CERAMIC ABSTRACTS SECTION

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March 1, 1946

Abrasives

Abrasive hardened wheels cut diamond-wheel costs. ANON. *Can. Machinery,* **56** [10] 104 (1945).—A method has been developed that greatly improves the quality of grinding wheels. This process is available under the trade name of "BuXite" from the Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn. The grain of the wheel is coated, and under the pressure and heat of grinding this coating becomes a layer of extreme hardness. It is claimed that this process is so efficient that the use of diamond wheels will be limited to only the most difficult grinding operations. M.M.W.K.

Compass of the tang. ANON. *Ind. Diamond Rev.,* **6** [62] 12 (1946).—The compass of the tang has been invented to explain directional machining of the stone. The tang is taken with the hand from the grinding disk (scaife) running in anticlockwise direction, and the observer looks at the stone in front of him. A distinction between the four main directions and the four intermediate directions is made. The several notations in use are compared, and the English and Dutch equivalents are given. The adoption of a standard notation is advocated. 6 illustrations. P.G.

Has surface grinding efficiency reached its maximum? H. J. CHAMBERLAND. *Can. Machinery,* **56** [9] 117–19, 228 (1945).—Mass production is indirectly dependent on surface grinders; without them, gauge blocks and many other mechanical precision instruments could not be economically produced. C. believes that a finish of 5 micro-in. or better can be held on a production basis by the use of these machines. The fact that the machines have been redesigned for convenience to the operator and electronic control allow the operator to work at maximum efficiency. With the new progress made in coolants able to stand up at the high temperatures inherent in surface grinding, it is possible to finish work in micro-inches. The best methods for cooling the work and the advantages of magnetic chucks are discussed. 6 figures. M.M.W.K.

More about blotters. A. ROUSSEAU. *Grits and Grinds,* **36** [8] 6–8 (1945).—R. gives two more examples of the new method of studying flange impressions of grinding wheels, dealing with a 6 in. diameter vitrified diamond wheel broken soon after mounting; main lines of fracture are radial. The flange impressions of both sides were on different diameters, and therefore cross-bending stresses led to breakage. A 36-in. wheel on a crankshaft grinder developed a radial crack after mounting during truing. 4 illustrations. See "Trouble...," *Ceram. Abs.,* **1946,** Feb., p. 28. P.G.

Norton diamond wheels help set production record. ANON. *Grits and Grinds,* **36** [8] 9–11 (1945).—A short review on diamond wheels is presented. In one of the three standard types of diamond wheels being produced today, the abrasive section consists of minute, carefully sized diamond particles uniformly bonded with a synthetic resin and molded to a depth of usually $^1/_{16}$ or $^1/_8$ in. The resinoid bonded diamond wheel is fast and cool cutting as well as wear resistant. The second type is made with a metal bond, which provides an exceptionally wear-resistant tool. These metal bonded diamond wheels are specially suited for offhand sharpening and reconditioning carbide single-point tools. Vitrified bonded diamond wheels combine fast cutting action with relatively low rate of wear in grinding and honing carbide tools and cutters of all types. 3 illustrations. P.G.

Optical lenses generated rapidly by Norton diamond wheels. ANON. *Grits and Grinds,* **36** [7] 12 (1945).—The edging and beveling of lenses, formerly done with slow cutting artificial abrasive wheels, is now being accomplished with fast cutting metal bonded diamond wheels more accurately and economically. Optical prisms for binoculars, range finders, and periscopes are ground at unbelievably fast rates on heavy-duty vertical spindle grinders. 1 illustration. P.G.

Proportioning of grinding coolants. J. R. LEONARD. *Grits and Grinds,* **36** [7] 8–9 (1945).—The correct proportioning of the coolant with water is of great importance. In a locality using soft water less compound can be used, while hard water will require more compound. Two examples are cited where the proportion of water to coolant was corrected and the grinding difficulty was overcome. The mixture was too rich, and the heat of grinding was not dissipated rapidly enough. The same effect is produced if the work is ground dry or if there is insufficient coolant flowing on the work. The change in temperature is slight, but it is sufficient to cause difficulty. P.G.

Should aircraft engine gears be ground? E. A. KOETHER. *Grits and Grinds,* **36** [8] 1–5 (1945).—K. studied the production methods, the effect of grinding on gears, and the relative effect of grinding on the endurance limit of gears and gear-tooth fatigue. The preparation of the gear blanks, distortion during heat-treatment, and the machining and grinding of the gears are described, special attention being given to the machining of gear teeth and shaved gears. Gear-tooth loads, cracked gears, control stresses, the importance of grinding wheels, and carburized parts are also dealt with. A study of gear tooth load cycles

shows that both at very low speeds and at very high speeds the extreme accuracy of the gears plays only a little part; between these two extremes, however, the accuracy of the gears is a most important factor. Honing, polishing, or abrasive blasting of underground gear roots to remove any decarburized surface is also extremely important. The proper selection of grinding wheels is important because soft wheels that cut freely and reduce the danger of burning may not hold their edge sufficiently to correctly blend the radii of curvature of the teeth with the root fillet. Hard wheels hold their edge better and grind the contour more accurately and with a finer surface finish, but they have a tendency to burn the gear teeth. To insure ample lubrication of the mating tooth surfaces, very heavily loaded gears are now being ground to 30 to 45 micro-in. r.m.s. surface finish. P.G.

Wheel-forming device—roll-mounted type. ANON. *Grits and Grinds*, **36** [7] 10–11 (1945).—The wheel-forming device is built on antifrictional principles, is easily mounted on the table, and uses a diamond for truing. Eccentric mountings of supporting rolls provide for preloading, thus maintaining rigidity of the moving member with ease of motion. Form angles up to 45° and form depths up to $1^1/_8$ in. are handled with high efficiency. Details and operation are shown in an isometric drawing. 2 illustrations. P.G.

PATENTS

Abrasive. S. S. KISTLER AND LORING COES, JR. (Norton Co.). Can. 431,665, Dec. 4, 1945 (June 8, 1943; in U. S. Aug. 12, 1942). G.M.H.

Abrasive article. JACOB KURTZ (Callite Tungsten Corp.). Can. 429,381, Aug. 14, 1945 (July 26, 1943; in U. S. Sept. 10, 1942). G.M.H.

Abrasive composition. HERMANN KOTT AND MURRAY YAWITZ (Fish-Schurman Corp.). Can. 429,291, Aug. 7, 1945 (April 29, 1944; in U. S. May 26, 1943). Can. 429,292, Aug. 7, 1945 (April 29, 1944; in U. S. July 9, 1943). G.M.H.

Abrasive tool. LEON NUSSBAUM (one half to Hatim Attari). Can. 430,454, Oct. 2, 1945 (March 27, 1944); see *Ceram. Abs.*, **1946**, Feb., p. 29. G.M.H.

Coated abrasive. H. P. KIRCHNER AND A. L. BALL (Carborundum Co.). Can. 428,530, July 3, 1945 (June 30, 1943; in U. S. July 15, 1942). G.M.H.

Diamond abrasive. G. R. REHNBERG (Norton Co.). Can. 431,666, Dec. 4, 1945 (March 28, 1944; in U. S. Sept. 23, 1943). G.M.H.

Forming means for profile grinding wheels. C. B. A. PORTER, C. P. SEYMOUR, AND PRODUCTION PLANNING & DESIGN, LTD. Brit. 573,877, Dec. 28, 1945 (Dec. 21, 1943).

Gear grinding machine. I. J. GRUENBERG AND S. G. BRADY (Gear Grinding Co.). U. S. 2,392,819, Jan. 15, 1946 (Jan. 24, 1944). 3 claims. Cl. 51–33.

Grinding or abrading machines. ASSOCIATED EQUIPMENT CO., LTD., AND A. A. J. FRANCIS. Brit. 573,392, Nov. 28, 1945 (Feb. 28, 1944).

Grinding machine–table indexing mechanism. C. J. GREEN (Norton Co.). U. S. 2,393,040, Jan. 15, 1946 (Feb. 17, 1944). 5 claims. Cl. 51–72.

Grinding wheel dressing device. GUSTAVE HELDING. U. S. 2,392,668, Jan. 8, 1946 (Oct. 2, 1943). 7 claims. Cl. 125-11.

Grinding wheel truing apparatus. H. A. SILVEN (Norton Co.). U. S. 2,393,937, Jan. 29, 1946 (Nov. 21, 1944). 7 claims. Cl. 125-11.

Method and device for grinding cooperating faces of friction members. J. COTAL. Brit. 573,926, Dec. 28, 1945 (June 24, 1939).

Method of making laminated abrasive articles. N. P. ROBIE AND R. G. ROWE (Carborundum Co.). U. S. 2,393,267, Jan. 22, 1946 (June 27, 1944). 7 claims. Cl. 51–297.

Porous abrasive article. H. R. HOUCHINS (Carborundum Co.). Can. 431,956, Dec. 18, 1945 (Feb. 28, 1944). G.M.H.

Precision grinder for tools, etc. E. C. SHUGARS. U. S. 2,392,780, Jan. 8, 1946 (Nov. 5, 1943). 6 claims. Cl. 51-218.

Reinforced abrasive article. W. M. WHEILDON, JR. (Norton Co.). Can. 429,179, July 31, 1945 (March 30, 1944; in U. S. July 1, 1943). G.M.H.

Sheeted abrasive article. B. S. CROSS (Minnesota Mining & Mfg. Co.). Can. 430,553, Oct. 9, 1945 (Jan. 30, 1936). G.M.H.

Sizing device for grinding machines, etc. R. H. CRAMER (General Motors Corp.). U. S. 2,392,836, Jan. 15, 1946 (July 3, 1942). 4 claims. Cl. 51-165.

Wheel-truing device. R. A. MAHLMEISTER (Sheffield Corp.). U. S. 2,392,332, Jan. 8, 1946 (March 15, 1944). 5 claims. Cl. 125-11.

Art and Archeology

Earliest chapter in the story of Mesopotamia. SETON LLOYD. *Illus. London News*, **117** [3042] 163–65 (1945).—Excavations by the Iraq government at Tell Hassuna south of Mosul have uncovered, at the bottom of 7 m. of stratified deposits, the earliest settlement yet found in Mesopotamia. It is thought to date from the beginning of the 5th millennium B.C. Coarse Neolithic pottery was found in the lowest level, and above it occurred painted, scratched, and burnished ware of the Ninevite type followed by the scarcely known Samarra type, with Tell Halaf pottery, heretofore among the oldest known in Mesopotamia, in the uppermost strata. In each level a village plan was recognized and the domestic assemblage of a farming community appeared. 14 illustrations. F.R.M.

Earliest Islamic paintings yet found in Iran: excavations at Nishapur reveal the influence of T'ang China upon Khurusan potters. ANON. *Illus. London News*, **106** [2761] 390–91 (1940).—Fragments of brightly decorated plaster and fine polychrome pottery were discovered by the expedition of the Metropolitan Museum of Art. 8 illustrations, 4 in color. See *Ceram. Abs.*, **18** [11] 289 (1939). F.R.M.

Egyptian queen's curtain box reconstructed from 5000 year old dust and fragments. R. A. REISNER. *Illus. London News*, **105** [2743] 757–58 (1939).—A wooden box 157.4 cm. long inlaid with faience on sheets of gold and silver, found in the 4th-dynasty tomb of Queen Hetep-Heres, was painstakingly reconstructed. 8 illustrations. F.R.M.

Engraving tool. ANON. *New Equipment Digest*, **10** [12] 29 (1945).—A vibrating tool for engraving, routing, carving, chiseling, peening, hammering, and cutting plastics, fiber, glass, gasket materials, and thin metal is described. Powered from a light socket, the tool delivers 7200 power strokes per min. It is made by the Electro-Mag Mfg. Co., Rockford, Ill. F.C.A.

Mighty entrepôt of ancient civilizations: the north Syrian kingdom of Ugarit as a center of intellectual life in the 2d millennium B.C., with Aegean meeting Egyptian influences. CLAUDE F. A. SCHAEFFER. *Illus. London News*, **105** [2749] 973–75 (1939).—The ninth expedition of Ras Shamra in Syria, the capital city of ancient Ugarit, found pottery showing foreign influence and stratified ceramic deposits in family tombs that were of much chronological importance. 18 illustrations. F.R.M.

Mines where the Mycenaeans got their copper discovered in Cyprus. J. DU PLAT TAYLOR. *Illus. London News*, **106** [2757] 251 (1940).—Late Bronze Age pottery found in a prospecting trench by the Cyprus Mines Corp. led to the discovery of Bronze Age houses and the shafts of the ancient mines. 7 illustrations. F.R.M.

