

B.—APPLIED CHEMISTRY

JULY 3 and 10, 1936.*

I.—GENERAL; PLANT; MACHINERY.

Measurements of temperature with a new colour pyrometer. K. GUTHMANN (Stahl u. Eisen, 1936, 56, 481—489).—Temp. measurements with a new optical pyrometer—the Biopix—have been compared with those taken with thermocouples and disappearing-filament pyrometers. The results of measurements on blast, Bessemer, open-hearth, and high-frequency induction furnaces are compared, and it is shown that the corrections necessary are smaller for the colour pyrometer than for other optical pyrometers. W. P. R.

Chemistry of bleaching earths. A. VOIGT (Fettchem. Umschau, 1936, 43, 49—52).—The recognition of bleaching earths and their activation and regeneration are discussed. E. L.

Filtration through compressible homogeneous sludges. D. T. SHAW (J. Chem. Eng. China, 1936, 3, 47—52).—A compressible filter-cake was simulated with soft Pb shot, and by increasing pressure the mean capillary diam. was reduced from 0.071 in. to 0.036 in. Rates of flow of H₂O for varying pressure were determined and results plotted as curves. A crit. point was observed beyond which further compression reduced flow rapidly. Poiseuille's equation was not followed in this case, the free spaces being too large for true capillary flow. Probably for any compressible sludge there is a limiting pressure which may be applied in filtration with advantage, but should not be exceeded. C. I.

Vacuum pumps and pump oils. I. Fractionation pumps. II. Comparison of oils. K. C. D. HICKMAN (J. Franklin Inst., 1936, 221, 215—235, 383—402).—I. The vac. obtainable with an oil-diffusion pump is affected by the impurities originally present in the oil and those formed in use. The most volatile of these collect in different parts of the pump and reduce the vac. obtainable. Fractionation pumps in which these difficulties are overcome and the precautions necessary to obtain true pressures on an ionisation gauge are described.

II. The suitability of phthalic esters and Apiezon oils for use in vac. pumps is discussed. The highest vacs. recorded were obtained with Apiezon-A and amyl and hexyl phthalates. Modifications of design for pumps using these phthalates are given. D. K. M.

Economics of water softening. C. M. STANLEY (J. Amer. Water Works Assoc., 1936, 28, 469—478).—In addition to other losses caused by hard H₂O the cost of extra soap is practically sufficient to pay the capital and maintenance costs of a municipal H₂O-softening plant. C. J.

Suspended solids in the foaming and priming of boiler water. C. W. FOULK (J. Amer. Water Works Assoc., 1936, 28, 528—536).—At low pressures suspended solids may cause priming; at higher temp. and pressures they lose this property. This may be due to the wettability of the solid, which increases with rise in temp. until the particles sink and can no longer stabilise the foam bubbles. The time required is usually small, but CaCO₃ pptd. by adding CaCl₂ to boiler H₂O containing excess of Na₂CO₃ retains the property for 4—5 hr., after which it reduces the priming. In the experimental boilers used, a similar reduction of priming was noted with certain other forms of suspended matter, e.g., ground flint. C. J.

Recording *d* of solutions.—See XVII.

PATENTS.

Mechanical roasting furnace. A/S. DANSK SVOVLSYRE- & SUPERPHOSPHAT-FABRIK, and K. J. LARSEN (B.P. 445,234, 16.8.35).—In a Herreshoff roaster the ore is conveyed from the top drying hearth to the first roasting hearth by means of a volumetric feeder (*F*) situated in the transfer port, the speed of *F* being adjusted by changing its driving pinions. B. M. V.

Open-hearth furnace. O. P. LUETSCHER (U.S.P. 2,011,554, 13.8.35. Appl., 15.7.33).—A burner (and gas port) suitable for liquid or gaseous fuel of high calorific val. is described. B. M. V.

Muffle furnaces. BONNYBRIDGE SILICA & FIRECLAY Co., LTD., and W. MCBRYDE (B.P. 445,972, 5.2.35).—Muffle plates (corrugated) are inserted in grooves in vertical pillars, being swung to, in the manner of a door, the groove on one side being merely a rebate which is afterwards caulked with mortar. B. M. V.

Mercury boilers. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 446,085, 19.12.35. U.S., 29.12.34).—Rapid circulation is effected by the injection of pumped Hg vapour into the lower ends of the heating tubes. B. M. V.

[Spot]-coating of flakes [for water softening]. R. E. ZINN, Assr. to VICTOR CHEM. WORKS (U.S.P. 2,008,651, 16.7.35. Appl., 1.3.34).—Flakes of meta- and pyro-phosphates (*A*) are coated with orthophosphate or carbonate (*B*) by dissolving anhyd. *B* in H₂O equiv. in amount to the H₂O of crystallisation and spraying the solution on to the flakes of *A*, which are agitated in a drum or the like. (Cf. U.S.P. 1,979,926; B., 1935, 788.) B. M. V.

Heat exchanger. F. E. KEY, Assr. to KEY Co. (U.S.P. 2,011,640, 20.8.35. Appl., 15.4.35).—An exchanger comprising a no. of larger heating tubes each

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

containing a small nest of smaller tubes, all tubes being bowed to the same curvature, is described. B. M. V.

Heat-exchanging elements. A. A. SHORT and C. E. DUNLEAVIE (B.P. 445,045, 10.10.34).—Tumbling bodies for use in rotary kilns or the like are formed of short pieces of tube pressed into various shapes. B. M. V.

Heat insulation. C. G. MUNTERS (U.S.P. 2,012,617, 27.8.35. Appl., 26.2.32. Swed., 3.3.31).—A glass or slag foam is formed by melting a mixture of the silicate with a powdered volatile metal, e.g., Zn, the melt being subjected to vac. and at least partly cooled while the pores are distended by the metal vapour. B. M. V.

Thermal insulation. N. V. INTERNAT. ALFOLMAATS. (B.P. 445,332, 30.1.35. Ger., 2.2.34. Addn. to B.P. 442,396; B., 1936, 352).—One or both boundary surfaces are movable in addition to at least one of the separating surfaces. B. M. V.

Apparatus for treating molten material. O. BLUME, and F. KRUPP A.-G. (B.P. 445,311, 20.11.34).—Other molten material is forced under by means of a rotary drum divided into sectors and rotated by a step-by-step motion. B. M. V.

Rotary or oscillating drying apparatus. H. G. C. FAIRWEATHER. From AKTIEB. SVENSKA MASKINVERKEN (B.P. 445,828, 5.12.35).—An oscillating drum heated by a jacket and by longitudinal tubes (which also effect cascading) and with means for applying vac. is described. B. M. V.

Dryer cylinder. P. M. F. BUETTNER (U.S.P. 2,008,434, 16.7.35. Appl., 5.7.32).—The cylinder is provided with a hollow core to restrict the steam space. The core is in connexion with the atm. and methods of centring and securing it are described. B. M. V.

Drying apparatus for powdered or granular substances. G. J. SALLES (B.P. 445,065, 5.4.35. Fr., 6.4.34).—The material is carried by preheated air through a tube provided with vane wheels rotated by the blast. B. M. V.

Drying or conditioning of (A) cigarettes, (B) articles. W. E. MOLINS (B.P. 446,077 and 446,221, 24.10.34).—(A) Cigarettes are heated at part of the cylindrical surface but never at the ends, the portion in contact with the heater being changed at intervals. (B) A rotary apparatus is described. B. M. V.

Catalytic apparatus. F. A. CANON, Assr. to AMER. CYANAMID Co., and HEYDEN CHEM. CORP. (U.S.P. 2,010,217, 6.8.35. Appl., 6.5.29).—A vertical tubular catalyser cooled by a non-boiling liquid bath has the latter agitated (and cooled) by injection of gas at the bottom in quantity which increases from the periphery inwards. B. M. V.

(A) Method of, (B) apparatus for, carrying out reactions for conversion of liquid materials into solid or semi-solid products. O. RÖHM (B.P. 445,478 and 445,927, 9.10.34. Ger., 9.10.33).—(A) Polymerisation of methacrylic acid esters (with accelerating, softening, or hardening agents) to form transparent sheets or rods free from bubbles (which are believed to be due to local

temp. variations) is effected in relatively narrow chambers heated over their whole surface by a medium of which the temp. is controlled. A separating layer of glue, viscose, or gelatin may be interposed. (B) Apparatus having some characteristics of a filter-press and of a plate heat exchanger is described. B. M. V.

Apparatus for carrying out exothermic catalytic gas reactions. COUTTS & Co., and F. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 444,898, 28.9.34).—In an apparatus in which the catalyst is contained in a bundle of tubes, the catalyst is divided into layers and those parts of the tubes where overheating is likely to occur are flushed outside with a special flow of cool fresh gas. B. M. V.

Carrying out gas reactions with the aid of contact substances. NON-POISONOUS GAS HOLDING Co., LTD. (B.P. 445,012, 16.9.35. Switz., 11.10.34).—For cleaning etc., the contact substance is renewed at one end and withdrawn at the other end of the contact chambers, and for this purpose is formed as rounded masses larger than the usual powdered or granular material but still small in comparison with the diam. of the chamber. B. M. V.

Thermostatic temperature-controlling means. MOFFATS, LTD., and E. S. SMITH (B.P. 445,205, 8.10.34).—The device comprises a bellows filled with liquid, a dial for setting the temp., a pointer indicating the actual temp., and a Hg switch, the complete assembly being arranged to be interchangeable with a 3-heat switch on an existing oven. B. M. V.

Manufacture of thermostatic material. R. F. GIBBS, Assr. to IMPROVED SEAMLESS WIRE Co. (U.S.P. 1,996,721, 2.4.35. Appl., 21.4.34).—Claim is made for a thermostatic device for the temp. range 280—850°, consisting of superimposed strips of 22% Ni-steel, brass, and 35—42% Ni-steel, joined by Ag solder. L. C. M.

Device for cooling a heat generator by means of a circulating auxiliary liquid. K. NESSELMANN, Assr. to SIEMENS-SCHUCKERTWERKE A.-G. (U.S.P. 2,008,333, 16.7.35. Appl., 22.6.32. Ger., 30.6.31).—A periodic absorption refrigerating system operated by an electric clock and with electric heating is described. An auxiliary convection-circulated cooling agent is provided to carry off some of the heat of absorption. B. M. V.

Distance thermometer. MALONE INSTRUMENT Co., LTD., and J. F. J. MALONE (B.P. 445,626, 24.10.34).—In a thermometer of the fluid-expansion type, the indicating part may be at a different temp. from that of the bulb; to compensate for this the main scale markings are slightly on the skew with regard to the stem, and a vernier truly square with the stem is marked off in various room temp. B. M. V.

Fire-extinguishing composition. A. LANGLOIS (U.S.P. 2,010,729, 6.8.35. Appl., 2.2.34).—A dry powder for casting on the fire is composed of NaHCO₃ 32, K H tartrate 3, B₂O₃ 8, and borax 1 pt. by wt. B. M. V.

Hammer mill. E. L. BARTELS, Assr. to G. C. BLUMSTENGEL (U.S.P. 2,012,416, 27.8.35. Appl., 12.9.32).—An apparatus comprising a rotor and arcuate screens is described. B. M. V.

Crushing and grinding mills. H. J. M. VON GERNET (B.P. 445,510, 26.7.35. S. Afr., 6.3.35).—A rotary drum is of trefoil (ace of clubs) or quatrefoil cross-section, and each lobe except one contains a loose grinding roller of such size that $\frac{1}{2}$ roller can enter any lobe. B. M. V.

Crusher and pulveriser. A. L. RUNYAN, Assr. to E. HARDING (U.S.P. 2,012,694, 27.8.35. Appl., 8.7.33).—The material, and added hard projectiles if desired, is thrown centrifugally against an annular falling curtain of itself. Oil or H_2O is admitted to reduce wear on the thrower. B. M. V.

Pulverising jaw crusher. C. J. ZILLGITT (U.S.P. 2,012,799, 27.8.35. Appl., 11.12.33).—The action of a hand bucking board is imitated. B. M. V.

