAMOLI (Perosa Corp.). U. S. 2,196,048, April 2, 1940 (March 29, 1937).—A process for the production of beryllium oxide from minerals containing beryllium and for the cyclic recovery of the reacting agent employed consists in powdering the beryllium-bearing ore, mixing the powder with an alkali bifluoride in an amount corresponding to 2 mols. of bifluoride for every BeO molecule present in the ore, adding water to form a paste, compressing the paste to briquettes, heating the briquettes to a temperature between 350° and 800°C. to cause the fluorine to combine with the beryllium to form a double alkali fluoride, leaching the reaction product with pure water at a temperature of about 90° to 100°C., adding alkali hydroxide to the alkali beryllium solution to precipitate beryllium as beryllium hydrate and form neutral alkali fluoride, separating the neutral alkali fluoride, calcining the beryllium hydrate to beryllium oxide, and treating the neutral alkali fluoride with a strong acid other than hydrofluoric to convert the neutral alkali fluoride to the corresponding acid fluoride.

Pure titanium dioxide. W. W. PLECHNER AND A. W. HIXSON (National Lead Co.). Can. 386,985, Feb. 20, 1940 (Oct. 12, 1937). G.M.H.

Pure titanium oxide. W. W. PLECHNER AND A. W. HIXSON (National Lead Co.). Can. 386,625, Jan. 30, 1940 (March 7, 1938). G.M.H.

Titanium pigment manufacture. ROBERT W. ANCRUM AND ASSUR G. OPPEGAARD (National Lead Co.). Can. 386,623, Jan. 30, 1940 (Nov. 29, 1937). G.M.H.

Zirconium oxide and method of making. C. J. KINZIE AND D. S. HAER (Titanium Alloy Mfg. Co.). U. S. 2,194,426, March 19, 1940 (July 23, 1937).—A crystalline zirconium oxide obtained by the calcination of a zirconium-oxygen-carbon compound without substantial grinding of the calcined product characterized as an essentially white powder and as being essentially white in color and consisting of crystal particles having their length greater than their width and their thickness less than their width, an index of refraction of about 2.3 to 2.4, and an adsorbed colorless carbon content of about a stoichiometric equivalent of 1.64% carbon dioxide.

General

Absorption of lead and arsenic through skin. ANON. *Jour. Amer. Med. Assn., Queries & Minor Notes*, 114, 604 (Feb. 17, 1940).—Lead and arsenic absorption through the skin does not occur to an appreciable extent in contact with aqueous solutions of these compounds in concentrations below 0.5 mgm. per 100 cc. of solution. It is unlikely that significant quantities could be ingested because of contaminated hands. F.S.M.

Clinical studies in asbestosis. M. J. STRONG. *Amer. Rev. Tuberc.*, 41, 12–21 (Jan., 1940).—This report is based upon examination of 181 persons formerly employed in the opening, carding, spinning, and weaving departments of an asbestos brake lining plant. F.S.M.

Compensation for industrial injuries and occupational diseases. E. R. KOONTZ. *Jour. Amer. Med. Assn.*, 114, 363–69 (Feb. 17, 1940).—K. gives an excellent discussion of a few of the many legal and medicolegal phases of compensation laws of prime importance to physicians interested in the field of industrial medicine. Tables show the compensability of occupational diseases, limitations of time and cost of medical and hospital benefits in compensable injuries and diseases, and the determination of medical matters under compensation laws: all data are given by states. F.S.M.

Consider the audience. S. MARION TUCKER. *ASTM Bull.*, No. 103, pp. 27–29 (March, 1940).—T. stresses the importance of presenting papers effectively. The causes of complaints are considered. The preparation of a technical paper is taken up with regard to the content and style. The manner of presentation is also considered. The audience must be considered first in technical paper presentation. F.F.

Dust-control systems for the metal-finishing industry. RICHARD T. PAGE. *Metal Cleaning & Finishing*, 10 [5] 531–47 (1938).—Dust is undesirable in any industry. Many of the metal-finishing processes, e.g., sandblasting, grinding, buffing, polishing, etc., are outstanding dust producers. Control procedures discussed are (1) personal respiratory protection, (2) substitution of a less harmful material causing the dust, (3) wet methods, (4) complete enclosure of the dusty process, (5) segregation of part of the equipment, (6) improved ventilation, (7) partial enclosure under negative pressure, and (8) local exhaust ventilation. A detailed study of dust-collection systems is presented. Air motion is discussed, and a table of air speeds in ducts necessary to convey various materials is given. A table shows the minimum thickness of metal for straight exhaust piping. Fans and cleaning apparatus

investigations are of considerable importance and frequently accompany the chemical work. The department is equipped for complete mineralogical examinations by microscopic and other processes used in determining rocks, minerals, ores, and concentrates of all types. It is frequently possible from the results obtained to offer opinions upon the commercial value of a mineral product or to give advice on methods of preparation for the market. Chemical and mechanical analyses can also be made of soils.
K.R.