Minoan influences in a Hittite city: discoveries in a palace of the second millennium B.C. at Alalakh in Syria.

LEONARD WOOLLEY. *Illus. London News*, **105** [2745] 833–35, 842 (1939).—Pottery like that made in Crete during the Bronze Age was found in Tell Atchana in the Hittite city. 19 illustrations. F.R.M.

New light on pre-Homeric Mycenae: recent excavations reveal remarkable pottery and the loveliest Mycenaean ivory ever found. A. J. B. WACE. *Illus. London News*, **105** [2747] 903–905, 916 (1939).—The recent work adds greatly to the understanding of the palace, houses, and cemetery of this site. 7 illustrations. F.R.M.

News from Armageddon: two important sites throw new light on Palestine in the second millennium and reveal Megara reminiscent of Troy. GORDON LOUD. *Illus. London News*, **105** [2744] 794–95 (1939).—Buildings and ceramic fragments consisting mainly of red burnished wheel-made and buff handmade ware were excavated in middle and late Bronze Age strata at Megiddo in northern Palestine. 18 illustrations. See *Ceram. Abs.*, **18** [8] 202 (1939). F.R.M.

On the threshold of history in central Europe: the tombs of rulers of a settlement which lasted from Neolithic to Roman times discovered in western Hungary. EUGEN LÁZÁR. *Illus. London News*, **106** [2752] 91–93 (1940).—Pottery of the Halstatt period (1000 to 500 B.C.) is described together with other objects found in the tombs. 17 illustrations. F.R.M.

Surface decoration on terra sigillata and on Greek black-painted vases. E. F. PRINS DE JONG AND A. J. RIJKEN. *Amer. Ceram. Soc. Bull.*, **25** [1] 5–7 (1946).—7 references.

"Treasury of Atreus" discoveries: the genius of a Bronze Age master builder; mason marks of 1500 B.C. A. J. B. WACE. *Illus. London News*, **105** [2748] 942–43 (1939).—Several thousand pottery fragments found beneath the walls and near the dome of the "Treasury," dating from 1450 to 1350 B.C., indicate that the structure cannot be earlier than 1350 B.C. 7 illustrations. See *Ceram. Abs.*, **20** [1] 5 (1941). F.R.M.

PATENTS

Bottle design. PRODUCTS DEVELOPMENT, INC. Can. 14,223, Aug. 27, 1945. PARLANE CHRISTIE. Can. 14,262, Sept. 12, 1945. G.M.H.

Glass lotion bottle design. 303 CHEMICAL CO., LTD. Can. 14,307, Sept. 26, 1945. G.M.H.

Tableware design. DOMINION GLASS CO., LTD. Can. 14,098, May 29, 1945. G.M.H.

Cements

Lime plant operator. W. G. BAUER. *Pit and Quarry*, **38** [6] 77–78 (1945).—B. compares fuel costs in lime burning and discusses heat values, kiln efficiencies, fixed charges, and heat cost. A table gives kiln efficiencies and costs for different fuels. The fuels listed include lignite, subbituminous coal, bituminous coal, coal gas, cut wood, hogged fuel, fuel oil, natural gas, oil, coke, and pitch. M.R.

New cement and concrete institute to be inaugurated in Sweden. ANON. *Cement, Lime & Gravel*, **19** [10] 352 (1945).—This new institute, the latest addition to the "City of Science" near the University of Technology, Stockholm, will be opened in March, 1946. It will specialize in research on cement and concrete constructions and has been set up with funds given by Skanska Cement A.B. L.C.C.

Portland cement—new French method. ANON. *Chem. Age*, **53** [1378] 49 (1945).—M. Dicharry, working under the auspices of the National Federation of Building Workers, has invented a process of Portland cement manufacture without using coal. The new process involves the use of all the calcareous or argillaceous waste thrown out of the mines, as well as the soot, dross, and clinker emanating from coal combustion. M. Dicharry has drafted a program of "rational reorganization of the French cement industry," with the support of the Government. A.B.S.

Rotary kiln. T. WATERFALL. *Cement, Lime & Gravel*, **19** [11] 385–87 (1945).—In general construction and operating principles, the rotary kiln designed for lime production closely resembles the cement kiln. To produce the maximum kiln temperature of 1315°C., 22 to 30 tons of coal are required for 100 tons of cement clinker. Valuable advances in kiln feeding in recent years include the use of rotary slurry filters, which provide a filter cake containing about 20% water for feeding to the kiln, and the use of slurry lifters, which are often made of Ni-Cr stainless steel. In general, the kiln lining requires renewal at least once a year, but good practice and care will often prolong its life. Improved cooler design and scientific control of air supply to the kiln lead to increased efficiency. See *Ceram. Abs.*, **24** [8] 149 (1945). L.C.C.

Theory and practice of rotary kiln operation in the manufacture of Portland cement. ANON. *Pit and Quarry*, **38** [2] 71–74; [3] 83–86, 93; [4] 76–78; [5] 91–93, 95 (1945).—The fundamentals of Portland cement manufacture are first discussed, including chemical composition, latent and specific heat, kiln fuels, and calculations of heat and heat losses. Next the composition of Portland cement clinker made from limestone and clay is considered. Heat transfer in rotary kilns is then taken up, and "heat transfer efficiency," the shape of kilns, and kiln operation are discussed at length. The burning zone, rate of coal delivery, air ratio, air temperature, velocity of coal entering kiln, coal fineness and coal dryness, and volatile matter are also discussed. 1 diagram, 18 photographs. M.R.

SEPARATE PUBLICATIONS

Cement Finishes. Draft for comment of proposed British Standard Code of Practice, Code 2.24. British Standards Inst., London, 1945. Price 2*s*.—Various cements and backing and finishing coats are defined, and instructions are given for preparing and applying the finishes. A.B.S.

Lime Plastering. Draft for comment of proposed British Standard Code of Practice, Code 2.22. British Standards Inst., London, 1945. Price 2*s*.—This code deals with the use of nonhydraulic and quick-hardening lime, magnesian lime for backing and finishing coats, and hydraulic and quick-hardening limes. Definitions of various kinds of lime are included. The preparation of various backings, the slaking of quicklime, and the making of lime putty are described. The application of the various coats (according to composition) is also described. The preparation of surfaces to receive plaster is the subject of Code 2.21. A.B.S.

PATENTS

Acid-resistant cement and concrete. ROBERT WARD (Canadian Industries, Ltd.). Can. 431,358, Nov. 20, 1945 (Dec. 18, 1940). G.M.H.

Cement composition. G. F. HOGG (Hercules Powder Co.). Can. 431,649, Dec. 4, 1945 (May 4, 1943; in U. S. June 26, 1942). G.M.H.

Cement manufacture. PIERRE COIFFU (Société des Ciments Français et des Portland de Boulogne-sur-Mer et Compagnie des Portland de Desvres). Can. 432,483, Jan. 8, 1946 (March 31, 1934; in France, April 25 and 26, 1933). G.M.H.

Hydraulic cement. O. T. ZIMMERMAN (Kerr Dental Mfg. Co.). Can. 431,515, Nov. 27, 1945 (Dec. 22, 1943; in U. S. Feb. 1, 1943). G.M.H.

Set stabilized plaster. DEAN D. CRANDELL (National Gypsum Co.). Can. 428,703, July 10, 1945 (June 23, 1944). G.M.H.

Enamel

Some interesting properties of titanium steels. GEORGE F. COMSTOCK. *Jour. Amer. Ceram. Soc.*, **29** [1] 1–7 (1946).—6 references, 4 figures.

PATENTS

Cooking utensil enameling method. R. S. COBB AND W. B. MOORE (Moore Enameling & Mfg. Co.). Can. 430,432, Oct. 2, 1945 (April 22, 1943; in U. S. April 23, 1941). G.M.H.

Vitreous enamel. L. C. ATHY AND P. C. STUFFT (Pemco Corp.). Can. 431,062, Nov. 6, 1945 (Sept. 16, 1944). G.M.H.

Vitreous enamels and compositions for their preparation and methods of enameling therewith. C. E. EVERY (Titanium Alloy Mfg. Co.). Brit. 573,449, Dec. 5, 1945 (Dec. 13, 1943).

Glass

Fiberglas blankets enhance comfort of Capitaliner passengers. ANON. *Amer. Ceram. Soc. Bull.*, **25** [1] 9 (1946).

Flow lines in a continuous melting glass furnace as determined by cobalt oxide and pictured on color photographs. VERNON W. LENZ. *Jour. Amer. Ceram. Soc.*, **29** [1] 8–15 (1946).—19 figures.

Geometrical considerations in glass. B. E. WARREN. *Jour. Soc. Glass Tech.*, **24** [105] 159–65 (1940).—Geometrical considerations can be applied to calculate a composition at which anomalies appear in the soda-boric oxide system. The soda-silica system and immiscibility in the lime-silica system can be explained through these geometrical considerations. Boric oxide ordinarily takes a three-fold coordination. With a low soda content enough oxygen is provided to change boron atoms to tetrahedral coordination. Above the calculated composition there are enough unsaturated oxygens to provide surroundings for Na^+ ions and no more boron goes to the tetrahedral coordination. W.R.B.

Light travels fast through new glass. ANON. *Science News Letter*, **48** [21] 328 (1945).—A new type of glass in which beryllium fluoride is substituted for silicon dioxide lets light go through at a higher speed than any other known glass. This glass, being hygroscopic, is at present unsuitable. G.A.K.

Relation of fineness to physical requirements. A. H. M. ANDREASEN. *Jour. Soc. Glass Tech.*, **24** [105] 166–75 (1940).—Fineness is considered in relation to homogeneity or to the attainment of a desired texture. Glassmaking and the manufacture of refractories need good control of grain size for a consistently good product. Grading relationships, covering capacity, and dust-raising capacity are considered. 11 curves. See "Fineness . . . ," *Ceram. Abs.*, **19** [7] 176 (1940). W.R.B.

Softening point of glass. J. T. LITTLETON. *Jour. Soc. Glass Tech.*, **24** [105] 176–85 (1940).—The fiber-extension method and the thermal-expansion method are the bases of two generally accepted definitions of softening point. The fiber-extension method gives much more information as to the melting and working characteristics of the glass than does the interferometer thermal-expansion method. Comparative results are shown. W.R.B.

Use of standard disks in the strain testing of glassware. E. J. GOODING. *Jour. Soc. Glass Tech.*, **24** [105] 186–96 (1940).—Glass disks with standardized degrees of strain have been used at various bottle and glass factories. G. correlates the observations of different sources. Four types of strain viewers have been used. It is concluded that the method of using a standard disk is best employed in conjunction with a strain viewer having a large, uniformly illuminated field of view, with uniform polarization. The method is simple and trustworthy but is not particularly suited for use with colored bottles. See *Ceram. Abs.*, **18** [5] 126 (1939). W.R.B.

PATENTS

Apparatus for recording temperature. H. W. RUSSELL AND C. F. LUCKS (Anchor Hocking Glass Corp.). U. S. 22,709, Jan. 15, 1946 (Oct. 18, 1945); reissue of original U. S. 2,377,376 (*Ceram. Abs.*, **24** [7] 124 (1945). 3 claims. Cl. 234-1.5.

Barium glass having low power factor. W. H. ARMISTEAD, JR. (Corning Glass Works). U. S. 2,393,449, Jan. 22, 1946 (July 11, 1944). 6 claims. Cl. 106-54.—1. A glass having a power factor less than 0.07%, a dielectric constant greater than 4, a temperature coefficient less than 100 p.p.m. per °C., and a softening point less than 800°C., consisting of compounds of barium, aluminum, boron, and silicon in proportions equivalent to 10 to 30 BaO, 5 to 20 Al_2O_3, 22 to 80 B_2O_3, and 0 to 55% SiO_2.

Barium-lead glass having low power factor. W. H. ARMISTEAD, JR. (Corning Glass Works). U. S. 2,393,450, Jan. 22, 1946 (July 11, 1944). 6 claims. Cl. 106-53.—1. A glass having a power factor less than 0.07%, a dielectric constant greater than 4, a temperature coefficient less than 100 p.p.m. per °C., and a softening point less than 800°C., consisting of compounds of lead, barium, aluminum, boron, and silicon in proportions equivalent to 0 to 50 SiO_2, 5 to 15 Al_2O_3, 10 to 75 B_2O_3, and 10 to 40% (PbO + BaO), the ratio PbO/BaO being at least 3 when the total PbO and BaO is near 40%.

Eye-protecting glass. H. P. HOOD (Corning Glass Works). Can. 430,915, Oct. 30, 1945 (Nov. 1, 1943; in U. S. Dec. 28, 1942). G.M.H.

