

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

AUG. 30 and SEPT. 6, 1935.*

I.—GENERAL; PLANT; MACHINERY.

Filtration. IV. Nature of fluid flow through filter septa and its importance in the filtration question. B. F. RUTH (Ind. Eng. Chem., 1935, 27, 806—816; cf. B., 1935, 705).—Contradictory results as to whether Poiseuille's law holds good for the flow of fluid through a filter septum (no filter cake being present) are partly due to the difficulty of obtaining H_2O quite free from solids in suspension. Electrical effects may also account for the increase in the resistance of filter septa, and stretching of the cloth etc. may occur. Tests to ascertain whether turbulent flow (to which case the law would not apply) could possibly occur under practical conditions gave negative results, and it is concluded that Poiseuille's law, that the flow is directly \propto the pressure, must hold good for all stages of a filtration including the initial one. This enables the equations to be simplified. Cloth resistance is not, however, a const. quantity, but increases with age and use. For design purpose an average val. over a long period is used. If the analysis of a time-vol. discharge curve is made by means of a $d\theta/dV$ plot the true vals. of C and K (the cloth resistance in terms of filtrate vol. and the filtration const.) are obtained independently of each other. C. I.

Factors affecting entrainment in bubble-cap columns. W. T. PYOTT, C. A. JACKSON, and R. L. HUNTINGTON (Ind. Eng. Chem., 1935, 27, 821—825).—In a semi-commercial-scale column of two trays, the lower one contained a non-volatile dye and the degree of entrainment under varying conditions was determined by the amount of colour carried into the upper tray. Factors varied include temp., gas and liquid velocity, plate spacing, and depth of liquid in the tray. Kerosene and H_2O were the liquids used. C. I.

Graphical correlation of solvent extraction data. S. S. KURTZ, JUN. (Ind. Eng. Chem., 1935, 27, 845—846).—On rectangular co-ordinate paper, the x axis represents a physical property (e.g., d) which is additive on a vol.-% basis and the y axis the % of solvent. A line joins a point on the x axis = the untreated oil and the "solvent apex" ($y = 100$), and points representing mixes must fall on this line. If points representing the solvent-free raffines, the solvent-raffinate mixes, and the extracts are plotted, the curve separating the regions of partial and complete miscibility can be produced. C. I.

Gas-conversion factors. H. S. NUTTING (Ind. Eng. Chem., 1935, 27, 820).—Curves are given to expedite the calculation of the vol. of a gas to n.t.p. conditions when collected over H_2O at varying temp. and pressure.

A factor can be read off to correct for the partial pressure of H_2O vapour. C. I.

Computing volumetric components of fluid mixtures. S. H. INGBERG (Chem. Met. Eng., 1935, 42, 317—319).—Equations and graphs are given for calculating the composition of fluid mixtures when the admixture is made with and without free efflux. D. K. M.

Modified Oxford glossmeter. O. KRESS and H. W. MORGAN (Paper Trade J., 1935, 100; T.A.P.P.I. Sect., 337—338).—The defects of the usual type of polarisation glaremeter (P) are pointed out, and a new type of glossmeter (G), incorporating a photo-electric cell, is described. Such factors as colour and brightness of the sample are shown not to interfere with gloss determination using G , nor does the presence of certain coating materials, which cause the polarisation angle to be changed in P , affect the result with G . G is also more sensitive to differences in papers showing high gloss vals., and is not subject to human errors and variations. H. A. H.

Solvent refining of oils. Contact filtration.—See II. **Service pipes for H_2O .**—See XXIII.

PATENTS.

Furnaces. K. SCHMIDT GES.M.B.H. (B.P. 429,562, 27.9.34. Ger., 30.9.33).—A no. of rotary drum furnaces having inclined axes are mounted on a turntable so that they may be brought in turn to register with various service conduits (fuel supply, exhaust flues, etc.). B. M. V.

Heat-treating furnaces. BRIT. DRIVER-HARRIS CO., LTD. FROM DRIVER-HARRIS CO. (B.P. 429,687 and 429,761, [A] 5.12.33, [B] 6.12.33).—Means for supporting and driving live rollers in such furnaces are described. B. M. V.

Chemical apparatus. [Roaster.] T. A. MITCHELL, ASSR. to HUGHES-MITCHELL PROCESSES, INC. (U.S.P. 1,977,238, 16.10.34. Appl., 18.2.32).—A multi-hearth roaster with muffled heating from flues around the periphery and under each hearth is described. B. M. V.

Drying apparatus. H. E. DIETRICH, ASSR. to VISKING CORP. (U.S.P. 1,976,438, 9.10.34. Appl., 26.11.30).—Cellulose tube or sausage skin is dried continuously while under tension; trapped in a length of tube between two sets of pinching rollers is a bubble of air, and the tube is kept distended to the correct extent by altering the position of the rolls. The relative speed of the rolls to maintain the correct tension is also controlled by the diam. of the tube. B. M. V.

Reaction chamber for contact masses. HOUDRY PROCESS CORP. (B.P. 430,312, 1.2.35. U.S., 20.2.34).—

* The remainder of this set of Abstracts will appear in next week's issue.

The perforated conduits for admission and exhaust of gases are distributed as evenly as possible, hollow or solid dummies being inserted near the outer wall to reduce the dead spaces there. B. M. V.

Control of temperature and fluid distribution in contact masses. HOUDRY PROCESS CORP., Asses. of T. B. PRICKETT and E. J. HOUDRY (B.P. 430,174, 14.12.33. U.S., 30.12.32 and 31.3.33).—The reacting fluid is admitted to and exhausted from the contact mass by means of embedded perforated tubes, one set only being gilled longitudinally and preferably in a non-uniform manner. B. M. V.

Heat-insulation. C. G. MUTERS (B.P. 430,286, S.9.34. Swed., 16.11.33).—The insulation comprises air layers bounded by reflecting surfaces. B. M. V.

Tubular surface apparatus for effecting heat exchange between liquids. H. L. GUY, and ASSOCIATED ELECTRICAL INDUSTRIES, LTD. (B.P. 430,015, 6.12.33).—A primary helix of wire, preferably flattened, is formed into a helix and placed in a heat-exchange tube, preferably around an axial rod. The pitch of this secondary helix is $> \frac{1}{2}$ but not many times $>$ the diam. of the tube. [Stat. ref.] B. M. V.

Cooling of roll-refiners [for chocolate etc.] or like mills. A. A. TUNLEY, G. R. BAKER, BAKER PERKINS, LTD., and ANC. ÉTABL. A. SAVY, JEANJEAN & CO. (B.P. 429,425, 25.10.33).—In hollow rolls, means (*e.g.*, disc baffles) are provided to cause the cooling- H_2O to pass in close contact with the wall, and the circulation is sufficiently rapid (*e.g.*, 10–12 gals. per min. for a 16-in. roll) to cause scouring. B. M. V.

Apparatus for disintegrating, mixing, and screening pulverulent material. G. M. TYLER (B.P. 430,277, 23.3.34).—Beaters are rotated across the direction of motion (fall) of the material inside a conical screen. For repeated mixing both the under- and over-size material are returned by separate elevators of the chain-and-bucket type having a generally vertical run but curved upper parts. Gas burners may be provided to heat the enclosing casing, and the partly cooled products of combustion may be mixed with the material. B. M. V.

Mechanism for classifying powdered material by elutriation. KINETIC ELUTRIATORS, LTD., and A. J. PRANGLEY (B.P. 429,818, 6.12.34).—A paddle exerting inward and downward forces on settled matter, to discharge it, is described. B. M. V.

Apparatus for handling granular or lumpy material. GEN. ELECTRIC CO., LTD., and C. H. MARSHALL (B.P. 429,598, 29.11.33).—Delivery shoots for avoiding the breakage of, *e.g.*, coal are described. B. M. V.

Adjustment of the water content of concretes or mixtures of granular materials. W. H. GLANVILLE (B.P. 429,942, 9.12.33).—The granular material (*e.g.*, sand) is flooded with H_2O while in a container with a porous bottom, which is then bumped in a definite manner on a machine (described). The remaining H_2O will be found to be independent of time (after a min.), but dependent on the severity of agitation, and since the content of H_2O is usually $<$ that desired in the

mixed concrete (*etc.*), a definite additional quantity is added. B. M. V.

Rotary machines for expressing liquid from moist materials. GREENWOOD & BATLEY, LTD., and J. C. M. MACLAGAN (B.P. 430,376, 7.4.34).—After passing for $< \frac{1}{2}$ revolution between annular discs rotating and inclined as in a disc crusher, the material is impelled by a finger to the central space and leaves through apertures formed in the crushing members. B. M. V.

Extrusion presses for freeing kneaded masses from gases. E. DÜRST, SEN., and O. DÜRST, JUN. (B.P. 430,166, 12.12.33).—The clay or the like is forced by a preliminary worm through an extrusion plate (*P*) into a degasifying zone which is connected to a source of vac. and thence to a final press. Additional cutting-up means may be provided adjacent to *P*, and precautions are taken to prevent clay getting into the vac. pump. B. M. V.

Activation of adsorbent earths or clays. F. W. HUBER (U.S.P. 1,976,127, 9.10.34. Appl., 5.4.32).—The earth is mixed with 5–35% of conc. H_2SO_4 , heated at 150–300°, lixiviated with H_2O , dried, *e.g.*, at 140°, and reground. B. M. V.

Filter-press. N. H. HILLER and A. ROE, Assrs. to CARBONDALE MACHINE CO. (U.S.P. 1,977,480, 16.10.34. Appl., 20.11.33).—A press is opened and closed hydraulically and held closed by long bolts. A welded construction of end-plate is described. B. M. V.

Conduct of distillation under high vacuum. M. BARTHEL & Co. CHEM. FABRIK G.M.B.H. (B.P. 429,720, 31.8.34. Ger., 16.9.33).—Oil, wax, grease, or the like is distilled in a heated chamber (*A*) and the vapours are scrubbed by reflux in a superposed cooled chamber (*B*), *A* and *B* being filled with Raschig rings or the like formed of good heat-conducting material and the material in *A* spread on them in layers > 1 mm. thick. B. M. V.

Packing for fractionating columns. CARBORUNDUM CO., LTD. (B.P. 429,616, 4.12.33. U.S., 5.12.32).—The use of SiC (apparent *d* 2.0–2.5) is claimed. It is manufactured by recrystallisation, one method being to take the amorphous form (“fire sand”) from an ordinary furnace run, mix it with a little sawdust, and replace it in the furnace around the graphite core and itself surrounded by the regular mixture, the re-treatment being effected at approx. 2000°. B. M. V.

Condensate extraction systems. DRYSDALE & Co., LTD., and W. DRYSDALE (B.P. 430,450, 7.3.34).—The discharge valve of an extraction pump is adjusted to be forced open by liquid condensate only, being held closed when vapour only is present by the combined action of a spring and of the pressure in the condenser, calandria, or the like communicated to a piston on the valve spindle. B. M. V.

Resolution of solutions or liquid mixtures into their constituents by cooling and crystallisation. GES. F. LINDE'S EISMASCHINEN A.-G., and G. A. KRAUSE (B.P. 429,474, 25.10.34. Ger., 1.11.33 and 9.4.34).—The crystalliser (1) is of such a shape as to produce a solid body suitable for treatment in the next process (2), *e.g.*, centrifuging, without change of shape; the temp. gradient of cooling in (1) is in the same direction as the

separating force in (2). The above is attained by forming the crystallising space as a tapering annulus from which the mass is easily withdrawn. B. M. V.

Water-softening apparatus. W. H. PIPER, and CLENSOL, LTD. (B.P. 429,285, 7.12.33).—A small vessel containing a cake of H_2O -softening material is connected as a by-pass to a H_2O -pipe. B. M. V.

[Electrical] prevention of incrustation in boilers and the like. J. GERBER-RITTER (B.P. 429,564, 8.10.34. Ger., 6.10.33).—One a.c. main (e.g., 50 ~, 110 or 220 volts) is connected through several condensers of small capacity (in parallel) to as many different parts of the object to be protected; the other main is connected to an insulated electrode in the feed- H_2O supply pipe through a regulating resistance. B. M. V.

Preparation for cleaning, preventing, or removing scale or stains from articles. E. L. SMEAD (B.P. 429,504, 30.11.33. Mex., 30.11.32).—Henequen plant sap, strained free from pulp, is conc. to $\frac{1}{2}$ — $\frac{1}{3}$ of its vol. and a preservative, e.g., about 0.1% of PhOH, NaOBz, or borax, is added. The product is claimed to remove scale from boilers and rust stains from clothing. A. W. B.

(A) **Fluid [liquid with liquid] treating apparatus.**

(B) **Treatment of liquids with gases.** G. MACLEAN, Assr. to TURBO-MIXER CORP. (U.S.P. 1,976,955—6, 16.10.34. Appl., [A] 16.12.31, [B] 18.11.32).—(A) A tank contains several superposed compartments and rapid local circulation is induced by impellers; minor transfer flows take place at the periphery. (B) An impeller is arranged to induce liquid from above and below, and gas from above, and to expel the mixture downwardly and outwardly. B. M. V.

Dust-extraction apparatus. H. F. HEBLEY and K. PRINS (U.S.P. 1,977,479, 16.10.34. Appl., 1.3.33).—An apparatus in which coal or the like is subjected to air currents while on screens and while falling freely, and the dust afterwards separated from the air by cyclonic action, is described. B. M. V.

Determining the colour value of liquids. V. A. SCHOENBERG (B.P. 429,347, 25.11.33. U.S., 5.6.33).—In an apparatus for comparing the intensities of beams of light after passing through a standard liquid (*A*) and a sample (*B*), the length of the cell is adjusted so that when containing *A* the light emerging will have the same val. as if passed through air only in the cell. The compensation for absorption is believed to be due to reflexion from the walls of the cell. B. M. V.

Prevention of foaming of liquids. DEUTS. HYDRIERWERKE A.-G. (B.P. 429,423, 23.10.33. Ger., 22.10.32).—Glue, lactic acid, or a fermentation product of corn or molasses (e.g.) is evaporated in presence of 0.1—5.0% of a H_2O -insol. alcohol $> C_8$ and a dispersing agent if necessary. B. M. V.

Regulating the viscosity of liquids. D. P. GRAHAM, Assr. to PEABODY ENG. CORP. (U.S.P. 1,975,937, 9.10.34. Appl., 1.10.29).—The oil or other liquid, after heating, is caused to flow under const. pressure drop (*h*) through a coil having wall friction, and then at the varying rate of flow through a sharp-edged orifice, the varying pressure across which regulates the heating

medium. Devices are provided to maintain *h* const. irrespective of the original and back-pressures on the oil (etc.). B. M. V.

Analysis [of gases] employing photosensitive devices. C. A. STYER, Assr. to WESTINGHOUSE ELECTRIC & MANUFG. CO. (U.S.P. 1,977,359, 16.10.34. Appl., 24.3.31).—Two equal beams of light are caused to cross a gas flow at different points, and between them is added a reagent which causes a fog, or a change of colour, or a variation of *n* by reaction with the constituent to be assayed. B. M. V.

Filter and pad therefor. M. T. WELLS, J. H. and J. GOLDMAN (B.P. 430,375, 4.4.34).—See U.S.P. 1,955,158 and 1,966,274; B., 1935, 4, 435.

Separation of fine particles from gases by contacting with a liquid. R. G. BOWMAN (B.P. 430,379, 13.4.34).—See U.S.P. 1,959,945; B., 1935, 210.

[Work-batch location indicator for] heat-treatment furnaces, kilns, stoves, and similar structures or installations. BIRMINGHAM ELECTRIC FURNACES, LTD., and A. G. LOBLEY (B.P. 429,782, 29.12.33).

Insulation for cold- or heat-retaining cabinets. C. G. MUNTERS (B.P. 429,432, 24.11.33. Swed., 25.11.32).

Evaporation (etc.) of HCl.—See VII. **Caulking compound.**—See XIII. **Treating goods under heat and pressure.**—See XIV.

II.—FUEL; GAS; TAR; MINERAL OILS.

Present position of the chemical up-grading of bituminous coal. P. DAMM (Gas- u. Wasserfach, 1935, 78, 413—419).—The processes of low-, medium-, and high-temp. carbonisation, of hydrogenation, and of complete gasification of coal are briefly discussed.

A. B. M.

Press for [coal samples with] high caking indices. R. KATTWINKEL (Brennstoff-Chem., 1935, 16, 231; cf. B., 1932, 487).—A suitable design of press for determining the crushing strength of the coke-sand button is described. A. B. M.

Processing coal in the Knowles coke oven. R. S. MCBRIDE (Chem. Met. Eng., 1935, 42, 300—303).—The plant of the Radiant Fuel Corp. at West Frankfort, Ill., for conversion of low-val. bituminous screenings into smokeless domestic fuel is described and illustrated. D. K. M.

Comparison of external and internal heating processes of low-temperature carbonisation. E. GROH (Brennstoff-Chem., 1935, 16, 221—230).—The Kohlenveredlungs A.-G. (*A*), Freiberg (Seidenschnur) (*B*), and Lurgi (*C*) processes of low-temp. carbonisation of brown coal, and the process of complete gasification of brown-coal briquettes (*D*), are critically compared. The cost of the plant is practically the same for all the processes. Where the cost of electric power is high operating costs are lowest for *D* and highest for *B* and *C*. The somewhat smaller yield of tar from *A* is offset by its better quality. *D* gives a tar similar to that from *B* and *C*, but in slightly smaller yield. The coke yield from *B* and *C* is smaller than from *A*, but the product is of larger particle size. *D*, of course, yields no coke,

but an increased vol. of gas. The choice of process is determined largely by the character of the coal and the use it is desired to make of the products.

A. B. M.

Town's gas and "synthesis gas" from brown coal. Kassel "concurrent flow retort," Bubiag-Didier system. W. ALLNER (Gas- u. Wasserfach, 1935, 78, 438—456; cf. B., 1931, 790).—Further details, including heat and material balances, are given of the operation of this plant in which brown coal is carbonised in a vertical, externally-heated retort in such manner that the tar vapours are caused to pass in the same direction as the solid material, *i.e.*, downwards, and are cracked to gas by passage over the incandescent coke. Steam is simultaneously passed through the hot coke zone. The plant yields a gas having the desired calorific val. and *d* for normal town's use; by varying the operating conditions a gas suitable for synthetic purposes, *e.g.*, production of NH_3 or of benzine (Fischer-Tropsch synthesis), can be produced. The gas, tar, benzol, and NH_3 liquor are similar to the products obtained from bituminous coals. The difficulties usually associated with brown-coal carbonisation, *e.g.*, unpleasant odour, disposal of liquor, etc., are absent. The coke produced is used for heating the retorts. The plant has been in successful operation since Oct., 1934, with an output of 5000—7000 cu. m. of gas per day. A. B. M.

Production of town's gas from water-gas. H. ROSENTHAL (Gas- u. Wasserfach, 1935, 78, 436—438).—A method involving the following steps, utilising known processes, is suggested: (a) partial conversion of the CO according to the reaction $\text{CO} + \text{H}_2\text{O} = \text{CO}_2 + \text{H}_2$, (b) removal of H_2S , (c) removal of the bulk of the CO_2 , (d) removal of org. S, (e) partial conversion according to the reaction $\text{CO} + 3\text{H}_2 = \text{CH}_4 + \text{H}_2\text{O}$. The product is an especially pure "town's gas" of approx. composition CO 16, CH_4 25, H_2 46.2, CO_2 5.5, N_2 7.3%. It is estimated that 1.8 cu. m. of water-gas would give 1 cu. m. of town's gas at a cost (for conversion) of 1.5—2.3 Pf. The process could be used to supplement the production of normal coal gas at gasworks to meet peak loads, and also provides a means of disposing of surplus coke. A. B. M.

Drying and removal of residual impurities of town's gas with silica gel. H. BRÜCKNER and W. LUDEWIG (Gas- u. Wasserfach, 1935, 78, 459—462).—Gas containing 17.5—20 g. of H_2O per cu. m. was passed over 1 kg. of SiO_2 gel at a rate of 1 cu. m./hr.; the H_2O content of the effluent gas was reduced to nil for the first 2½ hr., but thereafter increased slowly. The gel at the same time removed the residual C_{10}H_8 and NH_3 in the gas completely, as well as the greater part of the residual HCN. Presumably the gum-forming constituents were also removed. C_6H_6 and its homologues were partly removed at first, but were later completely returned to the gas. The moist gel was readily regenerated by passing hot air through it. The advantages of SiO_2 -gel drying are (a) simple apparatus, (b) small heat consumption during regeneration, (c) accompanying gas purification; the disadvantages are high initial cost of the gel, and necessity for cooling the gel during absorption. A. B. M.

Production of water-gas from brown coal in the Pintsch-Hillebrand generator of the Hamburg gasworks. H. MÜLLER (Gas- u. Wasserfach, 1935, 78, 431—436; cf. B., 1932, 789).—The generator, the arrangement of which has been modified, has been in uninterrupted operation for 12 months, with an average throughput of 47.8 tons of briquettes and a production of 48,087 cu. m. of gas per day. Results of a 3-days test run are given in detail. The composition of the gas was CO_2 10.1, C_nH_m nil, O_2 nil, CO 33.6, H_2 54.2, CH_4 0.4, N_2 1.7%; calorific val. 2743 kg.-cal./cu. m. The thermal efficiency of the process was 58.3%. A. B. M.

Sulphur-free gas for distance transmission. H. TRUTNOVSKY (Gas- u. Wasserfach, 1935, 78, 462—465).—The results of small-scale experiments on the efficiency of various processes for removing the residual org. S in coal gas (about 20 g./100 cu. m.) are discussed. Washing with oil removed only 36% of the S. Passing the gas over heated Fe or adsorption on active C was too uncertain in its action for large-scale application. The most efficient method consisted in the catalytic conversion of the org. S into H_2S ($\text{CS}_2 + 2\text{H}_2 = \text{C} + 2\text{H}_2\text{S}$) over Ni at 450°, followed by removal of the H_2S with Fe_2O_3 . 90% of the S was removed by this process and the purified gas could be used for the heat-treatment of metals without using a muffle. A. B. M.

Rapid determination of acetylene in generator water. E. SAUERBREI and W. SCHERUHN (Autog. Metallbearb., 1934, 27, 341—343; Chem. Zentr., 1935, i, 758).—Dissolved gases are liberated by boiling, and C_2H_2 is absorbed in alkaline KCN solution or fuming H_2SO_4 . J. S. A.

Liquid-liquid extraction systems. Computations for solvent refining of oils. T. G. HUNTER and A. W. NASH (Ind. Eng. Chem., 1935, 27, 836—845).—Two processes are distinguished, *viz.*, those employing a single solvent for extraction, and those using two solvents in a way analogous to fractional distillation and termed "fractional distribution." The Duosol process for refining lubricating oils by separating naphthenes and paraffins is an example of the latter. Multiple-contact methods in the latter case are suitable only for laboratory use owing to the large vols. of solvent required. Its extension to "pseudo-countercurrent extraction" is discussed. In a true countercurrent process of fractional distribution a binary mixture of A and B is fed into a column at some intermediate point, while the two immiscible or partly miscible solvents pass through the column in opposite directions. Owing to the chemical complexity of petroleum distillates, to which this process is applied, performance can be computed only approx. by considering the oil as a binary mixture of components of differing physical properties such as η index. Equilibria can then be represented on triangular co-ordinates. Examples are given of the refining of lubricating oil with PhNO_2 by multiple-batch extraction in the laboratory, the results being generally in good agreement with those calc. by the authors' graphical method. The method of computation may be used to forecast the most favourable extraction conditions to produce a max. yield of product of given physical constns. C. I.

Applications of distillation in modern petroleum refining. J. S. CAREY (Ind. Eng. Chem., 1935, 27, 795—801).—By "stabilisation" of crude oil is meant the removal of the most volatile components up to about C_5H_{12} . It may be combined with the stripping of natural gas in the field or be located at the refinery with separate production of C_3H_8 and C_4H_{10} . Then follows primary distillation for which a flow sheet is given, kerosene and some gas oil being produced at atm. pressure and the higher fractions separated by vac. distillation. Units of capacity of 50,000 barrels per day are under construction. Acid-treated distillates are redistilled, the portions of higher b.p. being kept back to dissolve S compounds. Design depends largely on the desired end point, two-stage units being most usual. A typical flow sheet is given. Lubricating oil distillation and gas recovery are also referred to. C. I.

Modern contact filtration and pressure filters [for oil refining]. C. E. MOSMANN (Petroleum, 1935, 31, No. 23, 1—7).—Modern methods of oil refining by the combined action of H_2SO_4 and fuller's earth, and modern high-pressure (10—15 atm.) filter presses are described. Costs of operation are given. G. M.

Action of bleaching earths [on benzine]. E. ERDHEIM (Petroleum 1935, 31, No. 29, 7—8; cf. B., 1935, 582).—Active black (I) is twice as efficient as fuller's earth (II) or activated earth (III) for decolorising benzine (IV) from Boryslaw crude. On extracting the used earths with equiv. amounts of EtOH, the solutions obtained from (II) and particularly (III) were darker than was the original (IV), whilst that from (I) was the same colour as (IV). In similar experiments using (IV) containing a yellow dye, decolorisation was complete except with (II). The colour was not removed from the used earths by benzine, but was extracted by $COMe_2$ from (II) and (III) but not (I). In the last case decolorisation is ascribed to adsorption. C. C.

Polymerisation gasoline from cracked gases. V. N. IPATIEV and G. EGLOFF (Petroleum Eng., 1935, 6, No. 10, 29—32; Petroleum, 1935, 31, No. 29, 1—7).—The production of gasoline by polymerisation of cracked gases (I) has been investigated on a semi-commercial scale using 5 samples of (I). The operating conditions varied as follows: gas rate 0.05—11.4 cu. ft./hr. per lb. of catalyst, temp. 232—260°, pressure 100—175 lb./sq. in. Yields of liquid polymeride (II) ranged from 3.0 to 8.4 gals./1000 cu. ft., whilst 71—99% of the olefine content was converted into (II). H_2S must be removed from (I) by aq. NaOH to give a product of low S content (0.02%). (II) has a high C_8H_{18} no. (81) and a higher blending val. than C_6H_6 or *iso*- C_8H_{18} . Although the O_2 -bomb stability of (II) is low (induction period < 60 min.), the susceptibility to inhibitors is high. C. C.