Fatal subacute occupational lead poisoning. WERNER EINHARDT. *Arch. Gewerbepath. & Gewerbehyg.*, 9, 407–13 (1939).—Industrial lead poisoning as a rule is a chronic poisoning. Characteristic symptoms appearing suddenly, like the colic and intestinal stoppage, show that the poison has been at work in the system for a long time. Acute poisoning as an industrial disease is seldom encountered. E. reports an acute case which came to the Berlin Clinic for Industrial Diseases and discusses its manifestations. On Dec. 4, 1938, a sprayer of lead, 49 years old, was brought to the clinic in a dangerously ill condition. Very carefully and fully he was examined; the next day he died. For several weeks as an occasional worker he had been spraying cable muffles in a cable plant. The workspace was 3 x 4 x 3m.; the spraying was expected to be done under a hood. The worker used a spray pistol in which a lead wire was inserted and the propane gas flame mixed with air, which was introduced into the pistol at the same time, melted the lead wire. The molten lead was at once ejected by the pressure of the air, spraying the muffles revolving in front of it. During this process the worker was expected to wear a mask and to manipulate the pistol through slits. About the middle of November he had been seized with violent pain and vomiting; he was off from work for 8 days and resumed work again late in November. The hood apparatus was then out of repair; three other men working in his absence in the same small space, with very low suction in the ventilating apparatus, caused the returned worker to ask for the night shift where he could be alone. On November 30 he was overcome with the same violent symptoms as before. Being somewhat better by the next night, he insisted on working, only to return home in the same condition, with additional symptoms; his wife noted that his face was as black as lead. E. details the man's further breakdown and the efforts of the company physician in palliation; these failing, the victim was transferred on Dec. 4 to the Occupational Clinic. The plant conditions under which the lead spraying took place were examined and reported on by E. after the autopsy. A large hole was found in the left side of the framework supporting the hood through which the sprayed lead had been escaping into the small enclosure; lead dust lay heavy on the glass valves of appliances carrying the cables; the clothing and shoes worn by the various shifts were loaded and sodden with the scattering lead dust; the mask of the worker was in disrepair, so that he might not have worn it on his final night shifts. He must have breathed the lead dust in its most finely divided particles, i.e., in almost molecular form. Such an aerocolloid condition is taken up by the organism with special ease and constitutes the highest possible risk to the subject. The lungs in this case were permeated with it, and the blood readily carried this fatal dust to the entire system. From the evidence derived from the illness, the autopsy, and the plant, E. concludes that the poisoning could be called acute but also subacute, the worker evidently having been sensitized by his first attack and the subsequent exposures, massive in character, sustained December 1 and 2. An inspector testified that, after being placed on the night shift, this worker had done the work of three ordinary men on the spraying. Hence his constitutional resistance was utterly broken down beyond repair. The lead content of the urine was 2140 γ in 10 gm. of dry feces, 490 γ in 10 gm. of the liver, and 370 γ in 10 gm. of the kidneys.
K.R.

Fuel gas generator. HARRY A. CURTIS, RALPH B. STITZER, AND WILBER J. DARBY. *Ind. Eng. Chem.*, 32 [6] 757–62 (1940).—Developments in the use of electrical energy as a source of heat for the carbonization of coal are described. Illustrated.
F.G.H.

Glass industry of Ohio. ARTHUR S. WATTS. *Ohio State Univ. Eng. Expt. Sta. News*, 11 [4] 10–13 (1939).—Ohio is the third largest glass-producing state and has twenty glass plants. In 1797 there was a glass plant on the Ohio river; by 1825 they were all over the state. The production of hollow glassware has increased twenty times since glass blowing machinery has been introduced. Ohio is an important producer of flat glass. Today this is drawn from the tank as a continuous flat sheet. Other important products are electric light bulbs, fiber glass, and glass blocks for use in building construction.
W.D.F.

Plant laboratory. K. SPINGLER. *Tonind.-Ztg.*, 62 [44] 492–93 (1938).—The plant laboratory has the following tasks: the testing of raw materials and half-finished and finished products, the working out of new formulas, improvement of old shapes and construction of new shapes, and local research.
W.K.

Prevention of industrial dermatitis. J. V. KLAUDER, E. R. GROSS, AND H. BROWN. *Arch. Dermatol. & Syphilol.*, 41, 331 (Feb., 1940).—Much of the industrial skin disease is caused by the methods of cleaning the skin. Skin cleansing, methods and materials used, and the use of protective applications are studied. Formulas for eight protective applications are given. Substitutes for mechanic abrasive soap are listed. Various kinds of soaps and detergents, such as triethanolamine soap, naphthenic acid soap, and sulfonated oils, are discussed. The detergent properties of the vegetable meals are not sufficiently appreciated.
F.S.M.

Pyrophyllite dust; its effect and control. M. F. TAYLOR. *Amer. Inst. Mining Met. Engrs. Tech. Pub.*, No. 1179; *Mining Tech.*, 4 [3] 13 pp. (1940).—North Carolina is the only commercial source of pyrophyllite at present. Pyrophyllite occurs associated with quartz, together with chloritoid and sericite. All the pyrophyllite marketed is ground; it is classified by air separation. It is mined by open-cut, glory-hole, and underground methods. At only one operation has work been carried on since 1920. Underground, the free silica content of the dust is 35%; 80% of the particles are less than 3 microns in size; dust concentration rises to 500 million particles per cu. ft. when drilling. X-ray examination was made of 101 workers; of those with over two years' exposure, 35% were affected; two died. The lesions were the same as those produced by free silica alone. The threshold dust concentration allowable underground is 10 million particles per cu. ft. Drilling is done wet; stopes are ventilated by "ventubes." Above ground, tight housing for machinery and exhaust ventilation have been installed. These procedures give the required results.
W.D.F.