Fine glass fiber manufacture. GAMES SLAYTER (Fiberglas Canada, Ltd.). Can. 430,523, Oct. 9, 1945 (May 20, 1943; in U. S. May 20, 1942). G.M.H.

Fluorescent glass and lamp made therefrom. J. G. HOOLEY (Corning Glass Works). U. S. 2,393,469, Jan. 22, 1946 (Aug. 3, 1942). 1 claim. Cl. 176–122.—An envelope for a mercury vapor arc lamp comprising a silicate glass envelope having on its inner surface a transparent vitreous layer of a phosphate glass which consists of P_2O_5, Al_2O_3, Ce_2O_3, and an oxide of a metal of the second periodic group having an atomic weight not exceeding 138, the ratio of P_2O_5 to second group oxide being greater than 1 but not greater than 4.

Fluorescent lamp. C. G. SMITH (Raytheon Mfg. Co.). Can. 428,283, June 19, 1945 (Jan. 2, 1943; in U. S. Feb. 24, 1942). G.M.H.

Glass article reshaping apparatus. D. E. GRAY (Corning Glass Works). Can. 430,914, Oct. 30, 1945 (Dec. 19, 1942; in U. S. Dec. 9, 1941). G.M.H.

Glass article tempering means. H. R. KIEHL (Corning Glass Works). Can. 430,971, Oct. 30, 1945 (June 11, 1941; in U. S. Aug. 3, 1940). G.M.H.

Glass container improving method. ERIC SEDDON (United Glass Bottle Manufacturers, Ltd.). Can. 428,876, July 17, 1945 (Dec. 14, 1943; in Great Britain Jan. 25, 1943). G.M.H.

Glass-fiber strand. L. P. BIEFELD (Owens-Corning Fiberglas Corp.). U. S. 2,392,805, Jan. 15, 1946 (Oct. 11, 1943). 12 claims. Cl. 28–60.—4. A fibrous strand composed of a multiplicity of glass fibers, the fibers whereof are coated with a material containing dodecyltrichlorosilicane in amounts sufficient to lubricate and protect the fiber surfaces against mutual abrasion, and a resin distributed over the fibers in amounts sufficient to bind them together into an integral body, the resin containing an organosilicon compound containing organic groups attached to silicon atoms through direct carbon linkage.

Glass-filament manufacture. A. L. SIMISON AND E.

FLETCHER (Fiberglas Canada, Ltd.). Can. 430,418, Oct. 2, 1945 (March 26, 1943). G.M.H.

Glass-to-metal seal. A. J. MONACK (Radio Corp. of America). Can. 431,262, Nov. 13, 1945 (Jan. 2, 1943). G.M.H.

Glass-to-metal seal. R. H. DALTON (Corning Glass Works). U. S. 2,392,314, Jan. 8, 1946 (March 2, 1943). 4 claims. Cl. 106–54.—1. A glass of high electrical resistivity and chemical durability which consists of approximately 67 to 67.5 SiO_2, 15 to 16 B_2O_3, about 7.5 Al_2O_3, 1 to 3 Na_2O, 3 to 5 K_2O, about 1 Li_2O, and about 3% BaO, the electrical resistivity at 350°C. being over 9 megohms per cm. cube, the setting point temperature of the glass being about 460°C., and its specific elongation between 25° and 460°C. being about 2.4×10^{-3} parts per unit length.

Glass product making apparatus. J. A. HOFFMAN (Dominion Oxygen Co., Ltd.). Can. 432,128, Dec. 25, 1945 (July 21, 1942). G.M.H.

Glass-tempering apparatus. W. R. WISNER (Corning Glass Works). Can. 430,913, Oct. 30, 1945 (Dec. 16, 1942; in U. S. Dec. 11, 1941). G.M.H.

Glass-tempering method. W. W. SHAVER (Corning Glass Works). Can. 430,911, Oct. 30, 1945 (Nov. 21, 1941). G.M.H.

Glass thread or glass silk manufacture. FELIX NEUMANN. Can. 429,917, Sept. 11, 1945 (March 16, 1944; in Great Britain May 24, 1943). G.M.H.

Glassware-forming machine. C. C. KINKER (O'Neill Patents, Ltd.). Can. 430,819, Oct. 23, 1945 (Dec. 4, 1942). G.M.H.

Glassworking apparatus. A. F. CASLER AND J. J. SALO (Canadian General Electric Co., Ltd.). Can. 429,976, Sept. 11, 1945 (Sept. 30, 1943). G.M.H.

Hollow glassware manufacturing system. ALPHONSE WYSS. Can. 431,153, Nov. 13, 1945 (Sept. 13, 1943; in Switzerland Sept. 16, 1942). G.M.H.

Lead glass having low power factor. W. H. ARMISTEAD, JR. (Corning Glass Works). U. S. 2,393,448, Jan. 22, 1946 (July 11, 1944). 6 claims. Cl. 106–53.—1. A glass having a power factor less than 0.07%, a dielectric constant greater than 5, a temperature coefficient less than 100 p.p.m. per °C., and a softening point less than 800°C., consisting of compounds of lead, aluminum, boron, and silicon in proportions equivalent to 20 to 40 PbO, 5 to 15 Al_2O_3, 5 to 65 B_2O_3, and 10 to 50% SiO_2.

Lens manufacture. H. R. MOULTON (American Optical Co.). Can. 427,952, June 5, 1945 (June 7, 1944). G.M.H.

Lens-molding press. C. V. SMITH (Univis Lens Co.). Can. 429,725, Aug. 28, 1945 (Jan. 2, 1941; in U. S. Oct. 29, 1940). Can. 429,726, Aug. 28, 1945 (June 3, 1941; in U. S. Feb. 24, 1941). Can. 429,727, Aug. 28, 1945 (March 23, 1942; in U. S. April 28, 1941). G.M.H.

Method and apparatus for molding glass articles. H. K. RICHARDSON, F. A. NEWCOMBE, AND A. H. LAIDIG (Westinghouse Electric Corp.). U. S. 2,393,265, Jan. 22, 1946 (April 30, 1938). 23 claims. Cl. 49–5.

Method of forming siliceous bodies. G. J. BAIR (Norbert S. Garbisch). U. S. 2,392,568, Jan. 8, 1946 (Nov. 16, 1940). 4 claims. Cl. 49–85.—1. A process of forming a strong dense body from a mixture of finely divided silica and glass, which comprises compacting the mixture in a mold while it is heated to a temperature above that of sintering of the glass and below that of sintering of the silica by a series of strong hammerlike blows, the glass content of the mixture being insufficient to form a continuous plastic phase.

Mineral wool producing apparatus. J. R. PARSONS (Canadian Gypsum Co., Ltd.). Can. 429,388, Aug. 14, 1945 (March 13, 1941). G.M.H.

Mold for glassware. J. C. WEBER, JR. (West Virginia Glass Specialty Co., Inc.). U. S. 2,392,561, Jan. 8, 1946 (June 18, 1943). 3 claims. Cl. 49–71.

Optical lens centering machine. P. N. DAWSON. Can. 430,726, Oct. 23, 1945 (Nov. 18, 1943). G.M.H.

Process for producing bent laminated safety glass. J. D. RYAN AND G. R. ZOLMAN (Libbey-Owens-Ford Glass Co.). U. S. 2,392,770, Jan. 8, 1946 (Feb. 27, 1942). 7 claims. Cl. 49–67.

Structural Clay Products

Brick and tile production. ANON. *Amer. Ceram. Soc. Bull.*, **25** [1] 29 (1946).

SEPARATE PUBLICATION

Clay Flue Linings and Chimney Pots [for open fires]. British Standard Specification No. 1181—1944. British Standards Inst., London, 1945. Price 2*s*.—Two patterns of flue linings are specified, one square and the other circular in plan; the former fits a 9- x 9-in. opening, and the latter an opening 9.5 in. in diameter. The specification deals with dimensions and workmanship only. No clauses requiring durability have been included; they were regarded as unnecessary. Straight flue linings are $11^5/_8$ in. long; curved linings are $15^7/_8$ or $10^3/_{16}$ in. in height when measured vertically. A tolerance of 0.25 in. in the length and of 0.125 in. in the diameter is allowed. Divergence from straightness shall not exceed 0.25 in. Chimney pots are to be made of fire clay or terra cotta. There are three patterns: (*a*) square base with rounded corners, (*b*) circular base, and (*c*) square base to fit on flues not provided with linings. The dimensions are as follows:

	a	*b*	*c*
Length	12, 16, 24, 36	12, 18, 24, 36	12, 18, 24, 36
Base (ext.)	8.5 x 8.5 in.	9 in. diam.	10 x 10 in.
Diameter at top (int.)	6 in.	6 in.	6 in.
Min. wall thickness	0.5 in.	0.5 in.	0.5 in.

Tolerance: length 0.25 in., diameter 0.125 in. A.B.S.

PATENTS

Brick-molding method and apparatus. E. G. COWAN AND J. M. CODER (General Refractories Co.). Can. 429,687, Aug. 28, 1945 (May 22, 1944). G.M.H.

Clay processing. A. D. GARRISON AND K. C. T. BRINK (Texaco Development Corp.). Can. 427,890, May 29, 1945 (April 14, 1942; in U. S. Nov. 6, 1941). G.M.H.

Hollow building block. JAMES ROE (one half to Albert Kahn). U. S. 2,392,552, Jan. 8, 1946 (May 10, 1943). 8 claims. Cl. 72–41.—1. A building block comprising a hollow tube of substantially uniform thickness, and a load-sustaining element comprising a plate entirely within and extending transversely of the tube.

Interlocking building block. JAMES ROE (one half to Albert Kahn). U. S. 2,392,551, Jan. 8, 1946 (May 10, 1943). 7 claims. Cl. 72–38.—1. A wall structure comprising a series of superposed courses of building blocks, matching keyways in certain adjacent blocks in a course, keys in the keyways locking the adjacent blocks together, each of the keys extending from one course into and fitting snugly within an opening in a block of an adjacent course.

Refractories

Alabama flake graphite in World War II. HUGH D. PALLISTER AND RICHARD W. SMITH. *Amer. Inst. Mining Met. Engrs. Tech. Pub.*, No. 1908; *Mining Tech.*, 9 [4] 11 pp. (1945).—The Alabama flake graphite industry has flourished only in times of war when importation of foreign flake graphite for crucibles has been greatly curtailed. In

1918, 30 plants produced 7,800,000 lb. of flake. None was produced between 1929 and 1939. The U. S. Bureau of Mines investigated the graphite deposits and worked out a flotation concentration method. Prospecting showed reserves of 25,000,000 tons of graphitic schists. In 1943 three plants produced 8,000,000 lb. Increased imports from Madagascar late in 1943 curtailed production again. The future of the industry depends on meeting the high carbon content for other uses rather than flake for crucibles. Suggested uses are in foundries, dry cells, and lubricants. 8 figures, 3 references. W.D.F.

Alumina from clays. D. D. HOWAT. *Chem. Age*, **53** [375] 406 (1945).—In discussing the future of the chemical industry in South Wales, H. says that a development urgently awaited is the extraction of alumina from clays and shales to replace the present requirements of imported bauxite. Progress in the U. S. has been much faster than in Wales, one process having reached commercial operation. Two methods have been proposed, one involving sintering with additions of lime and soda and the other a sulfuric acid extraction process. Either could be employed in South Wales, but probably the sintering process would be favored in view of the supplies of coke fines for the sintering operation. Imports of bauxite ore will have to be continued for the present, the materials being purified in the Bayer plant. Insufficient data exist in Wales to yield an accurate analysis of the relative cost of the Bayer process and that of one of the new clay-extraction processes. Fundamentally, the Bayer process is costly and difficult, involving the consumption of 1.5 to 2 tons of coal for each ton of purified alumina plus the expenditure of foreign currency in purchasing the ore as well as freight charges. An immediate investigation on a pilot-plant scale should be made of the new process reported from the U. S. for the use of naturally occurring clays and shales as sources of alumina. A.B.S.

Coke-oven and blast-furnace plants. J. H. PATCHETT. *Iron & Coal Trades Rev.*, **151** [4060] 979–84, 996 (1945).—Recent trends, present practice, and future developments are discussed in a presidential address to the Cleveland Institution of Engineers (England). M.HA.

Density of open-hearth bottoms. R. B. SNOW. *Blast Furnace Steel Plant*, **33** [11] 1394–97 (1945).—A satisfactorily dense hearth can be built with fine magnesite and fine clay; it can compete with rammed earth. Thorough firing of bottoms has a tendency to produce shrinkage cracks. Densities of core samples from several furnaces are tabulated. B.L.