Extraction and preparation of petroleum asphalt. N. MAYER (Chem.-Ztg., 1935, 59, 456—457).—Methods and plant employed for the recovery of asphaltic bitumen (I) from crude petroleum containing both large (50%) and small (6%) proportions of (I) are outlined. The system used for maintaining a high vac. in a 2-stage pipe still when using cooling- H_2O at 30° is described. The theories underlying the conversion of petroleum

oils into (I) by chemical methods and the prep. of (I)- H_2O emulsions for road use are reviewed. G. M.

Entrainment in bubble-cap columns. Solvent extraction.—See I. **Stability of Na methylxanthate.**—See III. **Cable insulation.**—See XI.

PATENTS.

Coal bricks and like fuel products. A. F. ECHBERG, B. W. MASON, and L. H. STRAIN (B.P. 430,233, 6.2.35).—Briquettes that can be moulded in a moist, plastic state and hardened in air are composed of, e.g., 60 vol.-% of coal dust, 30% of breeze, and 6% of cement. B. M. V.

Carbonisation or heat-treatment of solid materials. ILLINGWORTH CARBONIZATION CO., LTD., and S. R. ILLINGWORTH (B.P. 429,458, 30.11.33 and 17.8.34).—A retort (R) for the heat-treatment, more particularly the low-temp. carbonisation, of coal or coal briquettes comprises a stationary setting containing one or more horizontal metal heating chambers (C), into which the material is fed; C are supported in such a manner within R that they can be given a longitudinal, reciprocating, quick-return movement, which impels the material along C to the discharge ends. The motion is imparted to C by means of pusher rods which pass through gas-tight glands in the wall of R and are actuated by cams operating outside R. Seals are provided between C and the R setting to keep the hot gases from contact with the means supporting C. R is heated by means of suitably disposed horizontal flues. A. B. M.

Apparatus for use in retorts for distillation treatment of materials containing hydrocarbons. E. W. BROCKLEBANK and W. B. MITFORD (B.P. 430,649, 23.9.33).—An inclined, cylindrical, rotary retort is provided with an internal, longitudinal roller which is divided into sections, is allowed a certain degree of freedom, and is composed of pipe or the like furnished with spikes to dislodge coke from the walls of the retort. B. M. V.

Reclaiming bone black and like materials. N. R. ANDREWS (U.S.P. 1,971,895, 28.8.34. Appl., 24.4.33).—Spent activated C, e.g., char used in sugar refining, is revived by passing it countercurrent to air through tubes heated by the flue gases from a boiler furnace (F), the rates of passage of the C and of the air being automatically controlled in proportion to the rate of fuel supply to F. A. B. M.

Production and combustion of oil gas in furnaces. J. McQUARRIE and P. C. WALKER (B.P. 430,098, 18.12.33).—A burner has three co-axial air passages (1, 2, 3), the oil being supplied by a radial tube to the axial passage (1) and sprayed by shearing. The air in (1) is preheated to > 205° and that in (2) to < 260°, and these streams preferably swirl in opposite directions. The air in (3) adjusts the final combustion and composition of the gas. B. M. V.

(A) **Re-forming of oil gas.** (B, C) **Production of mixed oil gas and water-gas.** (A, B) J. A. PERRY, (C) H. G. TERZIAN, Assrs. to UNITED GAS IMPROVEMENT CO. (U.S.P. 1,971,728—9 and 1,972,804, [A, B] 28.8.34,

[c] 4.9.34. Appl., [A] 27.2.29, [B] 2.3.29, [C] 3.1.29).—(A) Hydrocarbon gases of high calorific val., e.g., by-product oil-refinery gas, are converted into gases of suitable calorific val. and d for domestic and industrial use by partial combustion with O_2 . The burner and reaction chamber are so designed that the heat of combustion is utilised to crack the remaining higher hydrocarbons. (B) A water-gas plant is operated as follows: (a) the fuel bed (F) is air-blasted and the blast gases are burned in the carburettor (C) and superheater (S); (b) oil or oil gas is admitted to the top of F , the gases produced being passed down through F and thence directly to storage; simultaneously oil or oil gas and, if desired, steam are supplied to C , the gases produced being passed through S to storage; (c) F is steamed, the water-gas produced being carburetted in C , if desired, and then admixed with the other gases. (c) The cycle is: (a) as in (B); (b) oil and, if desired, steam are admitted to the top of C , the gases and vapours formed being passed through S and then up and/or down through F , whereby the oil vapours are cracked; (c) steam is passed through F , the C deposited therein during the preceding stage being thereby removed; the water-gas formed is carburetted in C if desired. The order of the operations may be varied. A. B. M.

Continuous manufacture of carburetted water-gas. P. SUBKOW (U.S.P. 1,972,833, 4.9.34. Appl., 17.10.25. Renewed 6.4.32).—The plant comprises \leq 3 generators (G), a carburettor (C), and a superheater (S). The blast gases from G , which are operated in such a cycle that at least one is always being air-blasted and at least one steamed, are burned with secondary air and passed through banks of heating tubes which traverse C and S . The water-gas produced is passed continuously through C and S and is carburetted therein by the addition of oil and, if desired, steam. The steam used for the up- and down-runs in G is preheated by passing it through coils in C and S . A. B. M.

Gas-purification process and recovery of by-products therefrom. H. A. GOLLMAR, ASSR. to KOPPERS CO. OF DELAWARE (U.S.P. 1,971,779, 28.8.34. Appl., 8.1.32).—Gas containing H_2S and HCN is treated with a reagent which selectively absorbs HCN , e.g., an alkaline suspension of S , and is then freed from H_2S by washing with aq. Na_3AsS_4 as described in U.S.P. 1,719,762 (B., 1929, 707). A. B. M.

Purification of coal-distillation gas by-products. I. H. JONES, ASSR. to KOPPERS CO. OF DELAWARE (U.S.P. 1,971,786, 28.8.34. Appl., 22.4.31).—Fuel gases are treated in the usual manner to remove tar, NH_3 liquor, and light oil. The liquor is dephenolised in known manner and the alkaline phenolate solution obtained is "sprung" by treatment with CO_2 . The carbonate solution which separates is used to neutralise the oil after it has been refined by treatment with H_2SO_4 . A. B. M.

Manufacture of granular material for gas purification. G. E. SEIL, ASSR. to E. J. LAVINO & CO. (U.S.P. 1,971,969, 28.8.34. Appl., 13.4.33).—Fe ore or other suitable compound is mixed with an alkali, e.g., Na_2CO_3 , and the mixture is sintered to form an alkali ferrite in granular form, which is then leached with hot H_2O .

The Fe_2O_3 produced is porous and highly active as a gas-purifying material. A. B. M.

Testing [the explosibility] of gases. G. W. JONES (U.S.P. 1,977,481, 16.10.34. Appl., 28.8.30).—A gas is confined and sparked and, if it does not explode, is tested in the same way after successive additions of C_3H_8 or other paraffin (A) until it explodes or until the proportion of A has reached the same val. as in an explosive mixture of A with air. Similarly, O_2 -containing gas (B) should be added until an explosion takes place or until the O_2 added has reached 100% of an explosion-supporting mixture. B. M. V.

Tar distillation. J. ZAVERTNIK, JUN., ASSR. to BARRETT CO. (U.S.P. 1,972,468, 4.9.34. Appl., 31.3.30. Cf. U.S.P. 1,418,893; B., 1922, 539A).—Tar is distilled at about 370° , the vapours being removed by circulating through the still an inert gas preheated to about the same temp. by heat interchange with the gases and vapours leaving the still, and with the combustion products used for heating it. A. B. M.

Manufacture of bituminous road oils. H. D. ELKINGTON. From N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 429,548, 31.5.34).—The adhesive properties of road bitumens for aggregates, particularly in presence of H_2O , are improved by the addition of 0.1–2% of org. acids of high mol. wt. or derivatives thereof, e.g., stearic acid, montan wax, solid resins, oxidised paraffin wax, etc., with the exception of liquid higher fatty acids, e.g., oleic acid. A. B. M.

Dispersing and stabilising hydrocarbon oils and the like. M. ERNOTTE (B.P. 428,908, 18.9.34).—By-products obtained from the carbonation of sugar juices, consisting principally of pptd. $CaCO_3$, are used as dispersing and stabilising agents in the production of emulsions of oil, tar, bitumen, etc. A. B. M.

(A) **Resolving, (B) parting of chemically treated, emulsions.** C. J. ROBINSON, ASSR. to L. BLAKE-SMITH (U.S.P. 1,974,692–3, 25.9.34. Appl., [A] 21.5.32, [B] 3.4.33).—(A) Emulsions, e.g., of petroleum and H_2O , are resolved by treatment with finely-divided (80–100-mesh) mineral (I) or artificial product having $d >$ that of the continuous phase (C) and also a much higher adhesion tension (A) for the dispersed phase (D) than for C . A is measured by the "sp. rise" in 20 hr. of liquid in a glass tube filled with (I) and dipped in the liquid. The ratio of sp. rise for D and C should be \leq 2.5 unless the d of (I) is $>$ 3 times that of C , and for $H_2O \leq$ 200 mm. in 20 hr. (I) must be hard enough to resist abrasion during mixing and must be insol. in C and D , e.g., hæmatite or oxides of Ti, V, Cr, Zn, Fe. (B) The phases of the emulsion are separated, after addition of reactive chemical to bring the former to a state of instability, by passing through the emulsion, in the direction in which D tends to gravitate, granules of an insol. solid wetted by D . Light solids suitable for upward settling of oil include small cubes or pellets of wood or cork, vesiculated clay ($\frac{1}{8}$ – $\frac{3}{8}$ in.). Heavier-than- H_2O and H_2O -wettable solids include hæmatite, flint glass, alundum ($>$ 20 mesh— $\frac{1}{4}$ in.). The processes are continuous, (I) after passage through the emulsion being collected and returned for use again. C. C.

Treatment of hydrocarbon oils. G. EGLOFF, ASSR. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,974,301, 18.9.34. Appl., 16.3.31).—In the cracking of heavy hydrocarbon oils under normal conditions for production of gasoline, aq. $MgCl_2$ (I), with or without air, is introduced with the charge into the heating and reaction zones. (I) decomposes, forming $Mg(OH)_2$ and HCl, the former reducing the S content and the latter partly saturating and chlorinating unstable unsaturated compounds. C. C.

Conversion of hydrocarbons. K. R. FINSTERBUSCH (B.P. 428,475, 14.11.33).—The gases remaining after condensation of the distillate (*D*) from a tower (*R*) refluxing cracked hydrocarbons are compressed and cooled, mixed with *D*, and passed into a reflux tower (*T*) the vapours from which after condensation (consisting of C_4 and C_3 hydrocarbons) are polymerised by heating in a pipe-furnace (*F*). Heavy hydrocarbons from this product are returned to the cracking unit, while the lighter polymerides after condensation are returned to *T*, from the bottom of which motor fuel consisting largely of such polymerides and C_4 and C_5 hydrocarbons is withdrawn. The uncondensed gases from *T* and *F* are scrubbed under pressure with a liquid withdrawn from *R*, and this liquid is returned to a vessel which receives the products from the cracking furnace. D. K. M.

Purification of hydrocarbons [benzol]. NAT. BENZOLE Co., LTD., W. H. HOFFERT, and E. G. HANCOCK (B.P. 428,931, 14.10.33).—Benzol (100 gals.) is freed from CS_2 by shaking with MeOH (\approx 5 gals.) and NaOH (7.5 lb.) and separating. From the MeOH layer either Na xanthate may be recovered by treatment with more CS_2 and distilling, or CS_2 by treatment with H_2SO_4 and distilling. D. K. M.

Refining of emulsified compounds. R. H. RUSSELL, ASSR. to GAS FUEL CORP. (U.S.P. 1,970,771, 21.8.34. Appl., 25.3.31).—Hydrocarbon oil, H_2O , and a gas rich in CO_2 are mixed together to yield an emulsion consisting of globules of gas in a film of H_2O within a film of oil. This is mixed with hot products of combustion, whereby the oil is converted into light hydrocarbons. D. K. M.

Regeneration of doctor sludge. H. G. M. FISCHER, ASSR. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,970,693, 21.8.34. Appl., 29.4.31).—The emulsion obtained by treating hydrocarbon oil with doctor solution (*D*) is centrifuged in a machine with a rotor inside a rotating bowl; these rotate at different speeds. According to the speeds employed the emulsion is separated into spent *D* + PbS and oil with or without PbS, or PbS, oil, and spent *D*. D. K. M.

Manufacture of oils with a low paraffin wax content. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 430,485, 8.3.35. Holl., 25.4.34).—A 1:1 mixture of tetrahydronaphthalene and $COMe_3$ or $COMeEt$ is used as diluent in dewaxing oils of high paraffin wax content. C. C.

[Coloration of] gasoline. G. ALLEMAN, ASSR. to SUN OIL Co. (U.S.P. 1,969,249, 7.8.34. Appl., 9.10.33).—The addition of a 1-alkyl-(methyl-amino-4-*p*-toluidino-anthraquinone (0.0004—0.0005%) is claimed. H. A. P.

[Preparation of] colour-stabilised mineral oil. V. VOORHEES, ASSR. to STANDARD OIL Co. (U.S.P. 1,973,676, 11.9.34. Appl., 21.12.31).—The addition of 0.005—0.02% of $\alpha\beta$ -alkylenediamines or their substitution products (including polyalkylenepolyamines) obtained from alkylene dihalides ($C_2H_4Cl_2$) and NH_3 is claimed. H. A. P.

Gum inhibitor for [liquid] hydrocarbon fuels. W. S. CALCOTT and I. E. LEE, ASSRS. to GASOLINE ANTI-OXIDANT Co. (U.S.P. 1,972,760, 4.9.34. Appl., 23.8.29).—Gum and colour formation in, e.g., gasoline are inhibited by addition of diarylguanidines of the type $NH_2C(NHR)NHR'$, e.g., where R and R' may each be Ph, C_6H_4Me , or $C_6H_3Me_2$, or R is Ph and R' is C_6H_4Me , in appropriate quantity (0.0001—0.05%). A. W. B.

Antiknock composition. A. PACYNA (U.S.P. 1,973,320, 11.9.34. Appl., 29.10.31).—A solution of UO_2Cl_2 (I) (85 g.) and $V_2O_5Cl_4$ (II) (15 g.) in $COMe_2$ (III) (300 c.c.) is sprayed into the cylinders of an internal-combustion engine. Alternatively, (I) (85 g.) and (II) (15 g.) are mixed with crude cholesterol and heated at 200° for 1 hr.; after cooling, xylydine (25 g.) is added and the mixture heated to 150° . When cool the product is dissolved in (III) (300 c.c.) and the solution (1 oz.) added to petroleum (10 gals.). D. K. M.

Production of antiknock compounds. G. EGLOFF and R. E. SCHAAD, ASSRS. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,973,474, 11.9.34. Appl., 14.1.28).—The incondensable hydrocarbon gases from cracking operations are mixed with NH_3 and heated at about $650^\circ/vac$.—1000 lb. per sq. in. The resulting NH_2 -compounds are separated by condensation. D. K. M.

Core oil. E. H. PAYNE, ASSR. to STANDARD OIL Co. (INDIANA) (U.S.P. 1,970,916, 21.8.34. Appl., 12.5.30).—The sludge from acid treatment of mineral oil is neutralised by washing with aq. NaOH and distilled. The distillate having A.P.I. gravity 26—16 is core oil and may be mixed with 20—50% of a drying vegetable oil, e.g., linseed. The bottoms are heated further with air until they have m.p. 121° , when the tar is withdrawn and ground to pass 100-mesh. D. K. M.

Lubricating oil. J. F. WERDER, ASSR. to E. ROGERS (U.S.P. 1,971,243, 21.8.34. Appl., 31.5.32).—A mixture of S_2Cl_2 (10 vol.-%) and a mineral or vegetable oil (90 vol.-%), e.g., fish oil, linseed oil, is heated at 66° . The product (6%) is mixed with a mineral oil or grease (94%) and the product (25%) mixed with mineral oil or grease (75%). D. K. M.

Synthetic lubricating oils. J. Y. JOHNSON. From I. G. FARBERIND. A.-G. (B.P. 428,936, 17.11.33).—The viscosity index, coke and oxidation tests of lubricating oils made by polymerising liquid olefines either alone or with mineral or tar oils are improved by extracting the oils with a suitable solvent, e.g., $PhNO_2$, NH_2Ph , at -30 to 50° . D. K. M.

Production of lubricating oils. H. R. SNOW, ASSR. to STANDARD OIL Co. (U.S.P. 1,970,402, 14.8.34. Appl., 15.5.30. Cf. U.S.P. 1,955,260; B., 1935, 261).—Lubricating oils are produced by polymerising suitable cracked distillates with a metal halide, e.g., $AlCl_3$, at $\geq 204^\circ$ in presence of HCl or alkyl halide, e.g., CCl_4 .

The sludge from a previous batch may replace part of the metal halide. D. K. M.

Production of lubricating oil. R. C. OSTERSTROM, Assr. to PURE OIL Co. (U.S.P. 1,973,824, 18.9.34. Appl., 25.2.32).—A cracked distillate (10–50%), *e.g.*, with boiling range 215–370°, is freed from light hydrocarbons by distillation, heated at 120–260° with a wax-distillate residue (90–50%) and AlCl_3 , washed with aq. NaOH, and 25% is distilled off. The residue lowers the cold pour test of lubricating oil when mixed with it.

D. K. M.

Manufacture of a lubricating compound. L. R. CHURCHILL, Assr. to TIDE WATER OIL Co. (U.S.P. 1,974,299, 18.9.34. Appl., 3.2.32).—A mineral oil is mixed (5–25%) with a base produced by heating at 215–260° a mixture of a fatty oil, *e.g.*, maize oil (8 pts.), and S (1 pt.) until it no longer corrodes Cu strip immersed in it for 3 hr. at 99°.

D. K. M.

Lubricant. L. C. BRUNSTRUM and D. G. LOETSCHER, Assrs. to STANDARD OIL Co. (U.S.P. 1,970,902, 21.8.34. Appl., 31.12.31).—An alkali (Na) alginate (19%) is mixed into a paste with H_2O at room temp. to 100°, a polyhydric alcohol, *e.g.*, glycerol (76%), is added, and the H_2O boiled off so as to leave in the product about 5% of H_2O .

D. K. M.

Suspension of lubricating and other particles in less dense fluid media. SULFLO CORP. OF AMERICA, Asses. of V. R. ABRAMS (B.P. 428,463, 10.11.33. U.S., 26.11.32).—A hot fluid gel, *e.g.*, Na oleate, dissolved in hydrocarbon oil is cooled to < the gel point without agitation. A finely-divided substance (*F*), *e.g.*, S, is mixed into the gel and sufficient air introduced to maintain *F* in suspension. (Cf. U.S.P. 1,913,300; B., 1934, 328.)

D. K. M.

Treatment of lubricating oils. C. C. WAKEFIELD & Co., LTD., and E. A. EVANS (B.P. 431,066, 30.12.33).—To prevent the formation of sludge in lubricating oil (I), $\nless 1\%$ of an oil-sol. org. compound of Cr (*e.g.*, Cr oleate) is added to (I) together with a small proportion ($\nless 1\%$) of an org. compound of Sn and/or Pb, *e.g.*, Sn oleate, PbEt_4 .

C. C.

(A) **Treatment of lubricating oils.** (B) **Lubricating oil.** (A) W. O. KEELING, (B) F. R. LANG, Assrs. to CROWN CENTRAL PETROLEUM CORP. (U.S.P. 1,974,777—8, 25.9.34. Appl., 5.11.28).—A red tint and a green fluorescence are imparted to lubricating oil by mixing it with (A) the residue from the cracking of hydrocarbon oil freed from light hydrocarbons and heating the mixture with acid and filtering through clay; (B) the oil, after washing with H_2O , obtained by heating a mixture of acid sludge and cracked residue to 149°, or the residue obtained after evaporating the filtered Et_2O extract of a cracked residue. D. K. M.

Purification and revivification of [lubricating] oils. S. WRIGHT (B.P. 428,762, 5.8.33).—Lubricating oil which has been affected by use, especially in steam turbines and internal-combustion engines, is revivified by heating to 40–150°, mixing with H_2SO_4 or activated earth, and heating to 205–290°. The oil is neutralised with $\text{Ca}(\text{OH})_2$, freed from suspended matter, heated to

120–290° with a little activated earth, cooled, and filtered. [Stat. ref.] D. K. M.

Solid lubricant. C. A. MILLER and C. B. KARNS, Assrs. to VALVOLINE OIL Co. (U.S.P. 1,973,537, 11.9.34. Appl., 1.12.26).—A fibrous lubricant, m.p. $> 205^\circ$, is obtained by mixing heavy paraffin-base cylinder stock (52%) with stearic acid (39%) at 94° and adding a paste of granular NaOH and H_2O . When the reaction is complete the temp. is raised to 177° and the mass drawn from the kettle. The product contains Na stearate 47, free alkali 0.5, and H_2O 1%.

C. C.

Manufacture of paraffin emulsion and the like. H. L. BECHER, Assr. to BENNETT, INC. (U.S.P. 1,973,692, 18.9.34. Appl., 30.10.28).—A mixture of paraffin with < 20 –25 wt.-% of montan wax (I) is agitated with sufficient hot H_2O to form a proper emulsion (II) when (I) is completely saponified by stirring with alkali (NaOH). On cooling, a paste is formed. Pulpboard, cardboard (III), or paper (IV) can be waterproofed and rendered highly dielectric by treating the pulp directly with (II) and subsequently adding a precipitant, or by first converting (II) into a fine suspension (V) by adding a metallic salt, *e.g.*, MgSO_4 or $\text{Al}_2(\text{SO}_4)_3$. In either case the alkali salt, *e.g.*, Na_2SO_4 , is practically completely removed in the drainage- H_2O on pressing. (II) or (V) may also be used for forming a surface coating on (III) or (IV).

C. C.

Electrical insulating oil. S. W. FERRIS, Assr. to ATLANTIC REFINING Co. (U.S.P. 1,969,737, 14.8.34. Appl., 10.1.31. Cf. U.S.P. 1,788,569; B., 1931, 831).—Electrical insulating oil is heated to miscibility with PhNO_2 (I), cooled, and the (I) layer removed; the operation is repeated on the residue several times. The residue is freed from (I) by distillation and passed through a layer of fuller's earth. The resulting oil has improved insulating stability.

D. K. M.

Treatment of heavy hydrocarbon oils. A. J. PARIS, JUN. (B.P. 428,971, 22.8.33. U.S., 2.9.32).—The consumption of lubricating oil by an internal-combustion engine is reduced by passing part of the exhaust gases, cooled to < the oil-cracking temp., through the oil in the crank case or on its way thereto.

D. K. M.

Doors for coke ovens and the like. P. E. H. FORSANS (B.P. 430,446, 10.2.34).

Handling granular material. Distillation under high vac. Regulating the η of oils. Dust extraction.—See I. Olefine-CO reaction products.—See III. Insecticide.—See IX. Carrying out chemical reactions.—See XI. Bituminous paints (etc.).—See XIII. Removing org. compounds from aq. solutions. Purifying phenolic liquors.—See XXIII.

III.—ORGANIC INTERMEDIATES.

Stability of sodium methylxanthate. W. A. DAMON (71st Ann. Rept. on Alkali etc. Works, 1934, 27–32).—Na methylxanthate (I) obtained in the extraction of CS_2 from crude benzol on decomp. with acid, besides CS_2 , yields H_2S and other S compounds, so that recovery is incomplete. (I) is more stable in neutral than in alkaline solution, the reaction $(\text{I}) + 5\text{NaOH} = 2\text{Na}_2\text{S}$

+ Na₂CO₃ + MeOH + 2H₂O occurring in the latter together with production of MeSH. If alkaline (I) is heated the above reaction is quant. and no MeSH is formed. Neutral (I) decomposes slowly on heating with production of MeSH, H₂S, CO₂, and CS₂. It is recommended to use as little excess NaOH as possible, and to store for as short a time as possible and at a low temp.

C. I.

Determining C₂H₂.—See II.

PATENTS.

Reacting olefines with carbon monoxide. J. SCHALCH, ASSR. to VAN SCHAACK BROS. CHEM. WORKS, INC. (U.S.P. 1,973,662, 11.9.34. Appl., 2.1.31).—Unsaturated hydrocarbons (I), *e.g.*, olefines, acetylenes, di- or poly-enes, vapour-phase-cracked petroleum products, are treated with CO at 80—350° > 1 atm., in presence of steam in < 10% (30—70%) of the wt. of (I) if desired, and, preferably, in presence of a catalyst, *e.g.*, Ni(CO)₄, finely-divided Ni or Fe, ZnO, V₂O₅, Cu₂Cl₂, Fe₂O₃, Al₂O₃, MoO₃, SiO₂ (gel), ThO₂, Ce₂O₃, U₃O₈, Pt, Pd. The products, which have a b.p. > that of (I), are diluents or solvents for pyroxylin or resin compositions.

A. W. B.

Purification of alcoholic mixtures. C. H. GREENEWALT, ASSR. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,972,887, 11.9.34. Appl., 28.2.31).—Crotonyl alcohol is removed from the mixture obtained on dehydrogenation of EtOH (cf. U.S.P. 1,708,460; B., 1929, 661), with or without prior fractionation, by passing in dry HCl (at < 50°) and distilling off the crotonyl chloride formed. A continuous process can be effected.