Pulveriser. P. C. FORRESTER, Assr. to FORRESTER-LARGILLIERE ENG. & MILLING Co. (U.S.P. 2,012,602, 27.8.35. Appl., 14.4.33).—A polygonal screen drum is provided with a no. of substantial, not quite rigidly supported rings, each pair of which loosely supports a bundle of grinding rods. Means are provided to transmit the vibration of the rings to the screen surfaces. B. M. V.

Pulverisation of mineral substances or aggregates. R. S. DEAN and J. GROSS (U.S.P. 2,010,981, 13.8.35. Appl., 14.2.31).—The mineral is impregnated with solutions or suspensions of, or with naturally fluid, mutually explosive substances (e.g., $AgNO_3$ and C_2H_2) and explosion effected in the pores by detonation. B. M. V.

(A—C) **Grinding mill, (c) with divided feed.** (D) **Pulverising mill.** E. G. BAILEY, P. R. CASSIDY, and R. M. HARDGROVE, Assrs. to FULLER LEHIGH Co. (U.S.P. [A, B] 2,012,265—6, [C] 2,012,783, and [D] 2,012,802, 27.8.35. Appl., [A] 9.11.33, [B] 25.7.29, [C] 4.4.30, [D] 16.11.31. Renewed [B] 25.7.34, [C] 24.2.34).—The mills are of the ball-and-race type with air separation which is self-contained in (A—C) and elaborate and external in (D). The claims relate mainly to methods of inserting the feed and oversize materials into the rings of balls. B. M. V.

Refining of pulps and fibrous or porous materials. W. P. WILLIAMS. From F. S. FARLEY and R. B. BROWN (B.P. 445,800, 27.12.34).—In a disc grinder, the variations of load on the main motor(s) start, stop, and reverse a small motor which adjusts the thrust bearing to maintain the discs closely spaced when working and separated when unloaded. Forms of grooves in the discs are described. B. M. V.

Minerals separating and concentrating machine. W. J. HANCOCK (U.S.P. 2,012,192, 20.8.35. Appl., 7.10.32).—In a two-compartment jig the beds are stationary, the H_2O -level is adjusted to the top of the ore bed, and the H_2O is reciprocated by plungers in side chambers, to which points clean H_2O is supplied. In the bottom of the jig compartments are agitating rakes for effecting amalgamation or like process. B. M. V.

Filters. J. BROWN (B.P. 446,027, 21.12.34).—A cylindrical filter is compressed endways by a spring-loaded piston and cap. Increase of fluid pressure due to clogging of the filter decreases the end-pressure owing

to the cap being connected to the outer wall by a flexible diaphragm. B. M. V.

Filtering apparatus. F. W. MANNING Co., LTD. (B.P. 446,107, 29.10.34. U.S., 7.11.33).—The filter element comprises a hollow roll of paper or other fabric which is automatically unwound when the pressure rises due to clogging. B. M. V.

Manufacture of filtering composition. W. C. KUPPINGER, Assr. to FILTROS, INC. (U.S.P. 2,008,327, 16.7.35. Appl., 19.5.31).—A porous mineral filter is composed chiefly of globular SiO_2 sand with a small proportion of powdered glass fritted together in a mould composed of SiO_2 sand only. B. M. V.

Centrifugal separators. SHARPLES SPECIALTY Co., Asses. of A. U. AYRES (B.P. 446,143, 4.7.35. U.S., 21.7.34).—A centrifuge having continuous outlet of both products is provided with annular baffles (B) perpendicular to the axis; B do not extend either to the centre or the circumference, but radial vanes are provided which extend over the full radius. B. M. V.

Centrifugal separator. G. D. ARNOLD (U.S.P. 2,010,128, 6.8.35. Appl., 17.9.31).—A cyclone collector of the type in which the exhaust air from the first and largest cyclone is caused to whirl in the axial outlet pipe and be further cleaned therein is described. B. M. V.

Manufacture of discs for centrifugal-separator bowls. T. H. MILLER, Assr. to DE LAVAL SEPARATOR Co. (U.S.P. 2,012,589, 27.8.35. Appl., 21.9.33).—Discs for nesting are manufactured by embossing the spacing cauls so as to project from the lower surfaces, the upper surfaces being afterwards turned down to a smooth surface level with the bottoms of the depressions formed during the embossing. B. M. V.

Separation of granular material of all kinds in the form of pulp or sludge. E. BIERBRAUER (B.P. 444,993, 16.5.35. Ger., 16.5.34 and 2.1.35).—In a circular casing a stratified layer of pulp is maintained by the centrifugal rotation of an eccentric paddle-wheel, and strata are withdrawn at different distances from the axis. The feed is applied only to a small proportion of the inner circumference of the pulp. B. M. V.

(A) **Process for, (B) press for, and (c) filter for use in a press for, (A—C) extraction of juices from exhausted sugar-beet cosettes, fresh cosettes, and other air-containing substances.** D. H. J. VAN MAANEN (B.P. [A] 445,293, [B] 445,302, [Addn. to A], and [C] 444,937, [A, C] 4.10.34, [B] 6.10.34. Belg., [A, C] 7.11.34, Ger., [B] 21.12.33).—(A) The material is pressed between convergent surfaces one of which is continually heated and the other cooled to maintain always a temp. gradient; one surface, preferably the cooled one, is permeable but the other is not. (B) Continuous screw-blade or rotating-cone presses are described. (C) A pair of notched metallic tapes are overlaid in reversed relation with the teeth in register and the pair is wound into a spiral. B. M. V.

[Rake] classifiers. DORR Co., Inc. (B.P. 445,115, 3.10.34. U.S., 19.10.33).—The lower part of the tank is closed by a ceiling (C) parallel to the sloping bottom, the feed being introduced just above the top end of C

and the fines overflowed through a vertical stack erected over an aperture through *C*; the cross-section of the stack can be varied by the insertion of cylindrical dummies, and it forms a quiescent zone to take up surges due to rake action and permitting entrained sand to drop out. B. M. V.

Hydro-extractors. WATSON, LAIDLAW, & Co., LTD., and R. W. LAMONT (B.P. 444,984, 8.3.35).—An inner basket detachable for unloading is described. B. M. V.

Apparatus for removing solids from liquids. F. W. KERNS and W. EGBERT (U.S.P. 2,012,567, 27.8.35. Appl., 14.11.32).— H_2O containing impurities of either greater or lesser *d* is caused to flow in a curved passage which is divided by closely-spaced horizontal plates to afford frictional retarding surfaces. The impurities are delivered by centrifugal or centripetal action to dead spaces which are left between the edges of the plates and the outer and inner curved walls, in which spaces the impurities eventually settle or float. B. M. V.

Centrifugal method and apparatus [for mixing of liquids]. V. W. MACISAAC (U.S.P. 2,010,405, 6.8.35. Appl., 29.1.31).—Two liquids are mixed by causing both to flow through zigzag passages in a centrifuge, any stratification in one passage being reversed in the next so that the liquids are continually caused to flow through each other. B. M. V.

Effecting contact between gas and liquid. W. P. CHANDLER, JUN., Assr. to BLAW-KNOX Co. (U.S.P. 2,012,442, 27.8.35. Appl., 12.8.33).—In a process of humidification the gas is passed in contact with (being usually bubbled once through) a pool of H_2O the depth of which is adjusted inversely as the gas pressure, and heat is supplied inversely as the difference of temp. between the humidified and entering gas. B. M. V.

Apparatus for contacting liquids with vapours or gases. R. B. CHILLAS, JUN., Assr. to ATLANTIC REFINING Co. (U.S.P. 2,010,010, 6.8.35. Appl., 20.5.33).—Devices for distributing and bringing the gases etc. in contact, for use in a fractionating tower, are described. B. M. V.

Intimately contacting fluids [immiscible liquids]. V. J. D. VAN DIJK (U.S.P. 2,011,186, 13.8.35. Appl., 16.2.34. Holl., 11.2.33).—In a tower the heavy liquid is admitted near the top and the lighter liquid near the bottom, and they are withdrawn exactly at the bottom and top, respectively. Intermediately they are trapped and locally stratified between, and then remixed on passing through, perforated trays which are reciprocated vertically. B. M. V.

Apparatus for measuring the density of flowing liquids. W. SCHOLZ, and J. C. ECKARDT A.-G. (B.P. 446,069, 21.9.35).—The position of a float (*F*) in an overflowing liquid is recorded at intervals after clamping *F*. Accuracy in the position of *F* is attained by const. rate of flow of the liquid and streamline form to all parts, a meniscus at the top of the liquid of such a nature that *F* is self-centring, and sharp-edged circular overflow preferably of soapstone or other liquid-repellent substance. B. M. V.

Shell and tube evaporator. W. H. CARRIER, Assr. to CARRIER ENG. CORP. (U.S.P. 2,012,183, 20.8.35. Appl.,

9.3.34).—Apparatus in which the liquid to be evaporated is sprayed on the upper part of a bank of horizontal heated tubes is described. B. M. V.

Evaporating and distilling apparatus. DEUTS. GOLD- U. SILBER-SCHNEIDANSTALT, FORM. ROESSLER (B.P. 445,209, 29.10.34. Fr., 28.10.33).—Easily decomposable liquids, e.g., H_2O_2 , are evaporated in the annular space, 2–40 mm. wide, between inner and outer heating means, the flow being upwards. Baffles are provided in a dome above the annulus to catch entrained liquid. B. M. V.

Fractional distillation. FOSTER WHEELER, LTD. (B.P. 446,137, 13.5.35. U.S., 15.1.35).—The heated liquid (oil) enters the fractionator at an intermediate level; the residue may be further heated and enter a second tower. A fraction of higher b.p. than that of the side-stream vapour is removed from the only or second tower and passed to the heater with the feed. B. M. V.

[Spray] drying of liquid and semi-liquid materials. J. C. and J. M. MACLACHLAN, Assrs. to A. P. HUNT (U.S.P. 2,010,101, 6.8.35. Appl., 28.3.32).—The spray disc is rotated by air impinging on vanes thereon, the exhaust air entering the drying chamber and assisting in projecting the liquid, e.g., milk. B. M. V.

Viscosimeter. R. POWIS, Assr. to STERLING ENGINE Co. (U.S.P. 2,012,550, 27.8.35. Appl., 11.12.33).—The pressure of liquid in a pressure chamber (*C*) is maintained at a predetermined figure, inversely as the temp., by means of a relief valve loaded by a bimetallic spring which is submerged in the liquid (oil) in *C*. B. M. V.

Viscosity measuring device. W. J. ALBERSHEIM and H. S. KONHEIM (U.S.P. 2,010,837, 13.8.35. Appl., 28.4.26).—Pressure in a chamber is maintained const. by a bellows valve acting on the supply; the outlet is through a friction tube slidably mounted in the wall of the chamber, compressing a spring and moving a pointer to indicate η . B. M. V.

[Cyclone] cleaner for gaseous fluids. C. H. HEIST (U.S.P. 2,010,231, 6.8.35. Appl., 20.1.32).—The inlet of the cleaner is tangential to a smaller extension part of the outer casing, and means are provided to reduce or even reverse the rotation of the clean air layers without retarding the outer layers. B. M. V.

Gas-filtering device. R. R. HALSTEAD, Assr. to HALSTEAD CORP. (U.S.P. 2,012,508, 27.8.35. Appl., 25.4.35).—A suitable liquid is scooped up from a sump and showered over a bundle of metallic ribbon through which the gas is passed. B. M. V.

Separation of dust from flowing gases. J. MARTIN (B.P. 445,322 and Addn. B.P. 445,338, 4.7.35. Ger., [A] 9.7.34).—The dust is conc. in the layers of a sub-divided S-bend and picked up by films of H_2O the inlet for which is so situated that the flow is (A) counter-current or (B) concurrent. B. M. V.

Apparatus for separating dust or the like from gases or vapours. T. SKAJAA (B.P. 445,245, 8.10.35. Norw., 8.10.34 and 19.6.35).—The gas is caused to whirl outside and inside horizontal discharge tubes. B. M. V.