Dolomite linings for basic electric arc furnaces. E. C. BRAMPTON, H. PARNHAM, AND J. WHITE. *Jour. Iron & Steel Inst.* [London], Advance copy, **1945**, 32 pp.; *Iron & Coal Trades Rev.*, **151** [4058] 891–96; [4060] 991–93 (1945).—The most important part of a basic electric arc furnace is the refractory lining, as it determines the temperature attainable. The factors that influence the life and performance of the refractory were therefore the object of an exhaustive investigation. They are as follows: (1) the nature of the source of the intense heat and the relative close proximity of the arcs to the side-wall and roof refractories (temperatures of 3500° to 4000°C. exist with the extremely intense radiation); (2) the intermittent nature of the heating and the relatively frequent alternations of heating and cooling periods (chiefly because of the small size of these furnaces, cooling and heating tend to be rapid, causing thermal stresses); (3) frequent alternations between oxidizing and reducing conditions; (4) the large proportion of fluorspar used relative to the weight of slag (with consequently considerable evolution of fluorine from the slag accelerating the wear of siliceous refractories); (5) volatilization of fluxes (mainly of iron oxide in the vicinity of the arcs, particularly during the oxidizing period); (6) the high proportion of alloy steels usually made in basic electric furnaces, which often necessitates higher bath and slag temperatures than normal, often held for fairly long periods (with consequent excessive melting and fluxing of roof and walls). Brick made from a stabilized dolomite clinker are used especially under the hearths of basic electric furnaces in place of magnesite, but, in general, they are not sufficiently slag-resistant at high temperatures in the more exposed positions. A semistable dolomite was developed (S.S.D.) which could also be used successfully in the exposed positions, and magnesite was therefore no longer required except for skewbacks of silica arches (where used). S.S.D. withstood continuous operation at a bath temperature of 1725° to 1750°C. In addition to basic side walls, experiments were also made with a basic roof and charging and tapping door arches and jambs, all constructed of S.S.D. brick in suitable shapes. The roof lasted 57 complete heats, and the wear was mainly due, not to fluxing at the working face, but to a periodical flaking or splitting-off of the working face, generally in pieces 1 to 2 in. thick. This performance is considered promising, as the roof was markedly superior to silica in respect to refractoriness and resistance to fluxing and could be run at a much higher temperature than silica without melting. A dolomite roof will also materially increase the life of the dolomite side walls. A questionnaire among operators indicated that rammed dolomite of widely varying thickness is used extensively for the actual hearth. Magnesite, chrome-magnesite and 100% dolomite, and stable dolomite are used under the hearth. No definite relationship appears to exist between wall thickness and furnace capacity; 9-in. walls are used in 7- to 15-ton furnaces, 12-in. walls in 8- to 12-ton furnaces, and 13.5-in. walls in 3- to 10-ton furnaces. If silica is used for door arches or jambs in conjunction with dolomite-brick walls, it is necessary to insert a layer of chrome-magnesite brick between the two materials to prevent reaction and fluxing. In using S.S.D. brick, cutting or mechanical abuse during installation should be avoided as much as possible, as these brick rely on tar impregnation for protection against hydration by the atmosphere. In the discussion, many additional points on performance and recommendations for practical purposes are given and discussed. M.HA.

Electric-furnace alumina cement for high-temperature concrete. G. R. POLE AND D. G. MOORE. *Jour. Amer. Ceram. Soc.*, **29** [1] 20–24 (1946).—11 references, 4 figures.

Furnace refractory problems. P. J. MADDOX. *Nat. Engr.*, **49** [12] 864, 875 (1945).—M. discusses problems faced by furnace operators. Many of these were solved by selection of the proper type of refractory; others were solved by making up some structural defect of the furnace by means of the refractory. Furnace operators are urged to avail themselves of the cooperation offered by refractory manufacturers through their service engineers. These engineers can advise small operators who have no engineering departments to rely upon. By utilizing this service small operators will place themselves on a par with the larger operators. 1 photograph. M.R.

Graphite for manufacture of crucibles. G. RICHARDS GWINN. *Amer. Inst. Mining Met. Engrs. Tech. Pub.*, No. 1909; *Mining Tech.*, **9** [4] 4 pp. (1945).—Before the war graphite was imported from Madagascar or Ceylon. Other commercial deposits were in Chosen, the U.S.S.R., Canada, Germany, Mexico, and the U. S. A small amount of clay is used in the crucible as a binder. Ceylon produces a granular product, while Madagascar produces a flake. This flake is better for crucibles. Large flakes are better as they are thicker, with less surface per unit weight and a slower burning rate, and can be oriented more nearly correctly in the crucible. Toughness is almost as important as size. Domestic graphite should be sized more carefully to reduce packing volume and also mixed more gently. W.D.F.

Testing of chrome-magnesite brick for resistance to iron oxide bursting. S. ZERFOSS AND H. M. DAVIS. *Jour. Amer. Ceram. Soc.*, **29** [1] 15–20 (1946).—13 references, 3 figures.

Zinc smelting and refining. W. H. DENNIS. *Mine & Quarry Eng.*, **10** [9] 211–20 (1945).—D. reviews present-day practice, with a special note on the use of refractories. Details are given of metallurgical considerations involved in zinc oxide reduction, the advantages and disadvantages of fire clay, silica, and silicon carbide for use in retorts, roasting and sintering, horizontal retorting, furnaces and

retorts, distillation, vertical retorting, preparation of the mix, coking, gas circulation, and refining. L.C.C.

SEPARATE PUBLICATION

[Bauxite Substitute] Chrome Ulcerations. Annual Report of Chief Inspector of Factories. H. M. Stationery Office, London. Price 1*s.* 6*d.*—Three cases of ulceration were due to the unsuspected use of sodium bichromate to overcome a temporary shortage of natural bauxite. This particular hazard ceased when the bauxite again became available, but it could have been anticipated and controlled by the usual measures. Shortly afterwards, a non-irritating substitute for the bichromate was found. In 1940, seven cases due to exposure to a chromium oxide were found; last year eight cases were reported. Local exhaust ventilation was found to be faulty (partly owing to corrosion), and the cases ceased when the ventilation was made effective. A.B.S.

PATENTS

Alumina preparation from clay. R. J. DAVIES, H. E. DERING, AND T. W. PARKER (English Clays, Lovering, Pochin & Co., Ltd.). Can. 430,795, Oct. 23, 1945 (Dec. 16, 1942). G.M.H.

Cast-refractory production. T. E. FIELD AND H. T. SMYTH (Corhart Refractories Co.). Can. 432,124, Dec. 25, 1945 (July 17, 1941). G.M.H.

Dead-burned magnesia. R. D. PIKE (Harbison-Walker Refractories Co.). Can. 428,559, July 3, 1945 (Aug. 13, 1942; in U. S. Sept. 6, 1941). G.M.H.

Furnace wall. W. B. YOUNG (Chicago Fire Brick Co.). Can. 430,518, Oct. 9, 1945 (Sept. 27, 1944). G.M.H.

Graphite article. R. J. THRUNE (Dow Chemical Co.). Can. 428,259, June 19, 1945 (July 30, 1943). G.M.H.

Manufacture of products from refractory material. BASIC REFRACTORIES, INC. Brit. 573,943, Dec. 28, 1945 (Feb. 19, 1943).

Manufacture of refractories. BASIC REFRACTORIES, INC. Brit. 573,410, Dec. 5, 1945 (Sept. 2, 1942). Brit. 573,939, Dec. 28, 1945 (May 26, 1942).

Preparation of refractories. R. A. SCHOENLAUB (Corhart Refractories, Inc.). Can. 432,393, Jan. 8, 1946 (June 21, 1943; in U. S. May 26, 1942). G.M.H.

Process for the liberation of the magnesia of magnesium silicates. W. H. MACINTIRE (American Zinc, Lead & Smelting Co.). U. S. 2,393,920, Jan. 29, 1946 (May 28, 1942). 7 claims. Cl. 23-201.—1. The process which comprises the steps of mixing a finely divided material of the group consisting of burned and unburned calcic carbonate and dolomitic materials with a finely divided mineral magnesium silicate and calcining the mixture at a temperature between about 850° and 1100°C. in an atmosphere of steam, the proportions of the mixture being such as to induce liberation of the MgO content of the silicate.

Refractory coating material. W. M. DUMMETT AND H. H. YORK (H. H. York). Can. 432,326, Jan. 1, 1946 (Oct. 7, 1943; in Australia Oct. 21, 1942). G.M.H.

Refractory composition. EUGENE WAINER (Titanium Alloy Mfg. Co.). Can. 432,465, Jan. 8, 1946 (Dec. 13, 1944). G.M.H.

Refractory manufacture. R. H. HEARING (Basic Refractories, Inc.). Can. 432,392, Jan. 8, 1946 (June 8, 1943). G.M.H.

Refractory material. LISLE HODNETT (Canadian Refractories, Ltd.). Can. 429,272, Aug. 7, 1945 (Feb. 25, 1942). G.M.H.

Terra Cotta

Fire-clay bases for open fires. ANON. *Brit. Standards Inst. Monthly Information Sheet,* **1945,** Oct., p. 2.—British Standard Specification 1074—1942, relating to fire-clay bases for open fires, has now been cancelled. A.B.S.

SEPARATE PUBLICATIONS

Fire-Clay Sinks. British Standard Specification No. 1206–1945. British Standards Inst., London. Price 2*s.*—Fire-clay sinks shall be made of glazed fire clay and shall be sound, of good workmanship, and free from crazing and dunts. There shall be two patterns: (1) reversible sinks without shelves in two over-all sizes, (*a*) 30 x 18 x 10 in. and (*b*) 24 x 18 x 10 in.; (2) sinks with back shelves in the same sizes. They shall be of one-piece construction with a combined overflow and designed with a fall to the outlet so as to drain completely. The walls shall be approximately 1.5 in. thick. Tolerances of 0.25 in. per ft. for dimensions exceeding 3 in. and of 5% for lesser dimensions are allowed. Details are shown in illustrations. In sinks without shelves, the outlet must be at the end and not in the middle of the longer side. A.B.S.

Glazed Fire-Clay Wash Tubs and Tub and Sink Sets. British Standard Specification No. 1229—1945. British Standards Inst., London. Price 2*s.*—The articles shall be sound, of good workmanship, and free from cracks. The glaze shall be uniform, noncrazing, and free from discoloration and shall have an impervious surface. It must not yield more than 5% soluble lead. Single wash tubs without shelf shall be (over-all) 24 x 21 x 15 in. Sets shall be in corresponding sizes, as illustrated in the Specification, with tolerances of 0.25 in. per ft. for dimensions greater than 3 in. or 5% for lesser dimensions. The waste seatings shall be fixed and the outlet screwed for 2-in. B. S. pipe (parallel) thread. Overflows of weir type shall be provided. Square tapholes (1.125 in.) shall be provided diagonally to the backs of the tubs. A.B.S.

Whiteware

Laboratory porcelain. ANON. *Ind. Chemist,* **21** [250] 623 (1945).—Specimens of Royal Doulton laboratory porcelain, made by Doulton and Co., Ltd., are shown in actual size. It is of use in microanalysis. 1 figure. D.G.P.

SEPARATE PUBLICATIONS

Ceramic Lavatory Basins. British Standard Specification No. 1188—1944. British Standards Inst., London. Price 2*s.*—The lavatory basins shall be made of earthenware, fire clay, heavy earthenware, stoneware, or vitreous china. The glaze shall be sound and of good workmanship and preferably lead free; in no case shall it yield more than 5% soluble lead. Two sizes are permitted, (*a*) 25 x 18 in. and (*b*) 22 x 16 in. The basins are to be of one-piece construction, including a combined overflow. Details are shown in illustrations. A tolerance of 0.25 in. per linear foot on dimensions greater than 3 in. and of 5% on lesser dimensions is allowed. Details of waste outlets, overflow chain hole, and tapholes are defined. The weight of lavatory basins shall not be less than those shown in the table.

	22 x 16 in.	25 x 18 in.
Earthenware	24 lb.	30 lb.
Fire clay	45 lb.	58 lb.
Heavy earthenware	32 lb.	40 lb.
Stoneware	32 lb.	40 lb.
Vitreous china	32 lb.	40 lb.

When a pedestal is required, it shall support the basin rigidly and adequately, and the height from the floor to the top of the basin shall be 31 in. The pedestal shall be

recessed at the back to receive supply and waste pipes and fittings. The quality of the pedestal shall not be less than that of the basin. A.B.S.