A. W. B.

Purification of glycols or derivatives thereof. F. C. STEPHAN, and TELEGRAPH CONDENSER CO., LTD. (B.P. 430,234, 8.2.35).—Cl₂ and volatile Cl-compounds may be removed from commercial glycol (I), or an ether of (I), by passing it in the vapour phase (at < 1 atm., *e.g.*, at 20 mm.) at 110—115° over a carrier, *e.g.*, pumice, asbestos, impregnated with HgO or Ag₂O; the Cl content is reduced to < 1 pt. in 10⁷ pts.

A. W. B.

Nitration. B. K. BROWN, ASSR. to STANDARD OIL Co. (U.S.P. 1,973,559, 11.9.34. Appl., 13.7.33).—Polyhydric alcohols (glycerol) are nitrated in presence of solvents of b.p. > the permissible upper temp. limit of reaction [saturated hydrocarbons (I), *e.g.*, *iso*-C₅H₁₂, C₄H₁₀]. Pressure may be varied, to > or < 1 atm., to bring the b.p. of (I) within desired limits (22—25°). Explosion hazards are reduced, wider temp. limits than hitherto can be used, and faster charging rates and purer products are claimed. Apparatus is described.

A. W. B.

Drying [of ethyl ether]. P. S. GREER, ASSR. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 1,974,069, 18.9.34. Appl., 4.6.32).—Et₂O is dried, to < 0.6% H₂O content, by distilling from a mixture with $\frac{1}{2}$ — $\frac{1}{2}$ vol. of a hygroscopic inert liquid which is relatively non-volatile and does not form azeotropic mixtures with Et₂O, *e.g.*, C₃H₇(OH)₂, C₃H₇(OH)₂, (OH·C₂H₄)₂O, glycerol, N(C₂H₄·OH)₃.

A. W. B.

Manufacture of vinyl ethers. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 430,590, 10.2.34).—

Mononuclear, *isocyclic* OH-compounds (phenols) are converted into vinyl ethers by passing them in the vapour phase with C₂H₂ over org. salts, *e.g.*, acetate, of Zn or Cd (pptd. on active C or pumice) at > 20 (> 1) atm.

A. W. B.

Manufacture of finely-divided [chlorinated diphenyl] powders. R. L. JENKINS and T. W. SCHILB, ASSRS. to SWANN RESEARCH INC. (U.S.P. 1,972,447, 4.9.34. Appl., 7.3.32).—Compounds (I) stable in the vapour state and of m.p. > room temp. (highly halogenated Ph₂, *e.g.*, C₁₂HCl₉) are obtained in a finely-divided state, *e.g.*, of particle size < 0.001 mm., by mixing a stream of the vapour of (I) with a stream of a cold inert gas, *e.g.*, air, N₂, steam, the size of the latter stream being < that of the former. Apparatus is claimed.

A. W. B.

Inhibiting discoloration of aromatic compounds.

R. P. PERKINS, A. J. DIETZLER, and E. C. BURDICK, ASSRS. to DOW CHEM. Co. (U.S.P. 1,973,724, 18.9.34. Appl., 19.9.31).—Amines and monohydric phenols, free from CHO, CO, or acid groupings causing a primary dissociation const. $K > 8 \times 10^{-5}$ at 25°, are protected against discoloration on exposure to light and/or air, even in presence of H₂O, by addition of N₂H₄·H₂O, (NH₂)₂-salts of weak acids, *i.e.*, of $K < 8 \times 10^{-5}$ at 25°, *e.g.*, N₂H₅·OBz, or semicarbazide in amount > 0.15%.

A. W. B.

Purification of methyl-*p*-aminophenol. A. W. M. DICKINS and C. R. FORDYCE, ASSRS. to EASTMAN KODAK Co. (U.S.P. 1,973,472, 11.9.34. Appl., 15.3.33).—*p*-Aminophenol is removed by boiling the aq. solution with a halogenated salicylaldehyde (I), *e.g.*, 5-bromo-, 3:5-dichloro-, or 3:5-dibromo-salicylaldehyde, and filtering off the pptd. salicylidene derivative and excess of (I).

H. A. P.

[Preparation of] octoic acid derivatives of phenols. L. P. KYRIDES, ASSR. to MONSANTO CHEM. Co. (U.S.P. 1,974,821, 25.9.34. Appl., 20.7.31).—The prep. by known methods of 2:4-dihydroxyphenyl, b.p. 186°/8 mm., and 4-(or 2-)hydroxy-2-(or 4-)tolyl γ -heptyl ketone, b.p. 138°/8 mm., and from them (Clemmensen) of C- β -ethylhexylresorcinol, m.p. 50°, b.p. 181°/8 mm., and C- β -ethylhexyl-*m*-cresol, b.p. 138°/9 mm., is claimed.

H. A. P.

Preparation of acetoacetanilide. CARBIDE & CARBON CHEMICALS CORP., ASSEES. of G. H. LAW (B.P. 429,982, 30.11.34. U.S. 2.12.33).—Diketen is added gradually to a solution of NH₂Ph in a common solvent, *e.g.*, PhMe, the temp. being held at 50—70° by external cooling. The product crystallises from the solvent on cooling and, finally, concentrating.

A. W. B.

Reaction products of sulphur dioxide and aldehyde derivatives of a Schiff's base. D. H. TOMPKINS, ASSR. to RUBBER SERVICE LABS. Co. (U.S.P. 1,973,918, 18.9.34. Appl., 9.3.31).—Schiff's bases, *e.g.*, from CH₂O and NH₂Ph, MeCHO and *o*-C₆H₄Me·NH₂, C₆H₁₃·CHO and NH₂Ph, CH₂O and β -C₁₀H₇·NH₂, are treated (in a solvent, *e.g.*, COMe₂) with SO₂ at 30—60° and then with an inorg. acid, *e.g.*, HCl₃, HPO₄, or, apparently, any org. acid, *e.g.*, HCO₂H, salicylic, sulph-anilic acid, at 50—70°. The resin-like products are

acid-pickling inhibitors for metals. (Cf. U.S.P. 1,808,184—8; B., 1932, 188.) A. W. B.

Production of phenylstearic acid. R. H. McKEE and H. B. FABER (U.S.P. 1,972,568, 4.9.34. Appl., 30.6.32).— AlCl_3 covered with dry C_6H_6 is added to a solution of dry oleic acid in C_6H_6 at $78-80^\circ$, excluding moisture from the reaction vessel. The product is run into dil. aq. HCl, obtained by absorption of HCl from the reaction; washed with H_2O , the bulk of the C_6H_6 removed by steam-distillation after filtration, and the product isolated by drying in a vac. spray-dryer at about 165° . A. W. B.

Manufacture of organic [dicarboxylic] acid chlorides. E. CLEMMENSEN and R. M. MILLER, Asssts. to MONSANTO CHEM. CO. (U.S.P. 1,974,845, 25.9.34. Appl., 10.8.31).— Cl_2 is passed into a (heated) mixture of the acid anhydride and PCl_3 or P . POCl_3 is formed as a by-product. *E.g.*, Cl_2 is passed into $o\text{-C}_6\text{H}_4(\text{CO})_2\text{O}$ and PCl_3 (equimols.) at room temp., the temp. being raised finally to $100-160^\circ$. Other examples include the prep. of BzCl , and maleyl and succinyl chlorides. H. A. P.

[Manufacture of] esters of dicarboxylic acids and compositions containing them. KODAK, LTD., Asses. of C. J. MALM and C. R. FORDYCE (B.P. 429,915, 11.9.33. U.S., 10.9.32).—H esters derived from polyhydric alcohols or phenols (I) and polybasic acids (II) are prepared by heating (I) with the anhydride of (II) and a *tert.*-base. The products may be further esterified with monohydric alcohols, either type of ester being used as plasticiser (for cellulose acetate). *E.g.*, $\text{C}_2\text{H}_4(\text{OH})_2$ (60 pts.) is heated with $o\text{-C}_6\text{H}_4(\text{CO})_2\text{O}$ (300 pts.) and $\text{C}_5\text{H}_5\text{N}$ (200 pts.) at $110-115^\circ$ for 2 days to give *ethylene glycol di-(H phthalate)*. *Quinol di- and glycerol tri-(H phthalate)*, and *ethylene glycol di-(H succinate)* are similarly prepared. H. A. P.

[Preparation of] polyglycol esters of phenoxy-acetic acids. [Plasticisers.] M. N. DVORNIKOFF, Assr. to MONSANTO CHEM. CO. (U.S.P. 1,974,810, 25.9.34. Appl., 9.6.30).—The prep. and uses of neutral polyglycol esters of phenoxyacetic acids (diethylene glycol bisphenoxyacetate) are exemplified. H. A. P.

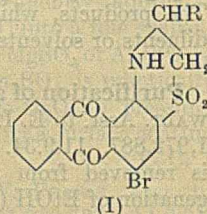
Production of 1-mercaptoarylthiazoles. I. WILLIAMS, Assr. to E. I. DU PONT DE NEMOURS & CO. (U.S.P. 1,972,963, 11.9.34. Appl., 4.2.33).—An anhydroformaldehyde-arylamine compound of the C_6H_6 or C_{10}H_8 series having a free *o*-position (NH_2Ph , $p\text{-NH}_2\text{-C}_6\text{H}_4\text{-OEt}$, $\alpha\text{-C}_{10}\text{H}_7\text{-NH}_2$) (1 mol.) is heated with S (3 mols.) and CS_2 (0.05–0.1 mol.) at $180-300^\circ$ (240°)/ $100-1000$ (500) lb. per sq. in. H. A. P.

Manufacture of 1-hydroxy-4-alkoxyanthracenes. I. G. FARBENIND. A.-G. (B.P. 430,250, 15.12.33. Ger., 16.12.32).—1:4-Dihydroxyanthracene (I), prepared by boiling 1-hydroxy-4-aminoanthracene with aq. inorg. acids, is treated with an alcohol and a strong acid for a short time (at room temp.), *e.g.*, with 20% HCl in MeOH until (I) has completely dissolved. The *Me*, m.p. $131-132^\circ$, and *Et ether*, m.p. $152-153^\circ$, of (I) are described. H. A. P.

Manufacture of 4-arylamino-1-alkylaminoanthraquinones. SOC. CHEM. IND. IN BASLE (B.P. 429,951 and Addn. B.P. 430,214, [A, B] 11.12.33. Switz., [A] 10.12.32).

—Simultaneous interaction is brought about between an alkyl- and an aryl-amine and (A) a 1:4-dihydroxyanthraquinone (quinizarin) and/or its leuco-compound (I) or a reducing agent, and (B) (I) and an oxidising agent (NaClO_3 , PbO_2) and (optionally) a condensing agent, *e.g.*, H_3BO_3 . Examples are: 1-*p*-aminoanilino-4- β -hydroxyethyl- (II) and 4-methyl-aminoanthraquinone (III), 1-*p*-hydroxyanilino-4-*p*-hydroxyethylaminoanthraquinone, and a mixture of (II) and (III) which is claimed to have special dyeing properties. The products are greenish-blue to green dyes for acetate rayon. H. A. P.

Manufacture of derivatives of the anthraquinone series containing nitrogen and sulphur. I. G. FARBENIND. A.-G. (B.P. 430,260, 16.12.33. Ger., 17.12.32).—A cyclic sulphone, obtained by oxidising an anthraquinonethiomorpholine carrying a substituent replaceable by amines, is condensed with an arylamine (in presence of an acid-binding agent, *e.g.*, an alkali acetate, and Cu or a Cu compound). Thus the compound (I; R = H), m.p. $256-258^\circ$, obtained by oxidising anthraquinone-1:2-dihydro-1':4'-thiazine with $\text{H}_2\text{O}_2\text{-AcOH}$ and brominating the product, m.p. $291-292^\circ$, in PhNO_2 , is condensed with NH_2Ph (excess) and NaOAc at the b.p.; other amines used are $p\text{-C}_6\text{H}_4\text{Me-NH}_2$ (II) and $4\text{-C}_6\text{H}_4\text{Ph-NH}_2$. The compound (I, R = Me), obtained by condensing $\text{CH}_2\text{Cl-COMe}$ with 1-amino-2-thiolanthraquinone, hydrogenating, and oxidising and brominating the product, m.p. $229-230^\circ$, as above, is similarly condensed with (II). Sulphonation of the condensation products gives blue to green wool dyes. H. A. P.



Application of organic cyanogen compounds. GRASSELLI CHEM. CO. (B.P. 431,064, 29.12.33. U.S., 29.12.32).—See U.S.P. 1,963,100; B., 1935, 348.

Azo intermediates.—See IV. **Halogenated hydrocarbons.**—See XI. **Removing org. compounds from aq. solution. Purifying phenolic liquors.**—See XXIII.

IV.—DYESTUFFS.

Basic dyes from lichens. C. D. MELL (Text. Colorist, 1935, 57, 409–411).—Various lichens which provide red, carmine, blue, and brown dyes suitable for application to textile fibres are enumerated, together with notes on their origin and distribution. A. J. H.

PATENTS.

Manufacture of basic triphenylmethane dyes soluble in water. I. G. FARBENIND. A.-G. (B.P. 425,041, 4.9.33. Ger., 3.9.32).—The basic dyes contain 2 bis(hydroxyalkylamino)aryl groups and a 4'-alkyl- or 4'-alkoxy-diphenylamine group. Examples are: product from $p\text{-C}_6\text{H}_4\text{Cl-CHO}$ and $\text{NPh}(\text{C}_2\text{H}_4\text{-OH})_2$, condensed with $p\text{-OEt-C}_6\text{H}_4\text{-NH}_2$ (I) (blue); $[(\text{OH-C}_2\text{H}_4)_2\text{N-C}_6\text{H}_4]_2\text{CO}$ with 4-OEt- $\text{C}_6\text{H}_4\text{-NHPh}$; that from $p\text{-C}_6\text{H}_4(\text{SO}_3\text{H})\text{-CHO}$ and $m\text{-C}_6\text{H}_4\text{Cl-N}(\text{C}_2\text{H}_4\text{-OH})_2$, condensed with (I) (greenish-blue). C. H.

Manufacture of [direct yellow mono]azo dyes. I. G. FARBENIND. A.-G. (B.P. 425,167, 8.9.33. Ger.,

9.9.32).—Dehydrothiolutidinedisulphonic acid or a similar compound is diazotised and coupled with an acetoacetic 2-benzthiazylamide, *e.g.*, the 4-methyl-2-benzthiazylamide, to give direct yellow shades dischargeable to pure white. C. H.

Manufacture of monoazo dyes insoluble in water [ice colours and pigments]. I. G. FARBENIND. A.-G. (B.P. 425,042 and 425,226, [A] 4.9.33, [B] 9.9.33. Ger., [A] 2.9., 14.9., and 24.12.32, [B] 9.9. and 24.12.32).—An *o*-toluidinesulphonamide, $C_6H_3Me(NH_2)SO_2NRR'$, where R = alkyl, aralkyl, or hydroaryl, and R' = a hydrocarbon radical, is diazotised and coupled with (A) 2:3-hydroxynaphthoic 5:2:4- or 4:2:5-chlorodimethoxyanilide, or (B) a 2:3-hydroxynaphthoic 6-methoxy-*m*-toluidide or 5-methoxy-*o*-toluidide. The shades are red to yellowish-red. The diethyl- (m.p. 117°), benzylmethyl- (m.p. 110°), cyclohexylmethyl- (m.p. 112°), and *o*-chlorophenylmethyl- (m.p. 114°)-sulphonamides are described. C. H.

Manufacture of water-insoluble azo dyes [ice colours and pigments] and of intermediates therefor. I. G. FARBENIND. A.-G. (B.P. 425,168 and Addn. B.P. 425,211, [A] 8.9.33, [B] 8.9.33. Ger., [A] 9.9.32, 15.2., 17.2., and 28.6.33).—(A) 2-Aminoarylthiazoles and (B) other 2-aminothiazoles are condensed with an acyloacetic ester to give corresponding thiazylamides which are used as coupling components for ice colours and pigments. (A) The following benzthiazoles are described: 2-NH₂, m.p. 129° [acetoacetyl compound, m.p. 223° (decomp.)]; 2-NH₂-6-OEt-, m.p. 164° (benzoylacetyl compound, m.p. 211°); 6-Cl-2-NH₂, m.p. 201° (acetoacetyl compound, m.p. 264° (decomp.)); 2-NH₂-6-OMe-, m.p. 146° (acetoacetyl compound, m.p. 206°); acetoacetyl compounds of the 2-NH₂-6-Me-, m.p. 232° (decomp.), 2-NH₂-6-NHBz-, m.p. 212° (decomp.), 4-Cl-2-NH₂, m.p. 230°, and 4-Cl-2-NH₂-6-OMe-, m.p. 204°, derivatives, and of μ -aminothiazoles from α -C₁₀H₇-NH₂, m.p. 164°, β -C₁₀H₇-NH₂, m.p. 206°, 2-amino-6-naphthyl Me ether, m.p. 236°, 2-amino-5-ethylcarbazole, m.p. 220°, 3-aminodiphenylene oxide, m.p. 288°, 5-aminoacenaphthene, m.p. 156°, and 5-aminocoumaran, m.p. 256°. (B) Acetoacetyl compounds of 2-aminothiazole, m.p. 168°, and its 4-Me (m.p. 184°), 4-Ph (m.p. 176°), and 4:5-Ph₂ (m.p. 150°) derivatives, and benzoylacetyl compounds of 2-amino-4-methyl- (m.p. 141°) and 2-amino-4-phenyl- (m.p. 184°)-thiazoles are described. All the compounds yield yellow to orange shades when coupled with usual diazo components. C. H.

Manufacture of monoazo dyes insoluble in water [pigments]. J. R. GEIGY A.-G. (B.P. 424,365, 28.11.33. Ger., 28.11.32).—An *o*-nitroarylamine of the C₆H₆ series is diazotised and coupled with an alkyl 2:3-hydroxynaphthoate to give yellowish-red to bluish-red pigments for lacquers and for dyeing acetate silk. Examples are Et 2:3-hydroxynaphthoate with diazotised 3-nitro-*p*-phenetidine, 2:4-dinitroaniline, *o*-nitroaniline, Et 3-nitro-*p*-aminobenzoate. C. H.

Manufacture of azo dyes containing copper in a complex form. I. G. FARBENIND. A.-G. (B.P. 425,367, 13.9.33. Ger., 15.9.32. Addn. to B.P. 268,754; B.,

1928, 667).—The Cu compound of an *oo'*-dihydroxy-monoazo dye carrying NO₂ *para* to the azo group (*e.g.*, 5-nitro-*o*-aminophenol \rightarrow H-acid) is reduced (NaOH and glucose) to the corresponding azoxy- or azo compound. Blue to grey dyes for cotton are obtained. C. H.

(A) **Manufacture and application of anthraquinone dyes.** (B) **Manufacture of anthraquinone derivatives.** IMPERIAL CHEM. INDUSTRIES, LTD., F. LODGE, and (A) H. A. PIGGOTT, (B) C. H. LUMSDEN (B.P. 430,013 and 430,160, [A] 6.12.33, [B] 28.11.33 and 14.3.34).—(A) 1:4-Diamino- or a 1-amino-4-alkyl- or -aryl-amino-anthraquinone-2-sulphonic acid (I) is heated with a condensation product of (CH₂)₂O (II) with itself (+H₂O), a mono- or poly-hydric alcohol, or a carbohydrate. *E.g.*, Na 1-amino-4-anilinoanthraquinone-2-sulphonate (III) is heated with polyethylene glycol and 32% aq. NaOH at 100° for 1 hr.; glycerol tri- β -hydroxyethyl ether (IV) or mannitol + 30 mols. of (II) may also be used, the products in every case being violet dyes for acetate rayon. Other examples are Na 1:4-diamino- (bluish-red) or 1-amino-4-methylamino-anthraquinone-2-sulphonate + (IV) (reddish-violet). (B) The product of interaction of (I) with an alkali alkoxide having C₈₋₂₀ (or with the alcohol and an alkali, *e.g.*, NaOH) is sulphonated to produce violet wool dyes of good fastness to milling, washing, and light. *E.g.*, (III) heated with *n*-C₁₆H₃₃-OH and NaOH at 90° for 1 hr. gives 1-amino-4-anilino-2-cetyloxyanthraquinone, m.p. 98°, which is sulphonated with 6% oleum at 15–25°. Other examples are: 1-amino-4-anilino-2-dodecyloxy-, m.p. 104°, and -2-octyloxy-anthraquinone, 1-amino-4-*p*-toluidino- and 4-*p*-anisidino-2-dodecyloxyanthraquinone, and derived sulphonic acids. H. A. P.

Preparation of anthraquinone compound[s containing selenium]. M. A. PERKINS, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,973,773, 18.9.34. Appl. 27.3.33).—2-Halogenoanthraquinones (I), *e.g.*, Cl-, Br-, or their NH₂- or aroylamino- (5- or 8-arylamino-*e.g.*, NHBz-) derivatives are heated, under pressure if necessary, to > 150° (175–225°) with Se in an org. reducing solvent, *e.g.*, tetralin or kerosene, other solvents being also present if desired, together with an acid-binding agent, *e.g.*, Na₂CO₃, CaO. The products, 2:2'-dianthraquinonyl selenides, are vat dyes for cotton. The following are prepared from the appropriate (I): 2:2'-dianthraquinonyl and 5:5'-di(benzamido)-2:2'-dianthraquinonyl selenides. A. W. B.

Manufacture of sulphur dyes [to improve their physical form]. IMPERIAL CHEM. INDUSTRIES, LTD., E. CHAPMAN, and E. A. LITTLEWOOD (B.P. 430,171, 14.12.33).—Readily H₂O-sol. grains of lustrous appearance are prepared by drying a conc. solution or suspension of the dye (S black) in aq. Na₂S in relatively thick layers (0.5–1.5 in.) at moderate temp. (90–115°) in a vac., *i.e.*, < 125 mm. (< 75 mm.), and crushing the product. H. A. P.

Manufacture of sulphurised dyes. SOC. CHEM. IND. IN BASLE (B.P. 430,055, 17.5.34. Switz., 17.5.33 and 19.4.34).—Indophenols (or their leuco-compounds) derived from a carbazole and a nitrosophenol are heated with S and a nuclear-substitution product of NH₂Ph

having a N·C or C·N bridge, *e.g.*, monoarylaminediamides, Schiff's bases, iminazoles, at $> 210^\circ$ (210 — 250°). *E.g.*, the leucoindophenol from carbazole and *p*-OH·C₆H₄·NO is heated with S, *p*-NH₂·C₆H₄·NHAc (I), and NaCl at 210 — 215° until no more H₂S is evolved; in place of (I) its *m*-isomeride, *p*-NH₂·C₆H₄·NH·CHO, 2:1:4-NH₂·C₆H₃Me·NHAc, or 6-amino-2-methylbenzimidazole may be used. Blue to black S dyes with outstanding fastness to Cl₂ are obtained. H. A. P.

Manufacture of asymmetrical dye of the thioindigo series [6-methoxy-6'-ethoxythioindigo]. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 430,105, 2.2.34).—6-Ethoxy-2:3-diketodihydrothionaphthen-2-*p*-dimethylaminoanil is condensed with 3-hydroxy-6-methoxythionaphthen in PhCl at 115 — 120° ; alternatively, 6-methoxy-2:3-diketodihydrothionaphthenanil is condensed with 3-hydroxy-6-ethoxythionaphthen. The product is a red-orange dye of good fastness to light and soaping and superior in shade to the *s*-(OMe)₂- or (OEt)₂-compounds. H. A. P.

4-Arylamino-1-alkylaminoanthraquinones. Anthraquinone derivatives containing N and S.—See III. Dye preps.—See VI.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Amino-nitrogen contents of wool and collagen. J. R. KANAGY and M. HARRIS (J. Res. Nat. Bur. Stand., 1935, 14, 563—574).—Treatment of wool, collagen, and arginine (I) with HNO₂ leads to N₂ evolution which increases with time, owing to the action of the HNO₂ on the guanidine nuclei, a process which differs from its action on free NH₂-groups. The (I) content of a protein can be determined by a method based on the relative rates of evolution of N₂ from the guanidine nuclei in a protein and in (I). The free NH₂-N contents of wool and collagen, calc. from the difference between total N and guanidine-N, are 2.53 and 2.77% respectively. A. G.

J. W. S.

Change in fibre structure in certain sulphite- and sulphate-cellulose cookings. E. HÄGGLUND (Cellulosechem., 1935, 16, 41—49).—In some sulphite cookings in a rotating, stainless-steel boiler the fibre became broken and weak; the cuprammonium η was also low, but the Cu no., solubility in 1% NaOH, and α -cellulose content were little affected. The smaller was the wt. of material put into the boiler the weaker it became. Defibrination increased the risk of damage. A. G.

Fractionation of cellulose acetate. W. HERZ (Cellulosechem., 1935, 16, 56).—A reply to Ubbelohde (B., 1934, 56). A. G.

Solubility and viscosity of cellulose nitrate. T. TOMONARI (Cellulosechem., 1935, 16, 49—56).—An insol. substance on the surface of micelles, *e.g.*, cellulose (I) on cellulose trinitrate (II) hinders dissolution and the η of the solution is raised. When an insol. micelle has a skin of a sol. substance, *e.g.*, cellulose dinitrate (III) on (II) in MeOH, dissolution of the insol. material is promoted, and the η is lower than for a uniform sol. substance. Treatment of cellulose nitrate with HNO₃-H₂SO₄ lowers the η , but treatment with HNO₃-H₃PO₄ increases it, and the η may be alternately

lowered and raised several times. The val. of $\eta_{sp}/\text{concn.}$ generally increases with concn., but is nearly const. for (II) coated with (III) in MeOH because the structure of the micelles prevents the dispersion increasing with increasing dilution. A. G.