Recent Commission findings. ANON. *Ohio Industrial Commission Monitor*, 13, 41–42 (March, 1940).—An employee of a steel foundry worked from May, 1922, to June, 1939, in the cleaning department in the foundry, where his duties required him to remove hardened sand from castings by use of a pneumatic hammer. A dust count in the room showed an exposure well below the accepted safe standard, but the dust contained approximately 20% of free silica. The Claims Referee was of the opinion that the exposure to silica dust was well established, and the claim was approved as compensable by the Silicosis Referees. Acting under the provisions of an amendment to the Occupational Disease Act effective May 20, 1939, the Commission granted an award of $6500 to the widow and minor children, payable at the maximum rate of $18.75 per week.
F.S.M.

Recent developments in relation to silicosis. LEROY U. GARDNER. *Ind. Med.*, 9, 45–51 (Feb., 1940).—Certain tentative conclusions derived from experimental work upon silicosis in progress at the Saranac Laboratory for some years are recorded. As a basic doctrine, G. considers that it is still true that only certain forms of free silica and the group known as asbestos (fibrous silicates)

are capable of producing fibrosis in a normal lung. The trend of some of the Saranac experiments, however, has altered certain concepts previously regarded among research workers as fixed. Inhaled chrysotile asbestos fibers now appear to be irritating, not because they are silicates, but because they are stiff fibers, mechanically irritating to the lungs. Grinding them down very finely so that few of the fibers were longer than 2 microns practically destroyed this irritating property. Even with an average atmospheric concentration of 1.25 million particles per cu. ft. of air, no fibrosis developed. If the effect of asbestos on the lung were entirely chemical, a decrease in particle size might be expected to increase tissue response. Large particles of free silica have little effect on the body, but small particles increase the reaction of body cells. The histology of early asbestosis, as detailed by G., does not suggest chemical injury. Among dozens of different silicate minerals, only the group of five known as asbestos are unique in having fibrous structure and in being commonly recognized as pulmonary irritants. The group varies in chemical composition within itself more markedly than, as a group, from other silicates. Chrysotile asbestos has the same chemical formula as a nonfibrous silicate, serpentine, which is physiologically inert. In mills that fabricate asbestos textiles there may be much fine dust, but if the dust is composed of serpentine and very short chrysotile fibers, clinical asbestosis will not develop. Free silica dusts, unlike those from asbestos, cause a chemical form of irritation in laboratory animals. G. describes the two histological stages which characterize the tissue reaction in such animals after inhaling excessive quantities of pure quartz or flint dusts in an extremely fine state. In human subjects, only cases of rapidly developing silicosis show evidence of this two-stage reaction. The solubility hypothesis, however, hitherto rather widely used in interpreting silica reactions in the lungs, is declared to rest entirely on indirect evidence. It has never been possible to prove that silica dissolved within the body, because the soluble material immediately combines with local tissue elements. Soluble silica detected in the urine and the blood is now generally accepted as more likely derived from food and drink than from inhaled dust. G. describes many of the Saranac experiments whose outcome individually and collectively is difficult to reconcile with the theory of silica solubility. No fibrosis has ever been produced by single or repeated injections of soluble silica in its various forms. Evidences of specific toxicity exerted by silica upon living tissues have been manifested through long series of experiments lasting years; many concrete examples are given. Intravenous experiments immediately fatal to guinea pigs produced no symptoms in dogs. The toxic effects of quartz have been more or less neutralized by adding small amounts of different substances, e.g., colloidal aluminum hydroxide which gives complete protection in a 0.03% dilution. Particle size is discussed as having new and unexpected relations with both highly toxic and merely slow fibrotic conditions. G. is cautious about drawing final conclusions from animal experiments alone, but he does begin to correlate his experimentally derived facts into a coherent silicosis etiology. K.R.

Relation between the thermal expansion and the properties of ceramic products. W. H. Earhart. *Ohio State Univ. Eng. Expt. Sta. News*, 12 [2] 25–28 (1940).—The composition of a body may be modified to obtain a desired thermal expansion. The thermal history also affects the thermal expansion; certain compositions fired at low temperatures have less expansion than the same body fired at higher temperatures. Thermal expansion may be measured directly on a bar or by the interferometric method. Bodies with a considerable amount of high-expansion quartz in low-expansion clay may show dunting tendencies on cooling. Beta-quartz expands on cooling and may also set up strains. The abrupt quartz inversion point at 575°C. may be destructive. Quartz and clays have fairly uniform thermal expansions, but the feldspars are variable. Hotel china, sanitary ware, and floor tile all have thermal expansion curves lying close together. The quartz present does not seem to affect them. A quartz grain shrinks more rapidly on cooling, and it is thought to pull away from the remainder, so that it does not fill its recess in the body completely on cooling. W.D.F.

Report of Committee on Ceramic Education. N. W. Taylor, *Chairman*. *Bull. Amer. Ceram. Soc.*, 19 [6] 220–21 (1940).