Destruction of dust. GUTEHOFFNUNGSHÜTTE OBERHAUSEN A.-G. (B.P. 444,977, 8.1.35. Ger., 27.8.34).—Two treatment chambers, preferably rotating, are arranged at the ends of a stationary connecting piece through which additional air is admitted and at which inspection of the condition of the transferred gases may be made. Fuel is burned at the outer end of one chamber at a time, and in that chamber smelting of the dust is effected while in the other drying and partial combustion take place. A common recuperator or regenerator and separate dust catchers are provided. B. M. V.

Separating and/or estimating particles suspended in gases or vapours. R. WHYTLAW-GRAY, H. L. GREEN, R. LOMAX, and H. H. WATSON (B.P. 445,551, 10.10.34).—Use is made of the thermic repulsion effect described by J. Aitken (Trans. Roy. Soc. Edin., 1887, 32, 239—272), the gases being caused to flow in a narrow opening between two cold metal blocks lined with transparent material suitable for use later as microscope slides; in the centre of the space is an electrically heated wire. After passage of a known vol. of gas the slides are removed to a microscope and the particles counted. B. M. V.

Air cleaner and humidifier. C. A. KUTCHER (U.S.P. 2,012,571, 27.8.35. Appl., 2.10.34).—Air is discharged through a no. of vertical tubes on to or slightly below the surface of a liquid. B. M. V.

Apparatus for humidifying air and for like purposes. M. PAYNE, and BRIT. THERMOSTAT CO., LTD. (B.P. 445,889, 19.10.34).—Air is drawn through the apparatus in downward and then upward direction (both currents being annular) and meets a spray of H₂O at the return bend. On a single vertical shaft are, in order downwards, a motor, a fan, and lifting and spraying devices for the H₂O. B. M. V.

Dispersion of fog or other particles suspended in air with or without other gases mixed therewith. A. A. THORNTON. From AMY, ACEVES, & KING, INC. (B.P. 445,775, 15.10.34).—Waves 5000—100,000 (14,000—60,000) ~ per sec. are created in the air with energy sufficient to produce a pressure > 1 dyne/sq. cm. at 300 ft. from the generator and preferably (to reduce power) in the form of a pencil of rays along the desired line of vision. Wave generators of the air-jet type are described. B. M. V.

Gas-mixing apparatus. C. A. KUTCHER (U.S.P. 2,012,570, 27.8.35. Appl., 22.6.34).—An apparatus for insertion in the inlet pipe of an internal-combustion engine after the carburettor comprises a pair of fans and corrugated linings to each fan chamber. B. M. V.

Gas-analysis apparatus. (A) J. H. OETJEN, (B) W. O. HEBLER, Assrs. to C. ENGELHARD, INC. (U.S.P. 2,012,017 and 2,012,231, 20.8.35. Appl., [A] 30.7.32, [B] 2.1.34).—(A) A potentiometer method of comparison of heated wires of which the cooling is varied by the composition of the surrounding sample and standard gases is described. (B) A method of mounting the constituent parts of a thermal-conductivity apparatus in a cabinet is described. B. M. V.

Apparatus for indicating the relative density of a gas or mixture of gases. MALONE INSTRUMENT CO.,

LTD., and J. F. J. MALONE (B.P. 445,432, 24.10.34).—The gas to be measured (flue gas) and a standard gas (air) are admitted to opposed hollow arms of a centrifuge, each arm having a small leak on the trailing side of the outer end. On spinning, the heavier gas escapes faster and produces a lowering of pressure which is measured on a manometer. B. M. V.

Friction facing material. W. R. SEIGLE, Assr. to JOHNS-MANVILLE CORP. (U.S.P. 2,011,915, 20.8.35. Appl., 28.11.30).—A mixed pulp of asbestos fibres, rubber emulsion, and a material for augmenting the coeff. of friction, e.g., a drying oil or copal gum, is filtered to form a non-laminated sheet, which is then vulcanised. B. M. V.

Friction lining. H. B. DENMAN (U.S.P. 2,012,259, 27.8.35. Appl., 16.12.32).—No fibrous material is embodied, a homogeneous mass being formed of finely-divided asbestine, an org. binder (e.g., vulcanised rubber), rosin, and wax. B. M. V.

Manufacture of engine, hydraulic, and other packings. F. R. HALL, and HOMOGENE PERMANENT PACKING, LTD. (B.P. 445,852, 17.7.34).—Extrusion processes of forming packings of mixed materials are described. B. M. V.

(A) Apparatus with large output for measuring granular material volumetrically. (B) Means for simultaneously determining the volume, weight, and density of granular and other materials. Soc. DES COMPTEURS VOLUMÉTRIQUES (B.P. 409,629 and 445,520, [A] 14.12.33, [B] 4.11.35. Fr., [A] 29.12.32, [B] 3.1. and 29.6.35).

Pptg. particles from gases.—See XI.

II.—FUEL; GAS; TAR; MINERAL OILS.

Formation of coal with particular reference to its behaviour under heat and pressure. E. LEWIS (J. Inst. Fuel, 1936, 9, 235—250).—On plotting (on triangular co-ordinates) the C, H, and O contents of the cokes obtained by carbonising coals under reduced pressure the points corresponding to successively higher carbonising temp. lay on straight lines connecting the original compositions to a point close to 100% C. On plotting a similar series of points obtained when the carbonisations were effected under increased pressure (300 lb./sq. in.) the lines were curved towards the "coal band," i.e., the cokes approached in composition a series of coals of rising rank. In the pressure carbonisations there was a crit. temp. at which the rate of evolution of H₂ showed a marked increase. Sections of coal near an igneous intrusion showed a gradation in composition and properties similar to those in a series of coals of progressively higher rank. The results are discussed in relation to theories of coal formation. A. B. M.

Crystalline nature of the chief constituent of ordinary coal. C. S. FOX (Nature, 1936, 137, 746). L. S. T.

Cleaning of coal using dense media. R. A. MOTT (J. Inst. Fuel, 1936, 9, 270—276).—A discussion of a paper abstracted previously (B., 1936, 257). A. B. M.

Effects of ageing on plasticity of coking coals. G. JUNG (Glückauf, 1935, 71, 1141—1148).—The changes in coking properties effected by heating a no. of Silesian coking coals in a current of air at 20°, 60°, or 100° for periods up to 700 hr. were investigated by means of the Gieseler plastometer and the Maurice-Campredon coking test. The results show that the speed of ageing, *i.e.*, decrease in coking power, is inversely \propto the average grain size of the coal and is doubled by a rise in temp. of 10°. The practical application of the results to the problem of coal storage is discussed. R. B. C.

Colloidal structure of bituminous coal as the cause of the plasticity, swelling, and caking of coking coals. G. AGDE and R. HUBERTUS (Brennstoff-Chem., 1936, 17, 149—150).—The theory that on heating a coking coal the micelles of the residual coal substance are first "solvated" and then "peptized" by the bitumen is briefly discussed. A. B. M.

Critical investigation of methods of determining the ash content of bituminous coals. C. HOLTHAUS (Arch. Eisenhüttenw., 1935—6, 9, 369—387).—Tests on numerous types of coal indicated that in determining the ash the best temp. at which to burn the coal is 750°; the true ash content is then the sum of the calcination residue, the SO_3 , and the CO_2 content of the original coal and $0.335 \times$ the FeS_2 content less the SO_3 , CO_2 , and C content of the ash. The results obtained on many German coals are tabulated and briefly discussed. A. R. P.

Oxygen in coal. I. Direct determination. T. INABA and Y. ABE (J. Soc. Chem. Ind., Japan, 1936, 39, 91 B).—The Russell and Marks method was employed, the NiO-ThO₂ catalyst being used at 300—350° and the Pt-SiO₂ gel catalyst at 1000°. S from the coal was absorbed by NiO placed between the catalysts. With low-ash coals good agreement was obtained with indirect figures. J. W.

Major problems in the utilisation of coal. F. S. SINNATT (J. Inst. Civ. Eng., 1935—6, 545—582).—A lecture dealing with the work of the Fuel Research Board, and in particular with the coal survey of the country, coal cleaning, the burning of pulverised fuel, and the hydrogenation of coal and tar. A. B. M.

Coal hydrogenation in Great Britain. ANON. (Nature, 1936, 137, 690—692). L. S. T.

Thermal and electrical aspects of the design of converters for the hydrogenation process. A. BLACKIE, C. W. OCKLEFORD, and C. M. CAWLEY (Proc. Physical Soc., 1936, 48, 339—357).—The hydrogenation process for coal and tar is outlined. Designs of converters with internal electric heating and experiments for improving thermal insulation, reducing power consumption, and lowering the temp. of the converter walls are described. Methods of maintaining a uniform temp. in the catalyst bed, dissipating the heat evolved in the reaction, and overcoming electrical insulation difficulties are considered. N. M. B.

Apparatus for continuous laboratory experiments on the hydrogenation of coal and oils. F. LAUPICHLER (Petroleum, 1936, 32, No. 12, 1—6;

No. 13, 1—5).—Some details of design, construction, and operation of high-pressure apparatus are discussed. A. B. M.

Combustion process in the heating of muffles. J. LAMORT (Gas- u. Wasserfach, 1936, 79, 241—249).—In muffles heated by a Bunsen type of flame burning in a refractory-lined chamber below the muffle combustion is not flameless. Most even heating is obtained with a combustion chamber (C) the exit from which extends over the full width of the muffle. For best results correct secondary-air regulation and some unburnt gas leaving C are essential. Throttling the exit from C gives very uneven heating. Shape and size of C (apart from the exit) have no influence. Results are tabulated for various types of C. J. W.

Wood fuel burning tests. E. S. MALLOCH and C. E. BALTZER (Canada Dept. Mines, Mines Branch Rept. No. 761, 1935; Steam Eng., 1936, 5, 277—279, 283).—The relative efficiencies of wood refuse, peat, and anthracite when burned in a vertical, cylindrical, domestic boiler having a grate area of 3.4 sq. ft. and a heating surface of 32.4 sq. ft. were investigated. The boiler trials were conducted along lines similar to those reported in earlier publications. Small pieces of hardwood (maple) and softwood (pine), in both green and seasoned condition, were burned either on the normal coal grate or on a perforated Fe plate lying above the latter. A considerable saving in fuel per therm delivered to the cooling-H₂O resulted from the use of the plate. Under comparable conditions the overall thermal efficiencies of anthracite, air-dried peat, hardwood, and softwood in the boiler were 66.6, 54.4, 50—60, and 42—52%, respectively. It is concluded that wood cannot be considered in Canada as an economic substitute for American anthracite; it is, however, about the equal of air-dried peat. R. B. C.

Liquefied fuel gas. H. PICKERING (J. Inst. Fuel, 1936, 9, 251—260).—Liquefied fuel gas, consisting largely of C₃H₈ and C₄H₁₀, is obtained from natural gas, refinery gas, and coal-hydrogenation gases. It can be distributed in cylinders of 5—100 lb. capacity and tanks of 500—10,000 lb. capacity, and can be used for domestic or industrial purposes. The method of separation and the properties and uses of the fuel are briefly discussed. A. B. M.

Causes of decomposition of leather packing in valves of house [gas]-pressure regulators. W. ZWIEG (Gas- u. Wasserfach, 1936, 79, 293—295).—Chemical and microscopical study of decomposed leather showed deposits of free S, formed in the mains from CS₂ in the gas as follows: $\text{CS}_2 + \text{CO}_2 = 2\text{COS}$; $\text{COS} + \text{H}_2\text{O} = \text{CO}_2 + \text{H}_2\text{S}$; $3\text{H}_2\text{S} + 2\text{Fe}(\text{OH})_3 [\text{rust}] = \text{Fe}_2\text{S}_3 + 6\text{H}_2\text{O}$; $\text{Fe}_2\text{S}_3 + 3\text{O}_2 + 6\text{H}_2\text{O} = 4\text{Fe}(\text{OH})_3 + 6\text{S}$. The S gradually reacts with aq. condensate, giving H₂SO₄ [or Fe₂(SO₄)₃] which attacks the leather. More careful gas purification before distribution is recommended. J. W.