Microscopical method for determining the titre [denier] of rayon filaments. A. HERZOG (Kunstseide, 1935, 17, 186—194).—The titre is determined by measurements on drawings of highly magnified cross-sections (obtained by Viviani's method; B., 1931, 196) and the use of given formulæ containing const. applicable to acetate, cuprammonium, nitro-, and viscose rayons. Variations found in the diam. and area of rayon cross-sections are: 9.1, 10.2% (acetate); 6.5, 9.7 (cuprammonium); 15.5, 21.5 (nitro-); and 8.3, 10.6 (viscose). A. J. H.

Improved pulpwood grinder for experimental work. E. R. SCHAFER and J. C. PEW (Paper Trade J., 1935, 100, June 20th, 19).—The new equipment differs in size from large-scale grinders only in the narrower stone face. Unusual ranges of speed, pressure, and stone flexibility are incorporated, however, so as to permit exaggerated grinding conditions. Pressure control by oil-operated pistons is a novel feature. A. G.

H. A. H.

Hypochlorite bleaching of E.-B. [easy-bleaching] sulphite pulp. J. STRACHAN (Paper Maker, 1935, 90, TS 97—98).—The development of sulphite-pulp bleaching during the past 40 years is sketched. Advantages and disadvantages of modern multiple-stage bleaching are enumerated. H. A. H.

Reflexion measurements on pulp and paper. R. S. HUNTER (Paper Trade J., 1935, 100; T.A.P.P.I. Sect., 333—337).—A no. of known instruments for measuring gloss, brightness, opacity, etc. are described and discussed. H. A. H.

Beating versus jordaning in papermaking. R. D. KEHOE (Paper Trade J., 1935, 100; T.A.P.P.I. Sect., 319—325).—It is believed that high- or low-speed refiners cannot prepare papermaking stock so well as beaters, except for certain special papers which require short-fibred stock. H. A. H.

Is the beater obsolete [in papermaking]? J. A. HAMM (Paper Trade J., 1935, 100; T.A.P.P.I. Sect., 325—328).—A combined pulper-refiner is more economical than a beater (cf. preceding abstract). H. A. H.

[Control of] semi-commercial drying of pressboard by measuring its electrical resistance. E. R. WHITEMORE, C. B. OVERMAN, and B. WINGFIELD (Ind. Eng. Chem., 1935, 27, 831—833).—Pressboard made from maize stalks requires drying to the point at which there is no further risk of entrapped steam causing blistering, the work being carried out in a steam-heated press. The process can be satisfactorily controlled by wiring the platens of the press so that the resistance of each board can be measured by a voltmeter, the voltage- and moisture-time curves being very similar. As boards made from the same pulp and dried simultaneously vary in respect to time required, such control is essential. C. I.

Glossmeter.—See I. Recovery of viscose spinning bath.—See VII. Size making. Preserving

written records.—See XIII. Sugar from sulphite pulp.—See XVII.

PATENTS.

Manufacture of α -cellulose. J. S. POU (B.P. 430,259, 15.12.33. Spain, 21.10.33).—Plants of the order Gramineae, *e.g.*, bamboo, after cutting and air-drying, are treated with running H_2O , disintegrated to a kind of tow, boiled with NaOH and a reducing agent at 1.5–2 atm., and washed with hot H_2O . The pulp is then digested with NaOH, Na_2S , Na_2SO_3 , and guaiacol for 1 hr. at 156°/5.8 atm. and for a few hr. at 140–143°/4 atm., and is washed first with H_2O emulsified with C_6H_6 and afterwards with H_2O ; it is next oxidised with NaOCl, washed, treated with HF, washed, treated with Na_2SO_3 at 60°/2 atm., washed, bleached with H_2O_2 or Na_2O_2 , washed, and converted into solid form.

F. R. E.

Cellulose esters of dicarboxylic acid and composition containing these esters. KODAK, LTD., Assees. of C. J. MALM and C. R. FORDYCE (B.P. 430,409, 11.9.33. U.S., 10.9.32).—Non-resinous acid dicarboxylic acid esters of (a) non-saccharide polyhydroxy-compounds (*cf.* B.P. 429,915; B., 1935, 762), and (b) monohydric alcohols, are esterified with cellulose (I), or esters of (I) containing esterifiable OH groups, in presence of $Mg(ClO_4)_2$ and an "impelling agent," *e.g.*, $(CH_2Cl-CO)_2O$, $(OEt-CH_2-CO)_2O$, or in ultra-violet light or at high temp., *e.g.*, 100–125°. Examples include the interaction of cellulose acetate (38% Ac) with (a) $CO_2Et-[CH_2]_4-CO_2H$, (b) $C_2H_4(O-CO-C_6H_4-CO_2H-o)_2$. Manufacture of H_2O - and org. solvent-insol. surfaces and moulded products is claimed.

A. W. B.

Saponification of cellulose esters. BRIT. CELANESE, LTD., (A–C) R. W. MONCRIEFF, (A, c) F. B. HILL, and (A, c) T. B. FREARSON (B.P. 430,349–51, 12.12.33).—The materials are treated at 50–60° for 2–3 min. with an aq. solution of an org. base (I) (15–30% of NH_2Me) containing (A) 0.05–0.5% of Cu (as hydroxide), (B) <1% of NaOH, (c) 0.05–0.5% of a metal (as sulphate, nitrate, etc.) capable of forming compounds with (I), but with little or no tendency to form complex compounds of the metal-ammine type, *e.g.*, Ni, Zn, Ag.

F. R. E.

Manufacture of filaments, foils, and similar materials having a basis of organic derivatives of cellulose. H. DREYFUS (B.P. 430,489, 14.12.33).—The materials are softened in a liquid containing an org. base (NH_2Me , C_5H_5N) under such conditions that no appreciable hydrolysis takes place and are then stretched.

F. R. E.

Treatment or manufacture of cellulose ester filaments, threads, yarns, ribbons, and like materials. BRIT. CELANESE, LTD., R. W. MONCRIEFF, and F. B. HILL (B.P. 430,352, 12.12.33).—The materials are softened and partly hydrolysed by passing through an aq. bath containing a swelling agent (dioxan, $COMe_2$) and an org. base [NH_2Me , $C_2H_4(NH_2)_2$], together with a small quantity of a Cu salt, and are simultaneously stretched.

F. R. E.

Manufacture or treatment of yarns, threads, fabrics, and other textile materials, and films, foils, and the like. BRIT. CELANESE, LTD. (B.P.

430,221, 2.11.34. U.S., 2.11.33).—In order to reduce their tendency to become charged with static electricity, the materials, particularly those composed of org. derivatives of cellulose, are treated so as to deposit thereon a salt of an org. base and a hydroxycarboxylic acid, *e.g.*, triethanolamine lactate, in admixture, if desired, with a lubricating agent (blown olive oil, sulphonated castor oil) or a hygroscopic substance (glycerin).

F. R. E.

Treatment of paper webs. R. & W. WATSON, LTD., H. E. ANDERSON, and J. H. WATSON (B.P. 429,760, 6.12.33).

Drying apparatus.—See I. Esters of dicarboxylic acids.—See III.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Reactions between textile fabric and detergent during the washing process. W. SECK (Fettchem. Umschau, 1935, 42, 120–124).—Textile fibres are shown (X-rays) to consist of an aggregate of crystallites within the sheath-like epidermal membrane which must act as an ultra-filter and prevent the penetration of colloidal micelles of soap or other detergent; therefore a gel layer of more or less dehydrated conc. soap is deposited on the surface of the fibre, which must play an important part in the cleansing action. It is suggested that some sulphonates, although good wetting and emulsifying agents, are poor detergents because they cannot readily form such a gel layer, whilst colloidal clay and silicates, which have a great tendency to form gels, cleanse well. Original X-ray diagrams of Na stearate, Na sulphohydroxystearate, and Na stearyl sulphate (I) are given, which indicate the cryst. structure; this persists in the swollen material over a large range of hydration, and in the case of (I) is well marked in the 10% aq. solution (gel).

E. L.

Vat dyeing in package machines. E. P. DAVIDSON (Amer. Dyestuff Rep., 1935, 24, 364–368).—Unsatisfactory dyeing due to pptn. of the vat dye results in H_2O having a hardness (calc. as CaO) of > 2.5. The dye liquor should contain 0.25–2.0 oz. of NaOH and 0.375–2.5 oz. of $Na_2S_2O_4$ per gal., and animal glue is the most satisfactory levelling agent; it is pumped through the yarn alternatively inwards and outwards under pressure (15–30 lb. per sq. in.) and the rate of exhaustion is controlled by means of the temp. Aq. $NaBO_3$ (1–2%, calc. on the yarn) is the most suitable after-oxidising agent; $Na_2Cr_2O_7 + H_2SO_4$ renders the yarn harsh and the shade dull.

A. J. H.

Printing of coir [coconut-fibre] mats. F. HARBELL (Text. Colorist, 1935, 57, 486–487).—A limited no. of aci dyes, but mainly direct and basic dyes, are used. In prep. for printing the mats are scoured with warm dil. aq. NaOH, soured with dil. aq. H_2SO_4 , washed, and dried. The printing paste [for direct dyes: dye (30 pts.), Na_2HPO_4 (30), glycerol (70), and 5% gum tragacanth thickening (500) per 1000 pts.; for basic dyes: dye (30), 30% AcOH (90), 5% gum tragacanth thickening (450), and glycerol (30) per 1000 pts.] is applied through Zn stencils and the mats are then dried, steamed for 0.5 hr. without pressure (steaming may be omitted with basic dyes), and then beaten against a "braying

stoop" to loosen the fibres. Cheap brown prints are obtained with KMnO_4 , and blacks with logwood + $\text{K}_2\text{Cr}_2\text{O}_7$. A. J. H.

Chlorination and damaging of wool. O. VIERTEL (Mschr. Text.-Ind., 1934, 49, 261—262; Chem. Zentr., 1935, i, 822).—The dry strength of wool is increased and the wet strength somewhat decreased by Cl_2 treatment. Subsequent soaping decreased the strength in each case.

H. J. E.

Bleaching pulp.—See V. **Dopes for aeroplane fabric.**—See XIII. **Starches.**—See XVII. **Ca-soap formation.**—See XXIII.

PATENTS.

Apparatus for treating [tubular] fabrics. M. M. KASANOF (B.P. 430,334 and Addn. B.P. 430,414, [A, B] 7.11.33. U.S., [A, B] 7.11.32).—(A) Fabric in the form of a tube (T) is subjected to air, steam, dye liquid, or the like while being drawn over a supply conduit having flanges (F) of diam. = the desired finished diam. of T . The treatment chamber is bounded only by F and the permeable wall of T , and the distance between the F can be adjusted to vary the time of treatment. (B) The F at the entry end is formed as a steam chamber or other heating means, and an intermediate F may be provided to permit treatment with two fluids. [Stat. ref. to (A).] B. M. V.

Washing or impregnation of webs of material with liquids. W. W. SPOONER (B.P. 429,592, 30.9.33).—While submerged in the liquid (L) the material (M) is passed between flat jets of L , the jets being opposed and balanced to obviate strain on M . B. M. V.

Vat and sulphur dye preparations for textile printing. I. G. FARBENIND. A.-G. (B.P. 424,588, 25.8.33. Ger., 26.8.32).—A bishydroxyalkyl sulphoxide, $\text{R}_2\text{S}\cdot\text{O}$ (where R carries ≤ 1 OH) is added to vat or sulphide dye printing pastes to improve depth of shade and rate of fixation. C. H.

Dyeing of wool. I. G. FARBENIND. A.-G. (B.P. 430,287, 27.9.34. Ger., 30.9.33).—Wool is dyed in a single-bath process, using monoazo dyes obtained by coupling a diazotised aromatic amine free from halogen, CO_2H , or NO_2 -groups, and OH groups *ortho* to the NH_2 -group, with 8-hydroxyquinoline (I) or a substitution product thereof, one or other component containing a single SO_3H -group. The dye bath contains 3—8% of a mixture of $(\text{NH}_4)_2\text{CrO}_4$ or Na_2CrO_4 and $(\text{NH}_4)_2\text{SO}_4$ and the dissolved dye is added with 10% of Na_2SO_4 (calc. on the wt. of wool). The wool is introduced at $< 60^\circ$ and the bath slowly heated to b.p. and boiled for 1—2 hr. Examples are: diazotised $p\text{-NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{SO}_3\text{H} \rightarrow$ (I); diazotised $p\text{-OEt}\cdot\text{C}_6\text{H}_4\cdot\text{NH}_2 \rightarrow$ 8-hydroxyquinoline-5-sulphonic acid. Orange to reddish-brown shades are obtained, and the products are fast to light, washing, and fulling. A. W. B.

(A) Crabbing of materials manufactured from animal fibres such as wool. (B) Treatment of animal fibres such as wool, and production of [shrinkage] effects on materials containing wool and/or related animal fibres. J. B. SPEAKMAN, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 430,341 and 430,455, 18.11.33).—(A) Wool is treated at $\leq 80^\circ$,

and (B) felts, fabrics, etc. wholly or partly composed of wool, after deamination or "blocking" of the fibre, are treated at or near the b.p., (A, B) with an agent (aq. borax) capable of producing within the fibre an alkalinity = p_H 8—10 (9.1). F. R. E.

Light waterproof fabrics. TEXTILWERK HORN A.-G. (B.P. 427,686, 2.6.34. Ger., 18.12.33).—A light cotton fabric is caused to shrink to the max. extent by mercerising in NaOH at 4° for 1 hr. without tension, rinsed in hot H_2O , cold-bleached, dyed, impregnated by known means to render it waterproof, and finally calendered twice (dry) at 100° under 200 kg./sq. cm.

A. R. P.

Production of radioactive threads. F. FATTINGER (B.P. 429,453, 10.7.34. Austr., 28.5.34).—After impregnation with an insol. Ra salt by treatment with a solution of RaBr_2 followed by a precipitant, e.g., $(\text{NH}_4)_2\text{SO}_4$, the threads are continually washed with H_2O or with alkali carbonate to remove radioactive particles in the superficial layers, and finally coated, if desired, with a H_2O -insol. layer (resin, rubber). F. R. E.

Removing stains.—See I. **Antraquinone dyes.**—See IV.

VII.—ACIDS; ALKALIS; SALTS; NON-METALLIC ELEMENTS.

Manufacture of phosphoric acid at Wilson Dam, Ala. H. A. CURTIS (Chem. Met. Eng., 1935, 42, 320—324).—Ground and screened phosphate rock, coke, and SiO_2 are heated in an electric furnace (two types described). The P vapour and CO evolved are burned and the P_2O_5 is hydrated and absorbed in H_2O . Operating difficulties and the means of overcoming them are described. Duriron pipes, C tubes, plates, etc., and acid-proof masonry have shown no serious corrosion; Pb as a material of plant construction is unsatisfactory. D. K. M.

Caustic soda from sodium sulphate. Application to recovery of the viscose spinning bath. K. TANEMURA and S. MIYOSHI (J. Soc. Chem. Japan, 1935, 38, 188—189 B; cf. A., 1935, 961).— Na_2SO_4 is eliminated as $\text{NaHC}_2\text{O}_4\cdot\text{H}_2\text{O}$ (I) by addition of $\text{H}_2\text{C}_2\text{O}_4$, and (I) converted into NaOH by means of CaO .

J. S. A.

Determination of oxides of nitrogen, excluding nitrous oxide. W. A. DAMON (71st Ann. Rept. on Alkali etc. Works, 1934, 33—35).—Attempts to obtain quant. absorption of NO and NO_2 by scrubbing with H_2O_2 or NaOCl (alkaline or neutral) or with KMnO_4 were unsuccessful. If NO is allowed to remain in presence of H_2O_2 and the solution finally titrated with NaOH and Me-orange, contact for 30 min. gives about 90% absorption and for 7 days 97% absorption. If HNO_2 is still present the end-point is obscure. 30 mins. contact with excess of NaOH and back-titration with Me-red gives $> 95\%$ absorption; almost equal results are obtained, however, if the NaOH is added in excess at the end of the absorption time, and this procedure is preferred. For works tests the bellows aspirator may replace a separate aspirator bottle. C. I.

Synthesis gas.—See II. **Colour measurement [of aq. I].**—See XI.

PATENTS.

Evaporation, distillation, or concentration of aqueous hydrochloric acid solutions. DR. F. RASCHIG GES.M.B.H. (B.P. 429,816, 22.11.34. Ger., 27.11.33).—HCl is evaporated in Cu vessels in presence of H_3PO_4 , preferably of $> 60\%$ concn. B. M. V.

Treatment of the residues from the roasting of iron pyrites to obtain a raw material [magnetic iron oxide] for metallurgy. I. DE VECCHIS (B.P. 427,604, 10.9.34. Fr., 16.9.33 and 28.2.34).—Burnt pyrites from the manufacture of H_2SO_4 are quenched directly from the roasting furnace, separated magnetically, and the magnetic portion is used for the production of Fe or steel. A. R. P.

Apparatus for producing oxygen from liquid air. F. J. EICHELMAN, Assr. to CARBO-OXYGEN Co. (U.S.P. 1,976,388, 9.10.34. Appl., 20.6.32).—Liquid O_2 is pumped to a heat exchanger of the liquefying plant and thence, as gas, into bottles at the pressure desired for sale, which is much $>$ that in the rectifier. B. M. V.

Material for gas purification.—See II. H_2O electrolysis.—See XI. Fertilisers.—See XVI.

VIII.—GLASS; CERAMICS.

Glasshouse superstructure materials. W. L. FABIANIC (J. Amer. Ceram. Soc., 1935, 18, 211—219).—Full physical, chemical, mineralogical, and X-ray examinations were made on 100 samples of SiO_2 - Al_2O_3 materials and the results correlated with slagging tests in actual glass-melting tanks. Refractories for port-nozzle side-walls, port floors, breast and baffle walls, and port blocks should have a refractoriness of $<$ cone 34 and be of even texture and fine grain size, with grog of uniform size and shape, and having an adsorption $>$ that of the brick as a whole. The absorption of the brick is not very important provided the pores are uniform and not interconnected. The mineralogical composition should fall within a specified area of the mullite-corundum-glass diagram and consist of well-formed, interlocking crystals embedded in a matrix of fine crystals in a min. of glass. Refractories for the port side-walls and top chequer-courses need not have a high refractoriness (cone 31), but must have low absorption (5—12%) and good spalling-resistance, heat capacity, and heat-exchange properties. The texture should be free from hair cracks around the grog particles, and the mineralogical composition should include a max. of mullite. J. A. S.

Water-jackets for glass-melting tanks. L. T. SHERWOOD (Bull. Amer. Ceram. Soc., 1935, 14, 119—120).—Water-jackets are considered to reinforce glass-tank blocks (e.g., by freezing penetrating glass) rather than to preserve them by cooling, and facilitate working with thinner blocks. The cost of, and the effect on fuel consumption of, cooling by air and by water-jackets are discussed. A. L. R.

Lithium oxide as a constituent of glasses—its effect on thermal expansion. L. NAVIAS (J. Amer. Ceram. Soc., 1935, 18, 206—210).—A review of the

literature and new measurements on several glasses indicate that Li_2O is as effective as Na_2O in producing high thermal expansion. This result is contrary to the impression given by Winkelmann and Schott, which was based on measurements on only one Li_2O glass. J. A. S.

Index of refraction, density, and thermal expansion of soda-alumina-silica glasses as functions of the composition. C. A. FAICK, J. C. YOUNG, D. HUBBARD, and A. N. FINN (J. Res. Nat. Bur. Stand., 1935, 14, 133—137; cf. B., 1934, 673).—Data are recorded for a series of glasses (Al_2O_3 1—10, Na_2O 19—45, SiO_2 50—78%). Substitution of Al_2O_3 for Na_2O and SiO_2 in the proper ratios gives glasses of the same n , d , and expansion as the original Na_2O - SiO_2 glass. H. J. E.

Time factor in testing glassware. F. W. PRESTON (J. Amer. Ceram. Soc., 1935, 18, 220—224).—Preliminary experiments on the effect of the time factor in the measurement of the strength of glass are discussed. Tests on bottles and plate glass lasting from 3 sec. to several hr. showed that the strength increases enormously the more rapidly the test is carried out, and appears to approach infinity for "instantaneous test." The amount of permanent set observed in glass was small. J. A. S.

Series of raw leadless glazes at low temperatures. C. W. MERRITT (Bull. Amer. Ceram. Soc., 1935, 14, 104—106).—Trials of various compositions for glazes maturing at cones 04—02 are described, in which were used colemanite ($2CaO \cdot 3B_2O_3 \cdot 5H_2O$), and a Na K felspar ($0.64 Na_2O, 0.36 K_2O$) which gave better fusibility than, and worked as well into the glaze as, K felspar. Colours obtained with a base glaze containing cryolite were unsatisfactory, but good results were obtained with colemanite alone as the main flux. The results of blending various colouring oxides with two satisfactory base glazes of the following compositions are described: (1) {KNaO 0.20, CaO 0.40, ZnO 0.30, BaO 0.10} Al_2O_3 0.28 { SiO_2 3.00, B_2O_3 0.60}, (2) {KNaO 0.20, CaO 0.40, BaO 0.40} Al_2O_3 0.30 { SiO_2 3.00, B_2O_3 0.60}. (1) were waxy and lustrous in appearance, and between bright and semi-matt in texture; (2) were transparent and brilliant, the colours being similar to, but tending to be darker than, those of (1). Glazes of this type may be stored wet or dry, and (2) show good possibilities for use over underglaze colours. A. L. R.

Relation between cobalt and nickel oxide content and reboiling of sheet-steel ground-coats. J. M. CAYFORD and R. M. KING (J. Amer. Ceram. Soc., 1935, 18, 224; cf. B., 1933, 965).—Persistence and duration of reboiling increased to a max. at 0.4—0.5% of Co_3O_4 and then decreased to almost zero at 2.0%. With Ni_2O_3 the max. occurred at 1.5%, and at 2.0% the duration had decreased while the persistence remained the same. With both oxides together or with MnO_2 the duration and persistence decreased and in some cases MnO_2 eliminated reboiling. J. A. S.

Thermal behaviour of the kaolin minerals. H. INSLEY and R. H. EWELL (J. Res. Nat. Bur. Stand., 1935, 14, 615—627).—The X-ray patterns of the kaolin minerals (kaolinite and dickite) and of artificial

Al_2O_3 - SiO_2 gels after various heat-treatments indicate that the broad endothermic effect at 550° is due to dissociation into H_2O and a mixture of amorphous Al_2O_3 and SiO_2 , and the intense exothermic effect near 950° to the crystallisation of γ - Al_2O_3 from amorphous Al_2O_3 . The delay in the recrystallisation and its consequent intensity are attributed to the restraining action of the rigid amorphous SiO_2 network. With artificial Al_2O_3 - SiO_2 gels the exothermic effect yields mullite or mullite + γ - Al_2O_3 instead of γ - Al_2O_3 . J. W. S.

Iron oxide in fireclay burning. O. KRAUSE (Tonind.-Ztg., 1934, 58, 803—804; Chem. Zentr., 1935, i, 289).—Dissociation of Fe_2O_3 causes porosity. The gas in the pores of a specimen fired at 1400° in an oxidising atm. was almost pure O_2 . H. J. E.

Effect of fused alumina and boron oxide on plastic fireclays. D. G. MOORE and R. K. HURSH (Bull. Amer. Ceram. Soc., 1935, 14, 106—112).—Of three plastic refractory bonding clays fired to cone 14, addition of 2% of B_2O_3 reduced the shrinkage on firing in all cases, reduced the thermal expansion to 700° , and increased refractoriness under load and spalling-resistance of clays of low impurity content [*i.e.*, Missouri (*a*) and Tennessee (*b*) clays], but did not improve these properties in a Pennsylvania clay (*c*) of higher SiO_2 and impurity content. 15% of fused Al_2O_3 had little effect on the expansion of the clays, but increased the refractoriness of *b* and *c*, reduced that of *a*, increased the spalling-resistance of *a* and *c*, and had almost no effect on that of *b*. The observed effects of small additions of B_2O_3 are considered to emphasise the importance of the glass phase in a refractory material. A. L. R.

Properties of some American kaolins and a comparison with English china clays. T. A. KLINEFELTER and W. W. MEYER (J. Amer. Ceram. Soc., 1935, 18, 163—169; cf. B., 1933, 627).—From a comparison of the properties [*e.g.*, chemical and mineral composition, refractoriness, deflocculation characteristics, sol. salt and colloidal material content, thermal expansion of the fired materials, and colour, shrinkage, porosity, and transverse strength after drying and after firing at various temp.] of 9 American kaolins (*A*) and the average of 15 English china clays (*E*), it is concluded that *E* differ essentially from *A* in refractoriness, colour, and transverse strength after low-temp. ($< 1210^\circ$) firing, and in thermal expansion, shrinkage, and porosity after heat-treatment at all temp. The differences could generally be correlated with differences primarily in mineral composition and secondarily in the content of fine-grained material. From an examination of the properties of mixtures of *A* with fluxes (*e.g.*, feldspar and MgCO_3) added to give approx. the average mineral composition of *E*, the following mixtures are suggested as substitutes for *E*: (1) *A* (of primary origin) 61.8, feldspar 7.2, and MgCO_3 0.4%; (2) *A* (secondary) 87.5, feldspar 12.5, and MgCO_3 0.4%. A. L. R.