PATENTS

Apparatus for securing a handle to a cup or other hollowware article made of earthenware, china, etc. J. WEDGWOOD & SONS, LTD., AND A. STEELE. Brit. 573,703, Dec. 12, 1945 (Oct. 20, 1943).

Apparatus for use in manufacturing pottery ware. W. J. MILLER (Miller Pottery Engineering Co.). U. S. 2,392,399, Jan. 8, 1946 (May 16, 1942; June 13, 1944). 20 claims. Cl. 25-22.

Chinaware sandblasting machine. W. H. EMERSON (Homer Laughlin China Co.). U. S. 2,393,762, Jan. 29, 1946 (Sept. 8, 1943). 5 claims. Cl. 51-15.

Dinnerware decorating machine. GEORGE B. GUTHRIE. Can. 428,060, June 12, 1945 (Jan. 3, 1944; in U. S. Feb. 11, 1943). G.M.H.

Shielded spark plug for aircraft engines. HECTOR RABEZZANA (General Motors Corp.). Can. 429,297, Aug. 7, 1945 (Sept. 16, 1943; in U. S. Nov. 27, 1941). G.M.H.

Spark plug. M. F. PETERS (Titeflex, Inc.). Can. 432,032, Dec. 18, 1945 (April 22, 1944). G.M.H.

Spark plug. D. W. GREGORY (Firestone Tire & Rubber Co.). U. S. 2,393,497, Jan. 22, 1946 (March 6, 1943). 15 claims. Cl. 123-169.

Spark-plug manufacture. HECTOR RABEZZANA (General Motors Corp.). Can. 429,583, Aug. 21, 1945 (June 22, 1943; in U. S. Aug. 11, 1942). G.M.H.

Spark-plug seal. J. A. JEFFREY (Champion Spark Plug Co.). Can. 428,984, July 17, 1945 (April 20, 1944). G.M.H.

Equipment and Apparatus

Decimal point slide rule. ANON. *New Equipment Digest*, **10** [12] 1 (1945).—Made from Dowmetal and white plastic, this slide rule is equipped with a self-centering optical groove and is unaffected by moisture, temperature, and chemicals. The decimal point is set mechanically to 19 digits or zeros, and single hairline setting gives cube root, square root, and logarithm of answer. It is made by Pickett and Eckel, Chicago 4, Ill. F.C.A.

Dosage system of linear gamma-ray sources. D. E. A. JONES: *Brit. Jour. Radiol.*, **17** [194] 46-47 (1944).—For tabular X-ray applications a close approximation to a cylindrical surface of given length and radius may be obtained from an axially placed linear radioactive source of the same length subdivided into three contiguous equal lengths, the outer sources having a higher linear density than the inner sources. P.G.

Dust collector. ANON. *New Equipment Digest*, **10** [12] 7 (1945).—Glass filters are employed in this centrifugal vortex collector suitable for use with grinders, buffers, saws, etc. Gravity causes the dust particles to drop to the bottom of the unit for removal. No dust bags are required. It is made by Leiman Bros., Inc., Newark 5, N. J. F.C.A.

Electronic optics. P. GRIVET. *Rev. gén. élec.*, **54** [2] 45-54 (1945).—The formation of images by magnetic lenses in electron optics is described, and the applicability of Gauss's formulas for their calculation analogous to light optics is discussed. Certain modifications to the formulas must be adduced; in many cases only narrow electron beams give good pictures, while the often desirable wide-angle beams still give difficulties. Spherical aberration cannot be corrected in electronic lenses as it can in optical lens systems. M.HA.

Functional photography. J. ROW. *Can. Machinery*, **56** [8] 69-72, 167 (1945).—The use of X-ray radiography in finding flaws in metal castings, welded metal units, and plastic moldings with metal inserts is shown. Examples are cited where, by the use of radiography, the number of units rejected has been greatly reduced. The manufacturer, after seeing radiographs of the article he manufactures, is able to change his process so that the factors causing rejection are either eliminated or greatly reduced. The subject of photographic layout on flat sheets or plates of metal is discussed. By coating flat sheets of metal with a light-sensitive material, Transfax, made by the Eastman Kodak Co., Rochester, N. Y., the engineering drawing may be applied to the sheet or plate of metal and reproduced. As these operations may be carried on in a lighted room, no darkroom is necessary. The photo transfer appears as a white line positive, and as the process is very fast and the transfer so accurate this method is suitable where complex drawings are to be laid out. Training films in industry, working prints, metallography, and microphotography are reviewed. 14 figures. M.M.W.K.

Mighty atom and industrial radiography. ANON. *Can. Machinery*, **56** [9] 144-50 (1945).—Radium sulfate salt is used for industrial radiography, and a capsule suitable for this purpose may be rented at $50 to $100 per month. It should be stored in a thick lead container when not in use, and personnel using the capsule for radiography should be suitably protected by lead coverings or lead-impregnated aprons and gloves. Methods are described for using the capsule to determine whether defects exist internally in castings or welded joints which are to be used in a critical application where either hermetic sealing or great resistance to stresses is required. Films stored near the capsule should be encased in a suitable lead covering; otherwise they will be hopelessly fogged, as the radiation can travel appreciable distances through nonmetallic substances. 8 figures. M.M.W.K.

New method of studying the expansion of bodies at elevated temperatures. JEAN DEMARQUAY. *Compt. Rend.*, **220** [2] 81-83 (1945).—D. describes a method for determining the expansion coefficients of bodies between 20° and 2400°C. The sample to be studied is placed in a carbon-tube furnace consisting of several concentric carbon cylinders which are closed at the end by refractory plates (of zirconium-thorium); the temperature can be maintained constant to less than 5°C. The expansion coefficients of tungsten and molybdenum were determined in this manner; the former has transformation points at 630° and 1340°C., while molybdenum apparently does not show a transformation point up to 2300°C. M.HA.

Photoelectric instrument measuring quality and quantity of X rays for radiographic purposes. R. H. HERZ. *Brit. Jour. Radiol.*, **15** [172] 110-13 (1942).—The application of barrier layer photocells to X-ray technique is described. Quality, quantity, and the photographically effective dosage may be measured simultaneously with the deflection of one light spot, the movement of which is caused by two ballistic galvanometers. P.G.

Protection in industrial radiology. W. BINKS. *Brit. Jour. Radiol.*, **16** [182] 49-53 (1943).—Exposure to a direct beam should be avoided. The protective arrangements and working hours should be such that the radiation received by one operator does not exceed one roentgen per week. The operator should be as far as practicable from the X-ray tube or radium source. P.G.

Pyrometer. ANON. *New Equipment Digest*, **10** [12] 30 (1945).—The device measures the temperature of atmospheres and liquids. The scale is direct reading. The pyrometer is made by the Roller Smith Co., Bethlehem, Pa. F.C.A.

Radio heating—applications in industry. ANON. *Ind. Chemist*, **21** [250] 589-90 (1945).—Radio heating generates heat directly in the substance under treatment, either uniformly throughout its mass or in highly localized areas at rates governed by the requirements of the work. It results in improved control, greater speed, and a more uniform product. It is carried out by the transmission through the material of electromagnetic radiation, alternating at frequencies ranging from 500,000 to 200,000,000

cycles per sec. As its source, it draws on the normal 180 to 250 v. 50-cycle per sec. a.c. on mains supply; this is converted by a system of transformers, tubes, condensers, etc., into radio heating power of the frequency mentioned, with a voltage ranging from a few hundreds to 20,000 v. Two types of radio heating are described briefly: dielectric for nonconductors of heat and eddy current for metals. Among the applications cited are the concentration of heat-sensitive solutions and the drying of refractory materials. The material is placed in a screened container fitted with perforated electrodes through which air is blown to remove moisture driven by the heating. 2 figures. D.G.P.

Self-contained electroscope charger. R. G. MITCHELL. *Brit. Jour. Radiol.*, **18** [210] 195–96 (1945).—M. describes a compact electroscope charger which enables any desired d.-c. voltage up to 1000 v. maximum to be obtained, without any mains or other external supply being required. P.G.

Some physical measurements with a 500-kv. continuously evacuated X-ray tube. W. J. MEREDITH AND S. K. STEPHENSON. *Brit. Jour. Radiol.*, **16** [188] 239–41 (1943).—Measurement of the absorption coefficients of a variety of materials for X rays from a 500-kv. continuously evacuated X-ray tube is described. Effective wavelength values obtained from these measurements are in good mutual agreement. Back scatter and depth dose data for radiation of H.V.L. 6.3-mm. copper and at 50 cm. F.S.D. have been obtained for a wide variety of fields. P.G.

Surface checking tracer. ANON. *New Equipment Digest*, **10** [12] 31 (1945).—A wide-range tracer for use with the profilometer to measure the roughness of surfaces on all outside and inside diameters down to 0.25 in. as well as tapered surfaces and gear teeth is described. It is made by the Physicists Research Co., Ann Arbor, Mich. F.C.A.

Temperature control unit. ANON. *New Equipment Digest*, **10** [12] 21 (1945).—The device controls building temperatures through the use of internal and outside temperatures. It is suitable for use with a motor operated zone valve, oil burner, stoker, or pump relay. It is made by the Barber-Colman Co., Rockford, Ill. F.C.A.

Two color spray gun. ANON. *New Equipment Digest*, **10** [12] 22 (1945).—A device for simultaneously spraying two colors through a single nozzle is described. The gun has a normal spray fan control valve and fluid control valve, trigger assembly, head, fluid tip, and needle. An additional fluid inlet near the head accommodates the second color paint. It is made by the Sherwin-Williams Co., Cleveland, Ohio. F.C.A.

Wick for testing efflorescence tendencies of materials. C. R. AMBERG AND L. WASHBURN. *Amer. Ceram. Soc. Bull.*, **25** [1] 7–9 (1946).—8 references, 1 figure.

PATENTS

Drying of clay. W. BOULTON, LTD., AND T. H. GASKELL. Brit. 573,349, Nov. 28, 1945 (Dec. 1, 1943).

Molding, shaping, and extruding method. E. W. BOWEN. Can. 429,210, Aug. 7, 1945 (Sept. 25, 1941). G.M.H.

Pottery-drying stove. R. B. BLOORE (Swinnertons, Ltd.). Can. 429,195, July 31, 1945 (Dec. 9, 1943; in Great Britain Feb. 12 and April 12, 1943). G.M.H.

Quartz lamp. E. C. DENCH (Canadian Westinghouse Co., Ltd.). Can. 428,110, June 12, 1945 (May 11, 1942). G.M.H.

Kilns, Furnaces, Fuels, and Combustion

Continuous kiln and its construction. ANON. *Brit. Clayworker*, **54** [642] 159–60 (1945).—Many brickworks owners are contemplating the erection of new kilns or extensive repairs to old kilns, and the question of improved construction and design is important. Factors to be considered include the weather, expansion and contraction of the fabric, underground water, foundation shrinkage, flue-dust abrasion, and mechanical shock on wicket corners, etc. (1) Flat arches. The flat or suspended arch is a notable advance but rather expensive. The upward and outward thrusts caused by the sprung arch are avoided, setting space is increased by about 20%, and the quality of the goods is claimed to be more regular. Kilns have been built without arches as a temporary measure, but if the arrangement is to be permanent, it is probably best to design the kiln for zigzag firing. (2) Cover. An uncovered kiln, apart from considerations of the comfort of the fireman, may waste much fuel during wet spells. The two usual types of cover are the Belfast trussed and the double-ridged cover. Both have certain drawbacks, and the independent roof, which also covers the runways, may make progress. (3) Foundations. These should be carefully studied in relation to the ground on which the kiln is to be built. In coal-mining areas, the ground should be tested for outcropping coal seams, and any which occur at less than 15-ft. depth should be removed and replaced with hard core or concrete; preferably, the kiln should be re-sited, as the combustion of an underlying seam may lead to irreparable damage through subsidence. The height of the water table during the wet months should be considered, and methods of diversion should be employed, e.g., drainage to a sump, quarry, or main drain. The elimination of underground water is vital for the economical operation of the kiln. (4) Wickets and grates. Wicket ways should have bullnosed corners and should be built with refractory cement of cold setting strength. This may be used with red brick or firebrick. The junction of red brick with lime mortar and firebrick with fire-clay mortar may crack. Grate walls in transverse-arched kilns should be thick enough to carry the weight of the outer courses of the setting. A 14-in. wall is insufficient. L.C.C.

PATENTS

Fuel-delivery apparatus for kilns, furnaces, or other solid fuel consuming equipment. MALKIN TILES (Burslem), LTD., ELLIOTT BROS. (London), LTD., L. J. WILLDIGG, AND F. C. LEONARD. Brit. 573,276, Nov. 28, 1945 (Oct. 8, 1943).