Separate determination of carbon monoxide, hydrogen, and methane. G. F. KNORRE, O. V. NEKRASOVA, and M. S. PLATONOV (J. Appl. Chem. Russ., 1936, 9, 389—398).—CO₂, O₂, and unsaturated hydrocarbons (in flue gas) are absorbed by the usual

procedures, the residual gas is hydrogenated (Ni catalyst) to convert CO into CH₄, O₂ is added, and H₂ and CH₄ are oxidised by passing over a Pt catalyst [prepared by soaking porcelain in aq. H₂PtCl₆, drying, and reducing (H₂) at 120–150°], at room temp. and 400–450°, respectively; the [CO] and [H₂] are derived from measurements of the vol. changes at each step, or by determining CO₂ produced. Alternatively, CO and H₂ are oxidised (same catalyst) at 140–150°, the vol. change and the CO₂ produced are measured, and CH₄ is determined in the residual gas by combustion at 400–500°.

R. T.

Production of hydrocarbon oils from industrial gases. II. W. W. MYDDLETON and J. WALKER (J.S.C.I., 1936, 55, 121–124 T; cf. B., 1935, 885).—An examination is made of the factors influencing the formation of mono-olefinic hydrocarbons (I) from CO and H₂ at atm. pressure. (I) promote high anti-knock in the motor spirit fraction, and improve yields of lubricating and transformer oils from heavier fractions with polymerising agents. > 1 passage over catalyst is necessary if high yield of oil containing high % of (I) is required. Vapours of products must be removed after the first passage, because strong adsorption of the products takes place on the surface of the catalyst. The vapours do not act as simple diluents of the reactant gases.

Asphalt. II. Softening point and penetration of mixtures of two or three kinds of asphalt. III. An asphalt[–rubber] compound. Y. UNO and M. ISHIDA (J. Soc. Chem. Ind., Japan, 1936, 39, 90 B; cf. B., 1936, 177).—II. The mixture law was not obeyed.

III. A compound of low susceptibility ratio was formed from asphalt and a 1–3% solution of rubber in oil.

J. W.

Viscosity of tar—its significance in the surfacing of roads. G. H. FUDGE (Chem. & Ind., 1936, 301–309).—Although tars of different η are used in various processes of road treatment they have approx. the same η at the temp. of use, *i.e.*, the temp. at which the road is rolled. It is suggested that the equi-viscous temp. (E.V.T.), *i.e.*, the temp. at which the tar has a standard η , is a convenient means of characterising road tars, and is preferable to quoting η at an arbitrary temp. Formulæ and tables are given from which the E.V.T. of a tar can be obtained from its time of flow in the B.R.T.A. viscosimeter. A simple, rotating-cylinder viscosimeter is described which permits the direct determination of the E.V.T.

A. B. M.

Fushun green shale. III—V. K. ISHIBASHI (J. Soc. Chem. Ind., Japan, 1936, 39, 89–90 B; cf. B., 1935, 1124).—III. Analyses are given for green shale, oil shale, and tuff and for the sol. portions of these (obtained by treatment with 10% aq. NaOH followed by 5% aq. HCl). Close similarities in composition were noted and a close relation in formation is postulated.

IV. A cheap product suitable for oil refining may be obtained by activating crushed, dried (300°) green shale rich in SiO₂ with 10–30% H₂SO₄ for 6–8 hr. at 80–100°.

V. Green shale may be used as a raw material in cement manufacture and for brick and tile production.

After calcination at 300° it makes a good polishing agent.

J. W.

Sampling of natural gas for geochemical study of its relationship to petroleum. O. HACKL (Petroleum, 1936, 32, No. 18, 3–5).

New German cracking process. E. L. LEDERER (Petroleum, 1936, 32, No. 17, 1–3).—In the Heckmann process the cracking unit is divided into 3 stages of successively higher, lower, and intermediate temp. After separation of the benzene and asphalt from the product the middle oil is recirculated. Yields of products from a Rumanian oil (Pakura) were: benzene to 200° 54.5, light oil boiling above 200° 6.0, gas 8.9, asphalt 27.6, loss 3%; the benzene and asphalt were of good quality. Corresponding yields from a brown-coal tar were 39.5, 3.5, 14.5, 40.5, and 2%, respectively.

A. B. M.

Use of inhibitors in gasoline. C. D. LOWRY, JUN. (Trans. Electrochem. Soc., 1936, 69, Preprint, 279–287).—Substances which inhibit the oxidation by air of gasoline produced by cracking contain phenolic or aromatic NH₂- or NH-groups. The presence of > 1 of these groups, or of alkyl, aryl, or *tert.*-NH₂-groups, especially in the *o*- and *p*-positions, gives increased, and of NO₂, CO, and CO₂H groups reduced, effectiveness. The inhibiting power of a substance is related to its oxidation potential. The mechanism of inhibitor action is discussed. Accelerated oxidation tests give a guide to the storage life of gasoline, but no exact correlation has been found when dealing with gasolines from different sources.

D. K. M.

Catalytic condensation of Surachan and Balachan benzenes. N. D. ZELINSKI and N. I. SCHUJIKIN (J. Appl. Chem. Russ., 1936, 9, 260–268).—54–65% of the benzenes (of b.p. 100–102° and 119.5–121.4°) are converted into aromatic hydrocarbons by passing over Pt–C catalyst at 300°; Ni–Al₂O₃ catalyst gives 84% conversion at > 300°.

R. T.

Viscosity of cylinder oils. G. DUFFING (Oel u. Kohle, 1936, 12, 420–421).— η has been determined over the range 100–300°. Results may be expressed by Vogel's formula $\log_{10} 100\eta = \zeta = \alpha + c/(\sigma + \gamma)$, where σ = temp. (°C.) and α , γ , c are consts. η at working temp. bears no relation to η at 100°. η for H₂O at 100–300° (extrapolated by Vogel's formula) is very much < η for oils, contrary to some expressed views.

J. W.

Thin layers of tin and other metals. II. Corrosion of metals by technical insulating oils. P. J. HARINGHUIZEN and D. A. WAS (Proc. K. Akad. Wetensch. Amsterdam, 1936, 39, 201–214; cf. B., 1936, 134).—The corrosion of thin layers of Sn, Cu, and Pb by various oils has been followed by means of the increased light transmission of the metal layers due to the corrosion (cf. B., 1935, 272). The velocity of corrosion is not related to the concn. of the acids produced by the oils. The metals build up a protecting surface film of reaction products. The mechanism of the corrosion process is discussed.

O. J. W.

Vac.-pump oils.—See I. Road emulsions.—See IX. Transformer oil.—See XI. Protecting gasoline by antioxidants. Oil-resisting rubber.—See XIV.

PATENTS.

Gravity concentration processes for the wet separation of coal or the like. WESTFALIA-DINNEN-DAHL-GRÖPPEL A.-G., and GEWERKSCHAFT SOPHIA-JACOBA (B.P. 445,062, 19.3.35. Ger., 19.3.34).—Coal is cleaned by flotation in a suspension of clay, barytes, etc. to which has been added a hydroxy-fatty acid, *e.g.*, saccharic or gluconic, in amounts of 20–60 g./cu. m. The acid reduces hydration and swelling of the suspended particles and permits the suspension to be used for the separation of small coal, *e.g.*, of particle size < 10 mm. A. B. M.

Separation of dust from coal. B. NORTON (B.P. 445,709, 16.10.34).—Circulating air is supplied and withdrawn through flexible pipes to and from a staircase which is reciprocated to cause the coal to cascade, the air flowing through the risers of the stairs. B. M. V.

Manufacture of agglomerates of carbonaceous material without addition of pitch. H. A. HARDY (B.P. 445,207—8, 13.10.34. Belg., [A] 14.10.33, [B] 23.1. and 20.3.34. Addns. to B.P. 356,236; B., 1931, 1035).—(A) Coal rendered globular, as in the prior patent, may be mixed with a relatively high proportion of other carbonaceous material, or of ore etc., before agglomeration. (B) The globular coal, or mixture containing it, is agglomerated under pressure at the temp. at which it issues from the retort and is retained under pressure while cooling until the briquettes acquire an internal crystalline structure similar to that of native coal. A. B. M.

Intermittent operation of externally-heated coke ovens or retorts. C. STILL (B.P. 445,250, 1.11.35).—The distillation gases are withdrawn under suction simultaneously from the gas space above the charge, through the usual offtake and ascension pipe, and from spaces in the interior of the charge, through vertical pipes (*P*) leading to a separate collecting pipe. A considerably higher suction is maintained in the second offtake system than in the first. In order to maintain this difference the surface of the charge surrounding *P* is rendered impermeable either by the bitumen produced from the fuel during distillation or by an artificial packing of high-m.p. pitch or asphalt. A. B. M.

Settings of retorts for use in the distillation of solid carbonaceous substances. LOW TEMP. CARBONISATION, LTD., W. A. BRISTOW, and J. P. POSTLETHWAITE (B.P. 444,750—1, 21.8.34).—(A) Retort settings, particularly of the type described in B.P. 299,795 and 301,361 (B., 1929, 44, 119), are provided with sets of transverse superposed conduits at the upper part of the combustion chambers (*C*), through which the waste gases leaving *C* pass before they reach the waste-gas outlet. More uniform heating of the retorts is thereby effected. (B) Two independently regulable gas conduits are provided to each pair of adjacent *C* which lie between pairs of retorts that are to be simultaneously charged. A. B. M.

Vertical-retort bench [for coal distillation]. G. H. NILES, Assr. to IMPROVED EQUIPMENT-RUSSELL ENG. CORP. (U.S.P. 2,008,334, 16.7.35. Appl., 3.7.33).—A H₂O-sealed quenching tank is placed below the setting and the coke dumped therein by rolls. B. M. V.

Heat-treatment of gaseous and vapour products arising from the distillation of bituminous fuels. F. H. ROGERS. From H. KOPPERS GES.M.B.H. (B.P. 444,090, 18.3.35. Cf. B.P. 419,125; B., 1935, 87).—The heating flues of horizontal chamber ovens are so designed that the volatile distillation products are subjected to uniform heat-treatment at 600–800° in the gas-collecting space above the charge, throughout the whole coking period. A. B. M.

Preparation of activated vegetable carbons. L. WICKENDEN and J. J. NAUGLE (U.S.P. 2,002,651, 28.5.35. Appl., 27.12.33).—A purifying and filtering medium is prepared by combining sized fractions of a subdivided activated C, of different purifying characteristics, in such proportions as to remove most efficiently the various types of impurities present in the medium to be treated. A. B. M.

Preparation of activated carbon. E. T. OLSON, Assr. to CLEVELAND CLIFFS IRON CO. (U.S.P. 2,003,277—8, 28.5.35. Appl., [A] 2.8.33, [B] 28.8.33).—(A) Wood which retains its cellular structure during the process, *e.g.*, beech, birch, oak, is treated as described below (B) to give a charcoal of electrical resistance < 70 ohms/cu. in., ash of unwashed product < 7%, I absorption factor > 60%, etc. (B) Wood is carbonised at < 540°, the charcoal is ground to pass a 4–6-mesh screen, the dust is removed, and the granular material heated to 1650–1820° by passing an electric current therethrough, and is simultaneously treated with steam for < 1 hr. A. B. M.

Destructive hydrogenation of carbonaceous material. P. HEROLD and H. KAUFMANN, Assrs. to STANDARD-I. G. Co. (U.S.P. 2,002,997, 28.5.35. Appl., 23.10.31. Ger., 31.10.30).—The material is hydrogenated under pressure (200 atm.) in presence of a catalyst consisting of an isopoly-acid or metallic complex acid of Mo or W, or a salt thereof. The catalyst may also contain a non-reducible oxide or salt, *e.g.*, Al₂O₃ or Zn₃(PO₄)₂. A. B. M.

Catalytic treatment of carbonaceous materials with hydrogenating gases. H. E. POTTS. From INTERNAT. HYDROGENATION PATENTS Co., LTD. (B.P. 444,779, 6.6.35).—The catalyst is produced by treating Fe sulphide, obtained by pptn. by passing H₂S over Fe, or by other known means, with S, H₂S, or other volatile S compound free from O, at 200–400°/ < 2 atm. If the S compounds are used in admixture with H₂, higher pressures should be employed, *e.g.*, 100–200 atm. A. B. M.