Forsterite and other magnesium silicates as refractories. R. E. BIRCH and F. E. HARVEY (J. Amer. Ceram. Soc., 1935, 18, 176—192; cf. B., 1934, 452).—The possibilities of serpentine, talc, and olivine as raw materials for Mg silicate (I) refractories are surveyed,

and tests on these minerals and on their mixtures with MgO are described, which showed that (I) refractories should consist mainly of forsterite (*F*) ($2\text{MgO}, \text{SiO}_2$), the only (I) stable above 1562° . The properties of *F* bricks produced from olivine of low Fe content, to which was added sufficient MgO to convert all the (I) into *F*, are described, *e.g.*, approx. bulk d 2.50, true d 3.36, apparent porosity 24—28%, refractoriness \leq cone 38, and cold crushing strength about 2000 lb./sq. in. *F* bricks have greater resistance to spalling, much lower thermal conductivity (*e.g.*, 12.7 and 10.5 B.Th.U./sq. ft./hr./ $^\circ\text{F}$./in. at average temp. of 250° and 950° , respectively, as compared with 34.5 and 25.3 for MgO brick), rather lower thermal expansion, and greater refractoriness under load (temp. of collapse under 25 lb./sq. in. $> 1550^\circ$) than ordinary MgO bricks. *F* bricks show negligible after-contraction at open-hearth furnace temp. (*e.g.*, 0.5% after 5 hr. at 1600°), and have about the same resistance as MgO bricks to hydration by steam. The min. temp. at which reaction was observed when *F* bricks were heated in contact with the following common refractories were: SiO_2 bricks and high- Al_2O_3 bricks, 1700° ; fireclay, 1500° ; no reaction occurred with ordinary MgO, low-Fe MgO, and chromite bricks. *F* bricks thus contrast strongly with MgO bricks in being highly resistant to reaction with SiO_2 although it cannot be concluded that MgO bricks and SiO_2 may be safely used in contact in service, as reaction may be accelerated by slags, ash, or highly reducing atm. Microscopical studies of MgO bricks, and a method of rational analysis of olivine-bearing rock, are described.

A. L. R.

Effect of repeated firing on specific gravity and microstructure of some alumino-silicate minerals. F. H. RIDDLE and A. B. PECK (J. Amer. Ceram. Soc., 1935, 18, 193—198).—Sp. gr. and optical data give confirmatory measurements of the decomp. of dumortierite, kyanite, andalusite, and sillimanite on repeated firing to cone 17—18. The rate of decomp. decreases in the order named. The d of dumortierite and kyanite decreases rapidly during the first firing, due to their almost complete decomp. Andalusite shows a more gradual change during 2 firings and the slow change in d of sillimanite is due to the associated minerals and not to sillimanite itself. The end-product in each case is a mixture of mullite and SiO_2 , dumortierite giving a greater proportion of mullite. The rate of growth of the mullite crystals is slowest in the case of dumortierite. In all the minerals except sillimanite the rate of decomp. depends on and increases with decrease in grain size. The rate of decomp. of a crystal, as determined by the border of dissociation or by the growth of the mullite crystals, varies with the crystallographic axes and may be due to differences in thermal conductivity. The decomp. of kyanite is aided by the shattering of the grain. J. A. S.

Influence of mineralisers on the formation of sinter-corundum. D. S. BELIANKIN and N. E. FILONENKO (Compt. rend. Acad. Sci. U.R.S.S., 1935, 2, 146—153).—The best mineralisers are FeCl_3 and Na_3AlF_6 . W. R. A.

Staining power of pigments.—See XIII.

PATENTS.

Manufacture of mirrors. N. V. PHILIPS' GLOEI-LAMPENFABR. (B.P. 427,860, 4.9.34. Holl., 19.9.33).—A glass plate is placed on a shaped backing of Cr-Fe alloy and heated until it adheres to the metal; after cooling, the glass is ground to the desired shape and provided with a reflecting layer. A. R. P.

Manufacture of enamel opacifier. C. ARNOLD. From HARSHAW CHEM. CO. (B.P. 427,850, 9.7.34).—Claim is made for fired products of the type $2MO, 3RO_2, Sb_2O_5$, where R is Ti or Zr and M is Zn, Ba, Cu, Be, Sn, Sr, Mg, Mn, Pb, Cu, or an alkali metal. Thus a fine white powder is obtained by heating at 1000° for several hr. an intimate mixture of TiO_2 33.1, Sb_2O_5 44.5, and ZnO 22.4%. A. R. P.

[Highly] porous ceramic objects. H. DAVIES (B.P. 430,391, 30.8.34).—Objects composed of clay, fine sand, and fine combustible matter, without additional flux, are formed by moulding, pricking the surface, and firing at a moderate temp. B. M. V.

Extrusion presses. Packing for fractionating columns.—See I.

IX.—BUILDING MATERIALS.

Effect of calcium chloride on Portland cements and concretes. P. RAPP (J. Res. Nat. Bur. Stand., 1935, 14, 499—517).—The heat contributed during the first 24 hr. by $3CaO, SiO_2$ (I), $2CaO, SiO_2$ (II), $3CaO, Al_2O_3$ (III), and $4CaO, Al_2O_3, Fe_2O_3$ (IV) has been determined on neat cement pastes and on pastes to which 1% of $CaCl_2$ has been added, and factors are given for calculating the heat evolved by a cement from its composition. $CaCl_2$ increases the heat contributed by (II) and (IV), decreases the heat from (III), and has no effect on the heat from (I), the total effect being to increase heat evolution in 24 hr. in cements which normally evolve 30—40 g.-cal. per g. and to decrease that in cements liberating 70—80 g.-cal. per g. $CaCl_2$ increases the strength of aged cement mortars as a whole; it increases the strength contributed by (I) and (II), increases at first then decreases that contributed by (III), and slightly decreases that contributed by (IV), which, however, is small in any case. At 21° $CaCl_2$ decreases the setting time and workability of cements and at low temp. is very effective in accelerating the cure and reducing the time necessary for protecting the cement. A. R. P.

Hardening of alumina cement. R. SALMONT (Cemento arm. Ind., Sept., 1934, 31, Suppl., 93—95; Chem. Zentr., 1935, i, 769; cf. B., 1934, 962).—Measurements on the process of hardening are recorded. The exothermic reaction may be the formation of $2CaO, Al_2O_3, 7H_2O$ by hydrolysis of CaO, Al_2O_3, nH_2O . H. J. E.

Effect of granulometric composition of cement on the properties of pastes, mortars, and concretes. J. A. SWENSON, L. A. WAGNER, and G. L. PIGMAN (J. Res. Nat. Bur. Stand., 1935, 14, 419—448).—Five laboratory-ground clinkers and one commercial cement have been separated into sized fractions of 0—7, 7—22, 22—35, 35—55, and $> 55 \mu$, and neat pastes, mortars, and cements prepared from the fractions

and 4 different blends with and without gypsum have been examined for setting properties, working qualities, and mechanical properties. The $3CaO, SiO_2$ tends to concentrate in the finer sizes and the $2CaO, SiO_2$ in the coarser sizes; all the fractions except the finest are deficient in the power to hold H_2O , are lacking in plasticity, and have poor working qualities. The fraction $< 7 \mu$ is very plastic, extremely sticky, and has a high H_2O -retaining capacity. In the blended cements the amount of H_2O necessary for normal consistency and the time of initial set are almost directly \propto sp. surface. The rate of development of strength in setting decreases with increasing particle size, so that the finest material makes the highest contribution to the early strength. The compressive strength of concrete is practically a direct function of the amount of cement which has reacted with H_2O , and is therefore the greater the finer is the cement. A. R. P.

Comparative tests with wood protectives (against fire, rot, and insects). F. GEWECKE and O. KÄRST (Angew. Chem., 1935, 48, 272).—Tests on the fire-resistance of pine wood impregnated with various protectives have shown the superiority of a mixture containing chlorinated $C_{10}H_8$ derivatives and fireproofing salts (nature not stated). A. R. P.

Petroleum asphalt.—See II.

PATENTS.

Apparatus for treating raw materials for manufacture of cement. M. VOGEL-JØRGENSEN (B.P. 430,430, 19.12.33).—In the wet process of manufacture of Portland cement, at least one sieving machine is installed between the wash mill and the kiln. It comprises a cylindrical screen against which the slurry is flung by curved arms, providing a disintegrating action. The oversize only is reground. B. M. V.

(A) Manufacture, (B) grinding, of Portland cement. H. M. LARMOUR and S. C. PIERCE, JUN. (U.S.P. 1,976,132—3, 9.10.34. Appl., [A] 15.4.31, [B] 28.9.31).—(A) Portland cement clinker is ground at an elevated pressure to maintain the H_2O content, the pressure being attained by opposed gas blasts through each end of the mill or merely by closing all vents. Hydrated cement or gypsum may be admixed, 1—3% of H_2O in the finished product being desired. (B) The clinker is ground at first without gypsum but with addition of H_2O to leave 0.5—4.0% after the inevitable evaporation. Gypsum and a little additional H_2O may be added in a second stage of grinding. B. M. V.

Manufacture of building, paving, or other constructional elements. R. JONES (B.P. 430,404, 15.1.35).—Mixtures of aluminous material and cement and of siliceous material and cement are mixed together, moistened with a "solution of quick-lime," moulded, dried, painted with oil, reheated, painted with cellulose, reheated at 150° for 2 hr., smoothed, and polished. B. M. V.

Composition for manufacture of insulating and decorative linings, and plastic pastes for mouldings, agglomerates, and other articles. C. DELUZENNE (B.P. 430,041, 15.1.34. Fr., 10.1.34).—The composition comprises H_2SiF_6 15, Na silicate 8, mica 20,

asbestos 65, algolite 15 pts. by wt., and H_2O to render plastic. B. M. V.

Penetrative insecticide to obviate the removal of wall plaster when carrying out disinfection of buildings. R. LEIGH (B.P. 430,620, 28.8.34).—An insecticide consisting of 1 pt. of a mixture containing 9 pts. of petrol and 1 pt. of benzol, 1 pt. of PhOH, and 6 pts. of kerosene (to make 1 gal.) is used to spray wall plaster through which the mixture penetrates. C. C.

Manufacture of [cellular] constructional material [from chlorinated rubber]. T. N. MONTGOMERY, J. A. M. W. MITCHELL, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 427,815, 1.11.33).—An emulsion formed by shaking equal vols. of a 0.5% soap solution and a 10% solution of chlorinated rubber (65% Cl) in CCl_4 is mixed with suitable reinforcing material, e.g., fibrous material, metal wires or rods, or textile material pretreated to render it non-inflammable, transferred to a mould, and heated with steam to expel the solvent and leave a spongy, cellular product. A. R. P.

Road surface. J. KREBITZ and F. MORTL (B.P. 429,973, 23.8.34. Austr., 6.9.33).

Adjusting the H_2O content of concrete etc.—See I. Road oils.—See II.

X.—METALS; METALLURGY, INCLUDING ELECTRO-METALLURGY.

Wall-thickness sensitivity of separately cast cast-iron test-pieces and its relation to the analysis. P. A. HELLER and H. JUNGBLUTH (Tech. Mitt. Krupp, 1934, 2, 106—116; Chem. Zentr., 1935, i, 778; cf. B., 1934, 1061).—An exponential relationship was found between wall strength of round test-pieces (C 3.17—3.78, Si 1.22—2.44, Mn 0.33—1.08, P 0.07—0.44, S 0.07—0.12%) and the tensile strength. The wall-thickness sensitivity of cast Fe is determined by the sum of the C and Si contents. H. J. E.

Microscopical investigation of cast [-steel] structures. B. D. ENLUND (Jernkont. Ann., 1934, 118, 391—438; Chem. Zentr., 1935, i, 779).—Observations are recorded on the effect on the micro-structure of additions of S, P, and O, and of the conditions of rolling and heat-treatment. H. J. E.

Corrosion [of metals]. V. Corrosion and water-mains. THIESING (Gas- u. Wasserfach, 1935, 78, 429—431; cf. B., 1932, 644).—The phenomena associated with the corrosion of Fe and Pb H_2O -mains and the preventive means adopted are briefly reviewed. A. B. M.

Corrosion of type metal by beech wood. B. SCHULZE (Z. Deuts. Buchdrucker, 1934, 46, 880—881; Chem. Zentr., 1935, i, 786).—Type metal stored in contact with fresh beech wood was strongly corroded, the effect being attributed to volatile acids ($AcOH$?) from the wood. H. J. E.

Influence of cuprous oxide on the welding of red copper. F. GYSEN (Rev. univ. Mines, 1934, [viii], 10, 425—428; Chem. Zentr., 1935, i, 781).—The welded material is separated from the base material by a Cu_2O

film. Cu_2O also changes the composition of both Cu phases. H. J. E.

Three-product flotation at Britannia. Separation of copper-zinc-iron [sulphides] from low-grade ore. H. A. PEARSE (Trans. Canad. Inst. Min. Met., 1934, 37, 341—350).—The ground ore, containing Cu 0.6, Zn 1.35, Pb 0.12, Fe 5.0, and S 5.0%, is passed over a wool blanket to remove coarse Au and then treated in Forrester roughers to produce a bulk concentrate containing all the sulphides and the remainder of the Au; the tailings contain Cu 0.09, Zn 0.30, Pb 0.03, Fe 2.8, S 1.9%, and Au 0.013 oz. per ton. The concentrate is dewatered to 60% solids in a Dorr thickener, part is filtered, and the filter cake is mixed with the remainder to give a pulp with 80% of solids, which is reground and re-treated in the same machines to give first a Cu concentrate, then a Cu-Zn middling which is re-treated, thirdly a Zn concentrate, and finally a pyrite concentrate; the Zn product is re-cleaned twice and the Cu and pyrite products once each. Sufficient CaO to give a p_H of 9.0—9.5 in the tailings, $ZnSO_4$, and NaCN are added to the regrinding circuit to depress the blende, but the actual grinding operation in a thick pulp seems to be the most important factor in this process. The middling product is floated with a butylxanthate and pine oil and the Zn product is obtained by addition of $CuSO_4$. The final Cu product contains Cu 23.4, Zn 7.85, Pb 4.3, Fe 24.7, and S 33.8% with 1.4 oz. of Au per ton, the Zn product assays Cu 1.4, Zn 55.7, Pb 0.65, Fe 6.7, and S 33.6% and the pyrite Fe 43.1, S 50.1%. A. R. P.

Influence of small quantities of nickel on the properties of bronzes and brasses. I. CEREKOSOV (Chem. Obzor, 1934, 9, 156—160; Chem. Zentr., 1935, i, 468; cf. B., 1935, 27).—Addition of Ni to Cu alloys improves the mechanical and corrosion-resisting properties. Data are tabulated. H. J. E.

Principles and practice of [nickel-copper] metallurgy at Falconbridge. A. GRONNINGSATER, J. R. GILL, and R. C. MOTT (Trans. Canad. Inst. Min. Met., 1934, 37, 219—250).—The ore is crushed through a 4-in. hole, material finer than $1\frac{3}{4}$ in. being removed on vibrating screens and stage-ground to 20-mesh, whilst the coarse ore is separated magnetically to yield pyrrhotite for the blast furnace and a reject which passes to the crushers. The ground material is treated by flotation, using Na_2CO_3 1.5, a 60:20:20 mixture of coal-tar creosote, coal tar, and cresol 0.25, K amyloxanthate 0.07, pine oil 0.16, and $CuSO_4$ 0.09 lb. per ton, and making a 25% concentrate of high-grade sulphides and a tailing containing only 0.8% of sulphides. The concentrate is sintered on standard Dwight-Lloyd machines and the fines are removed and mixed with more concentrate for re-sintering. The blast-furnace charge consists of coarse sulphides 47, sinter 27, converter slag 23, and limestone 3%, the throughput averaging 780 tons per 24 hr. instead of 545 tons of lower-grade material when no flotation was employed. The coke consumption is 9% and the matte contains 14% Ni + Cu; the matte is blown to 82% Cu + Ni in a converter capable of holding about 30 tons of it, and producing slag containing SiO_2 20, Fe 48—50, and

Cu + Ni 4.25%. Recent developments in the smelting of Ni-Cu sulphide ores are critically reviewed. A. R. P.

Determination of small amounts of zinc in commercial nickel. B. S. EVANS (Analyst, 1935, 60, 464—466).—A method is described based on the selective pptn. of ZnS when H₂S is passed through the aq. cyanides slightly acidified with AcOH. E. C. S.

Analysis of nickel-aluminium-iron alloys. E. C. PIGOTT (Ind. Chem., 1935, 11, 273—274).—Fe is removed by cupferron; Al is pptd. by aq. NH₃ and determined as Al₂O₃; Ni is determined in the filtrate by the dimethylglyoxime method. E. S. H.

Gold-cobalt resistance alloys. J. L. THOMAS (J. Res. Nat. Bur. Stand., 1935, 14, 589—593).—Alloys containing 0.75—5% Co have been investigated. The temp. coeff. of electrical resistance of alloys containing 1.5—2.5% Co is low at 30—40°, but their thermo-electric power against Cu is high. They are inferior to analogous Au-Cr alloys. J. W. S.

Coloured gold alloys with palladium. L. STERNER-RAINER (Deuts. Goldschm.-Ztg., 1934, 37, 512—514; Chem. Zentr., 1935, i, 783).—Alloys are described with Au + Pd > 25, Pd > 9%, and the Zn content < 13% of the Au. The Sn content is < 5% of the Au, < 10% of the Ag, and < 14% of the Cu content. Analyses are not given. H. J. E.

Preparation of thin wires by cooling streams of liquid metal. G. TAMMANN and G. MORITZ (Z. Metallk., 1935, 27, 114—115).—Extrusion of liquid Sn, Bi, Cd, Pb, Zn, and Al from fine glass jets by means of compressed air affords thin wires of the metal under suitable conditions of temp., pressure, and jet diam.; these wires consist of a series of long single crystals, but at relatively low pressures and temp. just above the m.p. the wires are broken by small beads consisting of 10—50 crystallites. The best conditions for obtaining smooth wires are a temp. of 20—40° > m.p. and a pressure of 3—5 atm. A. R. P.

Hardness of sprayed metal films. KESSNER and T. EVERTS (Z. Metallk., 1935, 27, 104—107).—The hardness (*H*) of sprayed metal films depends on the oxide content and quenching temp. of the particles, so that heating the material to be sprayed, reducing the distance of the pistol from it, and using reducing flames decrease *H*. On the other hand, a high gas pressure and a high air or O₂ pressure increase *H* by heating the particles to a higher temp. so that cooling is more severe, and by increasing the oxidation. A. R. P.

Action of metallic salts in the flotation of oxide minerals. L. KRAEBER and A. BOPPEL (Metall u. Erz, 1934, 31, 417—427; Chem. Zentr., 1935, i, 776—777).—Sulphonated oils gave satisfactory results with calcite and apatite. Results with metal salts are recorded. The nature of the surface film and the dependence on *p*_H are discussed. H. J. E.

Physico-chemical characteristics of light metals. R. MÜLLER (Berg- u. Hüttenmänn. Jahrb. montan. Hochsch., Loeben, 1934, 82, 121—126; Chem. Zentr., 1935, i, 782).—A review and discussion of oxide-film formation, and the electrochemical and amphoteric

behaviour of Al, Mg, Ce, La, and Zr. (Cf. A., 1934, 605.) H. J. E.

Differentiation of various qualities of aluminium. A. VON ZEERLEDER (Aluminium, 1934, 17, 88—90; Chem. Zentr., 1935, i, 782).—Hardness tests for pure Al, Cu-free Al alloys, and those containing Cu are described. All Al alloys containing Cu give a definite blackening on treating for 10 min. with a few drops of 20% NaOH. In absence of Cu a white or grey effect is produced. Presence of Mn causes a brown, and that of Si a grey, stain with NaOH. H. J. E.

Notched-bar impact strength of avional. K. GÜLER (Z. Metallk., 1935, 27, 137—138).—Graphs and mathematical expressions for calculating the permissible loading of avional rods with notches of various size are given. A. R. P.

Influence of cerium on aluminium alloys. M. BOSSHARD (Alluminio, 1934, 3, 205—209; Chem. Zentr., 1935, i, 783).—Small amounts of Ce have no effect on the mechanical, electrical, or corrosion properties of Al and Al-Mg alloys. The tensile strength of aldreyl (containing Mg₂Si) is much reduced by Ce; that of avional is reduced by addition of 0.20—0.42% Ce. H. J. E.

Influence of small excesses of zinc or magnesium on the age-hardening of alloys of aluminium with MgZn₂. R. SCHMITT (Z. Metallk., 1935, 27, 121—125).—The variations in hardness (*H*) of cast Al alloys with 2.6—14% of MgZn₂ and with 0—6% excess of Zn or 0—6% excess of Mg are shown graphically as functions of the time and temp. of ageing after quenching from 475°. Increase in the MgZn₂ content in the quasi-binary system from 6% to 9% increases *H*_{max} from 106 to 150, but a further increase in MgZn₂ has a much smaller effect on *H*_{max} and tends to produce brittleness. Excess of Mg or Zn has relatively little effect on the age-hardening. A. R. P.

Rapid photometric determination of silicon in light metals. H. PINSL (Z. Metallk., 1935, 27, 107—114).—Al or an alloy thereof (0.1 g.) is dissolved in 15% aq. NaOH and H₂O₂ in a Ni crucible, and the solution filtered through a Ni funnel into HCl, oxidised with KMnO₄ at 60°, decolorised with H₂C₂O₄, and treated with 20% (NH₄)₂MoO₄ solution to give the yellow silicomolybdate. Mg alloys are dissolved in HNO₃ and the solution is treated as above. The yellow colour of the solution is then measured photometrically as described for the determination of Si in Fe (B., 1934, 1105). Working details are given and sources of error discussed. A. R. P.

Electrolytic zinc from fume produced from Trail lead blast-furnace slags. W. H. HANNAY and J. BRYDEN (Trans. Canad. Inst. Min. Met., 1934, 37, 141—164).—The fume contains Zn 61.0, Pb 15.6, Cd 0.04, Sb 0.23, As 0.037, Cl 0.005, S (as SO₄'') 1.3, and SO₂ 0.35%, as well as traces of F, Ge, and Sn, and the electrolyte used contains an average of Zn 125 and H₂SO₄ 90—100 g./litre. In this solution the crit. concn. of impurity, when present alone, is (mg. per litre) Sb 0.15, Ge 0.15, Te 0.5, Se < 1, Sn 3, As 5, Co 10, Ni 12, Bi 20, Cu 30, Fe 70, In > 50. F has no effect on the current efficiency, but causes serious corrosion of

the Al cathodes and rapidly accumulates in the electrolyte; its effect can be overcome by addition of Al (1 g./litre) as sulphate and it can be kept at > 30 mg./litre by treatment of the neutral purified solution with $\text{Ca}(\text{OH})_2$. The fume is leached with spent electrolyte from the electrolytic Zn plant, containing H_2SO_4 88 and Zn 53 g./litre, to give a solution containing 1 g. of free acid per litre, about 2 g. of Fe^{+++} per litre (as sulphate) are added, followed by MnO_2 ore and roasted blende to ppt. the Fe^{+++} , PbSO_4 , and other impurities, which are passed to the Pb smelter, and the filtrate is treated with $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ 250 mg. and Zn dust 5 g. per litre at 70° in batches of 30 tons. The filtered liquor passes directly to the electrolysis tanks and the ppt. is reworked to recover the Cd. Details of the plant used and the composition of the products obtained at every stage of the process are given. A. R. P.

Specification of electrodeposited coatings. III. Cathodic deposits, with particular reference to nickel and chromium. S. WERNICK (Ind. Chem., 1935, 11, 275—276; cf. B., 1935, 730).—Standards of appearance, uniformity, and adhesion are discussed. E. S. H.

(A) Examination of cathode sludges obtained when using currents of high density. (B) Causes of formation of spongy cathode deposits. O. KUDRA and K. IVANOV (Mém. Inst. Chem. All-Ukrain. Acad. Sci., 1935, 1, 299—310, 311—319).—(A) X-Ray examination of the sludges obtained from aq. $\text{Cu}(\text{NO}_3)_2$, CuSO_4 , CuCl_2 , ZnCl_2 , $\text{Zn}(\text{NO}_3)_2$, $\text{Cd}(\text{NO}_3)_2$, and AgNO_3 shows that these are mixtures of the metals and their lower oxides (Cu_2O , ZnO , Cd_2O , Ag_2O), containing adsorbed H. The mechanism of formation of the oxides is discussed.

(B) Spongy, but not bright, deposits of Cd and Zn contain oxides, whence it is concluded that failure to obtain adherent metallic deposits is associated with oxidative processes taking place at the cathode (probably due to anions), under conditions of excessively low or high c.d. R. T.

Service pipes for H_2O .—See XXIII.

PATENTS.

[Production of alloys in a] cupola. R. H. CROMWELL (U.S.P. 1,977,428, 16.10.34. Appl., 3.7.33).—A cupola is run as usual to produce Fe or steel, and while the metal is dripping from the charge powdered $\text{Ca}(\text{MoO}_4)_2$ or other compound of an alloying metal is injected by a minor stream of air through a downwardly directed tuyère which is below the main tuyères but above the slag and metal bath. B. M. V.

Casting of metals, alloys, and other molten materials. W. SMITHSON (B.P. 427,640, 27.10.33).—The apparatus comprises a moulding box carrying the mould, means to reduce the pressure therein, and a crucible or similar vessel having an inlet into the mould sealed with cement or a metal which can be melted by the heat of the metal to be cast. A. R. P.

Iron alloys [for permanent magnets]. F. KRUPP A.-G. (B.P. 427,593, 26.6.34. Ger., 29.6.33. Addn. to B.P. 423,960; B., 1935, 504).—Claim is made for ptpn.-hardened Fe alloys containing Ti and/or Ta in

amount $>$ that required to combine with the C, together with 2—30% Mo + W, the W being $< 10\%$ and the Mo preferably $> 12\%$. A. R. P.

Dephosphorisation of steel. SOC. D'ELECTROCHIM., D'ELECTROMÉTALLURG., ET DES ACIÉRIES ELECTR. D'UGINE (B.P. 427,763, 19.7.33. Fr., 25.8.32. Addn. to B.P. 427,466; B., 1935, 679).—After finishing the blow in the Thomas converter, the residual P is greatly reduced by removing the phosphatic slag, pouring on a very fluid basic slag, e.g., SiO_2 14.5, Al_2O_3 8, CaO 55, MgO 13.5, and CaF_2 9%, and continuing the blow for a short time (< 1 min.). A. R. P.