Report of Committee on Publications. John D. Sullivan, *Chairman*. *Bull. Amer. Ceram. Soc.*, 19 [6] 222–23 (1940).

Report of Committee on Research. Arthur A. Wells, *Chairman*. *Bull. Amer. Ceram. Soc.*, 19 [6] 214–18 (1940).

Report of Committee on Sections and Divisions. M. E. Holmes, *Chairman*. *Bull. Amer. Ceram. Soc.*, 19 [6] 221–22 (1940).

Report of Committee on Standards. John W. Whitemore, *Chairman*. *Bull. Amer. Ceram. Soc.*, 19 [6] 218–20 (1940).

Roentgenologic aspects of bronchomycosis. H. P. Doub. *Radiology*, 34, 267–75 (March, 1940).—The signs and symptoms of the bronchomycoses are similar to those of tuberculosis and they are often at first thought to be tuberculous in origin. D. describes some of the more prominent Roentgen signs of the various bronchomycoses. F.S.M.

Silicosis. E. R. Hayhurst. *Merck Rept.*, 49, 6, 3, 9, 23, 30, 32 (April, 1940).—H. gives an excellent short review of silicosis. F.S.M.

BOOK

Engineers and Engineering in the Renaissance. William Barclay Parsons. Williams & Wilkins Co., Baltimore. 661 pp. Price $8. Reviewed in *Science News Letter*, 37 [12] 192 (1940).—P. discusses the amazing engineering achievements produced during the Renaissance. P.G.H.

PATENT

Coating and coloration of granulated materials. N. P. Haasbergen (Bakelite Building Products Co., Inc.). U. S. 2,202,002, May 28, 1940 (June 2, 1936).—A roofing granule has on the exterior thereof a coating comprising a hardened high-alumina cement containing principally calcium aluminates or calcium alumina ferrites and substantially free of free lime in amount to produce objectionable efflorescence in exposure, the surface of the granule being also substantially resistant to chipping and wear and stable with respect to a bituminous bond.

been taken of the advanced training centers in heavily industrialized communities, showing that there is evidently small demand for this field of practice. F.S.M.

I. Lead content of human blood. II. Lead as a poison. J. N. M. CHALMERS. *Lancet*, 238, 447–50, 492–493 (March 9, 1940).—Tompsett's method of determination was used. Blood was obtained from 31 normal people and 50 hospital cases, all with no known exposure to lead, and also from 44 factory workers with a definite lead exposure while manufacturing white lead and storage batteries. The blood of the controls showed a lead content which varied from 30 to 90 μgm. per 100 cc. with a mean of 57. The lead workers, who presented no symptoms of poisoning, had blood lead values ranging from 61 to 102 gm. per 100 cc. with a mean of 104. Augmented concentrations of lead in blood indicate increased absorption of lead but do not constitute evidence of plumbism; they are a *useful estimate* of the degree of exposure. Clinical findings must still continue to govern the diagnosis of lead poisoning. There is a discussion of the problem and also of the value of milk in the diet of lead workers. With a high calcium diet, there is less lead absorbed from the gut than with a low calcium intake. Since, industrially, most lead enters the body through the lungs, the calcium probably acts by helping to fix the lead in the bones and thus prevent it from circulating in the blood. Though of great value, blood studies and similar biochemical investigations must not be given too much consideration. F.S.M.

Lungs of cement workers. S. CACCURI AND L. DI-PRISCO. *Folia Med.*, 26, 1–32 (1940).—A review is given of Italian literature on the subject which seems to give a less favorable picture of the health of cement workers than is found in other countries. Histories of seven cases are given which show silicosis in grades 1 and 2 and emphysema. Tuberculosis was not found. F.S.M.

Manufacture of fired clays (brick, tile, and pottery). A. COUTHON. *Argile*, No. 197, pp. 13–21 (1939); No. 198, pp. 3–9 (1940).—C. discusses the raw products used in the manufacture of fired clay products, the formation of clays, and their characteristics and composition. M.V.C.

Mechanism of development of lead anemia: IV, Physiochemical nature of the splenic and liver substances which decrease erythrocytes. S. KIM. *Jour. Med. Coll. Keijo*, 9, 101–107 (1939).—After injection with lead acetate, the spleen and liver seem to contain some specific chemical substances which are able to decrease the number of erythrocytes. K. attempted to determine the physiochemical nature of these substances which were obtained from the splenic and hepatic veins after injection of the lead. The anemic action of the splenic substance disappeared after heating for an hour at 100°. The substance was soluble in water, but did not dissolve in ether and alcohol; it was adsorbed easily by animal charcoal or kaolin. Its action was also retained after ultraviolet radiation for 3 hr. F.S.M.

Metabolism of nucleoproteins in lead poisoning. C. MICHETTI AND F. MOLFINO. *Rass. Med. Applicata Lavoro Ind.*, 10, 562–92 (1939).—Original research on ten cases of lead poisoning shows that there is a pronounced tendency to uric acidemia; this becomes more acute as the poisoning tends towards chronicity. No relation was seen between the degree of uric acidemia and kidney function, and no such connection is likely to exist in cases of recent lead poisoning. F.S.M.