Treatment of distillable carbonaceous materials with hydrogenating gases. H. E. POTTS. From INTERNAT. HYDROGENATION PATENTS Co., LTD. (B.P. 445,274, 29.9.34).—Corrosion of the apparatus used for hydrogenation, under pressure, of coal etc. in presence of halogens or volatile halogen compounds is avoided by coating or lining the parts in contact with gases and vapours at 200–350° with Ag or an alloy rich in Ag. A. B. M.

Regulation of the temperature in the treatment of carbonaceous initial materials with hydrogenating gases. H. E. POTTS. From INTERNAT. HYDROGENATION PATENTS Co., LTD. (B.P. 444,936,

1.8.35).—Undesired rises in temp. are counteracted by the introduction of NH_3 into the reaction vessel, the supply of NH_3 being stopped as soon as the desired reaction temp. is regained. The NH_3 is added in amount = 5–30% of the hydrogenating gases.

A. B. M.

Gas process. T. NAGEL, Assr. to CARBURETTED GAS, INC. (U.S.P. 1,996,167, 2.4.35. Appl., 10.11.34).—Lean gas is carburetted by injection of oil thereinto, the oil having been preheated in the liquid phase, under pressure, to a temp. such that on admixture with the hot lean gas it is converted into fixed gas.

A. B. M.

Recovery of hydrogen sulphide from gases. COUTTS & Co., and F. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 444,327, 21.9.34).—Gases containing H_2S and CO_2 are scrubbed with alkaline liquids which absorb these gases in the cold and give them up again when heated (cf. B.P. 391,780; B., 1933, 588), the liquid being brought in contact with the gas in finely-divided form, and the time of contact being < 5 sec. Under these conditions the H_2S is preferentially absorbed and is recovered by heating the solution.

A. B. M.

Removal of hydrogen sulphide from gases containing ammonia and hydrogen sulphide. C. EYMANN, Assr. to KOPPERS Co. OF DELAWARE (U.S.P. 2,002,365, 21.5.35. Appl., 23.2.32. Ger., 23.2.31).—The gas is scrubbed with aq. Na thioarsenate in such manner that part only of the H_2S is removed. The S obtained on regeneration of the liquid by air oxidation is converted into SO_2 , which is then combined with the NH_3 recovered from the gas to form aq. $(\text{NH}_4)_2\text{SO}_3 + \text{NH}_4\text{HSO}_3$. The remaining H_2S is removed from the gas by scrubbing with this solution, which is thereby converted into thiosulphate and polythionate liquor, the latter being subsequently converted into $(\text{NH}_4)_2\text{SO}_4$ and S by heating under pressure.

A. B. M.

Production of gaseous fuel mixtures. RUHR-CHEMIE A.-G. (B.P. 444,315, 16.7.34. Ger., 15.7.33).—A fuel containing C_2H_4 , C_3H_6 , C_4H_8 , C_2H_6 , C_3H_8 , C_4H_{10} , and C_5H_{12} is obtained from coke-oven gas by compression followed by partial expansion with utilisation of the cooling so produced. The fuel is liquid at normal temp. under 20–30 atm.

A. B. M.

Operation of internal-combustion engines with liquefied gases. I. G. FARBENIND. A.-G. (B.P. 445,747, 16.8.35. Ger., 18.8.34).—The fuel stored in a liquid state is preheated by the cooling- H_2O , is passed through a pressure-release valve, and further heated by the cooling- H_2O , with added heat at starting and other times as necessary completely to gasify; thence only vapour passes to the mixing chamber with air.

B. M. V.

Calorimetric method and apparatus adapted for gas-mixing control. E. X. SCHMIDT, Assr. to CUTLER-HAMMER, INC. (U.S.P. 2,002,279, 21.5.35. Appl., 29.5.31).—The relative proportions in which two or more gases are being mixed are automatically controlled to give a mixture of const. calorific val. This is effected by continuously passing a sample of the mixture to a calorimeter device which operates means for controlling a valve on one of the gas-supply pipes.

A. B. M.

Gas testing. M. G. JACOBSON, Assr. to MINE SAFETY APPLIANCES Co. (U.S.P. 2,010,995, 13.8.35. Appl., 17.12.30).—A resistance which is affected by the heat conditions of the gas is connected in parallel with a standard resistance in a potentiometer device. The flow of gas is maintained const. and combustion initiated either by using sufficient current to heat the resistance or by a catalyst. In the standard gas (air) the voltage drop in the resistance is balanced against a standard e.m.f.

B. M. V.

Manufacture of asphalt. E. B. MCCONNELL, Assr. to STANDARD OIL Co. (U.S.P. 2,002,670, 28.5.35. Appl., 30.6.34).—Petroleum residuum, atomised by being forced through a porous diaphragm, is passed countercurrent to a stream of air, and the oxidised product is withdrawn from the apparatus. The residuum and/or air may be preheated.

A. B. M.

Manufacture of asphalt and product thereof. A. A. WELLS, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 2,010,423, 6.8.35. Appl., 1.9.32).—Crude oil is distilled into (1) a lower-boiling fraction, (2) a higher-boiling, e.g., cylinder oil, fraction, and (3) a residue. (2) is extracted with an org. solvent, e.g., PhOH or furfuraldehyde, and the extract (freed from solvent) is mixed with (3).

B. M. V.

Recovery of tar acids etc. S. P. MILLER, Assr. to BARRETT Co. (U.S.P. 2,002,704, 28.5.35. Appl., 26.9.31).—Hot coal-distillation gases from coke ovens etc. are cooled to a temp. (e.g., 110°) at which the tar acids remain in the vapour phase, but below that at which the vapours constitute a creosote oil; they are then freed from suspended matter by electrostatic pptn. and finally cooled to separate therefrom a tar-acid oil free from pitch.

A. B. M.

Heating of hydrocarbon oils. GYRO PROCESS Co. (B.P. 445,549, 9.10.34. U.S., 9.10.33).—Heating of oil in coils is effected by various combinations of convection and radiation up to 8 successive stages.

B. M. V.

Production of normally liquid hydrocarbons from gaseous or lower-boiling hydrocarbon materials. P. K. FROLICH, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 2,002,534, 28.5.35. Appl., 10.9.30).—Low-boiling paraffins are cracked, e.g., at $450\text{--}700^\circ/\text{X}$ 250 lb. per sq. in., in presence of a Zn-Cr catalyst, the H_2 is removed by interaction with a C oxide, e.g., CO, at $200\text{--}350^\circ/100$ atm. in presence of Ni mixed with Al_2O_3 , and the H_2 -free product polymerised, e.g., at $500\text{--}900^\circ/300\text{--}1000$ lb. per sq. in.; 90% of the liquid product has b.p. $85\text{--}220^\circ$.

A. W. B.

Treatment of distillate petroleum product. J. B. RATHER, L. C. BEARD, JUN., and O. M. REIFF, Assrs. to SOCONY-VACUUM OIL Co., INC. (U.S.P. 2,002,645, 28.5.35. Appl., 23.5.33).—Urea, $\text{CS}(\text{NH}_2)_2$, or a derivative thereof is added, X 0.02%, to gasoline or kerosene to inhibit colour and odour development on storage.

A. W. B.

Purifying and dewaxing of mineral oil. G. J. STREZYNSKI and W. KRONASSER, Assrs. to DE LAVAL SEPARATOR Co. (U.S.P. 2,006,816, 2.7.35. Appl., 23.10.33).—After rapidly chilling the oil with violent agitation to 8° or lower, a (chilled) diluent such as

naphtha is added and the whole mixed with conc. H_2SO_4 . Centrifuging then causes simultaneous separation from the oil of both acid sludge and wax. Apparatus is described. E. G. H.

Motor fuels. E. V. BERESLAVSKY (B.P. 444,026, 11.9.34. U.S., 24.1.34).—The fuel comprises a mixture of petrol (85%), anhyd. EtOH (10%), and a *sec.* or *tert.* hydroaromatic alcohol, *e.g.*, terpineol, and/or an open-chain unsaturated alcohol, *e.g.*, geraniol (5%). Steam-distilled pine oil, preferably treated with a gum inhibitor, may be used as the third constituent. It functions as a blending agent and also increases the calorific val. and the anti-knock val. of the mixed fuel. A. B. M.

Manufacture of benzine with a high anti-knock value from benzine with a low anti-knock value. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 446,621, 16.9.35. Holl., 21.9.34).—Benzines are treated in presence of phosphate catalysts, *e.g.*, BPO_4 , $Ca_3(PO_4)_2$, at temp. < that at which appreciable gas-formation takes place (*i.e.*, at < 525°). E. G. H.

Emulsification of oils. STANDARD OIL DEVELOPMENT Co. (B.P. 444,851, 8.4.35. U.S., 18.8.34).—Oil-sol. sulphonates, obtained by sulphonating lightly or highly refined petroleum hydrocarbons, mixed with a hydroxyamine, *e.g.*, $N(C_2H_4 \cdot OH)_3$, salts of carboxylic acids of $> C_6$ ($> C_{12}$), *e.g.*, oleic acid, together with a homogeniser, *e.g.*, polyhydric alcohols, are added to mineral oils to give emulsifiable compositions. A. W. B.

Burning of oil. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 445,506, 4.7.35. Holl., 6.8.34).—Heavy fuel oil containing inorg. constituents corrosive to fire-brick (*e.g.*, 710 pts. of V per 10⁶) is burned in direct contact with refractory material, and to the flame is supplied silicious or other material sufficient to neutralise the V or other corrodant. B. M. V.

(A) Decolorising and dewaxing petroleum lubricating oils. (B) Dewaxing lubricating oil distillates and residues. C. F. TEARS, Assr. to PETROLEUM PROCESSES CORP. (U.S.P. 2,008,569—70, 16.7.35. Appl., [A] 27.1.34, [B] 25.5.34).—Decolorising and dewaxing are effected in one continuous operation by means of a comminuted solid adsorbent (liquefied C_3H_8 or the like) and a filter press, chilling being brought about by flash evaporation. (B) Owing to the absence of solid decoloriser decantation in a series of thickeners under pressure is carried out instead of filtering. B. M. V.

Manufacture of [high-pressure] lubricants. ATLANTIC REFINING Co., Assecs. of W. M. MALISOFF (B.P. 446,567, 26.10.34. U.S., 1.11.33).—< 10% (1—3 wt.%) of tritoyl phosphate is added to the lubricating oil. The treated oils may be used in the prep. of greases. [Stat. ref.] E. G. H.

[Tiling of walls of] carbonising chambers and the like. GAS CHAMBERS & COKE OVENS, LTD., A. H. LYMN, and A. V. KEMP (B.P. 444,916, 10.12.34).

Fractional distillation. Gas-mixing apparatus.—See I. Separation of hydrocarbons etc. Naphthenic acids.—See III. C_2H_2 . Oxidation catalyst for CO.—See VII. Paving mixtures. Dust fixative.—See IX. Preventing corrosion of [oil] tanks. Ore-flotation agent. Applying metal-forming lubri-

cants.—See X. C electrode. Transformer oil.—See XI.

III.—ORGANIC INTERMEDIATES.

Homologues of Paris Green. I. Lower members of the acetic series. F. E. DEARBORN (J. Econ. Entom., 1935, 28, 710—714).—The prep. and analysis of homologues from HCO_2H , $EtCO_2H$, $PrCO_2H$, $CH_2Cl \cdot CO_2H$, $CHCl_2 \cdot CO_2H$, and $CCl_3 \cdot CO_2H$ are recorded. Some of these are probably more highly insecticidal than is Paris Green. A. G. P.

Production of furfuraldehyde and acetic acid as by-products in the hydrolytic treatment of agricultural waste products. V. D. ZAGRJATSKAJA (J. Appl. Chem. Russ., 1936, 9, 254—259).—The max. yields of furfuraldehyde (as a by-product of xylose production) from rye straw and maize leaves are 1.25 and 3%, respectively, using 2 vols. of 2% H_2SO_4 per vol. of material, and conducting the hydrolysis for 1.5 hr. under a pressure of 5 kg. 1.9—2.3 and 3 kg. of AcOH are formed incidentally per quintal of straw and maize leaves, respectively. R. T.