Treatment of metallic [steel] articles or the metallic surface layers or coatings of articles. DEUTS. EDELSTAHLWERKE A.-G. (B.P. 427,623, 19.7.33. Ger., 19.7.32).—The articles are heated in an atm. containing volatile compounds of C, P, N, Si, or B which are dissociated at subatm. pressure by means of an ionisation electrical discharge so as to produce a hard or corrosion-resistant surface layer. A. R. P.

Treatment of mineral sand for separation of one constituent from another. D. J. BURKE (B.P. 429,998, 12.10.33).—A flotation process for the separation of zircon, monazite, rutile, and gangue comprises: (1) treatment with dil. HCl and washing with soft H_2O ; (2) washing with dil. soap solution and H_2O ; (3) slow agitation in H_2O with a little air injected mainly to prevent silting, no noticeable froth being produced, but a scum of zircon and monazite being formed; (4) flotation of rutile by addition of oleic acid; (5) refloating the scum from (3) after treatment with a conc. acid, zircon floating and monazite sinking. Between (3) and (4) pickle in HCl may be necessary. B. M. V.

Separator. A. McLELLAN (U.S.P. 1,976,856, 16.10.34. Appl., 18.3.32).—Amalgamation of ores of Au and the like is effected with the aid of electricity and magnetism. It is stated that the Hg is actually caused to dance off the amalgamated plate, with consequent augmented surface, by means of low-voltage a.c. applied between the Hg in rifle pockets (*R*) of the plate which forms one electrode and other electrodes in contact with the H_2O of the pulp. Electromagnets underneath *R* set up a magnetic flux normal to the plate and cause vibration. B. M. V.

Recovery of gold from roasted pyrites. HOCHOFENWERK LÜBECK A.-G. (B.P. 427,600, 8.8.34. Ger., 9.8.33).—Roasted pyrites are subjected to a chloridising roast, whereby the Cu and Au are converted into chlorides, the product is leached to remove Cu and ppt. the Au on the surface of the Fe_2O_3 , and finally the Au is extracted with 0.05% aq. KCN, the wash waters from the extraction being used to make up solution for the next cyanide leach. A. R. P.

Reaction products of SO_2 and aldehyde derivatives of Schiff's base.—See III. **Magnetic Fe oxide.**—See VII. **Induction furnace. Lamp filaments.**—See XI.

XI.—ELECTROTECHNICS.

Inductive electric heating. C. E. DANIELS (Chem. Met. Eng., 1935, 42, 325—328).—The conditions calling

for inductive electric heating for chemical work, and factors bearing on design, including tables showing the effect of turn spacing, layers of coils, and no. of turns, are discussed.
D. K. M.

Mixtures of asphalt and synthetic rubber for electrical insulation of cables. D. POSPECHOV and A. FOKIN (Mém. Inst. Chem. All-Ukrain. Acad. Sci., 1935, 1, 287—297).—Satisfactory insulation is achieved by coating the cable with a vulcanised mixture of synthetic rubber 15, filler (kaolin, chalk) 40, and asphalt 45%.
R. T.

Chemical reactions in the lead storage battery. G. W. VINAL and D. N. CRAIG (J. Res. Nat. Bur. Stand., 1935, 14, 449—462).—Working with an accumulator made with pure Pb plates and filled with H_2SO_4 of reagent grade it is shown that 2.02 ± 0.03 eqivs. of acid are used and 1.96 ± 0.19 eqivs. of H_2O are formed by the passage of 1 faraday of electricity through the cell in the direction of discharge, thus confirming the double-sulphate theory of reactions in the Pb storage battery.
A. R. P.

Electrolytic removal of fat. F. SCHÄFER (Metallw.-Ind. Galv.-Techn., 1934, 32, 408—409; Chem. Zentr., 1935, i, 785).—The baths used contained: (1) H_2O 100 litres, anhyd. Na_2CO_3 3.5, $NaOH$ 3.5, KCN 2.5, $Cu(CN)_2$ 1.2, and Na_2S 0.12 kg.; (2) H_2O 100 litres, anhyd. Na_2CO_3 2.5, KCN 2.5, Na_2S 2, $Cu(OAc)_2$ 2 kg.; (3) H_2O 100 litres, anhyd. Na_2CO_3 3.6, KCN 3.6, Na_2S 2.8, and $Cu(OAc)_2$ 2.8 kg. Operating conditions are described.
H. J. E.

Colour measurement of oils and other liquids. E. R. BOLTON and K. A. WILLIAMS (Analyst, 1935, 60, 447—454).—The absorption of light by the liquid is measured photoelectrically. The light is filtered through aq. $CuSO_4$ to remove infra-red radiation, and through Wratten filters transmitting various wave-bands in the visual region. Curves are given for representative normal, green, and red oils, and for aq. I.
E. C. S.

Glossmeter.—See I. **Pressboard drying control.**—See V. **H_3PO_4 .**—See VII. **Au-Co alloys.** **Electrolytic Zn. Ni- and Cr-plate.** **Cathode sludges.**—See X. **Determining pH of soils.**—See XVI.

PATENTS.

[**Electric resistance] furnace.** O. S. HASKELL, Assr. to GEN. ELECTRIC Co. (U.S.P. 1,976,557, 9.10.34. Appl., 27.7.33).—The furnace is of the type in which the base (and charge upon it) is separable as a unit from the roof, walls, and heaters as another unit. A circulating fan is situated in the base between a real and false bottom, the motor being outside; the fan and charge of material are enclosed in a liquid-sealed metallic hood within the refractory walls and within the heaters.
B. M. V.

Metallurgical [three-phase, normal-frequency] induction furnace. T. J. SALTER (B.P. 430,667, 23.12.33).—The metal bath comprises a central space and a triangular channel, the latter linking with the cores of 3 separate transformers. Single-turn secondary windings are connected in Δ form to electrodes in the metal, and others of multi-turn windings are connected

in Y form to plates embedded in the walls of the furnace.
B. M. V.

Carrying out chemical reactions between gas-like substances. R. STADLER and O. EISENHUT, Assrs. to I. G. FARBENIND. A.-G. (U.S.P. 1,977,155, 16.10.34. Appl., 26.7.30. Ger., 30.8.29).—Gases are led by streamlined, approx. conical surfaces causing a convergence of approx. 10:1 in cross-section into an arc chamber in which they are electrically treated while in a state of smooth motion. *E.g.*, if a waste gas from the hydrogenation of coal, containing 30% of CH_4 and homologues, is subjected to an arc at 3000 volts, the C_2H_2 in the output will be raised to 10% and no C black will be deposited.
B. M. V.

Electrical storage batteries. D. & B. ELECTRICAL Co., LTD., J. O'HEA, and R. E. PEARSON (B.P. 429,931, 5.12.33).—In a Pb cell, the positive plates after pasting with PbO_2 are dipped in a solution which liberates CO_2 on reaction with PbO_2 and has the effect of improving the cryst. structure and cohesion. $H_2C_2O_4$ is very suitable because a second gassing takes place when the plate is immersed in H_2SO_4 electrolyte.
B. M. V.

Halogenated hydrocarbon compounds [suitable as dielectric materials]. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 430,298, 26.11.34. U.S., 29.11.33).—Compositions claimed are obtained by heating, *e.g.*, at 85° , halogenated (chlorinated) olefines, *e.g.*, halogenated C_2H_4 , C_3H_6 , C_4H_8 ($CHCl:CCl_2$), with $AlCl_3$ (0.1—0.5 mol.); the mixed polymerides and condensation products obtained, which vary in consistency and volatility according to the duration of heating and quantity of $AlCl_3$, may be mixed with other halogenated compounds, *e.g.*, chlorinated C_6H_6 , Ph_2 , Ph_2O , $COPh_2$, or CH_2Ph_2 . The products are stable, non-corrosive, and, alone or in mixtures, of low pour point, *e.g.*, -45° and -60° .
A. W. B.

Liquid insulating compositions for electrical apparatus. BRIT. THOMSON-HOUSTON Co., LTD., Asses. of F. M. CLARK (B.P. 430,045, 6.2.34. U.S., 8.2.33).—Halogenated C_6H_6 derivatives, *e.g.*, $C_6H_5Cl_3$ (I) or $CPhF_3$ [mixed isomerides of (I)] are mixed, to < 20% on the wt. of the mixture, with vegetable oils. The products are stable, non-inflammable, and have a high dielectric const., $d > 1$, and a low pour point.
A. W. B.

Manufacture of incandescence bodies for use as filaments of electric lamps etc. Y. SAKAKURA (B.P. 427,757, 16.11.33. Jap., 19.5.33).—A pressed slug of W powder is partly sintered, impregnated with aq. $Th(NO_3)_4$ or salt of any other grain-growth restrainer, washed in H_2O to remove the salt from the outer layers, dried at 200° , baked in H_2 at $800-1200^\circ$, and finally sintered and worked to wire in the usual way. The ThO_2 content of the wire thus increases from the surface inwards and again decreases to zero at the axis.
A. R. P.

Electrolytic apparatus. NORDISKE FABRIKER DE-NO-FA A./S., and C. F. HOLMBOE (B.P. 430,225, 6.12.34).—Electrodes for the decomp. of liquids are formed, as to the one set, of a no. of thin plates assembled so that the plane of the laminations is parallel to the direction of flow of current, and, as to the other set, of plain or perforated plates, or a pair of perforated plates with

gauze between, the plane of the plates being perpendicular to the direction of flow. Diaphragms are contemplated. B. M. V.

Electrolytic water decomposer, particularly for high-pressure operation. SIEMENS & HALSKE A.-G. (B.P. 430,477, 22.12.34. Ger., 26.1. and 9.3.34).—The electrodes comprise nested, concentric, metallic cylinders of alternate polarity, insulating spacers being placed between frusto-conical extensions at the top and bottom. B. M. V.

Electrolytic apparatus. M. TETRAULT (U.S.P. 1,977,499, 16.10.34. Appl., 28.12.32).—A stiffener for a sheet electrode (*E*) comprises a length of U-shaped metal (*C*) pressed on the edge of *E* with the intervention of a rubber strip. The edges of *C* form convenient places to start stripping *E* after deposition has taken place. B. M. V.

[Portable] apparatus for oligodynamic treatment of liquids. KATADYN A.-G. (B.P. 430,635, 16.10.34. Ger., 16.10.33).—A modified form of B.P. 412,762 (B., 1934, 768) is described. B. M. V.

Electric condensers. PORZELANFABR. KAHLA (B.P. 430,645, 1.1.35. Ger., 2.1.34).

Preventing boiler incrustation. Analysis employing photosensitive devices.—See I. **Insulating oil.**—See II. **Alloys for magnets. Separator. Metallic surface layers.**—See X. **Cement for valve caps.**—See XIII. **Battery diaphragms. Rubber insulation.**—See XIV.

XII.—FATS; OILS; WAXES.

Refractometric determination of fat in German soya. W. LEITHE and E. MÜLLER (Angew. Chem., 1935, 48, 414—415).—The apparatus described previously (B., 1934, 969) was used to determine the fat in 23 different kinds of soya beans. Agreement with the extraction method was found. A. J. M.

Colloid-chemical foundations of detergents and detergency. W. PROSCH (Fettchem. Umschau, 1935, 42, 117—120).—A survey is made of the properties of soap solutions which may contribute to their detergent activity. E. L.

Recommended standard procedure for measuring colour of oils. G. S. FAWCETT (Analyst, 1935, 60, 467—468).—Readings of the colour of oil > 20 units of yellow in the Lovibond tintometer are unreliable. It is suggested that highly-coloured oils should be examined in correspondingly smaller cells. E. C. S.

Fat removal. Colour measurement of oils.—See XI. **Adulteration of ground almonds.**—See XIX.

PATENTS.

Refining of vegetable and animal oils and fats, and, more particularly, recovery of solvents used in such process. METALLGES. A.-G. (B.P. 430,381, 30.4.34. Ger., 15.2.34).—The soap stock formed during the neutralisation of oils is dried in vac. (either *in situ* in the deacidified oil, or after separation therefrom) before being dissolved in (or washed out by) a mixture of EtOH and H₂O or saline solution, so that when the separated EtOH solution of soap is distilled the recovered

solvent is at least as conc. as the original spirit used. It is advantageous to decompose the EtOH soap solution with mineral or org. acid before distillation. E. L.

Core oil. Lubricants.—See II. **Phenylstearic acid.**—See III.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Staining power of mineral pigments in paints and vitreous enamels. A. THÜRMER and H. VOIGT (Farbe u. Lack, 1935, 303—304, 315).—An elutriation method is described for the determination of the approx. particle size of very fine powders. The results are affected by their swelling power, which is determined by examination at intervals of the solid in H₂O or oil in a microscope fitted with a micron objective; data are tabulated for 4 technical samples each of Cr₂O₃-green, PbCrO₄, and ZnO, together with their packing vol. Gradual increments of Cr₂O₃ and PbCrO₄ were fused with a silicate mixture and the colour intensity of the product was determined by comparison with solutions of CrCl₃ and K₂CrO₄. It is concluded that in paints the effectiveness increases with the fineness of the pigment, but in vitreous enamels max. effects were obtained with particles having medium dimensions. S. M.

Rapid determination of the critical oil requirement [of pigments]. H. WOLFF and G. ZEIDLER (Farben-Ztg., 1935, 40, 667—668, 693—694).—Using a simplified form of turboviscosimeter (described and illustrated), the wt. to give a "fall time" of approx. 10 sec. is determined for three pigment-oil pastes prepared by progressively increasing the oil content (*O*) of an original stiff paste. "10-sec. vals." are calc. from these, and after subtracting the 10-sec. turboviscosity (*T*) of the particular oil used, they are plotted against the wt.-% of oil, the graph units chosen for *O* being 10 times those of *T*. An arc is then drawn by the aid of compasses the point of which is in the origin and the radius adjusted so that the *O-T* curve is touched at a point or cut at two close points. The val. of *O* at this point (or midway between the intersections) is a sufficiently close approximation to the crit. *O* calc. by the previously described method (which, it is pointed out, is the mathematical rendering of this graphical procedure). S. S. W.

Use of infra-red rays in examination of inks and pigments. C. A. MITCHELL (Analyst, 1935, 60, 454—461).—The absorption of infra-red light by the common org. and inorg. inks and pigments, and by a no. of salts of Fe, Ni, and Co, is reviewed. The examination of charred documents and blood stains is described. E. C. S.

Relation of ink to the preservation of written records. E. W. ZIMMERMAN, C. G. WEBER, and A. E. KIMBERLY (J. Res. Nat. Bur. Stand., 1935, 14, 463—468).—Accelerated ageing tests (heating for 72 hr. at 100°) indicate that all the common types of ink accelerate the deterioration of paper, the effect being most marked with papers suitable for permanent records. The only ink which has a negligible effect on paper is that of Silbermann and Ozorovitz (B., 1908, 974) which has a base of NH₄ ammoniumoxyferrigallate; this ink has a

good writing quality, is stable, and only mildly corrosive to steel pens. A. R. P.

Relative tautening effects of cellulose acetate and nitrate dopes [for aeroplane fabric], with special reference to influence of moisture. R. S. DANTUMA and A. M. MEES (Farben-Ztg., 1935, 40, 744—745).—Tests on acetate and nitrate dopes, both clear and pigmented, confirm the results of earlier workers. The nitrate dopes have greater tautening power and less susceptibility to H₂O than the acetate dopes. Pigmented dopes have greater tautening power and lower susceptibility to H₂O than non-pigmented. Protection of acetate dope with a synthetic lacquer or with nitrate dope does not improve its H₂O susceptibility significantly. Immersion tests, continuous and intermittent, show that susceptibility is definitely a matter of H₂O-absorptive power. S. S. W.

Losses in size making and observations in the cooking of rosin. M. KRIMMEL (Paper Trade J., 1935, 101; T.A.P.P.I. Sect., 10—12).—"F" and "G" grades of rosin were saponified by heating at 135—140° in a steam-jacketed kettle for 12—14 hr. and then treating with Na₂CO₃ for 2—4 hr.; a series of large-scale runs gave a total loss of material of 5.27%, due to the presence of volatile matter and H₂O (1 mol.) in the rosin and evolution of CO₂. Emulsification of the soap to a size milk with a steam injector produced a further loss of 1.57%. Analytical data (tabulated) for soaps prepared after ½, 1, 2, and 3 hrs.' cooking show that although the free Na₂CO₃ content decreased slightly in this order, the amount of combined rosin also decreased, and the free portion increased. The soaps dissociated feebly during emulsification, but did not differ in sizing quality. S. M.

PATENTS.

Bituminous paints, lacquers, and like coating compositions. F. B. DEHN. From DEUTS. HYDRIERWERKE A.-G. (B.P. 430,664, 22.12.33).—The incorporation of small amounts of cellulose derivatives into bituminous compositions is achieved by the use of esters of cyclohexanol or its homologues and/or the corresponding ketones, as common solvents. S. S. W.

Oleo-resinous coating compositions. L. D. GITTINGS, Assr. to SWANN RESEARCH, INC. (U.S.P. 1,974,799, 25.9.34. Appl., 1.2.33).—The use of finely-divided halogenated Ph₂, e.g., C₁₂HCl₉, in the pigment portion of oleoresinous paints is claimed. S. S. W.

Finish remover composition. G. KLINCKENSTEIN (U.S.P. 1,974,744, 25.9.34. Appl., 10.6.29).—A typical composition is: COMe₂ 35, EtOAc 15, denatured EtOH 10, C₆H₆ 10, oxidised pine oil 10, Et phthalate 20, and cellulose acetate 4 pts. by vol. S. S. W.

Production of plastic materials. W. J. TENNANT. From J. C. PATRICK (B.P. 431,011, 6.6.34).—An aq. EtOH solution of a polysulphide (S₂₋₅) of Na, Ca, etc. is heated with furfuraldehyde, or an alkyl derivative, in presence of a dispersing agent, e.g., Mg(OH)₂; inorg. impurities are washed from the latex-like product, which can be coagulated by a mineral acid. S. M.

Production of oil- and solvent-resistant [plastic] material. DUNLOP RUBBER Co., LTD., D. F. TWISS,

and A. E. T. NEALE (B.P. 430,773, 13.7.34).—A halide of S, Se, etc. is caused to react with an ethylene hydrocarbon or halogen derivative, a vinyl polymeride, or isoprene, etc., and the halogen in the product is partly or wholly replaced by S and/or Se by treating it, e.g., with Na₂S₂. The final product may be incorporated with rubber. S. M.

[Resinous] cementing materials [for thermionic valve caps etc.]. MARCONI'S WIRELESS TELEGRAPH Co., LTD., Asses. of C. EDDISON (B.P. 430,778, 22.8.34. U.S., 22.8.33).—Marble flour (85) or other filler is incorporated with a binder (15) consisting of a mixture of shellac (65), rosin (10), and a quick-setting phenol-condensation product (25 pts.). S. M.

Caulking compound. G. KLINCKENSTEIN, Assr. to MAAS & WALDSTEIN Co. (U.S.P. 1,974,745, 25.9.34. Appl., 23.5.32).—Permanently plastic caulking compounds, for use, e.g., in refrigerated show cases, comprise nitrocellulose (1—7 wt.-%), plasticiser, e.g., Bu phthalate or phosphate (15—60%), filler and pigment, e.g., asbestine, CaCO₃, C black (30—90%), and a trace of camphor. S. S. W.

Olefine-CO reaction products. Reaction products of SO₂ and aldehyde derivatives of Schiff's base. Esters of dicarboxylic acids. Plasticisers.—See III. Azo pigments.—See IV. Cellulose esters of dicarboxylic acid.—See V. Moulding powders.—See XIV. Removing org. compounds from aq. solution. Purifying phenolic liquors.—See XXIII.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Refractive index of rubber. A. T. MCPHERSON and A. D. CUMMINGS (J. Res. Nat. Bur. Stand., 1935, 14, 553—562).—Plantation *Hevea* and purified rubbers have n_D^{25} 1.5188 and 1.5190, respectively, the vals. being unaffected by addition of insol. fillers. Dissolution of S and C₁₀H₇-NHPh in rubber increases n_D^{25} by 0.0016 and 0.0015, respectively, per 1% addition. An equation is derived relating n_D^{25} of vulcanised rubber with the % of combined S and with t . The transition from soft to hard rubber is accompanied by a decrease in the slope of the $n-t$ curve. J. W. S.

Specific volume, compressibility, and volume thermal expansivity of rubber-sulphur compounds. A. H. SCOTT (J. Res. Nat. Bur. Stand., 1935, 14, 99—120).—Data are recorded for specimens with 3—31% of S, at 10—85° and up to 790 atm., experimental methods being described. H. J. E.

Chloro-rubber as a technical raw material. A. NIELSEN (Kautschuk, 1935, 11, 132—138).—The characteristics and possibilities of chlorinated rubber (I) are reviewed. Several stages of change can be distinguished in the properties during the chlorination process, but only the final product, with 64—68% Cl (corresponding in composition with a chlorinated hydro-rubber), is of technical importance. The properties of (I) are considerably influenced by the previous history of the rubber. Stability tests are likely to be misleading; (I), if properly prepared, is remarkably stable. As solvents, certain esters and ketones are available in addition to the usual rubber solvents, of which latter,

indeed, the paraffin hydrocarbons are ineffective. Although miscible with fats, oils, and certain colloids such as rosin and coumarone resins, (I) does not mix well with rubber or cellulose esters. At $> 80^\circ$ it loses its hardness and becomes elastic and capable of being milled like rubber. Its resistance to chemical influences makes (I) a valuable basis for protective films and bonding material of all kinds, for which its non-inflammable character and low conductivity for electricity and heat are additional advantages.

D. F. T.

Cable insulation.—See XI. *Cryptostegia* and hybrid.—See XVI.

PATENTS.

Purification and concentration of [rubber] latex. RUBBER PRODUCERS RES. ASSOC., and H. P. STEVENS (B.P. 430,426, 18.12.33 and 24.10.34).—A process and apparatus are described in which some or all of the dissolved serum solids are removed by dialysis in H_2O or in an aq. solution, e.g., of NH_3 , hydrostatic pressure being applied to prevent dilution of the latex or an NH_4 soap added to the dialysing bath for the same purpose. The process may be continuous. The dialysed latex may be further conc. by known methods.

D. F. T.

Concentration of [rubber] latex. RUBBER PRODUCERS RES. ASSOC. FROM RUBBER RES. INST. OF MALAYA (B.P. 430,935, 12.3.34).—Tragon-seed gum (e.g., 3%, on the H_2O), consisting essentially of the hemicellulose material of the carob bean, is used as a creaming agent, preferably in presence of additional NH_3 (e.g., 1.5%, on the rubber).

D. F. T.

Manufacture of rubber. RUBBER PRODUCERS RES. ASSOC., G. MARTIN, W. S. DAVEY, and H. C. BAKER (B.P. 430,422, 14.12.33).—Soft rubber is obtained from *Hevea* latex by adding an alkali, e.g., 0.5% of NaOH, then effecting coagulation with an acidic substance, preferably with an interval of < 1 day. The wet sheeted or créped coagulum is heated at 70° —approx. 100° until dry and soft. The process may further be modified by dilution of the alkaline latex to 0.25 lb. of rubber per gal. and/or by soaking the coagulum in H_2O . An antioxidant may be incorporated in the coagulum.

D. F. T.

Direct manufacture of rubber material from latex and like aqueous dispersions. FABRICHE RIUNITE INDUSTRIA GOMMA TORINO, and A. T. MAXIMOFF (B.P. 430,828, 28.12.33).—Tenuous rubber material such as elastic thread is made by extruding a coagulable dispersion into a coagulant bath, the dispersion being forced through the die by displacement from a closed tank by means of an auxiliary liquid, such as an oil, Hg, glycerin, or H_2O , delivered by a measuring pump and operating on the dispersion either by direct contact or through the intermediary of a piston or membrane.

D. F. T.

Production of rubber and like threads. H. SCHULER, E. MATZNER, and A. KAILICH (B.P. 431,031, 25.11.33. Austr., 1.8.33).—A continuously produced strip of rubber or the like in a partly dried and vulcanised adhesive condition is formed into thread by being twisted under tension about its longitudinal axis. Drying and

completion of vulcanisation may be effected subsequently. A device is described for forming strip.

D. F. T.

Vulcanisation of rubber or similar materials. A. L. HOCK, and P. SPENCE & SONS, LTD. (B.P. 430,798, 19.9.33).—The vulcanisation of rubber containing a highly absorbent siliceous filler (cf. B.P. 357,993; B., 1931, 1094) is aided by incorporating a H_2O -sol., inorg. alkali (NaOH) or alkaline salt (Na silicate or glyceroxide) and an org. accelerator. [Stat. ref.]

D. F. T.

Vulcanisation of rubber goods and treatment of other goods requiring heat and pressure. A. JOHNSTON, and NORTH BRIT. RUBBER CO., LTD. (B.P. 430,911, 22.12.33).—Suitable temp. and pressure conditions are obtained in the chamber containing the goods by forcing in air from the atm. and subsequently withdrawing a portion of the compressed air from the container, raising it to a higher pressure, and returning the compressed and adiabatically heated air to the container through a throttle valve.

D. F. T.

Rubber compositions and preservation of rubber. A. H. STEVENS. From B. F. GOODRICH CO. (B.P. 430,618, 27.8.34).—An antioxidant for rubber comprises a diarylamine and a diaryl-*p*-phenylenediamine, e.g., a cooled, fused mixture of β - $C_{10}H_7$ -NHPH and *p*- C_6H_4 (NHPH) $_2$, the former preponderating.

D. F. T.

Rubber mixture for purposes of electrical insulation, especially for marine communication cables. SIEMENS & HALSKE A.-G. (B.P. 430,019, 8.12.33. Ger., 12.12.32).—A mixture of hydrogenated rubber and polyvinyl compounds, e.g., polyvinyl acetate or polystyrene, possibly together with other insulating substances such as balata, gutta-percha, natural or artificial waxes, is used for electrotechnical purposes, especially for cable insulation.