Geology

Bauxite output of U. S. shows sharp decrease. JOHN H. WEITZ AND MARY E. TROUGHT. *U. S. Bur. Mines Mineral Market Rept.*, MMS No. 1344, 6 pp. (Aug. 13, 1945); abstracted in *Pit and Quarry*, **38** [5] 84 (1945).—Domestic mine production of bauxite decreased 54% during 1944, when production fell to 3,721,135 short tons. In 1943, 8,156,557 short tons were mined. M.R.

Bentonite production tops 500,000 tons. G. W. JOSEPHSON AND A. LINN. *U. S. Bur. Mines Mineral Market Rept.*, MMS No. 1336 (Aug. 4, 1945); abstracted in *Pit and Quarry*, **38** [5] 87 (1945).—Bentonite production increased 14% for the year 1944. Wyoming supplied 36% and South Dakota 31% of the production. The average value increased from $6.24 per ton in 1943 to $6.60 per ton in 1944. M.R.

Beryl found in large crystals. A. I. JOHNSON. *Pit and Quarry*, **38** [5] 82–83 (1945).—J. describes the Ingersoll mine in the Black Hills of South Dakota. Production has increased from 9700 tons in 1938 to 113,256 tons in 1944. This production is over one third of that credited to the U. S. 5 photographs. M.R.

Cinnabar at Puhipuhi and Ngawha, North Auckland.

J. HENDERSON. *New Zealand Jour. Sci. Tech.*, **26B** [2] 47–60 (1944); abstracted in *Mine & Quarry Eng.*, **10** [4] 94 (1945). L.C.C.

Cobalt salts from the cobalt ore. MADAN LAL DEWAN AND M. L. JOSHI. *Trans. Indian Ceram. Soc.*, **3** [1] 56–61 (1944).—Cobalt metal and salts manufacture in India has been impossible because of the scarcity of ore. An ore of 22.13% cobalt has been reported from Nepal, which is the best known to be available in India. This ore, however, is notable for its freedom from nickel, which increases its workability. Cobalt compounds are used in ceramics as a stain for bodies, glazes, and decorative colors; a 2 to 5% addition of the oxide gives varying shades of blue. Cobalt in the form of smalt is used in the enamel industry both as a stain and to increase the adherence of enamel to iron. The cobaltous phosphate has been used to produce light blue and metallic colors in the glass industry. A general analysis and extraction methods are outlined and discussed. Fusion with sodium chloride or treatment with sulfuric acid gave encouraging results. M.E.P.

Color standard for ruby mica. DEANE B. JUDD. *Jour. Research Nat. Bur. Standards*, **35** [4] 245–56 (1945); RP 1671. Price 5¢ from Supt. of Documents, Washington 25, D. C.—At the request of the Metals Reserve Co. and the War Production Board, a study was made of the color classification of mica used by the mica-consuming industry. A fundamental color standard for ruby mica is intended particularly for application to micas close to the border line between ruby and nonruby. M.L.B.

Combination classification-sizing process of mineral concentration. LEWIS S. PRATER AND A. W. FAHRENWALD. *Amer. Inst. Mining Met. Engrs. Tech. Pub.*, No. 1898; *Mining Tech.*, **9** [4] 3 pp. (1945).—By taking advantage of the fact that specific gravity has no effect on screening but is important in classification, minerals may be concentrated. It is suggested as part of a preliminary operation to reject part of the barren material. The underflow of the classifier is considered as a concentrate, and the overflow was screened, the oversize being rejected as a tailing; this was repeated, using successively finer screens. On galena ore the composite head showed 5.78% lead, the composite concentrate 11.2%, and the composite tails 0.73%. The same test was tried on an artificial mixture of quartz and magnesite. Here the composite head is 78.3% acid insoluble, the composite concentrate 68.3%, and the composite tailing 89.5% acid insoluble. This separation was not as good as that of the lead ore, at least partly because the two minerals are much closer in specific gravity. 1 figure. W.D.F.

Composite model X-ray generator. C. E. EDDY. *Brit. Jour. Radiol.*, **18** [206] 61–62 (1945).—A low-voltage model to demonstrate the seven most frequently used X-ray generating circuits is described; it is constructed from ordinary radio components. By means of a specially designed circuit-selector switch and an electronic switch, the tube voltage and current forms of the different circuits can be rapidly demonstrated with a cathode-ray oscillograph. P.G.

Composition of the Bird River chromite, Manitoba. J. D. BATEMAN. *Amer. Mineralogist*, **30**, 596–600 (1945).—Analyses of the Bird River chromite indicate an excess of ferric oxide in the lower-grade ores, which is verified by the presence of exolved hematite in the chromite crystals. Similar hematite inclusions in the higher grade ores are not indicated by recasts of the analyses, suggesting that some of the bivalent oxides (after excluding silicate gangue and ilmenite) do not enter into the chromite molecule. 4 references, 1 figure. W.D.F.

[Corundum mine]. ANON. *Eng. Mining Jour.*, **146** [9] 119 (1945).—The Blue Metal corundum mine in Lyon County, Nev., is driving a tunnel. Ore minerals are corundum and andalusite. W.D.F.

[Diaspore clay deposits.] ANON. *Eng. Mining Jour.*, **146** [10] 123 (1945).—Two new diaspore clay deposits have been found recently in Gasconade County, Missouri. W.D.F.

Glassmaking sand of Sawai Madhopur, Jaipur State. V. S. DUBEY AND M. L. MISRA. *Trans. Indian Ceram. Soc.*, **3** [1] 62–64 (1944).—The sandstone at Sawai Madhopur is one of the chief sources of supply of sand to many of the glass factories of the western United Provinces and the Punjab. The deposits are exposed in the form of a huge flat-topped hill and belong to the Bhander series of the Upper Vindhyan formation. Below 20 ft., the sandstone loses its iron and gains clay contamination. The quarrying is done by hand labor, and the stone is so soft that it is converted into sand in the process. The quarried sand is carried to the railroad by donkeys. The present quarry is 40 to 50 ft. deep and about 50 ft. in diameter. The site of the old quarries is close by, and since the workers used to go deep down into the deposits, excavating the softer portions only, there remain the narrow, zigzag, almost circular tunnels. Megascopic and microscopic descriptions are given of three different samples showing generally friable sandstone bonded with kaolin with only a small amount of magnetite and biotite. The sieve analysis showed a large proportion between 60- and 80-mesh, which is ideal for glass manufacture. Washing of the sandstone yields a white-firing kaolin and an excellent grade of sand, making the whole usable advantageously in both pottery and glassmaking. M.E.P.

Knoop microhardness tester as a mineralogical tool. HORACE WINCHELL. *Amer. Mineralogist*, **30**, 583–95 (1945).—The Tukon testing machine with a Knoop indenter has useful properties in measuring the hardness of mineral specimens. Not only does the instrument afford numerical hardness values, such as argentite = 25, calcite = 100, fluorite = 150, magnetite = 700, corundum = 2000, SiC = 3000, and diamond = about 8000, but it repeats these numbers with an accuracy of between 2 and 5% when applied to a given crystal face under constant conditions. Surprisingly large variations of hardness have been found in many crystals, the variation being a function of the orientation of the surface tested and the orientation of the long axis of the Knoop indenter in that surface. The results of 479 tests in 92 different orientations on 16 different minerals and mineral-like substances indicate that the instrument is worthy of further study as a mineralogical tool. 6 references, 3 figures. W.D.F.

Manganese from Gold Coast. ANON. *Iron and Steel*, **18** [13] 536–39 (1945).—Gold Coast was the chief source of manganese ore imported into Great Britain in 1940–45. The ore is excavated mechanically, the land being worked in terraces 20 ft. high and 1000 to 3000 ft. long. The material is washed, screened, collected in piles, loaded by Diesel shovels into railway cars, and taken to the post of Takoradi where it is loaded direct into ships by means of a truck tippler and conveyer belt. A.B.S.

Molybdenum. W. H. DENNIS. *Mine & Quarry Eng.*, **10** [5] 119–23 (1945).—D. gives an account of its production and uses. The chief ore, molybdenite, is not amenable to gravity concentration owing to its flakiness, and flotation is used almost exclusively. There is some recovery of Mo from Cu-Mo ores. Modern methods of treatment are fully described; finished dried concentrates assay 90% MoS_2. Wulfenite accounts for only a very small part of the total Mo output, and its mineral associates involve more difficult treatment. Vanadium is usually present and accompanies the Mo through the ore-dressing and smelting stages; it must finally be separated chemically. Typical practice is described for the complex ore of Mammoth St. Anthony, Arizona. Among the uses of Mo may be mentioned its employment in ball-mill liners and balls; cast Cr-Mo liners have a life 50 to 100% longer than that of white iron liners and are less liable to breakage. Balls forged and heat-treated with the addition of 0.2 to 0.3% Mo have been found to offer increased wear resistance and are being increasingly used in milling. L.C.C.

Report of Committee on Geological Surveys for 1944–1945. H. RIES, Chairman. *Amer. Ceram. Soc. Bull.*, **25** [1] 10–13 (1946).—3 references.

Rugged phototube devices ready for use in mining. ANON. *Eng. Mining Jour.*, **146** [10] 85–87 (1945).—Phototube devices have a light source and a relay. The

phototube has a life of 25,000 hr., and the whole unit is ruggedly built. The devices have many uses in increasing safety in hoisting. One plant uses them for peak load control, and they shut off equipment when a power peak starts; another tube controls ore feed to the mill. The usual phototube will not work in fog, but an advanced type will. An infrared phototube will sound an alarm when a trespasser interrupts the light beam. They are used to detect fires and mercury vapor and to measure high temperatures, in densitometers for spectrographic analysis, and to open doors or gates when a headlight approaches. 5 figs. W.D.F.

Some physical properties of mica. PETER HIDNERT AND GEORGE DIXON. *Jour. Research Nat. Bur. Standards*, **35** [4] 309–53 (1945); RP 1675. Price 10¢ from Supt. of Documents, Washington 25, D. C.—Data are given on the linear thermal expansion, changes in structure, power factors, and effects of heat-treatments on the thickness, opacity, and color of micas (muscovite, phlogopite, biotite, ripidolite, and zinnwaldite) from different domestic and foreign sources. M.L.B.

Zirconium in industry—review of recent developments. M. SCHOFIELD. *Ind. Chemist*, **21** [251] 641–43 (1945).—S. discusses briefly the occurrence of the ore and the production of pure zirconia from zirkite either by the use of concentrated sulfuric acid under pressure or by fusion with alkalis or alkaline salts in a reduction furnace lined with zircon, leaching, and acidification; the extraction and uses of zirconium metal; the use of zirconium oxide in glass, as a refractory, in enamels, as an opacifier, etc.; and the production of opacifying media directly from native zirconium silicate. D.G.P.

PATENTS

Chlorination of titanium-bearing materials. ALPHONSE PECHUKAS (Pittsburgh Plate Glass Co.). Can. 428,858, July 17, 1945 (Feb. 25, 1941). G.M.H.

Chemistry and Physics

Absence of the line of a large lattice in the X-ray diagram of the clayey fractions of certain soils. ROGER MICHAUD. *Compt. Rend.*, **220** [1] 53–54 (1945).—While the clayey fractions of soils from the Mediterranean region (in France) showed in the diffraction diagram, after proper treatment, essentially the common lines of kaolinite, montmorillonite, and attapulgite and sometimes also of quartzite and calcite, no line of a larger lattice (9 to 15 a.u.) was ever found. On the other hand, podsolic soils from other districts in France have shown a line of 7 a.u. characteristic of kaolinite, corresponding to a (001) lattice. In investigating this difference it was found that by proper sedimentation in preparing the clayey fractions, the rays of large lattice were always found; the diagrams of seven such prepared soils showed the presence of kaolinite or a mixture of attapulgite and kaolinite. M.HA.

Determination of carbonates in soil. C. J. SCHOLLENBERGER. *Soil Sci.*, **59** [1] 57–63 (1945).—The procedure consists essentially of the liberation of CO_2 with acid *in vacuo* and absorption of the liberated CO_2 in barium hydroxide solution as fast as it is formed, followed by titration of the excess barium hydroxide. The apparatus can be constructed rather easily. 6 references. E.W.R.