Crystal urea. Industrial development and properties. J. F. T. BERLINER (Ind. Eng. Chem., 1936, 28, 517—522).—An extensive review of the literature. J. L. D.

Rapid determination of trinitrophenol in technical picric acid. N. J. UGNJATSCHEV and D. A. RICHTER (J. Appl. Chem. Russ., 1936, 9, 379—388).—Aq. picric acid (I) is titrated with 0.05N- $HgNO_3$, with $AgNO_3-Na_2S_2O_3$ paper as an external indicator. Alternatively, standard $CuSO_4$ is added to aq. (I), and excess of Cu in the filtrate is determined iodometrically. R. T.

Applications of induced oxidation and catalysed autoxidations. W. P. JORISSEN (Chem. Weekblad, 1936, 33, 313—314).—A review of technical applications. S. C.

Chemistry of wetting-out. J. HETZER (Fettchem. Umschau, 1936, 43, 38—42).—Wetting-out, dispersing, detergent, and foaming agents are classified into some 20 classes according to their chemical constitution; lists of numerous proprietary preps. of the various types are given. E. L.

Antioxidants for decalin. A. CASTIGLIONI (Annali Chim. Appl., 1936, 26, 106—108; cf. A., 1934, 1184).—Of a no. of substances examined, pyrogallol, quinol, and $\alpha-C_{10}H_7 \cdot OH$ were specifically effective oxidation inhibitors. L. A. O'N.

Condensation of benzines.—See II.

PATENTS.

Treatment of [aliphatic] hydrocarbons. W. O. MITSCHERLING, Assr. to NEON RESEARCH OF CONNECTICUT, INC. (U.S.P. 2,003,898, 4.6.35. Appl., 28.4.31).—Apparatus for the degradation of hydrocarbons by exposure to Ne-lamp radiations, comprising also the formation of alcohols and ketones induced by presence of oxidising catalysts, *e.g.*, per-salts, is described.

A. W. B.

Separation of hydrocarbons and their oxygen-containing derivatives. P. K. FROLICH and J. W. PUGH, Assrs. to STANDARD OIL DEVELOPMENT Co. (U.S.P.

2,002,533, 28.5.35. Appl., 21.5.28).—MeOH containing 5—20 (10)% of H₂O is claimed as a solvent for extraction of alcohols, acids, aldehydes, and ketones from mixtures with hydrocarbons. Efficiency is increased when operating at 1000—3000 lb. per sq. in. A. W. B.

Production of polyhydric alcohols. H. S. ROTHROCK, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,004,135, 11.6.35. Appl., 23.12.32).—Sugar alcohols (I) are hydrogenated in presence of a Ni catalyst, containing < 70% of free Ni, and a weak alkali buffer (CaCO₃) at 200—300°/ > 1 atm., e.g., 3000—4000 lb. per sq. in. The products are lower polyhydric alcohols, e.g., glycerol, lower glycols. The process also comprises reduction of monosaccharides to (I) under the above conditions, preferably at lower temp. and pressure, e.g., at 150°/ 1800 lb. per sq. in. A. W. B.

Manufacture of tripropionin. D. C. HULL, Assr. to EASTMAN KODAK Co. (U.S.P. 2,005,371, 18.6.35. Appl., 18.8.34).—Glycerin (I) and EtCO₂H (II), in presence of a catalyst (III), e.g., H₂SO₄, *p*-C₆H₄Me·SO₃H, are heated at > 80°, H₂O being removed azeotropically by distillation of a solvent, e.g., PhMe. It is an essential feature of the process to heat (I) and (II) together at 50—80° for 3—6 hr. prior to addition of (III). A. W. B.

Production of ozonisation products of terpene alcohols. L. P. RANKIN, Assr. to HERCULES POWDER Co. (U.S.P. 2,002,583, 28.5.35. Appl., 18.10.33).—Unchanged material from the ozonisation of α -terpineol (cf. U.S.P. 1,951,708; B., 1935, 92), after heat-treatment, is steam-distilled off and the residue (of b.p. > 100°/5 mm.) washed free from acid by alkali. A second heat-treatment immediately after the first, using a dehydrating agent (I, fuller's earth, etc.), yields material of lower b.p. The products are used as plasticisers etc. for nitrocellulose. E. J. B.

[Catalyst for organic] oxidation process. F. A. CANON, Assr. to E. I. DU PONT DE NEMOURS & Co., INC. (U.S.P. 2,002,627, 28.5.35. Appl., 1.12.33).—Wet-ground MnO₂ ore is claimed to be a much more effective oxidising agent than the dry-ground material; e.g., it is 10—25% more active in the oxidation of *p*-NH₂·C₆H₄·SO₂H to quinol. E. J. B.

Preparation of calcium acetylsalicylate. W. H. LAWRENCE, JUN., Assr. to LEE LABS., INC. (U.S.P. 2,003,374, 4.6.35. Appl., 21.7.32).—A product substantially free from Fe salts and other Ca salts, and consequently of high storage stability, is obtained by mixing pure aspirin with pptd. CaCO₃, adding H₂O, stirring and filtering at > 20°, pptg. the product from the filtrate by adding MeOH (at 10°), isolating, washing the product with MeOH, and drying at > 50°. A. W. B.

Recovery of naphthenic acids. J. A. WUNSCH (U.S.P. 2,003,640, 4.6.35. Appl., 25.2.32).—Mineral oil (I) sludge is dispersed in H₂O, a thinner (II) is added, e.g., an org. solvent, C₆H₆, naphtha, kerosene, the thinned dispersion, at 90—100°, is de-emulsified by addition of, e.g., H₂O-sol. Na, K, or NH₄ inorg. salts or H₂O-sol. inorg. solvents of low η , MeOH, COMe₂, etc., and the layer of (I) and (II) is separated. The naphthenic

acids are then pptd., by addition of acid, from the aq. layer. A. W. B.

Preparation of [pure] quinizarin. H. R. LEE, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,003,859, 4.6.35. Appl., 25.1.34).—The reaction mass from interaction of *o*-C₆H₄(CO)₂O and *p*-C₆H₄Cl·OH in conc. H₂SO₄ in presence of H₃BO₃ is diluted until the [H₂SO₄] is 55—70% and the product filtered and then washed first with 55—70% H₂SO₄ and later with boiling H₂O. The product contains > 2% of PhCl-insol. matter. A. W. B.

Liquid hydrocarbons.—See II. **Textile-treating baths.**—See VI. **C₂H₂.** **Alkali formates.**—See VII. **Metal polish.**—See X. **Electrolytic [reduction] process.**—See XI. **[Acids by] oxidative fermentations.**—See XVIII.

IV.—DYESTUFFS.

Thiocyanines as optical sensitiser.—See XXI.

PATENTS.

Manufacture of monoazo dyes. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 443,898, 29.8.34).—Scarlet to blue-red wool dyes of good levelling power are obtained from diazotised *o*-NH₂·C₆H₄·CO₂H (I) and its substitution products and a 1-acylamido-8-naphthol-6-sulphonic acid; e.g., the bright red dye (I) \rightarrow 1:8:6-NHAc·C₁₀H₅(OH)·SO₃H. H. A. P.

[Preparation of mono-]azo dyes. J. HALLER, Assr. to DURAND & HUGUENIN A.-G. (U.S.P. 2,000,133, 7.5.35. Appl., 4.8.31. Ger., 11.8.30).—The H sulphate of a leucoindigoid vat dye containing < 1 diazotisable NH₂ is diazotised (in an org. acid, e.g., AcOH, to prevent hydrolysis of the ·O·SO₃H group) and used as first component. The H₂O-sol. azo dyes produced are oxidised on the fibre to insol. dyes of deeper shade and good washing fastness. Examples are the dyes: leuco-4'-chloro-5-aminoindole-2'-naphthaleneindigo H₂ disulphate \rightarrow CH₂Ac·CO·NHPh (yellow; green after oxidation); 4'-chloro-5-aminoindole-2:1'-thionaphthenindigo \rightarrow 1-hydroxyanthracene (violet; black) or \rightarrow 2:3-OH·C₁₀H₆·CO₂H (red; blue); 5-aminoindole-2:1'-anthraceneindigo \rightarrow 1-phenyl-3-methyl-5-pyrazolone (yellow; olive); 5-amino-4'-methoxy-4:7-dimethylindole-2:2'-naphthaleneindigo \rightarrow *o*-CH₂Ac·CO·NH·C₆H₄·OMe (I) (yellow; green); 9-chloro-5-amino-1:2-naphthindole-2:1'-(3-4-benz)thionaphthenindigo \rightarrow 1-*o*-chlorophenyl-3-methyl-5-pyrazolone (yellow; brown-olive); 5-amino-4'-methoxyindole-2:2'-naphthaleneindigo \rightarrow 2:3-hydroxynaphthoic *o*-anisidide (blue-red; violet-grey); 6:4'-dichloro-5-amino-7-methylindole-2:2'-naphthaleneindigo \rightarrow *o*-CH₂Ac·CO·NH·C₆H₄Cl (yellow; green), and 5-chloro-4'-amino-7-methoxy-4-methylindole-2:2'-thionaphthenindigo \rightarrow (I) (yellow; yellow). (The leuco-H₂ disulphates as their alkali salts are used in all the above examples.) 4-Nitro-2-hydroxythionaphthen has m.p. 128°. H. A. P.

Manufacture of azo dyes. COUTTS & Co., and F. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 445,862, 15.10.34).—Aromatic diazo compounds are coupled, in

substance or on the fibre, with β -hydroxytriphenylene or its derivatives, *e.g.*, its sulphonic acid, *o*-carboxylic acid (I) derivatives, $\beta\beta$ -dihydroxytriphenylene, amides or arylides of (I). Mainly brown shades are obtained.

A. W. B.

Manufacture of dyes of the anthracene series. I. G. FARBENIND. A.-G. (B.P. 445,892, 19.10.34. Ger., 19.10.33).—Oxidation of 9:10-disulphuric esters of leuco- β -aminoanthraquinones containing a free α -position to azine derivatives is improved by operating electrochemically in presence of a catalytic quantity of an oxidising agent capable of initiating oxidation to azines, *e.g.*, PbO_2 , NaOCl , $\text{K}_3\text{Fe}(\text{CN})_6$. (Cf. B.P. 416,939; B., 1934, 1051.)

A. W. B.

(A) **Production of acridone-dianthrimide vat dyes.** (B) **Anthraquinoneacridone vat dyes.** I. GUBELMANN, R. J. GOODRICH, and W. DETTWYLER, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,001,418—9, 14.5.35. Appl., [A, B] 30.4.31).—(A) An α -aminoanthraquinone is condensed (in presence of Cu or its salts and an acid binding agent) with a polyhalogenoanthraquinone-1:2-acridone in which the halogen occupies the *Bz* nucleus (≤ 2 atoms) and an α -position in the anthraquinone nucleus. *E.g.*, 4: *Bz-x*: *Bz-x'*-Trichloroanthraquinoneacridone (direct chlorination in PhNO_2) is heated with 1-amino and 1-amino-2-methylanthraquinone, Na_2CO_3 , and verdigris in PhNO_2 at the b.p.; the condensation products [(I) and (II)] are grey vat dyes. (B) The above products are further condensed (cyclised) by heating with acid agents. *E.g.*, (I) or (II) is heated with 93% H_2SO_4 at 130° to give grey to khaki, and with AlCl_3 at 210° to give green-grey vat dyes.

H. A. P.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Division of wool into its histological components. R. HALLER and F. W. HOLL (Kolloid-Z., 1936, 75, 212—217).—Wool is disintegrated into its component cells by treatment with conc. aq. NH_3 , revealing an intercellular protein to which the name "lanain" (I) has been given. (I) undergoes denaturation when kept dry, but may afterwards be obtained in colloidal solution again by treatment with conc. aq. NH_3 . Under certain conditions (I) can be obtained in cryst. form, m.p. about 110°; it is insol. in H_2O , EtOH , or Et_2O . E. S. H.