Nature of anthracotic foci. Experimental research. A. C. SAVELLINI. *Folia Med.*, 26, 21–32 (1940).—S. gives a review of the literature and of the views of some French and Italian workers who are of the opinion that the greater part of the "anthracotic" pigment in the lungs is not truly anthracotic but iron of hemolytic origin. Animal experiments by S. lead to the conclusion that carbon and iron participate in the common anthracotic focus; some contain carbon and some iron only. F.S.M.

Occupational dermatoses under the Illinois Workmen's Occupational Diseases Act. H. R. FORSTER. *Illinois Med. Jour.*, 77, 79–85 (Jan., 1940).—After analyzing various sections of the Illinois law, F. concludes that "any skin disease may therefore legally be an occupational disease in Illinois." F.S.M.

Preventing economizer corrosion. F. J. MATTHEWS. *Brit. Chemiker*, 48 [373] 332–34 (1940).—M. discusses the causes of corrosion and gives suggestions for the maintenance of the economizer. R.A.H.

Priceless possessions. L. GREENBURG. *Nat. Safety News*, 41, 25–27 (Jan., 1940).—There were 1843 cases of compensated eye injuries in New York State in 1938 and the cost was $1,165,000. Of these, 50% were caused by foreign matter entering the eye and could be avoided by the simple and cheap method of wearing goggles. Ventilation controls are needed for eye hazards of toxic dusts and fumes, and in the past year the Division of Industrial Hygiene has passed and approved 3000 sets of plans for such control in factories. Special goggles are needed for protection against radiant energy, and fatigue of the eyes can be lessened or eliminated by proper illumination. G. discusses these sight-saving means and methods for promoting their adoption. F.S.M.

Two fatal cases of pulmonary asbestosis. E. C. VIGLIANI. *Rass. Med. Applicata Lavoro Ind.*, 11, 28–32 (1940).—The first of these cases concerns a woman who worked for thirty years in a factory using asbestos in the manufacture of cord. The second woman worked for seven years in an asbestos factory. Her susceptibility to colds increased while she was working and she suffered all her life from bronchitis and asthma. She died at the age of fifty, with symptoms of a lung disease, nearly thirty years after having stopped work. The autopsy showed interstitial sclerosis of the lungs and asbestosis bodies. F.S.M.

Unemployment benefits no bar to workmen's compensation. ANON. *U. S. Dept. Labor, Monthly Labor Rev.*, 50, 670 (March, 1940).—An employee receiving unemployment benefits under the Unemployment Compensation Act is not disqualified from recovering compensation for the same period under the Workmen's Compensation Act, according to the Supreme Court of Michigan. F.S.M.

SEPARATE PUBLICATIONS

Basophilic Aggregation Test (for Lead Absorption and Lead Poisoning). ANON. Ohio Dept. Health, Adult Hyg. Div., 1940. 7 pp.—The technique and interpretation of results of the basophilic aggregation test are given in a concise form. F.S.M.

Legal Aspects of Engineering. W. C. SADLER. John Wiley & Sons, Inc., New York. 631 pp. Price $4.00.—This is a direct application of the case method to engineering problems, three hundred cases being selected after 6500 legal cases actually dealing with engineering problems were carefully analyzed. Cases dealing with compensation are of the most interest. S. gives a general discussion of the subject. Cases are given to illustrate the following points: elimination of defenses, hazardous employment, employer-employee relation, accidents arising out of and in the course of employment, proximate cause, award, dependency, and jurisdiction. F.S.M.

Manual of Industrial Health Hazards. J. B. FICKLEN. Service to Industry, West Hartford, Conn. 173 pp. Price $4.00.—F. presents methods for the evaluation of industrial hygiene exposure resulting from many dusts, vapors, and gases. The first chapter gives principles which are basic procedures for making surveys and describes sampling devices. The other chapters are given over to the materials or groups of materials which may cause industrial disease. For each substance, F. gives the occurrence and uses, certain physical properties, the clinical symptomatology it produces in man, the physiological responses of man to various concentrations, the concentrations allowable in the air of the workplace, and a simple method of estimation in air. Numerous references are given. An appendix includes useful constants, formulas, and instructions for the preparation of standard solutions. F.S.M.

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Iron and Coal Trades Review, September 8, 1939

THE
IRON & COAL TRADES REVIE

LONDON: SEPTEMBER 8, 1939

Iron-Ore Extraction in the Midlands*

OPEN CAST WORKING AND UNDERGROUND MINING

The appended description of iron-ore extraction in the Midlands has been taken from the Report* of the Committee on the Restoration of Land Affected by Iron Ore Working, and deals with methods of removing the overburden, and winning in underground workings

METHODS OF SURFACE WORKING

ALL ironstone in the Midlands was originally got by hand either at outcrops or not more than 15 to 20 ft. below the surface. The reinstatement of such land for agricultural use immediately after the working presented no difficulty. No great masses of subsoil had been disturbed; the topsoil was merely thrown on one side and then returned without any cost for haulage. At the turn of the century small steam excavators with a short-arm jib were introduced for the purpose of removing the overburden, but all land was still restored by hand. When a quarry was about to become too deep for restoration it was abandoned or mined. Excavators were then introduced for removing the ore itself. In the expansion of development due to the War, the American long jib and mechanical digger with a wide dumping radius was introduced. About this time some areas were first left unrestored. This was at first not so much due to technical difficulties as to a company going out of business.