D. F. T.

Manufacture of partly depolymerised rubber. ELECTRICAL RES. PRODUCTS, INC., Asses. of A. R. KEMP (B.P. 430,887, 13.12.34. U.S., 5.1.34).—Raw rubber, dissolved in an org. solvent (tetralin, decalin), is heated in an autoclave at $> 100^\circ$ for sufficient time to effect depolymerisation; the rubber after removal of the solvent is a viscous fluid.

D. F. T.

Manufacture of chlorinated rubber. F. P. LEACH, W. D. SPENCER, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 430,906, 20.12.33).—Chlorinated rubber is separated by bringing its solutions (e.g., in CCl_4) in contact with an excess of liquid precipitant while stirring; the precipitant, e.g., MeOH, is without chemical action on the ppt. and its mixture with the solvent is substantially without solvent action on the pptd. product.

D. F. T.

Production of (A) ebonite powder for moulding purposes, (B) ebonite or rubber moulding powders. ILFRA CORP., LTD., and F. N. PICKETT (B.P. 430,155—6, 9.11.33).—(A) A powder for use in producing hard rubber mouldings is made by mixing (3:1) powdered hard and softer vulcanised rubber, with or without accelerators and S. (B) A moulding powder consists of crumb rubber (obtained by grinding vulcanised or unvulcanised rubber) and a symmetrical substituted guanidine [e.g., 1—7% of $NH_2C(NHPh)_2$]. A synthetic resin ($\approx 10\%$) may also

be present and the mould surfaces may be dusted with synthetic resin powder. D. F. T.

Manufacture of porous ebonite diaphragms for electric batteries etc. S. J. CLARK, and YOUNG ACCUMULATOR Co. (1929), LTD. (B.P. 427,807, 31.10.33).—A mixture of rubber with 10–15% of S is vulcanised to produce a soft, crumbly rubber which is broken to a powder resembling fine oatmeal; the product is then mixed with sufficient S as a colloidal aq. suspension to give a rubber : S ratio of 68 : 32, and the mixture is moulded and vulcanised. A. R. P.

[Apparatus for continuous] vulcanisation of rubber articles. A. H. STEVENS. From BOSTON WOVEN HOSE & RUBBER Co. (B.P. 430,885, 26.11.34).

Rubber constructional material.—See IX. **Oil-resistant plastic.**—See XIII.

XV.—LEATHER; GLUE.

Single-bath chromium scouring [of leather] and its graphical calculation. B. KÖHLER (Gerber, 1934, 60, 81–83; Chem. Zentr., 1935, i, 507).—Diagrams are given giving the requisite quantities of chemicals and the basicities. H. J. E.

Influence of magnesium sulphate on deterioration of vegetable-tanned leather by sulphuric acid. R. C. BOWKER, E. L. WALLACE, and J. R. KANAGY (J. Res. Nat. Bur. Stand., 1935, 14, 121–131; cf. B., 1933, 400).—Data are recorded for the change of mechanical strength with time for chestnut- and quebracho-tanned leathers containing 0–2.5% of H_2SO_4 and 5% of $MgSO_4 \cdot 7H_2O$. For leathers with the same % of acid, those containing $MgSO_4$ as well deteriorated less. Deterioration was a function of the p_H and became serious at $p_H < 2.8$. H. J. E.

NH_2 -N content of collagen.—See V.

PATENTS.

Unhairing of hides or skins. H. G. TURLEY and W. WINDUS, Assrs. to RÖHM & HAAS Co. (U.S.P. 1,973,130, 11.9.34. Appl., 21.7.33).—A compound containing the SH group or capable of giving rise to it under the conditions of use, e.g., $EtSH$, Bu^iSH , Bu^tSH , $CH_2Ph \cdot SH$, thiosemicarbazide, $NH_2 \cdot C(=NH) \cdot SMe$, is added to the alkaline dehairing bath. H. A. P.

Manufacture of synthetic tanning materials. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 430,343, 7.12.33).—Aromatic or heterocyclic sulphonic acids, e.g., from phenols, naphthols, $C_{10}H_8$, tetralin, anthracene, carbazole, are condensed with aldehydes (0.7–1.4 mols.), e.g., CH_2O , furfuraldehyde, $PhCHO$, and aromatic OH-compounds containing CO_2H and/or halogen groups (0.1–0.5 mol.), e.g., a $OH \cdot C_6H_4 \cdot CO_2H$, *o*-, *m*-, and *p*-cresotinic acid, *o*- and *m*- $C_6H_4Cl \cdot OH$, at 50–150°. A. W. B.

Preventing foaming.—See I.

XVI.—AGRICULTURE.

Soil conditions in East Anglia. H. H. NICHOLSON and F. HANLEY (Empire J. Exp. Agric., 1935, 3, 60–

74).—Analyses, distribution, and agricultural uses of these soils are recorded. A. G. P.

Soils of Scotland. I. Introduction: Highlands and Hebrides. W. G. OGG (Empire J. Exp. Agric., 1935, 3, 174–188).—Descriptions and profile characteristics of the principal soil types are given. A. G. P.

Diurnal variation of moisture in [Indian] soil during the clear season. L. A. RAMDAS and M. S. KATTI (Current Sci., 1935, 3, 612–613).—Variations are recorded. The black cotton soils undergo the max. variation owing to loss of H_2O by evaporation during the day and gain by absorption from the atm. during the night. Such variations are maximal at the surface and decrease rapidly with depth. I. S. T.

Determination of the hydrogen-ion concentration of soils. E. F. SNYDER (U.S. Dept. Agric. Circ., 1935, No. 56, 47 pp.).—Electrometric and colorimetric methods are described and factors affecting results discussed. A. G. P.

Aluminium as an index of soil contamination. F. B. SHORLAND (Analyst, 1935, 60, 467).—An explanatory note (see B., 1934, 776).

Response of grasses and clover to treatment on acidic upland soils: effect of herbage plants on the reaction of acidic soils. II. Effect of herbage plants on *Molinia* soil. R. O. DAVIES and H. G. CHIPPENDALE (Empire J. Exp. Agric., 1935, 3, 50–59; cf. B., 1935, 245).—The acidity of soil and of drainage H_2O was decreased by the growth of grasses and of wild white clover, the former having somewhat the greater effect. The beneficial action of small dressings of basic slag is attributable more to the indirect influence on the growth of herbage than to its direct effect on soil p_H . The very rapid absorption of NO_3^- by grasses probably increased the rate of N fixation by clovers. The N of Nitrochalk (I) was completely recovered in herbage grown in the season of application. (I) increased the availability of soil-N. Protein synthesis was more rapid in clover receiving no N than in grasses generously treated with sol. N; also the residual N in soil after cropping was greater in the clover soil. A. G. P.

Comparative trials of calcium cyanamide and other nitrogenous fertilisers on arable crops. E. M. CROWTHER (Empire J. Exp. Agric., 1935, 3, 129–143).—With barley, potatoes, and sugar beet $CaCN_2$ (I) was as effective as $(NH_4)_2SO_4$ (II) on 11 out of 15 soils, and inferior in the other cases. With winter cereals on one soil type only, no differences between autumn and spring dressings or between (I) and (II) were observed. (I) was inferior when repeated small dressings were given in winter and spring. Dicyanodiamide applied alone or with (I) in autumn gave good results on winter wheat. A. G. P.

Action of calcium cyanamide on germinating seeds and on charlock in barley. H. L. RICHARDSON (Empire J. Exp. Agric., 1935, 3, 41–49).—In field trials, application of $CaCN_2$ (I) (3 cwt. per acre) \leq 1 week before sowing had no ill-effect on germination. Probably an interval of 2 days would be safe. Moderate

dressings given 2 days after sowing were harmless if left undisturbed on the soil surface. For destruction of charlock (I) was less effective than kainit or CuSO_4 .

A. G. P.

Effect of magnesium deficiency on crop plants. A. B. BEAUMONT and M. E. SNELL (J. Agric. Res., 1935, 50, 553—562).—The varying susceptibility of different plants to Mg deficiency is examined and physiological effects are described. On an acid soil (p_{H} 5.6) applications of MgSO_4 remedied the defect. To avoid ill-effects on crops surface soils should contain 60—80 lb. of Mg per acre.

A. G. P.

Plant-assimilability of iron and aluminium phosphates and complex salts. A. I. ACHROMEIKO (Phosphorsäure, 1934, 4, 429—440; Chem. Zentr., 1935, i, 773).—In the manufacture of Ammophos from phosphorites rich in sesquioxides, complex salts of the type $\text{NH}_4\text{H}_2[\text{Fe}(\text{PO}_4)_2]$ are formed. The availability to plants of these compounds is $<$ that of mechanical mixtures of the constituent salts. The solubility of the PO_4''' of Al and Fe phosphates decreases on admixture with podsollic soils, but rises again after 6 weeks. With chernozem soils there is an initial decline in the solubility of the Al, but not of the Fe, salt but after 6 weeks both attain a solubility equal to that of NH_4 phosphates.

A. G. P.

Yield of tea. III. Potash and nitrogen in relation to the pruning cycle. T. EDEN (Empire J. Exp. Agric., 1935, 3, 105—118; cf. B., 1932, 697).—Manuring with N causes definite but unimportant differences in the sol. N, caffeine, and ash contents of tea extracts, but not in total extractable matter or tannin. No characteristic distinction was observed between the effects of $(\text{NH}_4)_2\text{SO}_4$, CaCN_2 , and blood-meal.

A. G. P.

Rubber content of two species of *Cryptostegia* and of an interspecific hybrid in Florida. L. G. POLHAMUS, H. H. HILL, and J. A. ELDER (U.S. Dept. Agric. Tech. Bull., 1934, No. 457, 22 pp.).—The rubber content of the hybrid was $>$ that of either parent (*C. grandiflora* and *C. madagascariensis*). The resin content of the parents \propto the rubber content, but no relationship was apparent in the hybrid. In all plants the rate of rubber formation reaches a max. at the period of greatest vegetative growth. The effects of soil conditions are examined.

A. G. P.

Artificial farmyard manure. A. STÖCKLI (Landw. Jahrb. Schweiz, 1934, 48, 709—740; Chem. Zentr., 1935, i, 772).—The course of decomp. of straw in the presence of various N sources is examined, and the manurial efficiency of the products is compared in pot-culture trials.

A. G. P.

Derris dusts and oil-lead arsenate spray for squash vine borer (*M. satyriniformis*, Hbn.). R. C. BURDETTE (J. Econ. Entom., 1935, 28, 229—231).—Derris, especially when applied in S-clay combinations, was the more effective.

A. G. P.

Eelworm disease of cyclamen. O. B. ORCHARD (Cheshunt Exp. Sta. Ann. Rept., 1934, 68—69).—Infected soil should be treated with HgCl_2 solution (1 in 1000) in mid-April. Use of heat- or steam-sterilised soil is recommended.

A. G. P.

Control of Fuller's rose beetle (*Asynonychus godmani*, Crotch) in commercial greenhouses.

H. BROUDY (J. Econ. Entom., 1935, 28, 248—249).—Adult beetles are satisfactorily treated with BaSiF_6 dust, and the grubs by spraying soil with CS_2 emulsion.

A. G. P.

Utilisation of a completely refined low-boiling petroleum distillate in controlling insects infesting chrysanthemum and other plants. J. M. GINSBURG, J. B. SCHMITT, and P. GRANETT (J. Econ. Entom., 1935, 28, 236—242).—The oil [A.P.I. gravity 49—50, flash point (open) 76.7° , boiling range 188— 254° , η (Saybolt) $30/38^\circ$, 98% unsulphonatable] may be used as a dip or for direct spraying. Fog-spraying in bright sunlight in an atm. of low R.H. avoids injury.

A. G. P.

Control of certain *Tarsonemus* mites on ornamentals. F. F. SMITH (J. Econ. Entom., 1935, 28, 91—98).—Observations on the use of S, $\text{Ca}(\text{CN})_2$, C_{10}H_8 , and hot- H_2O treatments are recorded.

A. G. P.

Toxicity of fixed nicotine preparations to certain lepidopterous pests of truck crops. M. C. SWINGLE and J. F. COOPER (J. Econ. Entom., 1935, 28, 220—224).—Among insol. compounds of nicotine (I) the silicotungstate was the most effective. The sol. (I) bitartrate had approx. the same efficiency.

A. G. P.

H_3PO_4 .—See VII. Tobacco.—See XX.

PATENTS.

Manufacture of mixed fertilisers containing lime. I. G. FARBENIND. A.-G. (B.P. 430,380, 30.4.34. Ger., 10.5.33).—A solution obtained by decomp. of crude phosphate with acids is introduced, together with gaseous NH_3 , into a quantity of solution already neutralised with NH_3 , further NH_3 being subsequently added till the product has p_{H} 6—7. The temp. during the reaction is maintained at 100— 130° , so that H_2O is evaporated during the neutralisation. A K salt may be added at any stage.

W. J. W.

Insecticide.—See IX. **Fungicide.**—See XXIII.

XVII.—SUGARS; STARCHES; GUMS.

Sugar formation and decomposition in the sulphite-pulp cooking process. E. HÄGGLUND and H. NIHLEN (Svensk Kem. Tidskr., 1935, 47, 141—150).—The sugar yield when the same degraded cellulose is obtained depends not only on the acidity and CaO content of the cooking acid, but also on the mode of temp. rise. Differences in sugar yields could be calc. and confirmed experimentally.

M. S.

Methods for analysing, and analysis of, molasses. F. D. AGUIRRECHE and A. CASTILLO (Anal. Fis. Quím., 1934, 32, 233—245).—An improved method for the rapid determination of the dry matter content, employing low pressures, is described. The error introduced into the Clerget-Herzfeld inversion test, due to absorption of optically active material by the animal charcoal, is overcome by using standardised charcoal. Typical analyses of North of Spain beet molasses and its sulphate ash are given.

F. R. G.

Rapid determination of amino-nitrogen by formaldehyde titration. H. RIEHM (Z. Wirts. Zuckerrind., 1935, 85, 381—393).— NH_4^+ is removed by permutit, and $\text{CO}_3^{''}$ and $\text{PO}_4^{'''}$ are pptd. by BaCl_2 and $\text{Ba}(\text{OH})_2$. NH_2 -acids are determined by adding CH_2O to the neutral solution and titrating with NaOH to p_{H} 9. The procedure is suitable for the examination of products of the sugar industry. E. S. H.

Spanish carob bean. J. V. SÁNCHEZ (Anal. Fís. Quím., 1934, 32, 165—172).—The aq. extract of the pulped pods of the carob tree (*Ceratonia siliqua*) treated with Pb subacetate and pptd. with SrO yields almost the entire sugar content. Extraction with MeOH or EtOH gives a lower yield. Analyses of (I) and of the residues after extraction are given. The sugar content of pods grown in various Mediterranean countries varies considerably. F. R. G.

Materials and methods for solubilising and desizing starches. C. P. WALKER (Amer. Dye-stuff Rep., 1935, 24, 374—376).—Dextrins, formed in the manufacture of "thin-boiling" starch by acid hydrolysis, are unsuitable for sizing textile fibres since they lack elasticity. Starch treated with Cl_2 gas yields a product which is readily sol., gives films of high tensile strength and elasticity, and is satisfactory for sizing. Cl_2 gas can be replaced by Aktivin, but not by NaOCl . The adherence of a starch paste to metals varies with its content of merely swollen (as distinct from completely burst) granules; sticking during sizing is prevented by the presence of added fats. A satisfactory continuous desizing process for cotton consists in leading the fabric padded with aq. NaOH through Cl_2 gas, followed by lye treatment and washing; its disadvantages are that the NaOH fixes the albumin impurities, which then form chloroamines and these cause after-yellowing. Desizing can be satisfactorily effected with aq. Aktivin. A. J. H.

Trials of CaCN_2 [on sugar beet].—See XVI.

PATENTS.

Preventing foaming.—See I. Reclaiming bone black.—See II.

XVIII.—FERMENTATION INDUSTRIES.

Detection of pectin in hops. H. FINK and J. HARTMANN (Woch. Brau., 1935, 52, 221).—Acid hydrolysis of hop meal under pressure yielded a solution which, after neutralisation with BaCO_3 and decolorisation, contained the Ba salt of galacturonic acid. Further, Ca pectate was obtained from a citric acid extract of hops from which resins, waxes, and tannins had been previously removed. The pectin content of dry hops (free from resins etc.) was approx. 2%. I. A. P.

Present position of the [barley- and malt-] protein question. P. KOLBACH (Woch. Brau., 1935, 52, 209—214).—Methods of determining different types of proteins and protein derivatives, and for following the degree of protein hydrolysis brought about by malt enzymes, are indicated. Protein modification and total modification during malting are compared. Protein

changes during malting, mashing under various conditions, and later in the brewing process are discussed.

I. A. P.

Modified Windisch-Kolbach method for determination of the diastatic power of green malt. B. LAMPE and R. DEPLANQUE (Z. Spiritusind., 1935, 58, 195—196; cf. B., 1935, 695).—50 g. of crushed green malt are extracted with 500 c.c. of 1.5% NaCl solution at 40° for 1 hr.; the mash is clarified by filtration after making up to 555.5 g., and the filtrate (10% extract) diluted to a 2, 4, or 8% extract, dependent on the diastatic power of the malt. 5 c.c. of the extract are allowed to act on 100 c.c. of 2% starch solution (p_{H} 4.3 ± 0.1) under prescribed conditions, and the maltose formed is determined iodometrically. After correction of this latter val. for I absorption due to extract and starch, the diastatic power is calc. as g. of maltose per 100 g. of dry malt. I. A. P.

Mineral constituents of brewing waters and their influence in brewing operations. H. HERON (J. Inst. Brew., 1935, 41, 283—296).—The mineral constituents normally present in natural waters are described and their desirability or otherwise in brewing various types of beer is discussed. Methods of liquor treatment are indicated and the importance of the use of treated liquor at various stages of the brewing process is stressed. The types of interaction which take place during mashing between the liquor salts and those of the malt are described, with especial reference to their effect on p_{H} and the parts played by the products in the mash tun, copper, and fermenting vessel. I. A. P.

Calculation of sugar for improvement of musts and wines. C. VON DER HEIDE (Z. Unters. Lebensm., 1935, 69, 131—138).—A review. E. C. S.

Determination of extract in wine. C. VON DER HEIDE and W. ZEISSET (Z. Unters. Lebensm., 1935, 69, 138—145).—Determination of extract by both the direct and the indirect methods is recommended, since the difference between the results of the two methods and the appearance of the direct extract will enable adulteration with glycerol to be detected. The result of indirect extraction is checked by calculation by Tabarié's formula from the d of the wine and of the EtOH distillate. E. C. S.

Micro-methods for analysis of wines. C. SUMULEANU and G. GHIMICESCU (Ann. Sci. Univ. Jassy, 21, 303—392).—Free and total volatile acids are determined by steam-distillation without and with, respectively, added H_2SO_4 , using 5 c.c. of wine in each case. Lactic acid is isolated as the Ba salt from 1 c.c. of wine, converted into BaCO_3 , and decomposed with H_2SO_4 , the excess of this being titrated against $\text{Ba}(\text{OH})_2$. Malic acid is determined colorimetrically, colour being developed on decomposing the Ba salt (from 5 c.c. of wine) with H_2SO_4 - β - C_{10}H_7 - OH solution. Tartaric acid is pptd. as K H tartrate (I) and determined colorimetrically with AcOH and Na metavanadate (2 c.c. of wine). (I) may similarly be determined directly. Using liquids containing 5—50 mg. of N_2O_3 , the colour developed with salipyrine and glacial AcOH serves for determination of NO_2 . For determining K , 25 c.c. of wine are evaporated

to dryness in presence of H_2SO_4 , and the residue is ignited before and after treatment with H_2O_2 ; treatment with aq. Na_2CO_3 and AcOH follows, and K is pptd. as cobaltinitrite, washed with $Al_2(SO_4)_3$, treated with Na_3PO_4 , and the NO_2' determined colorimetrically as above. Glycerol is extracted from 1 c.c. of wine with EtOH after CaO treatment, and after removal of EtOH is determined colorimetrically from the colour developed on oxidation with saturated Br- H_2O and addition of pyrocatechol. Ca is pptd. as oxalate from 4 c.c. of wine, dissolved in H_2SO_4 , and $H_2C_2O_4$ found by titration against 0.01N-KMnO₄. For H_3BO_3 determination, 50 c.c. of wine are made slightly alkaline, evaporated to dryness, calcined, and extracted with pure MeOH. The extracts are distilled with conc. H_2SO_4 , and the distillate is titrated with 0.04N-Ba(OH)₂ (phenolphthalein) in presence of glycerol and absence of CO_2 . A distillation apparatus of potash glass should be used, Pyrex and Jena glass giving much higher results. Total H_2SO_3 is distilled in a current of H_2 from 5 c.c. of wine + H_3PO_4 and trapped in aq. KOH; 0.02N-I is added and the excess titrated against 0.01N- $Na_2S_2O_3$. Free H_2SO_3 is distilled in a current of H_2 and trapped in 0.02N-I + KI. Methods are further described for microdetermination of ash and ash alkalinity in 10 c.c. of wine. The above methods, and the necessary special apparatus, are described in detail. Analysis of numerous samples of natural Rumanian wines gave (per litre) 0.390—0.947 g. of K, 0.037—0.175 g. of Ca, and 17—94 mg. of H_3BO_3 . I. A. P.

Fruit "wines." W. V. CRUICK, G. L. MARSH, and S. MENDELS (Fruit Products J., 1935, 14, 295—298).—Recipes for the manufacture of wine from fruit other than grapes (oranges, berries, cherries, apples, pears, pomegranates, and dried prunes) are given. E. B. H.

Sour-apple [beverage]. I. CUCULESCU (Bul. Fac. Stiinte Cernauti, 7, 108—114; Chem. Zentr., 1935, i, 813).—The prep. and composition of this Rumanian beverage are described. *B. acidi lactici* and several yeasts are responsible for the fermentation process. A. G. P.

Intense development of the microbe of [wine] tourne in a very alcoholic medium. L. BAILLOT D'ESTIVAUX (Ann. Falsif., 1935, 28, 288—290).—A bacteriological study is made of some Gram-positive organisms found in wine of high EtOH content (16.8—18.1°). The morphology of the organisms is given with illustrations, cultural characteristics, and some data of the changes in acidity of the wines and in the sugar and acid content of the media used. It is noted that the filamentous organism which developed in a yeast extract-sugar medium produced no mannitol, a usual product of the tourne organisms when grown in wines of normal EtOH content. W. H. B.

PATENTS.

Production of a yellow oxidation ferment [enzyme] and a coloured component derived therefrom. SCHERING-KAHLBAUM A.-G. (B.P. 430,571, 15.12.33. Ger., 10, 15, and 23.12.32; cf. A., 1932, 1285).—A neutral extract of, e.g., yeast is prepared (cf. Warburg A., 1932, 1285), and a suitable solvent

(I) (MeOH, EtOH, COMe₂) is added to ppt. impurities. A yellow oxidation enzyme (II) remains in solution, and can in turn be pptd. by further addition of (I). (II) can be purified by re-dissolution and repptn. by (I) with saturation with CO_2 . Further, (II) may be treated with aq. (I) of such concn. and at such temp. that associated protein is split off and denatured, an enzymically inactive coloured component (III) remaining in solution. An alkaline solution of (III) after exposure to light, or after keeping or heating (for 2 hr. at 50—60°), is extracted with $CHCl_3$ after acidifying, the extract on concn. depositing a modification of (III) which may be recryst. from H_2O [yellow needles, m.p. 320° (decomp.)]. (III) may be extracted directly from plant or animal cells with aq. (I), especially in presence of acids or acid salts, or with aq. acid or acid salt solutions, increase of extraction temp. being advantageous. The products described may be used as antineuritic vitamin. I. A. P.

Preventing foaming.—See I.

XIX.—FOODS.

Flour and bread from meslin. P. NOTTIN and A. DARON (Ann. Falsif., 1935, 28, 281—284).—Physical and chemical properties of various grades of rye flour are given, and the need for a satisfactory definition of meslin (I) is noted. From grinding operations 28 grades of flour were separated, showing wide ash differences. The grade "farina flour" [as (I)] corresponded to 85% of rye, and from this mixtures containing 50% and 25% of rye were made up with wheat flour (II). Physical and chemical characters of these and of (II) alone were determined. Comparison of the extensimetric properties showed a regular gradation from (I) to (II). Analysis of the ash showed no appreciable difference, from an alimentary point of view, between wheat and rye. The composition of pastes made from the four flours is given, and the yield, H_2O content, and quality of loaves made from each are tabulated and described. Test-loaves were taken from each lot and examined 24, 48, 96 hr., and 11 days after baking, and the loss of H_2O was calc. This was a linear function of the time, in the four lots of bread. Bread made from (I) remained fresh for at least 48 hr., but was heavy and indigestible. That from the 25% rye remained moister than (II), but both were stale in 24 hr. The nutritive val. of bread containing rye is lower, since it contains less nitrogenous matter. Some advantage exists in the greater preservation of the bread, but < 50% of rye is required, and the mechanical properties of the flour produce bad panification. Hence, in bakeries, only $\frac{1}{3}$ of rye is used to make (I) bread or rye bread. W. H. B.

Microscopy of cereal seed-coats. H. HÄRDTL (Z. Unters. Lebensm., 1935, 69, 113—127).—A transparent, structureless tissue of wheat, rye, barley, and oats obtained by boiling the material with dil. NaOH assumes various, but characteristic, forms. Unripe can be distinguished from ripe grains by the degree of lignification. The four types are differentiated by the behaviour of the cell-wall in aq. alkali, $ZnCl_2$ -I, H_2SO_4 , and phloroglucinol-HCl. E. C. S.

Simplified molecular constant of Belgian milks.