Composition of some vegetable fibres, with particular reference to jute. A. G. NORMAN (Biochem. J., 1936, 30, 831—838).—Determinations of cellulose (I), lignin, uronic acids, and yields of furfuraldehyde indicate two groups of fibres according to whether the (I) is low or high in xylan, the former including flax, ramie, and Italian hemp, and the latter Manila hemp, sisal, and jute. The quality of jute is not related to the xylan content.

F. O. H.

Isolation of solid fibre from rice straw. M. TANAKA (Bull. Chem. Soc. Japan, 1936, 11, 35).—Details are given for the isolation of tubular cellulose from the straw.

H. G. M.

Determination of cellulose by the modified single-stage process at a higher temperature. Y. C. TANG and W. H. YEN (Cellulosechem., 1936, 17, 21—23).—If this process, using 1.5% each of ClO_2

and $\text{C}_5\text{H}_5\text{N}$, is operated at 40° the removal of lignin is complete in 3 hr. and the yield of pure cellulose is the same as by older methods.

A. G.

Ageing of alkali-cellulose. G. SATTO (Monatsh., 1936, 67, 141—158).—The change with time of the η of NaOH solutions of cellulose has been studied at various concns. and at various temp. in contact with O_2 , air, N_2 , and CO_2 . In contact with O_2 the chains are split during the oxidation. When the NaOH is converted by CO_2 into NaHCO_3 practically no decomp. is observed during ageing. Other conclusions concerning the depolymerisation of the cellulose are impossible owing to the unknown state of the solution. The cellulose particles are probably long, but not straight, chains. The observed η can be interpreted by reciprocal action between the particles and solvent, causing the apparent mol. wt. to be \geq the actual particle wt.

J. W. S.

Cellulose xanthate. T. LIESER (Chem.-Ztg., 1936, 60, 387—389).—Xanthation is a micellar surface reaction; the stoichiometric ratio $2\text{C}_6\text{H}_{10}\text{O}_5 : \text{CS}_2$ found in the xanthate is due to about half the cellulose (I) being in the surface, and xanthation occurs randomly along the superficial chain mol. (I) dissolves in org. bases such as $\text{NET}_4\cdot\text{OH}$, and the trixanthate can then be obtained.

A. G.

Potentiometric measurements in the analysis of viscose solutions during ripening. R. S. NEUMANN, V. A. KARGIN, and E. A. FOKINA (Cellulosechem., 1936, 17, 16—21).—When diluted viscose is titrated with HCl with a glass electrode a complex curve is obtained owing to the no. of weak acids present; during ripening the titre to the first break, corresponding with the strong alkalis, falls. Titration with AgNO_3 and a Ag electrode indicates the presence of Na_2S , and this and Na_2CS_3 can be determined. During ripening the amount of Na_2S falls to zero and Na_2CS_3 is formed, probably as a result of the reaction $\text{Na}_2\text{S} + \text{CS}_2 \rightleftharpoons \text{Na}_2\text{CS}_3$; the solubility of the Ag salt of cellulose xanthate changes, corresponding with a growth of the cellulose complex. The titres with CuSO_4 and a Cu electrode and with I and a bright Pt electrode fall during ripening, owing to the decrease in the amount of sulphides present.

A. G.

Economic and technical aspects of the rayon industry. E. B. BENDER (Ind. Eng. Chem., 1936, 28, 511—516).—Historical.

A. G.

Properties and application of oils for rayon. C. E. MULLIN (Text. Mercury & Argus [Rayon Suppl., May 8], 1936, 94, 35—37).—Oils are discussed which are applied to rayon yarn at the time of manufacture or during subsequent manufacturing operations (*e.g.*, weaving, knitting) in order to soften, lubricate, render less hygroscopic, and "lay together" the individual filaments.

A. J. H.

Pulp from reeds. H. Y. CHANG and T. H. CHANG (J. Chem. Eng. China, 1936, 3, 43—46).—A 2-stage digestion process is described for converting reeds into paper pulp; 80—90% recovery of the used NaOH is possible.

H. D.

Sulphite pulp from Lauan wood. T. OKADA and S. NAKASHIZUKA (J. Cellulose Inst., Tokyo, 1936, 12,

109—111).—Although Lauan wood is from a deciduous tree it is rich in lignin (32%) and resembles coniferous woods in analysis. Unbleached pulp obtained by the sulphite process contains 80% of α -cellulose and 92% of total cellulose, but the fibres are shorter than those from conifers. A. G.

Fused wood. B. T. IV and O. B. IV (J. Appl. Chem. Russ., 1936, 9, 322—324).—The C_6H_6 -EtOH-sol. fraction, and the lignin content of larch and oak sawdust rise, and the Ac, pentosan, and cellulose contents fall, after pressing for 3 hr. at 200°. The plasticity of the pressed mass is ascribed to processes similar to those occurring in the formation of bakelite (I); the fluidity of the product is greatly enhanced by adding (I), glucose (alone, or with PhOH), NH_2 -acids, or NH_2Ph , and the plastic masses so obtained compare favourably with (I) in every respect. R. T.

New applications and developments in the use of starch in paper[-making]. J. STRASSER (Paper Trade J., 1936, 102, TAPPI Sect., 229—230).—The greater fluidity of unmodified tapioca flours and potato starches, as compared with maize starch, is just as important for adhesive purposes as their higher capacity for cohesiveness and ability to form a better film. The increase in strength of rag paper is much $>$ that of sulphite paper, when both are tub-sized with starch. Starches which have been modified by enzyme action are useful in certain types of paper mills. H. A. H.

Factors affecting the determination of water-vapour permeability [of paper]. A. ABRAMS and G. J. BRABENDER (Paper Trade J., 1936, 102, TAPPI Sect., 204—213).—An improved form of Vapometer for measuring gravimetrically the rate of H_2O -vapour transmission through paper and other sheet materials is described and compared with the older form of the apparatus. Factors affecting the test results include R.H. differential inside and outside the instrument, the ratio of the test area exposed to the area of the H_2O inside, the distance (d) between the test sheet and the H_2O surface, the conditioning period, and leakage along the surface and through the edges of the paper. H_2O -vapour permeability is inversely $\propto d$. H. A. H.

Physical characteristics and printing quality of paper. J. NIEMCZYK (Paper Trade J., 1936, 102, TAPPI Sect., 241—243).—The various properties of paper are briefly reviewed, and their effect on printing is discussed. H. A. H.

Removal of ink from paper. I. I. KOVALEVSKI (Zellstoff u. Papier, 1936, 16, 138—140).—The effect of different reagents on the removal of ink from paper by flotation was investigated in the laboratory and the efficiency of removal was judged photometrically, the whiteness of the accepted stock after flotation being expressed as a % of that of the original unprinted paper. Papers tested were (I) newsprint with 70% of groundwood, (II) printing paper with 55% of groundwood, 45% of unbleached sulphite, and 13.1% of ash, and (III) a printing of 100% bleached sulphite, and 4.2% of ash. The best results with (I) (98.8% whiteness) and (II) (93%) were obtained by treating the stock with 3% of resin soap and floating in presence of 3% of petroleum. The greatest efficiency was obtained with (III)

(99.6%), which required 5% of resin soap and 3% of petroleum, and similarly good results are yielded with papers containing bleached sulphite and $>$ 15% of rags or groundwood. In general, petroleum alone had only a mild cleansing action; fatty and resin soaps were more efficient, but the latter frothed violently, giving rise to high losses. Addition of NaCl improved results. An average recovery of 70% was obtained. D. A. C.

Artificial sponges.—See XIII. **Decomp. of sulphite waste liquor.**—See XXIII.

PATENTS.

Removal of wool from animal skins. W. KRITCHEVSKY (U.S.P. 2,005,746—7, 25.6.35. Appl., [A] 7.5.34, [B] 3.12.34).—Dyed animal skins are treated with (i) a dil. solution of (A) a mineral acid or (B) H_3PO_4 , with addition of a finely-divided, non-ferrous metal if desired, to free the wool from the skin, (ii) a hot solution of a mild alkali (borax) containing a buffer (soap, urea), and (iii) a reducing agent ($NaHSO_3$). F. R. E.

Textile-fibre spraying oils. J. G. DETWILER, T. C. HEISIG, J. E. ROSNELL, and F. W. HALL, Assrs. to TEXAS CO. (U.S.P. 2,002,885, 28.5.35. Appl., 9.9.32).—Cotton fibre is sprayed with a light lubricating oil containing $>$ 5% of a H_2O -sol. soap and a smaller amount ($>$ 1%) of lecithin together with a small proportion of an antioxidant (β - $C_{10}H_7$ OH, quinol). F. R. E.

Compounding of flame- and water-proofing compositions for aqueous cellulosic media. F. W. HOCHSTETTER, Assr. to TREESDALE LABS., INC. (U.S.P. 2,003,148, 28.5.35. Appl., 23.3.33).—Aq. solutions of (1) $(NH_4)_2SO_4$, $(NH_4)_2CO_3$, H_3BO_3 , borax, starch, and soap, (2) NH_4Cl , H_3BO_3 , borax, gelatin, glycerin, soap, and dextrin, (3) soap bark, and (4) alum are prepared separately; after mixing (1), (2), and (4), (3) is added and the mixture applied to paper, textiles, etc. and dried. F. R. E.

Manufacture of textile articles. J. V. PUYMBROECK (B.P. 445,809, 5.3.35).—Before spinning into yarn, fibrous material consisting wholly or partly of "secreted" fibres (all animal fibres, particularly those of rabbit and hare), which have been treated to impart a felted texture, are "oiled" with a mucilaginous substance consisting of a decoction of malvaceous plants, e.g., mallow roots or *Compositæ* plants (coltsfoot). F. R. E.

Improving the quality of inferior kinds of natural cork. R. B. BRUGUERA (B.P. 445,854, 20.7.34. Spain, 10.8.33).—The pores and cracks are filled with cork dust and a binder in the form of an aq. suspension of rubber (I) (latex) with addition of one or more of the following: a solvent for (I), a dil. (I) solution, casein, dextrin, albumin, or an aq. dispersion of viscose or cellulose. F. R. E.

Digestion of vegetable growths to produce cellulose. H. B. KIPPER (U.S.P. 2,005,190, 18.6.35. Appl., 13.4.33).—Wood, cottonseed hulls, etc. are treated with HNO_3 and C_6H_6 or with H_2O and C_6H_6 at $>$ the b.p./ $>$ 1 atm., and mechanically disintegrated. After removal of the C_6H_6 , the residue is treated with hot aq. NaOH, further disintegrated, and washed. F. R. E.

Treatment of cellulosic material prior to esterification. C. J. MALM and C. R. FORDYCE, Assrs. to

EASTMAN KODAK CO. (U.S.P. 2,000,603, 7.5.35. Appl., 18.2.32).—Cellulose is pretreated with liquid SO_2 under pressure and a small amount of catalyst (H_2SO_4), and then esterified as usual after removal of the SO_2 by draining and distilling. F. R. E.

Fibrous esterification of cellulose. C. J. MALM and C. L. FLETCHER, Assrs. to EASTMAN KODAK CO. (U.S.P. 2,000,602, 7.5.35. Appl., 2.2.32).—Cellulose is treated with an org. acid, Ac_2O , and HClO_4 as catalyst, in presence of an amount of aliphatic ether of b.p. $> 70^\circ$ (Bu^n_2O) sufficient to prevent dissolution of the ester formed. F. R. E.

Esterification of cellulose with a modified perchloric acid catalyst. C. J. STAUD and J. D. COLEMAN, Assrs. to EASTMAN KODAK CO. (U.S.P. 2,005,398, 18.6.35. Appl., 4.3.32).—The catalyst consists of a mixture of HClO_4 with H_3PO_4 or HNO_3 as retardant. F. R. E.

Cellulose acetate composition comprising a tert.-alcohol. E. R. TAYLOR, Assr. to EASTMAN KODAK CO. (U.S.P. 2,000,622, 7.5.35. Appl., 2.2.32).—The ester is dissolved in propylene chloride containing a substantial proportion of a tert.-alcohol ($< \text{C}_6$), e.g., Bu^nOH . Highly-flexible films are produced. F. R. E.