Determination of exchangeable cations and exchange capacity of soils—rapid micromethods utilizing centrifuge and spectrophotometer. MICHAEL PEECH. *Soil Sci.*, **59** [1] 25–38 (1945).—P. describes systematic time-saving microprocedures, especially suitable for routine analytical work, for the determination of the exchangeable cations and the exchange capacity of soils. The exchangeable cations are extracted with 1 *N* ammonium acetate solution. The exchange capacity is determined by direct nesslerization of the ammonium adsorbed by the soil, subsequent to extraction with sodium chloride solution. All of the separations in the analysis of the ammonium acetate extract are carried out in a 15-ml. centrifuge tube. Calcium is determined volumetrically as the oxalate. Colorimetric methods utilizing a spectrophotometer are employed in the determination of magnesium, potassium, sodium, and manganese. Because accurate determination of the small amounts of exchangeable cations by conventional macromethods is attended by considerable analytical difficulties necessitating the use of a large soil sample and a large volume of the extracting solution, the more rapid micromethods described can be employed to advantage without significant sacrifice of accuracy. 13 references, 1 figure. E.W.R.

Determination of soil organic matter. C. J. SCHOLLENBERGER. *Soil Sci.*, **59** [1] 53–56 (1945).—Organic matter is determined by the reduction of a weighed amount of standard potassium dichromate by the organic matter in the soil in H_2SO_4, followed by titration of the excess dichromate with ferrous sulfate, using diphenylamine as an indicator. 12 references. E.W.R.

Fusion analysis of soils. W. O. ROBINSON. *Soil Sci.*, **59** [1] 7–11 (1945).—R. summarizes the methods for determining Si, Ti, Al, Fe, Mn, Ca, Mg, K, Na, and S in soils, each of which involves fusion. These methods are, in general, similar to those used for rocks as given by Hillebrand and Lundell. E.W.R.

X-ray diffraction data for compounds in the system CaO–MgO–SiO_2. C. BURTON CLARK. *Jour. Amer. Ceram. Soc.*, **29** [1] 25–30 (1946).—10 references.

PATENTS

Method of preparing zirconium oxide. J. B. MILLER (Titanium Alloy Mfg. Co.). U. S. 2,392,605, Jan. 8, 1946 (Aug. 15, 1941). 3 claims. Cl. 23–24.1.—3. The method of making zirconium oxide for use as an opacifier from zirconium-carbon-oxygen intermediates, which comprises spreading the intermediate in a layer more than 0.5 in. but less than 1 in. thick on a hearth composed of a heat insulating porous refractory aluminum silicate having a density of 0.3 to 1.0, provided with a smooth, hard, dense, surface layer less than 0.25 in. thick of refractory material, igniting the intermediate at spaced points, and then allowing the intermediate to completely burn to zirconium oxide without the further external application of heat.

Titanium pigment. R. W. ANCRUM (Canadian Titanium Pigments, Ltd.). Can. 432,113, Dec. 25, 1945 (April 29, 1942). G.M.H.

General

Accurate measurement of silicosis hazards—newer methods. F. R. HOLDEN AND E. C. HYATT. Presented at meeting of Industrial Hygiene Foundation, Pittsburgh, Nov., 1945; abstracted in *Safety Eng.*, **90** [6] 63–65 (1945). This study of industrial dusts deals largely with the ceramic and granite industries. One table of data concerns flatware brushing, jiggering, batch house, glass tank, mold operations, and furnace construction. Another table covers the granite industry in Massachusetts and Vermont. M.R.

Adrenal cortex and work in the heat. M. MOREIRA, R. E. JOHNSON, A. P. FORBES, AND F. CONSOLAZIO. *Amer. Jour. Physiol.*, **143**, 169–76 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [8] 149 (1945). D.G.P.

Aluminum therapy in silicosis. PAUL J. BAMBERGER. *Ind. Med.*, **14**, 477–79 (1945).—Forty-nine miners working in rock with 40% quartz were tested by the Gardner method. Hydrated alumina was given to 24, and metallic aluminum to 25. The conclusions are as follows: (1) Both materials seemed to be effective in relieving the symptoms

of silicosis. (2) They seemed equally effective. (3) After treatment, any improvement in work performance was too small to measure. (4) The hydrate has three points of superiority: (*a*) it is white and less objectionable than the black aluminum, (*b*) it causes less discomfort on inhalation, and (*c*) it is stable and does not require a bulky mill for its preparation. W.D.F.

Animal studies on the toxicity of inhaled antimony trioxide. C. U. DERNEHL, C. A. NAU, AND H. H. SWEETS. *Jour. Ind. Hyg. Toxicol.*, **27** [9] 256–62 (1945).—Guinea pigs inhaling antimony trioxide in amounts varying from 13 to 424 mg. had extensive pneumonitis. Four out of 24 died. Eleven out of 15 having "exposures" of 77 mg. or more had fatty degeneration of the liver. Hypertrophy of the lymphoid follicles of the spleen, a decrease in the number of polymorphonuclear leucocytes and eosinophiles, with a relative increase in the number of lymphocytes, and a decrease in the total white blood cell count were found. 16 references, 3 figures. D.G.P.

Atom bomb. ANON. *Can. Machinery*, **56** [9] 108–10, 183–84 (1945).—After a brief review of the discoveries and incidents leading up to the atom bomb, Canada's part in research on this project is discussed. The plant at Petawawa, Ont., being built as a part of the United Kingdom–United States–Canada program will have a branch of the National Research Council established there in close association with the pilot plant to carry on research on the application of atomic energy. The difficulties inherent in releasing atomic energy are discussed in a general manner. 5 figures. M.M.W.K.

Attitude of industry toward X-ray examination of the chest. C. D. SELBY. *Jour. Amer. Med. Assn.*, **128** [9] 630–32 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [8] 148 (1945). D.G.P.

Ceramics at Rochester Institute of Technology. ANON. *Amer. Ceram. Soc. Bull.*, **25** [1] 25 (1946).

Contact dermatitis from rubber gas mask. JOE C. GILBERT. *Arch. Dermatol. Syphilol.; Ann. Allergy*, **2**, 339 (July-Aug., 1944); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [8] 157 (1945). D.G.P.

Control of environmental health hazards. ALLAN L. COLEMAN. *Conn. State Med. Jour.*, **9** [7] 510–13 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 182 (1945).—Dust, lead, silver, radium, and heat-treating are included. D.G.P.

Control of health hazards in the industrial handling of chemicals. ANON. *N. Y. State Ind. Bull.*, **24** [6] 207–17 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 174–75 (1945).—A table of maximum allowable concentrations of air-borne substances is included. D.G.P.

Dermatitis from wearing apparel. LOUIS SCHWARTZ AND SAMUEL M. PECK. *Jour. Amer. Med. Assn.*, **128** [17] 1209–17 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 177 (1945). D.G.P.

Effectiveness of caffeine (1,3,7-trimethylxanthine) against fatigue. F. HUIDOBRO AND E. AMENBAR. *Jour. Pharmacol.*, **84** [1] 82–92 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 168 (1945). D.G.P.

Examining, placing, and safeguarding the industrial worker. MARTIN I. HALL. *Conn. State Med. Jour.*, **9** [7] 520–22 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 178 (1945). D.G.P.

Findings from Foundation plant surveys. W. C. L. HEMEON. Presented at meeting of Industrial Hygiene Foundation, Pittsburgh, Nov., 1945; abstracted in *Safety Eng.*, **90** [6] 71–73 (1945).—The Foundation made more than 1000 dust counts in potteries, glass plants, foundries, refractories plants, and several other industries. The study on dust control in the pottery industry was the most extensive yet made. In this industry good housekeeping is advocated, but the dust kicked up by plant traffic does not contribute materially to silicosis hazards. Carelessness in allowing flint to partially dry out and produce dust has received the Foundation's attention, and various measures to counteract this drying out have been developed. M.R.

High-pressure cleaner. ANON. *New Equipment Digest*, **10** [12] 1 (1945).—A reciprocating pump powered by a 5- to 7.5-h.p. electric motor delivers 10 to 20 gal. of cleaner per min. at pressures of 300 to 500 lb./sq.in. It may be used as a portable or stationary installation for cleaning walls, tanks, buildings, equipment, and machinery. Suction equipment for using concentrated cleaning solutions can be supplied. It is made by the A. B. Farquhar Co., York, Pa. F.C.A.

Industrial films. HAROLD E. SIMPSON AND JOHN W. JORDAN. *Amer. Ceram. Soc. Bull.*, **25** [1] 13–16 (1946).

Industrial hazards and their prevention. JOSEPH J. TOLAND, JR., AND IGHO KORNBLUEH. *Ind. Med.*, **12**, 534–52 (1943).—A study of 3600 accidents showed that there was a peak in the summer months due to the hot weather. In the week, Tuesday was highest, and daily there was a peak at 10 A.M. and a secondary peak at 3 P.M. People aged 21 to 25 had the most accidents. The fingers were most frequently injured, with hands and wrists next. The hands were most frequently lacerated or punctured, while the toes were most frequently bruised. Important reasons for accidents are (1) physical fatigue, (2) mental fatigue, (3) lack of concentration, (4) lack of sleep, (5) need of food, (6) lack of vitamins, (7) need for a short rest period, (8) dislike of the work, and (9) abuse of alcohol or nicotine. Strict observation of all safety rules would eliminate 80 to 90% of accidents to eyes, feet, and toes. W.D.F.

Industrial medicine and respiratory diseases. G. J. WHERRETT. *Can. Med. Assn. Jour.*, **52** [3] 271–75 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [8] 149 (1945). D.G.P.

Interrelationship of undernutrition, fatigue, and latent hepatic disease in the industrial worker. ABRAHAM O. WILENSKY. *N. Y. State Jour. Med.*, **45** [13] 1447–49 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 168 (1945). D.G.P.

Maximum allowable concentration of industrial atmospheric contaminants. WARREN A. COOK. *Ind. Med.*, **14**, 936–46 (1945).—The table lists 156 contaminants; they are mainly organic, and concentration is usually in parts per million. Columns A to F are values used in the states of California, Connecticut, Massachusetts, New York, Oregon, and Utah. Column G is used by the U. S. Public Health Service. Column H is from the American Standards Assn. Column I gives values both in parts per million and in milligrams per cubic meter and, in the author's opinion, shows the best values. C. discusses each substance briefly, with one or more references. The maximum for hydrogen fluoride is 3 p.p.m. Zinc oxide fumes are 15 mg. per cu. m. Silica dust is not listed. W.D.F.

Metallurgical progress and the mining engineer. L. SANDERSON. *Mine & Quarry Eng.*, **10** [8] 191–92, 200 (1945).—S. gives an account of wartime progress in Britain. Many developments are still on the secret list, but the following are of considerable interest: prevention of corrosion of zinc coatings on steel, research into failure of wire ropes, high-manganese steels, salvaging of porous castings, cleaning of steel, strength of 3.5% nickel-steel bolts and of special steels for mining machinery, hard facing of crushing and grinding equipment made of austenitic high-manganese steel, shot-blasting of springs, cadmium-plated bolts, corrosion of machinery by potassium nitrate or chloride, heat-treatment of steels, black acid-resisting finish for stainless steel, tubular mining-car axles, cold treatment of metals, induction heating, firing of rotary furnaces with pulverized coal, production of synthetic steel scrap by direct reduction of iron ore, production of boring bits by powder metallurgy, cleaning of metals, impregnation of steel with chromium, polishing of highly stressed engine parts, protection of finished steel against corrosion, boron as an alloying element in steel, electrolytic polishing of stainless steel, the use of solid photoelectric cells for measuring and controlling high temperatures, phosphatizing of steel, magnetic recovery of manganiferous waste, utilization of low-grade iron ores, chromium-plating of tools, colloidal oil fuel for boilers, and ferrous powder metallurgy. Many details are given. L.C.C.

William J. Miller, President of the Miller Pottery Engineering Co. ANON. *Amer. Ceram. Soc. Bull.*, **25** [1] 1–4 (1946).—1 photograph.

Mining locomotives. R. HAMMOND. *Mine & Quarry Eng.*, **10** [5] 116–18, 123; [6] 145–50; [7] 166–70 (1945).—An exhaustive account with references is given. L.C.C.

New dressing for burns and extensive abrasions. GEORGE S. KING. *Ind. Med.*, **14**, 796–97 (1945).—This new dressing is supposed to eliminate the pain when dressings are removed. An envelope is made of thin, pliable Cellophane, perforated with many small holes on the side to be in contact with the burn, sterilized, and filled with the ointment desired. The ointment melts and seeps through the small holes onto the burn. The removal is absolutly painless. W.D.F.

Nonpenetrating pulmonary injuries. EDWARD PHILLIPS. *Permanente Found. Med. Bull.*, **3** [3] 97–111 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 179–80 (1945). D.G.P.

Pennsylvania ceramic manufacturers unite. ANON. *Amer. Ceram. Soc. Bull.*, **25** [1] 28–29 (1946).—1 photograph.