The position became serious when, in the thirties, Stewarts and Lloyds left Scunthorpe and came to Northants. Since they were late-comers they found all the areas of easily got ore controlled by other firms, and they were forced to lease areas of deep overburden. They began work on these with an electrical excavator which, with a 9 cub. yd. bucket (1 cub. yd. represents very approximately 1 ton), a dumping radius of 101 ft., and a dumping height of 88 ft., could deal with overburden up to about 80 ft. in depth.

Ironstone is won by a number of different machines whose operations have somewhat different effects. They include the 'dragline which works on the principle of a rake; the excavator or "digger" with a short arm (the "jib") dumping on to a conveyor or wagons; the long-jib excavator which dispenses with the latter, and the Lubecker (land) dredger which can dump sand or other very light soil evenly. The dredger creates no problem of levelling because of the number of small bucket loads dumped, but for this reason it is only efficient in sand or light soil. There are a great number of combinations of these machines, with or without hand labour, which are used in different quarries, and it would be difficult to give a complete account of them. The following are descriptions of the work in three quarries which are representative of certain typical conditions.

(1) A 1½ cub. yd. dragline at A (Fig. 1) removes the 2-ft. overburden (including 9 in. of topsoil) and deposits it at C in a very shallow "hill and dale" formation which is then levelled by the ¾th cub. yd. dragline at C. The operation is then completed by a 4-cub. yd. steam navvy following up behind dragline A and loading the *ironstone into wagons B. The face at D* gradually recedes as the ironstone is removed. The working is like a *movable cliff.*

(2) A short jib excavator may be used in conjunction with a conveyor as in Fig. 2.

The excavator A removes overburden from the face B and then empties the load into a small truck, or dumping tram, on the steel-framed conveyor at C. This runs up to the other end at D and tips over. The function of the conveyor is therefore to move the dumped overburden away as far as possible so that there is no danger of the navvy which is removing the ironstone becoming buried. The overburden is dumped by the conveyor in a ridge and furrow formation similar to that which results from the use of a long jib excavator but in a rather more wavy line.

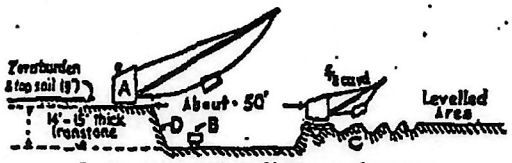


FIG. 1.—DRAG-LINE METHOD OF EXTRACTION.

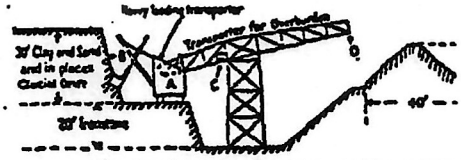


FIG. 2.—SHORT JIB EXCAVATOR AND TRANSPORTER

(3) The overburden can be removed and dumped by a long-jib excavator. The sketches (Fig. 3) are of 2-cub. yd. excavators at work. These machines are the largest in Europe, and they have an output of about 500 tons per hr. each. In fact the whole area assumes the aspect of having gigantic furrows, which are locally known as "hill and dale." The ridges consist predominantly of subsoil, and in them the topsoil is irretrievably lost. The size of these furrows depends on the size of the navvy used for the excavation. Where the largest navvies are in use, the distance from crest to crest is from 40 to 50 ft., the depth varying from 10 ft. to 16 ft., but where smaller excavators have been used in the past, the crest to crest distance is between 20 ft. and 30 ft., and the depth from 6 ft. to about 10 ft. The shape and size of the hills and dales depend not only on the type of machinery used for putting the material across, but also on the angle of repose of the dumped material. The natural angle of repose of any particular soil composition will generally only be found where it is free to trickle; *e.g.*, on the slope of the dumped material stretching down to the quarry floor. Measurements are often made of this angle for different materials and combinations of materials, because it is this angle that determines the distance between the top of the dumped overburden and the face of the excavation. These measurements show that an average angle of repose is 1¼ horizontally to 1 vertically, although it may be flatter in boulder clay where there is a good deal of slipping and steeper in limestone. The angle of actual hill and dale is nearly always flatter than the angle of repose proper because the material is partially spread as it is emptied from the excavator.

The size of hill and dale varies also with the depth of overburden, since the excavator used varies generally depth of the overburden to be wor can therefore talk of a "normal" and dale for a particular depth of If it is understood that only a very gr tionship is meant. The general ten manner of importance in connection costs of levelling. When the cut is a final gullet is left. This may be at of 200 to 300 ft. wide and 60 ft. de may form a considerable difficulty l seems to the quarry, particularly for restoration work.