LE TOURNEUR-HUGON and J. VALIN (Ann. Falsif., 1935, 28, 291; cf. B., 1935, 571, 604).—The necessity for standardising the Fehling's solution against the same sugar as that to be determined, and for observing certain precautions (details given) when the milk has been preserved by CH_2O , is pointed out. If the method of double polarisation (Denigès) be adopted, the error due to the vol. of ppt. must be eliminated. In the determination of fat, Gerber's method is to be preferred.

W. H. B.

Amylase test as sole means of detecting adequate holder-pasteurisation [of milk].

M. F. BENGEN and E. BOHM (Z. Unters. Lebensm., 1935, 69, 146—152; cf. B., 1934, 522).—A negative amylase reaction indicates only that milk has been heated to $\leq 55^\circ$, but in combination with the clouding and creaming tests it enables a distinction to be drawn between insufficiently heated milk and mixtures of pasteurised and raw milk. The p_H of perfectly fresh, normal milk [and of the $(\text{NH}_4)_2\text{SO}_4$ serum derived therefrom] is 6.6—6.7, and that of pathological milk 6.8—7.3. In the range p_H 4.87—8.8 the diastatic activity of serum is inhibited by H^+ . At $p_H < 5.9$ (13° of acidity) the amylase reaction is impracticable, consequently milk of $< 10^\circ$ of acidity must be adjusted to 6—7°. The reaction as described is applicable to buttermilk. 10% of goat's milk in cow's milk gives a cloudy serum; $> 30\%$ gives an almost unfilterable serum. E. C. S.

Action of potassium hydroxide on the colloidal system of skim milk in presence of calcium chloride, of formaldehyde, or of both. A. KERN (Milchwirts. Forsch., 1934, 16, 448—451; Chem. Zentr., 1935, i, 813).—The acidity of CH_2O -treated skim milk increased with time. Addition of 0.25N-KOH to such milk caused the separation (centrifuge) of a coagulation product in quantities which also increased with the period of CH_2O treatment. Skim milk treated with CaCl_2 , with or without CH_2O , yielded a pasty ppt. of protein matter on addition of sufficient KOH. No such ppt. was obtained when relatively large proportions of NaCl were substituted for KOH.

A. G. P.

Butter improves based on diacetyl. Are they natural products? M. LEMOIGNE and P. MONGUILLON (Ann. Falsif., 1935, 28, 278—280).—A new improver for butter ("milk-curd") contains 5—7 g. of Ac_2 per litre. Ac_2 was prepared by growing *B. globigii* on a special medium, oxidation by FeCl_3 of the $\text{CHAcMe}\cdot\text{OH}$ formed, distillation, separation of HCl by Ag_2SO_4 , and rectification. The Ac_2 present was determined by Lemoigne's method (cf. A., 1930, 1071). Toxicity tests of the Ac_2 were made on milk, soil, and sewage organisms. Growth was inhibited in all cases by 0.1 g. per litre, whilst these and other species were killed by liquid containing 1—1.5 g. per litre. It is concluded that the improvers containing 5—7 g. of Ac_2 per litre cannot be regarded as natural products.

W. H. B.

Biochemical aspects of cheese-ripening. J. G. DAVIS (Chem. & Ind., 1935, 631—635).—Cheese-ripening is associated, almost entirely, with protein degradation, but if accelerated artificially usually

produces poor body and texture, and loss of characteristic flavour. Flavour is dependent on p_H val., and acidity-, non-protein-N-, and $\text{NH}_2\text{-N-}p_H$ curves are given. A test for flavour is to note the time to produce a pink colour with quinhydrone, e.g., 4 and 1 min., respectively, for ripe Cheddar and Stilton (p_H 5.5 and 6.5—7.0, and $\text{NH}_2\text{-N}$ 12 and 18% of total, respectively). Cheeses may be standardised in terms of Lovibond colour, body (η , elasticity), chemical analysis (H_2O , fat, NaCl, Ca, protein- and total N), p_H , and flavour (volatile acids and esters). J. G.

Port-du-Salut cheese. M. FOUASSIER (Ann. Falsif., 1935, 28, 285—287).—A historical note. W. H. B.

Commercial ground almonds and their adulteration.

G. N. GRINLING (Analyst, 1935, 60, 461—463).—The I val., d , and butyro-refractometer reading of a no. of samples of almond and apricot-kernel oils are given. Only gross adulteration can be detected by determination of these vals. The val. of the Bieber and lime-water tests for detecting adulteration is discussed.

E. C. S.

Determination of total alkaloids in cocoa and of cocoa-matter in flour confectionery.

D. D. MOIR and E. HINKS (Analyst, 1935, 60, 439—447).—The cocoa or chocolate is digested repeatedly with 80 vol.-% EtOH and a little MgO and filtered. The filtrate is evaporated, H_2O added to replace EtOH lost, and the solution clarified with $\text{Zn}_2\text{Fe}(\text{CN})_6$. Theobromine and caffeine are extracted with CHCl_3 and N in the extract is determined by Kjeldahl's process. The application of the method to flour confectionery is described.

E. C. S.

Effect of hydrogen cyanide on fruit. Action of hydrogen cyanide and stimulating substances on apples.

F. BERAN (Z. Unters. Lebensm., 1935, 69, 170—174; cf. B., 1933, 1081).—HCN (12 g. per cu. m.) and $\text{CH}_2\text{Br}\cdot\text{CO}_2\text{Me}$ (I) (0.2 g. per cu. m.) separately had no harmful effect on apples in 2 hr., but together caused severe injury owing to the increased respiration induced by (I).

E. C. S.

Comparison of feeding values of grass ensiled by the A.I.V. process and a ration containing mangolds and hay.

J. B. E. PATTERSON (Empire J. Exp. Agric., 1935, 3, 144—152).—Replacement by silage of mangolds and part of the hay in the cow's ration did not affect the yield or fat content of milk. The colour and vitamin-A content of the butter were much improved.

A. G. P.

Carcass quality of the pig in relation to growth and diet.

E. H. CALLOW (Empire J. Exp. Agric., 1935, 3, 80—104).—A review of recent investigations.

A. G. P.

Tea.—See XVI.

PATENTS.

Preparation of a concentrated casein. W. W. TRIGGS. FROM KRAFT-PHENIX CHEESE CORP. (B.P. 430,617, 17.8.34).—The casein of milk may be pptd. by suitable heating with a small proportion of locust-bean gum. The conc. casein readily redisperses in H_2O .

E. B. H.

Manufacture of [dried, water-dispersible] pectin. W. W. COWGILL, Assr. to SARDIK, INC. (U.S.P. 1,973,613—4, 11.9.34. Appl., [A] 11.7.33, [B] 28.4.34).—The product is prepared by mixing the pectin solution with glycerin or a suitable oil or wax, and drum-drying as a film. The oil or glycerin is subsequently removed by washing in EtOH or other solvent; the p_H of the dried pectin may be adjusted as required by addition of alkali or acid to the solvent bath. E. B. H.

Conditioning [of fruit] by rinse water. J. F. LITTOOY, Assr. to HERCULES GLUE CO. (U.S.P. 1,975,962, 9.10.34. Appl., 15.5.29).—Acid-treated fruit is dipped in a colloidal solution of casein, optionally containing also rosin and Na_2CO_3 or $Ca(OH)_2$, and then dried rapidly to form a uniform film. B. M. V.

Preservation of foodstuffs, tobacco, and other perishable commodities. G. DUTTWEILER and P. LANZ (B.P. 430,053, 5.5.34).—A continuous process and apparatus for filling tins containing foodstuffs, tobacco, etc. with CO_2 , by displacement of air, at atm. pressure is described. Air may be removed from ground coffee, milk powder, etc. by mixing them with a neutral gas (e.g., N_2) which is subsequently displaced by CO_2 . E. B. H.

Preservation of green foodstuffs [fodder]. CHEM. FABR. KALK G.M.B.H., and H. OEHME (B.P. 430,417, 12.12.33. Ger., 12.12.32).—Conc. H_2SO_4 , H_3PO_4 , and/or their acid salts are mixed with and adsorbed by brown coal, lignite, peat, etc. to form a "strewable" powder for use in the preservation of green fodder, particularly in silos. E. B. H.

Towers, columns, silos, and the like for storage and/or treatment of cereal grain. T. ROBINSON & SON, LTD., and C. S. ROBINSON (B.P. 430,522, 19.2.34).

Pasteurising apparatus [for bottled goods]. J. R. H. STAVNSBJERG (B.P. 430,428, 19.12.33).

Cooling chocolate mills.—See I.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Diacolation. II. Apparatus and operative technique. III. Formulæ for preparation of infusions. E. BREDDIN (Boll. Chim. Farm., 1935, 74, 425—432, 432—437).—II. Various types of diacolorator for the prep. of pharmaceutical infusions are described.

III. Instructions for the prep. of numerous pharmaceutical tinctures and extracts are given. D. R. D.

Albumin tannate. F. REMERS (Dansk Tidsskr. Farm., 1935, 9, 153—174).—Danish preps. of albumin tannate (I) were variable in quality; they were all less sol. in pepsin-HCl (II) and in aq. Na_2CO_3 and had lower tannin contents than Tannalbin. If the aq. mixture of tannic acid and albumin (egg, serum or coagulated) is boiled for 2 hr. then hardening of the dry (I) is unnecessary. The pepsin and direct Na_2CO_3 tests are not conclusive, but the Dutch Na_2CO_3 test is valuable. The fixing of suitable solubility limits is desirable. E. H. S.

Composition of solids formed by heating tobacco. A. WENUSCH (Z. Unters. Lebensm., 1935, 69, 158—160).—Deposits on the walls of commercial tobacco-roasting

apparatus are examined. Those from cigarette tobacco heated at 128° contained 9.8% of higher hydrocarbons (I), 14.5% of resins (II), 44.66% of a substance (III) insol. in all indifferent solvents (probably a breakdown product of chlorophyll), and 3.04% of a brown substance (IV) sol. in Ac_2O and $C_{10}H_8$. Deposits from dark Virginia tobacco heated in vac. at 72° contained 10% of (I), 50% of (II), 10% of (III), and 15% of a substance similar to (IV) but sol. also in C_6H_6 . E. C. S.

Slow-burning properties of tobacco. C. COOLHAAS (Proefstat. Vorst. Tabak, 1934, Meded. 79, 105 pp.; Chem. Zentr., 1935, i, 324; cf. B., 1935, 429).—Slow-burning properties are directly dependent on the citric acid and alcoholic resin acid content and indirectly \propto the wax content. NH_3 -compounds influence these properties unfavourably. The optimum manuring for good slow burning is that with $(NH_4)_2SO_4$. The effect of other factors is reviewed and discussed. H. J. E.

Determination of very small amounts of nicotine nephelometrically. R. HOFMANN (Mikrochem., 1935, 18, 24—30).—The method depends on the production of an opalescent solution when silicomolybdic acid is added to a 0.001—0.005% solution of nicotine in 0.5% HCl. In the analysis of tobacco the sample is distilled with steam and an aliquot portion of the distillate used for the test. A. R. P.

Determination of citronellal in Java citronella oil. P. A. ROWAAN and D. R. KOOLHAAS (Chem. Weekblad, 1935, 32, 405—406).—The following standard method has been worked out by the Colonial Institute, Amsterdam, in conjunction with the Government Laboratory at Buitenzorg and several European users. 2 g. of oil in 10 c.c. of EtOH are neutralised with 0.1N-KOH (indicator bromophenol-blue). 20 c.c. of 0.5N-KOH and 20 c.c. of 5% NH_2OH , HCl-EtOH are then added and the excess of alkali is titrated with 0.5N-HCl-EtOH after shaking for 1 hr. S. C.

Determining alkaloids in cocoa.—See XIX.

PATENTS.

Production of chloral and bromal derivatives. J. GAATHAUG (B.P. 430,608, 12.6.34).—Trihalogenoacetaldehydes, e.g., chloral, bromal, are converted into HNO_3 additive compounds by adding, e.g., chloral hydrate, in equimol. proportions, to dil. aq. HNO_3 , $\geq 65\%$ (20—30%) at $\geq 30^\circ$ (10—25°). The products are remedies for rheumatic diseases. A. W. B.

[Preparation of] 3:5-diacetoxymercuri-4-nitroguaiacol. [Bactericide.] E. A. PETERSON (U.S.P. 1,974,506, 25.9.34. Appl., 14.7.30).—To a hot solution of 4-nitroguaiacol (110 pts.) in 40% NaOH (100 pts.) and H_2O (4000 pts.) are slowly added $Hg(OAc)_2$ (220 pts.) in boiling H_2O (1500 pts.) and glacial AcOH (10 pts.). Boiling is continued until pptn. of the $(HgOAc)_2$ derivative, m.p. $> 270^\circ$, is complete; this is purified by dissolution in aq. NaOH and reprecip. with AcOH. H. A. P.

Synthetic production of ephedrine homologue[s] and its [their] salts. C. NAGAI (U.S.P. 1,973,647, 11.9.34. Appl., 6.3.30. Jap., 6.8.29).—PhCHO is condensed with $MeNO_2$ or $CH_2Bu^{\delta}NO_2$, and the products are reduced (in presence of CH_2O , which gives the

N-Me derivative if desired). β -Amino-, m.p. 40°, and β -methylamino- α -phenylethanol, m.p. 77°, and β -amino- α -phenyl- δ -methylpentan- α -ol, b.p. 170—172°/8 mm. (?) (hydrochloride), are described. H. A. P.

Extraction of cardio-active principles of squill. C.S. DYAS, Assr. to GRISARD LABS., INC. (U.S.P. 1,972,876, 11.9.34. Appl., 22.9.30).—Cardio-active principles I, II, and III are obtained by extracting dry squill with a H₂O-sol. solvent, e.g., MeOH, EtOH, removing scillin, oils, and fats from the isolated extract by washing with a H₂O-insol. solvent, e.g., light petroleum, pptg. I, II, and III from aq. solution as tannates, simultaneously salting-out, and liberating them by treatment with an inorg. oxide or hydroxide, e.g., ZnO. I and II are then extracted from aq. solution with EtOAc, leaving III, which is afterwards reprecipitated as tannate and recovered as above in a pure state. II is separated from I by washing a CHCl₃ solution of both with Na₂CO₃. Analyses of the pure products are given; I has m.p. 220° and all hydrolyse to give aglucones. A. W. B.

Manufacture of colloidal suspensions [of herapathite]. E. H. LAND (B.P. 429,925, 2.12.33. U.S., 3.12.32).—See U.S.P. 1,951,664; B., 1935, 174.

Radioactive threads.—See VI. **Yellow oxidation enzyme.**—See XVIII. **Preserving tobacco etc.**—See XIX.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Photographic gelatin problem. A. STEIGMANN (Phot. Korr., 1934, 70, 184—185; Chem. Zentr., 1935, i, 842).—A review and discussion. H. J. E.

Fogging of silver bromide [photographic] plates by dyes. LÜPPO-CRAMER (Z. wiss. Phot., 1935, 34, 150—155).—The fogging action of Pinaflavol and related compounds, and of certain other dyes has been determined. The fogging action of certain dyes on emulsions developed with FeC₂O₄ has also been studied; the various extant hypotheses of this effect are discussed. J. L.

Ripening [of photographic emulsions]. R. E. LIESEGANG (Phot. Korr., 1934, 70, 177—179; Chem. Zentr., 1935, i, 842).—A discussion of ripening in terms of diffusion. An analogy is suggested between ripening and periodic (Liesegang) pptn. H. J. E.

Relation between exposure and blackening on exposure [of photographic emulsion] to X-rays. J. E. DE LANGHE (Z. wiss. Phot., 1935, 34, 174—180).—Mathematical. The formula calc. by Hofer (A., 1935, 177) is applicable only to an extreme case. A new formula has been evolved from first principles, wherefrom the blackening is $\propto \sum \varphi_i \alpha_i^2 n$, a function of the grain characteristics. It is also related to the wavelength by $f(v)y/hv$, where y is the no. of quanta per nucleus formed. J. L.

Colour measurement.—See XI. **Examining inks etc.**—See XIII.

PATENTS.

Sensitisation of photographic silver halide emulsions. I. G. FARBENIND. A.-G. (B.P. 430,357, 18.12.33.

Ger., 17.12.32).—*s*- or *as*-Oxacarbocyanines, substituted in one or both benzene nuclei, but unsubstituted in the trimethine chain, sensitise more strongly than do the unsubstituted dyes, and displace the sensitising max. towards the region of long wave-length. By known methods are prepared: 5:5'-bisdimethylamino-2:2'-dimethyloxacarbocyanine iodide, 5:5'-dihydroxy-2:2'-dimethyloxacarbocyanine perchlorate, and 4:4'-dichloro-2:2'-dimethyloxacarbocyanine iodide, the sensitising maxima of which lie at λ 590, 550, and 515 m μ , respectively. F. M. H.

Production of coloured photographic materials. B. GASPAR (B.P. 430,991, 28.12.33. Ger., 29.12.32).—Hydrazo compounds, easily capable of oxidation to form azo dyes, are incorporated in an emulsion wherein they can be converted locally, according to the Ag image or the non-image portions, into coloured portions. They may be impregnated into finished Ag image layers and treated subsequently by, e.g., FeCl₃, HNO₃, the dye and image being then removed at the required places; other methods of use are detailed. The oxidation may also be accomplished by conversion of the Ag image into an oxidising substance, e.g., PbCrO₄. Suitable substances are, e.g., phenylhydrazo- α -naphthol, a hydrazo-diphenyl, insol. salts of hydrazoarylsulphonic acids. J. L.

Photographic baths. I. G. FARBENIND. A.-G. (B.P. 430,916, 27.12.33. Ger., 24.12.32 and 28.9.33).—Developing, fixing, or toning baths, etc. are prepared by incorporation with the usual ingredients, or in place of alkali carbonate or hydroxide, of one or more amines containing hydroxyalkyl radicles and, optionally, further aliphatic or cycloaliphatic radicals, e.g., N(C₂H₄·OH)₃, ethanolcyclohexylamine; the derivatives in the form of salts of weak acids (carbonate, sulphite), which are very stable, may also be used. Greater stability and precision of the solutions are obtained. J. L.

Colour photography. I. G. FARBENIND. A.-G. (B.P. 431,072, 1.1.34. Ger., 30.12.32. Addn. to B.P. 345,575; B., 1931, 906).—The leuco-dye esters or ester salts of the prior patent are sensitive substantially only to ultra-violet light, and also strongly absorb that light. Two layers of such substances are coated on the same side, or, preferably, on opposite sides of a support; they can then be printed simultaneously, from opposite sides, through the respective component negatives, by ultra-violet light, the light from one image not penetrating to the other. After fixing these images, further layers may be coated on one or both sides and receive further component images. When very thin layers are used, an intermediate layer of *æsculin* is preferably incorporated to absorb light. J. L.

Production of natural-coloured images on paper, films, and the like. R. GSCHÖPF (B.P. 430,823, 20.12.33. Austr., 22.7.33).—Gelatin emulsions, for the imbibition process, are made alkaline by addition of aq. NH₃; complex acids, e.g., phospho-, silico-, or antimonio-tungstic, which can form insol. and light-fast lakes, are easily dissolved in the alkaline gelatin. The mixture is then made just neutral by addition of AcOH. Coagulation of the gelatin is thus avoided. J. L.

XXII.—EXPLOSIVES; MATCHES.

Cellulose nitrate.—See V.

PATENTS.

Blasting cartridge. J. TAYLOR, W. YOUNG, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 430,258, 15.12.33).—An explosive suitable for confining in a cartridge case until the pressure has reached a certain val. comprises (1) a substance incapable of sustaining its own decomp., but nevertheless exothermically yielding a gas when heated, *e.g.*, NH_4NO_3 with optional additions of $(\text{NH}_4)_2\text{C}_2\text{O}_4$ and NH_4HCO_3 ; and (2) a non-detonating heating composition the heat from which is alone insufficient to burst the case, *e.g.*, a black powder.

B. M. V.

Nitration.—See III. **Removing org. compounds from aq. solution.**—See XXIII.

XXIII.—SANITATION; WATER PURIFICATION.

Industrial protection against carbon monoxide. G. STAMPE (Dräger-H., 1934, 2614—2616; Chem. Zentr., 1935, i, 761).—With < 2% of CO, catalytic oxidation to CO_2 by a Hopcalite catalyst (I) is possible. (I) is rendered inactive by many gases (*e.g.*, Cl_2 , H_2S , SO_2 , HCl, org. halides, and H_2O vapour).

H. J. E.

Improvement of taste and biological investigation of surface water. W. PRANG (Gas- u. Wasserfach, 1935, 78, 421—429).—Difficulties due to an objectionable taste in the H_2O supplies of Königsberg are discussed. Treatment with KMnO_4 failed to effect a complete improvement. Filtration through active C gave satisfactory results on a laboratory scale, but failed on the large scale owing to choking of the filter; the choking was obviated by using $\text{Fe}_2(\text{SO}_4)_3$ instead of $\text{Al}_2(\text{SO}_4)_3$ in the purification process, but the difficulty with regard to taste was not completely removed. One source of supply was successfully treated by filtration through a slow sand filter into which a layer of granular active C had been introduced. Improvement in another source of supply was effected by pptn. with FeCl_3 with simultaneous addition of KMnO_4 . Fluctuations in the amounts of the various organisms present in the crude water supplies have been studied over a 3-year period. A fishy taste was associated with the presence of *Synura uvela*. Growth of this organism and of certain others could be inhibited by treatment of the source of supply with Cu.

A. B. M.

Action of water on materials for service pipes. F. W. GILCREAS (J. New England Water Works Assoc., 1935, 49, 170—175).—The controlling factors in the possible action of H_2O on pipe metals are the $[\text{O}_2]$, CO_2 content, hardness, alkalinity, and dissolved salts. Treatment is usually with $\text{Ca}(\text{OH})_2$, which increases the hardness but gives a protective coating when bicarbonate hardness is 35 p.p.m.; or with Na_2CO_3 , which does neither. Aeration reduces the CO_2 content, but by increasing $[\text{O}_2]$ may cause serious corrosion. The effect of various types of H_2O on Pb, Zn, Fe, Cu, and brass is described.

C. J.

Lime-soap formation [in water] and its prevention by protective colloids. K. LORENZ (Mschr. Text.-Ind., 1934, 49, 208; Chem. Zentr., 1935, i, 330).—The effect of various commercial protective agents on the pptn. of Ca and Mg soaps is discussed.

H. J. E.

Corrosion of H_2O -mains.—See X. **Brewing waters.**—See XVIII.

PATENTS.

Manufacture of skin-cleansing creams containing magnesium hydroxide. C. H. PHILLIPS CHEM. CO., ASSEES. OF B. WALTON (B.P. 427,597, 12.7.34. U.S., 29.7.33).—Wax (2.77), white mineral oil (37.61), and petroleum jelly (41.04%) are heated together at 76° and a suspension of $\text{Mg}(\text{OH})_2$ (2.97) in a solution of borax (0.28) in H_2O (15.08%) is vigorously agitated with the other ingredients to form a creamy emulsion which is solid at room temp.; about 0.25% of perfume may be added during cooling.

A. R. P.

Disinfectant [and fungicide]. W. H. TISDALE and I. WILLIAMS, ASSTS. TO E. I. DU PONT DE NEMOURS & CO. (U.S.P. 1,972,961, 11.9.34. Appl., 26.5.31).—Dithiocarbamic acid derivatives of the type $\text{NXY}\cdot\text{CS}\cdot\text{SZ}$, where X is H or alkyl, Y is H, alkyl, or aryl, and Z is a metal, NH_4 , org. base, *e.g.*, an alkaloid, alkyl or aryl, or $\text{S}_n\cdot\text{CS}\cdot\text{NYX}$ ($n=0-3$) are claimed as non-toxic fungicides and bactericides, used as solutions, dispersions, or powders. Examples include: $(\text{NMe}_2\cdot\text{CS}\cdot\text{S})_3\text{Fe}$, tetramethylthiuram disulphide, $\text{NMe}_2\cdot\text{CS}\cdot\text{S}\cdot\text{CH}_2\cdot\text{CH}\cdot\text{CH}_2$; known wetting-out and emulsifying agents may be incorporated in the products.

A. W. B.

Removal of floating scum and such like from the surface of sludge-setting tanks used in the treatment of sewage. J. MILLS & CO. (ENGINEERS), LTD., M. W. MILLS, and J. F. BOLTON (B.P. 429,700, 11.1.34).—From the front of a scum plate (S) of known type the floating material is removed to an annular channel at the centre of the tank (and thence eventually to mingle with the sludge) by means of rakes attached to a chain conveyor running radially and in a vertical plane and attached to the rotating arm carrying S.

B. M. V.

Removal of organic compounds from water solution. Purification of phenolic liquors and recovery of values therefrom. O. M. URBAIN, ASSR. TO C. H. LEWIS (U.S.P. 1,973,999 and 1,974,000, 18.9.34. Appl., [A] 15.3.32, [B] 6.6.32).—(A) Carbohydrates, carboxylic acids, mono- or poly-hydroxy-cyclic compounds, or org. amines, in true solution in H_2O (in industrial waste liquors) are pptd. by addition of $\text{Pb}(\text{OAc})_2\cdot 2\text{PbO}\cdot\text{H}_2\text{O}$ (I) in equiv. proportions, usually 0.5-mol. Peptisation by $\text{Pb}(\text{OAc})_2$, which is formed, is eliminated by addition of Na_2SO_4 . (B) The liquors are freed from phenols by treatment with (I). $\text{PbO}\cdot\text{ArOH}$ is pptd., from which ArOH is isolated by treatment with H_2SO_4 . The effluent is freed from $\text{Pb}(\text{OAc})_2$ by pptn. with Na_2SO_4 , so that the liquors are purified and the phenols and PbSO_4 recovered. Apparatus is claimed.

A. W. B.

Oligodynamic treatment of liquids.—See XI.