Physicists after the war. L. BRAGG. *Proc. Roy. Inst. Gt. Brit.*, **32**, Part 2 [148] 253–71 (1942).—(1) During the war, the demand for physicists has been very great, and universities have been pressed to train as many men as possible to fill the gap. In general, physicists have been drawn into the service of the country in a way that has never happened before, and with university scientists in particular this has meant a revolutionary change of outlook and occupation. In peacetime, the pure scientist works in a world of his own, and the practical applications of his discoveries will not usually become apparent for thirty or forty years. In wartime, the pure scientist must join the applied scientist and become a technician, with the knowledge that rapid practical results are essential. The reservoir of scientific research workers has proved of immense value, and it would be regrettable if these workers were not used for the more constructive tasks of peace. (2) Census of physicists. The records of the universities and of the Central Register of the Ministry of Labour and National Service show that one good physicist is bred per year per million inhabitants of Great Britain. The chief source of good physicists is the comparatively humble secondary and grammar school, the famous public (boarding) schools producing very few. (3) Characteristics of British physicists. The success of Great Britain as a "physicist-producing" country may be due to a certain native quality of horse sense, or sense of proportion, which is apparently lacking, e.g., in the earnest and industrious German. (4) Fundamental research. The system of combining fundamental research with university teaching, although not perfect, has been successful. The centralization of research (divorced from teaching) in institutions devoted to some special branch is full of dangers; the fresh flow of ideas brought to the universities by young men, encouraged by unselfish teaching, may be contrasted with the comparatively static conditions of a central research institution, where fossilization may rapidly follow any initial success. The idea of a lavishly equipped research institution, provided with a small nucleus of permanent staff and offering facilities for a constant stream of workers, is more promising, but the richest return has been from university research. (5) Physics in industry. There are objections to the present method of training physicists for industry, and there might well be a break in the long period of academic study which makes up the combined school and university career. This could take place at the end of the school years, and the student might advantageously work for an apprentice's wage in some industrial concern in order to become more practical. Leading technologists might be invited to give specialized courses at the university physics schools, leading to better contacts between the universities and industry, but it would be harmful to tie university research work to any particular industrial interests. (6) Physicists in the service of the state. The industrial research associations and laboratories partially or wholly supported by the nation are in some respects intermediate between the universities and industry. It is too early to form a definite opinion, but there is a danger that the workers in these associations, lacking the continual stimulus of the university researcher and the more pratical urge of the industrial physicist, may tend to work in a vacuum. The flow of fundamental ideas from the research associations has not yet reached the volume anticipated. The explanation may lie in a wrong conception of the nature of research, which cannot be carried out to order but is largely spontaneous. The central research association with specialized equipment but with a changing personnel may be a good solution. A research association set up for a definite purpose, directed by a formal committee, and staffed with a definite fixed staff cannot be expected to proceed along the right lines. The appointment of an industrial sponsor to direct the lines of research has been very successful during the war. (7) Research and administration. Original ideas arise largely by chance, and there is a danger that they will be lost if the researcher is hampered by administration and office routine. Red tape is the curse of Government scientific research, and, although some control is necessary to avoid waste, Civil Service procedure should be as direct and open as possible, and the methods appropriate to the administration and financial control of other classes of activity should not be applied to scientific research and development. For the best results, the researcher must keep his freshness and vitality and be able to obtain apparatus quickly, without the necessity of having to account for every moment of his time and of being forced to obtain every small item through an elaborate machinery appropriate to large contracts. The universities seem to treat this problem more successfully, the small research unit of six to twelve scientists, with a few assistants, being served by first-class mechanics provided with a workshop. The latter should contain not only a store of material but a collection of old junk, which is a most valuable asset for rapidly constructing a rough apparatus for trying out a new idea. If new apparatus is needed, it should be obtainable without delay. Freedom from control may be abused but can be checked, whereas too close control will kill all but a trickle of new ideas. (8) Appointments. The working of the Central Register has been interesting, and a postwar setup would be desirable. A Central Board keeping a dossier of every physicist in the country and run by an absolutely first-rate man would be invaluable. L.C.C.

Pneumonia following nonpenetrating chest injuries: a study of 56 cases. EDWARD PHILLIPS. *Permanente Found. Med. Bull.*, **3** [3] 112–23 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 180 (1945). D.G.P.

Practical considerations in selecting centrifugal and axial flow fans. J. W. MARKERT. *Heating & Ventilating*, **42** [12] 80–84 (1945).—The centrifugal fan has a field where it is pre-eminent, and so does the axial flow fan. M. discusses fan selection from the buyer's viewpoint and covers the generally accepted as well as the marginal applications of both types of fans. He considers, however, only the direct-connected ventilation fan. 8 diagrams. M.R.

Production efficiency. A. NELSON. *Mine & Quarry Eng.*, **10** [7] 171–74 (1945).—N. discusses the technique of time and motion economy as applicable to mining. He concludes that with increased mechanization, time and motion studies will become increasingly important, in the same way in which they are essential in factory practice. L.C.C.

Protection of workers against noise. WALDEMAR SCHWEISHEIMER. *Can. Machinery*, **56** [10] 87, 174 (1945).—There are many hazards connected with industrial conditions where excessive noise is present. The ear tends to lose its sensitivity, and this it does in an unequal manner, differentiating between different frequencies. There is also a great deal of nervous fatigue brought on by continual exposure to loud noises. S. warns, however, against being too apprehensive over the noise level in plants. He suggests that the audiometer used for noise survey can determine the necessary reduction in noise level and cites examples where noise-level reduction has reduced errors in plants to almost negligible amounts. The use of ear plugs, if they should be found necessary due to the high noise

level, should be properly explained to the workmen as well as the advantage to be gained by wearing them.
M.M.W.K.

Psychiatric techniques in management problems. L. E. HIMLER. *Jour. Amer. Med. Assn.*, **128** [9] 638–39 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [8] 148 (1945).
D.G.P.

Roentgenology of the massive conglomerate lesions of silicosis. MORTIMER R. CAMIEL. *Amer. Rev. Tuberc.*, **51** [6] 527–31 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 169 (1945). D.G.P.

Role of pyruvic acid in fatigue. NATHANIEL MEYER. *N. Y. State Jour. Med.*, **45** [13] 1450-51 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 168 (1945). D.G.P.

Significance of anemia among women factory workers. H. J. BARRIE. *Ind. Welfare*, **26**, 184–86 (Nov.-Dec., 1944); *Bull. Hyg.*, March, 1945; abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [8] 158–59 (1945). D.G.P.

Silicosis prevention in the foundry. W. J. REES. *Iron and Steel*, **18** [13] 549–50 (1945).—After an extensive series of laboratory investigation trials in steel foundries the Molding Materials Subcommittee of the Iron and Steel Institute reported as follows: Core and mold paints prepared from silica flour are a source of silica dust. Parting powders that are efficient and economical in use and contain no free silica include (1) limestone dust, preferably waterproofed by admixture with a small proportion of calcium or aluminum stearate or wax, (2) sillimanite, (3) calcined alumina, (4) vitrified china clay, and (5) calcined clay (chamotte). The nonsiliceous materials tend to shrink slightly when in use, whereas silica tends to expand, and this difference needs attention. Suspending agents include ball clay, core creams, dextrin starch, sulfite lye, and some artificial resins. A typical paint is made of sillimanite or other base, 100 lb. bentonite, 2.5 lb. core cream, 5 lb. sulfite lye, and 8 gal. water. When using other substitutes for silica, the following factors should be noted: *Molochite* (vitrified china clay) is satisfactory on lightweight castings but rather less suitable than silica on large, thick castings. *Calcined clay* (chamotte) gives results equal to silica flour on medium-weight castings, particularly with manganese steel. *Sillimanite* gives satisfactory results in some foundries, but on heavy, thick castings the results are erratic. One foundry making 500-lb. M. C. bombs prefers it to silica. In this foundry the paint is made of sillimanite flour 3 cwt., bentonite 17 lb., paint cream 27 quarts (composed of baltiseed cream 25 parts and sulfite lye 14 parts by weight), and water 20 gal. The mixture is diluted to a suitable specific gravity, e.g., 1.58, to give ease of application. *Fused alumina* gives good results in most cases, but in one or two instances poor stripping has been noted. Scrap aluminum wheels used for grinding "after burning out the bond" form a good source of alumina. *Zircon* gives uniformly satisfactory results, particularly in dry-sand work. The fusion points (by cone test) of the materials are molochite 1710°, calcined clay 1720°, sillimanite 1850°, fused alumina 1960°, zircon 2100°, and silica flour 1710 to 1720°C. Most of the substitutes are more expensive than silica flour, but the increased cost can be largely offset by reduced fettling costs and by improved results.
A.B.S.

Smoke and health. C. A. MILLS. *Rhode Island Med. Jour.*, **28** [7] 496–500, 509 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 184 (1945). D.G.P.

Some new aspects and approaches to the problem of dust diseases. CARL U. DERNEHL AND CARL A. NAU. *Texas Repts. Biol. Med.*, **3** [2] 227–37 (1945); *Ind. Med.*, **14**, 744–54 (1935); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 169 (1945).—Silicon dioxide is included.
D.G.P. & W.D.F.

Statistical study of 265 cases of heat disease. DANIEL L. BORDON, JAMES F. WADDILL, AND G. S. GRIER, III. *Jour. Amer. Med. Assn.*, **128** [17] 1200–1205 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 167–68 (1945).
D.G.P.

Suspected pneumoconiosis of graphite workers. ANON. *Brit. Med. Jour.*, **1945**, No. 4408, p. 916; abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 169 (1945). D.G.P.

Systemic sarcoidosis. J. F. BRIGGS. *Minn. Med.*, **28** [6] 452–54 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 169 (1945).—Sarcoidosis is similar to tuberculosis.
D.G.P.

Technology: theory or practice. ANON. *Chem. Age*, **53** [1376] 477–78 (1945).—The need for a better system of technical education in Britain is emphasized. The system of training most generally approved in Britain is almost wholly practical, based on a form of apprenticeship. This practical method of obtaining instruction seems peculiarly suited to the British character, although an adequate proportion of young persons are sufficiently well imbued with a desire for knowledge as such to attend classes in technical colleges and universities in which the theory is taught. It is suggested that Britain's decreasing share in the world's trade and a tendency to introduce foreign equipment instead of developing its own is due to lack of technical education. The decline of certain industries is not due to inadequate patent laws, to the heavy duty on ethyl, to a shortage of heavy chemicals, or to anything fundamentally wrong with the personal characteristics of the British but to the fact that their industries are suffering from rigidity of outlook. Not only is research essential, but also the personnel capable of seizing the opportunities afforded by research. The decline is widespread and cannot be attributed to exchanges, tariffs, dumping, subsidies, etc., damaging though these may have been. The special reasons which have been more disastrous to the United Kingdom than to other countries are the rigidity, lack of nimbleness in surmounting obstacles, lack of courage to scrap obsolete equipment, and lack of skill to adopt new inventions. Education is a highly individual business. Those who are adequately equipped for industrial life if they have a sound knowledge of scientific principles maintain that the study of pure science is the best possible preparation for industrial life. Others find it difficult to apply the principles of pure science to the everyday work of industry. Practical persons always learn better by application of the apprenticeship system than by any training in pure science. The majority of students belong to the latter category. The problem is whether to train future technologists in scientific principles, leaving them to pick up their practical knowledge in the works, or whether to give them immediate and purely scientific training with the maximum of technical training.
A.B.S.

Therapeutic use of sodium chloride in industry. DONALD STEWART. *Brit. Jour. Ind. Med.*, 2 [2] 102–104 (1945); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 168 (1945).
D.G.P.

Wire-rope clamp. ANON. *New Equipment Digest*, **10** [12] 13 (1945).—An alloy-steel clamp holds loads from 600 lb. to 23 tons. Easily installed, it reduces rope or sling breakage by equally distributing the pressure over a large area and doing away with cutting action. It is made by the National Production Co., Detroit 13, Mich. F.C.A.

SEPARATE PUBLICATIONS

Carbon Monoxide: Its Hazards and the Mechanism of Its Action. W. F. VON OETTINGEN. *U. S. Pub. Health Service Bull.*, No. 290, 257 pp. (1944); abstracted in *Jour. Ind. Hyg. Toxicol.*, **27** [9] 170–71 (1945). D.G.P.

Mining Machinery. T. BRYSON. 2d ed. Sir Isaac Pitman & Sons, Ltd., London, 1944. xii + 388 pp. Reviewed in *Mine & Quarry Eng.*, **10** [7] 174 (1945).
L.C.C.