Local Objections to Large Exc

It is the operation of these mach has alarmed local opinion and which attention to the whole question of t working of ironstone in this country. reaction to the coming of the larger has been to suggest that they are not It is true that ironstone was won be machines came and it is suggested ought, in view of the devastating co to be a reversion to older methods o covery of yet newer ones. *If it is pain reply that ironstone would not be got* ally at 60 ft. depth by the old met sometimes argued that, if the produ

put to it, they could invent new mach would abolish or modify hill and dale. engineering developments as they appe Committee from the evidence put bef included:—

(1) An attempt might be made to im excavator. The present performance o function of the radius of the jib an angle of repose of the dumped soil. cause these two factors are fixed, that dale formation occurs. If the length could be varied slightly with each bu then hill and dale of the present would not be formed and a surface wo which, if very irregular, would be much level. If the length of the jib were however, so as to give a choice of which each bucket could be emptied, t of the entire machine, which is alrea 500 tons, would be increased to an imp extent. Further, if any attempt were dump material anywhere near the area angle of repose of the tipped soil wo that the excavator itself would be burie

(2) A new conveyor might be desig position of which could be altered betw load placed on it by a small excavat witness suggested this, but the Committ it an unlikely development. The pre vevers cannot be used where there is of overburden of more than 40 ft. b the strain which would be imposed arm of the conveyor when the truck was away from its point of support. It w be easy, therefore, to design a convey would produce better results with an ov of 60 ft. or more in depth than are the present one with an overburden of

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*H.M. Stationery Office, York House, Kingsway, London, W.C.2. [Price 1s. 6d.]

Fatalities from Silicosis and Asbestosis

THEIR INCIDENCE IN INDUSTRY

The problems associated with silicosis and asbestosis amongst industrial workers are receiving close attention. The former has tended to increase, and the latter, on balance, to decrease, in recent years

A SECTION of the Annual Report* of the Chief Inspector of Factories dealing with health refers to the question of dust and its effects, including silicosis and asbestosis. It is pointed out that for some years past, particulars of the total number of deaths from these two causes, which have been investigated by the Department, have been given and brought up to date. These figures have been specially useful from the practical point of view in aiding the installation of preventive measures of the necessary standard in processes exposed to risk. Of much importance and more general interest, however, is the trend of mortality rates from these diseases with or without tuberculosis, which does, when comparison is made after a number of years, reflect the effectiveness of the preventive measures installed. For this purpose, comparison of the figures of two successive years is of no value and sometimes misleading.

Table I shows deaths attributed to silicosis (with or without tuberculosis) during the last four years, together with the industries concerned. In factory cases, the cause of death has been borne out by departmental investigation. The variety of industries will be noted, and if space permitted to give in detail the precise occupational history in each case, the very widespread nature of the risk would be still more evident. For example, refractories' industries include amongst the 52 fatalities three whose occupation was that of repairing the silica brick linings of steel furnaces or converters, one a pot maker in a glass works, one an engine driver in a silica brick works, and one a grinder of refractory bricks, the remainder being associated with processes in the getting, crushing, grinding and manufacturing of refractory materials.

The table also shows the fatalities from asbestosis and asbestosis with tuberculosis coming to the Inspector's knowledge and investigated during the years in question. The figures given under "Other Cases of Fibrosis" are the number of cases in which "Fibrosis of the Lungs" was entered on the death certificates as the primary cause of death, these figures being supplied by the courtesy of the Registrar General. It has not been possible to investigate all the deaths from fibrosis of the lung; but in the majority the occupation of the deceased appeared not to have involved risk from silica or asbestos, and it is well recognised that fibrosis may be due to causes other than the inhalation of dust. These returns are indispensable since, from time to time, they provide the starting point of further investigation which provides valuable information.

Table I.—*Deaths from Fibrosis of the Lung, including Silicosis and Asbestosis (England and Wales, 1933-36.*

Disease and Industry.	1933.	1934.	1935.	1936.
Silicosis—				
Refractories industries	12	9	19	12
Pottery, manufacture of	58	67	64	48
Sandstone quarrying and dressing	40	43	19	27
Earthenware masons	61	58	74	58
Metal grinding	22	24	18	25
Sand blasting	14	10	12	7
Steel dressing and cleaning of castings	1	6	3	3
Stone, pebble, flint, and sand crushing	1	1	4	6
Scouring powders, manufacture of	1	2	—	1
Enamel and glass makers	—	1	—	—
Compo mixer (Tripoli)	1	—	—	—
Abrasive-wheel manufacture	1	—	—	—
Millstone dressing	—	—	1	1
Slate dressing with sand	—	—	—	1
Electrician at steel foundry	—	—	—	1
Slate quarrying and dressing	3	6	10	7
Granite quarrying and dressing	1	—	1	1
Tunnel mining (sewage works, etc.)	2	—	2	2
Grave diggers	1	—	—	—
Coal mining	111	120	127	177
Gold mining (South Africa)	10	6	16	12
Tin mining	33	26	20	20
Iron ore (haematite) mining	12	9	16	13
Lead mining	2	1	1	1
Copper mining	—	—	1	1
Barytes mining	2	1	1	2
Mining engineers	—	1	2	2
Total: silicosis	392	365	416	420
Asbestosis	13	11	13	9
Other cases of fibrosis	538	544	534	503
Grand total	942	920	963	942

Silicosis and Asbestosis and Cancer of the Lung

In recent years the suggestion has been made in medical publications that there is some relationship between silicosis or asbestosis and cancer of the lung. The question is a difficult one, and the figures available are not yet large enough for it to be safe to draw conclusions from them. In exploring this question the field to be covered is wider than appears at first sight. Major points which will have to be settled are: Does silica or asbestos or the fibrosis of the lung they produce tend to inhibit cancer of the lung or to produce it? If the latter, do either of these two substances act as specific carcinogenic agents like tar, or is it that the disease they produce only prepares the soil for the occurrence of cancer? The following information has been collected from the Inspector's records. No case has been included in which a post-mortem examination has not been made.

Among 943 fatal cases in which silicosis or silicosis with tuberculosis was present, cancer of the lung was associated in 23 cases (2.4 per cent.). Of these 23, in 17 it was considered that the cancer was the primary cause of death, and in 6, silicosis or silicosis with tuberculosis. Among 347 deaths which were investigated during the same period owing to the possibility of silicosis being present, post-mortem examination revealed no silicosis but cancer of the lung was found in 17 cases (4.9 per cent.).

Similarly with asbestosis, among 103 fatal cases in which asbestosis or asbestosis with tuberculosis was present, cancer of the lung was associated in 12 cases (11.6 per cent.). Of these 12, in 6 it was considered that the cancer was the primary cause of death, and in 6, asbestosis or asbestosis with tuberculosis.

It is clear from these incomplete figures that extended inquiry and collation of data and evaluation of age incidence and age distribution are necessary before any conclusions can be arrived at.

The importance of the most careful post-mortem examination is emphasised by a recent case in which naked-eye examination revealed only advanced asbestosis, but what appeared to be a small blood clot in a bronchus turned out on microscopical examination to be a carcinoma, and also another case in which silicosis, tuberculosis and primary carcinoma were all present in the lungs.

Substitution of Siliceous by Non-Siliceous Materials

In processes in which the risk of silicosis is serious and uncontrollable or only partially controllable, the prevention of silicosis lies either in substitution by harmless materials or as the last resort in prohibition of the process. Efforts have been made therefore to find and test efficient substitutes for siliceous materials in certain processes. Progress has been made in this direction in the following processes—in some a considerable extent; in others is in course of technical experiments in the processes: Alumina for flint in china bedding; (2) alumina for siliceous material in parting powder; (3) non-siliceous abrasives for sand or flint in grinding; (4) non-siliceous material for blinding sand in the slow cooling of steel; and (5) non-siliceous material for silica bricks for limekilns and other furnaces.

*H.M. Stationery Office, York House, Kingsway, London, W.C.2. (Price 2s. net.)

Hydraulic Stowing in India

(Concluded from page 333.)

...livers sealing water to the suction gland of sand pump. Sealing water may be led by gravity at the colliery itself when the river is flood as the river water then contains an appreciable quantity of sand; but in dry periods of the year, when a large basin has been created clean sealing water is obtained direct from the river. The suction pipe is submerged and attached by a special flange to the pump and raised or lowered by a winch mounted on a pontoon. By this arrangement flexible hose is not needed on the suction side, and the quantity of sand to water is regulated easily.

From the delivery side of the pump the sand-water mixture is conveyed by means of armoured flexible hose pipe to a line of steel pipes in 18-ft. to 20-ft. lengths; flanged and Victaulic joints; the pipe range is carried on the stream. The pipeline delivers the sand-water mixture into a conical separator at the rate of 3 tons per min. The same mixture is fed on to screen plates with holes; the velocity of the incoming mixture is reduced that sand is deposited in the cone of the separator and fairly clear water flows through the sluices at the sides of the separator. The sand contains too much water, however, to be delivered direct to the belt conveyor, and the sand is further dewatered on a drying device.

Sand-Drying Device

The sand-water mixture—by weight approximately 4 parts of sand to 1 of water—flows from the bottom of the separator through a control valve over a distributing plate on to a 4 ft. wide drying belt. The drying belt consists of a series of shallow trays, 2 in. deep, carried on rollers; each tray contains a mixture of graded slag which is kept in place by ½ in. thick iron plates perforated with ½ in. holes. The belt is driven at a speed of 40 ft. per min. Three rollers or squeezers are placed equidistantly along the upper belt surface, and a series of prongs placed in series along the belt to stir the sand over as it is carried forward. The sand prongs help in the dewatering of the sand, whilst the slag in the trays allows water to flow but not the sand.

The sand issuing from the drying belt contains by volume approximately 10 per cent. water. The sand is delivered from the end of the drying belt direct on to a 36-in. troughed belt conveyor which delivers it into the overhead bunker. The belt conveyor elevates the sand 43 ft. in 150 ft. run to the top of the bunker. On account of this grade only fairly dry sand can be carried.

The sand is delivered by the belt conveyor into a specially constructed bunker holding approximately 1,000 tons. On the underside of the bunker runs the single rail around which the sand buckets of the aerial ropeway grip, after being delivered from the ropeway. On one side there are 7 shutes which deliver into the buckets; the regulator at the bottom of each shute controlling the sand outflow to the bucket is of a simple type, and is kept in place by a balance weight. A one-ton capacity bucket is filled in 3 secs. through one of the shutes.

Luxemburg: Iron and Steel Output 1939

Pig-iron output in Luxemburg in July 194,888 metric tons (183,563 tons in June, 117,364 tons in July, 1938). Steel production 177,645 tons in July, against 137,981 tons in June and 110,393 tons in July, 1938. A total of 24 blast furnaces were in blast on July 31.