Propionation of cellulosic material. C. J. STAUD and R. H. V. DYKE, Assrs. to EASTMAN KODAK CO. (U.S.P. 2,000,621, 7.5.35. Appl., 14.1.33).—Cellulosic material is treated with EtCO_2H , an impelling anhydride (Ac_2O), and a non-solvent (CCl_4) if a fibrous ester is required, in presence of a catalyst consisting of SO_2 and an oxide of N containing > 50 wt.-% of O, e.g., NO_2 . F. R. E.

Reducing the viscosity of cellulose ester waste. R. SPELLING (B.P. 445,742, 17.5.35).—Film waste is treated, either before or both before and after removal of gelatin and albumin layers, with dil. aq. alkali, e.g., 0.5–2.5% aq. NH_3 , at 40–60° for 2–4 hr. It is afterwards rinsed in dil. acid, e.g., 0.5% bisulphite solution, and finally with hot H_2O . F. R. E.

Hydrolysis of cellulose esters. T. F. MURRAY, JUN., and C. J. STAUD, Assrs. to EASTMAN KODAK CO. (U.S.P. 2,005,383, 18.6.35. Appl., 20.2.32).—The solid ester is treated with an EtOH solution of ZnI_2 or FeCl_3 . F. R. E.

Manufacture of artificial silk. H. G. STONE, Assr. to EASTMAN KODAK CO. (U.S.P. 2,000,048, 7.5.35. Appl., 21.9.32).—A solution (*S*) of an org. ester of cellulose is heated above room temp. ($< 74^\circ$) and spun into a zone of substantially immobile evaporative atm. of lower temp. than that of *S*, and then into a current of evaporative medium, the temp. of which (74 – 120°) is $>$ that of *S* and increases with progress of the filament therethrough. F. R. E.

Manufacture of threads, films, and similar articles. BRIT. CELANESE, LTD. (B.P. 446,132, 3.4.35. U.S., 5.4.34).—The materials are made from a composition containing cellulose acetate (40–50% Ac) or another org. ester of cellulose of a corresponding degree of substitution (I), a di- or poly-hydric alcohol or ester or ether thereof (II), e.g., $\text{C}_3\text{H}_5(\text{OH})_3$ or $\text{C}_2\text{H}_4(\text{OH})_2$

which is a non-solvent for (I) at room temp., and a solvent for (I) which is compatible with (II), e.g., COMe_2 – EtOH . F. R. E.

Manufacture from nitrocellulose of skins and envelopes particularly adapted for use as artificial sausage casings. F. GOLDBERGER, Assr. to SYLVANIA INDUSTRIAL CORP. (U.S.P. 2,000,836, 7.5.35. Appl., 22.1.34. Ger., 5.9.31).—A solution of nitrocellulose is extruded through an annular orifice, solidified, and partly denitrated with sulphhydrates to 0.5–2.0% N. F. R. E.

Manufacture of artificial threads, filaments, and the like. COURTAULDS, LTD., and H. J. HEGAN (B.P. 445,788, 18.10.34. Cf. B.P. 290,833; B., 1928, 565).—The filament cake is retained in its compressed and deformed state by wrapping in a cloth or band during drying. F. R. E.

Apparatus for drying cakes of artificial threads, filaments, and the like. COURTAULDS, LTD., and H. J. HEGAN (B.P. 445,539, 14.9.34).—The application of drying medium is confined to the inside of the cake only by subjecting the cake or pile of cakes to end-pressure, constantly applied. B. M. V.

Artificial silk filament [of reduced lustre]. J. A. SINGMASTER (U.S.P. 2,000,671, 7.5.35. Appl., 29.6.29).— \rightarrow 4% of finely-divided ZrO_2 is incorporated with the spinning solution, together with finely-divided oil, if desired, as a softener. F. R. E.

Digesting apparatus [for fibrous material]. J. J. DE LA ROZA, SEN., Assr. to DE LA ROZA CORP. (U.S.P. 2,011,799, 20.8.35. Appl., 8.10.34).—A volumetric discharge valve for a digester comprises a rotor divided into sector-shaped buckets running against a suitable inlet port; means for taking up wear are provided. B. M. V.

Recovering solid matter from paper- and pulp-mill effluent. R. J. VENN (B.P. 445,890, 19.10.34).—After formation of a cake on a rotary filter drum from any fibrous sludge to be found about the mill, the mill effluent is filtered through the cake and continuously a substantial proportion of the cake is returned to a mixer at the feed, i.e., is added as filter aid to the prefill mill effluent. B. M. V.

Manufacture of paper. H. and P. KLEIBAUMHÜTER (P. BAUMHÜTER) (B.P. 446,049, 11.7.35. Ger., 11.7.34).—Sisal or Manila fibres are loosely spun into threads which are then deposited in directions at right-angles to each other, forming a very loosely woven fabric. This is incorporated in paper so that the fibres fill the interstices between the threads. Plant is claimed. D. A. C.

Manufacture of paper. H. J. FINDER and D. H. GREENE (U.S.P. 1,998,190, 16.4.35. Appl., 28.8.33).—Addition to wood pulp of 5–30% of oat hulls ground through 30-mesh is claimed. A. R. P.

Paper-making. R. THOMAS (U.S.P. 1,998,344, 16.4.35. Appl., 5.3.34).—Wood is digested at 125 lb. steam pressure with aq. NaOH (*d* 1.06) containing borax 2.5, NH_4Cl 2.5, $\text{H}_2\text{C}_2\text{O}_4$ 2.5, starch 1.875, and Na_2SO_4 1.52 lb. per 100 gals. (U.S.). A. R. P.

Manufacture of strengthened absorptive paper. M. O. SCHUR, Assr. to BROWN CO. (U.S.P. 2,005,397,

18.6.35. Appl., 21.1.33).—About 0.75% of regenerated cellulose (xanthate) and 0.05–0.25% of a wetting agent are incorporated in paper (for use as towelling etc.) by passing the paper through baths of the reagents. About 1% each of H_3BO_3 and $(NH_4)_2CO_3$ are added to the cellulose xanthate bath to promote regeneration and remove S. D. A. C.

Manufacture of pigmented paper. AMER. ZINC, LEAD, & SMELTING Co. (B.P. 445,814, 7.6.35. U.S., 31.7.34).—ZnS pigment is prepared by rapidly mixing boiling solutions of $ZnSO_4$ and sulphite-free Na or NH_4 thiosulphate containing small quantities of Na_2S . The mixture is vigorously agitated, at the same time maintaining a const. p_H by addition of Na_2CO_3 . The ppt. is filtered, washed free from sulphate, and added to the pulp stock. Alternatively the ZnS may also be pptd. in presence of pulp. The ZnO content is claimed to be 3–5%. D. A. C.

Coating of paper. C. N. CONE and E. D. BROWN, Assrs. to GLIDDEN Co. (U.S.P. 2,006,229, 25.6.35. Appl., 5.3.30).—Pressed oil-seed cake, after extraction of the oil, is ground to 80-mesh and the protein extracted by heating, e.g., to 16–49°, in a weakly alkaline aq. solution. Insol. material is separated, and the protein pptd. with H_2SO_4 at 49° and p_H 4.4. It is then heated in aq. solution with Na_2CO_3 , borax, Na_3PO_4 , and $NaHSO_3$ at 49–66° and a CaO-containing mineral filler or CaO itself is mixed in with it, the mixture being used as the coating agent. D. A. C.

Dull-finish coated paper. D. B. BRADNER, Assr. to CHAMPION COATED PAPER Co. (U.S.P. 2,006,209, 25.6.35. Appl., 25.5.33).—Pulverised cellulose, prepared from dry bleached chemical pulp by subjecting to a ball-mill action to pass 200-mesh, is incorporated in the usual coating mixture. The paper is coated, dried, supercalendered, and moistened as usual. D. A. C.

Safety paper. J. W. NEFF, Assr. to M. C. JOHNSON Co. (U.S.P. 2,005,105, 18.6.35. Appl., 23.6.30. Renewed 18.4.33).—Paper is printed with colourless inks which produce a colour in presence of ink eradicators (oxidising or bleaching agents). Suitable inks consist of $Co_2Fe(CN)_6$ or dehydrothio-*p*-toluidine mixed with thin colourless varnish. D. A. C.

Manufacture of cellulose material. F. KIEL, Assr. to ZELLSTOFFFABR. WALDHOF (U.S.P. 2,005,378, 18.6.35. Appl., 9.11.32. Ger., 16.12.31).—The discoloration (reddening) of materials, e.g., paper, made from unbleached cellulose is prevented by impregnation of the fibrous material with a solution of $SnCl_2$. F. R. E.

Surface-sizing of paper with animal glue. R. SILBERBERGER (B.P. 444,787, 16.8.35. Austr., 16.8.34).—A mixture of urea or $CS(NH_2)_2$ with CH_2O or trioxymethylene in such proportions that rapid cooling occurs on stirring is added to the size bath, through which the paper web is passed; thence it is dried by steam-heated calenders. F. R. E.

Composition for coating sheets, fibrous stocks, and the like. C. M. BOYCE, Assr. to J. R. DITMARS (U.S.P. 2,003,065, 28.5.35. Appl., 20.6.31).—Paper

bearing an ink impression is coated with an aq. or aq.-alcoholic ammoniacal solution of casein containing gelatin, a hardening agent (CH_2O , alum), and a flexibility-imparting agent (glycerin, sulphonated oil), and the film is dried in contact with a polished surface. F. R. E.

Transfer decorating. T. S. REESE (U.S.P. 1,998,638, 23.4.35. Appl., 27.4.32).—The gummed surface of a backing paper is coated with a plastic nitrocellulose film on which the design is printed, and this is then applied to the surface to be decorated which has previously been coated with a film of colour complementary to the colours of the design. A. R. P.

Refining pulps. Filtering apparatus.—See I. **Bleaching pulp.**—See VI. **Moulded fibrous materials. Wallboard.**—See IX. **Wrapping.**—See XIV. **Fibrous materials from animal skins. Tanning materials.**—See XV.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Determination of active chlorine in bleach liquors. E. KORNREICH (Textilber., 1936, 17, 227–228).—Results obtained by using KI and 0.1N- $Na_2S_2O_3$ are too high since Cl in the form of chloramines is included, which reacts with KI but is ineffective in bleaching textiles. Accurate results are obtained by this method by deducting the chloramine-Cl determined as above after first destroying all other active Cl by adding H_2O_2 to the bleach liquor until it just fails to discharge the colour of aq. Me-orange (0.005 g. in 1 litre of 10% H_2SO_4). A. J. H.

Machinery layout of a knitted-goods dyehouse. A. S. GOLDBERGER (Amer. Dyestuff Rep., 1936, 25, 199–203, 222).—Types of modern yarn and fabric dyeing machines are illustrated and described, and plans of their layout in two separate dyehouses are given. A. J. H.

Chrome dyes and mordants in dyeing and printing. M. KISSILEV (Rev. Gén. Mat. Col., 1936, 40, 202–209).—A review is given containing recipes for the prep. of all the more important chrome mordants. S. C.

Mordanting [cotton] with antimony tannate. H. J. HENK (Textilber., 1936, 17, 251–252).—In mordanting cellulose fibres by successive treatments with a tannin (I) and tartar emetic (II), absorption of (I) is accompanied by its hydrolysis into glucose and gallic acid (III) which reacts with Sb_2O_3 (IV) resulting from hydrolysis of (II) to form one of two possible insol. gallates according to the relative proportions of (I) and (II) used. For mordanting, 4 mols. of (III) per mol. of (IV) should be employed since the resulting Sb gallate can combine chemically with basic dyes to form fast lakes, whereas the gallate produced when 2 mols. of (III) per mol. of (IV) are used forms only absorption compounds with basic dyes and these have inferior fastness. A. J. H.

Dyeing of felt hats. F. T. SYKES (Dyer, 1936, 75, 307–308, 355–356, 405–406, 453–456).—Methods, the most suitable dyes, machinery, fastness requirements, and practical difficulties are described. A. J. H.

Dyeing of rayon staple-fibre fabrics. ANON. (Silk & Rayon, 1936, 10, 336, 338).—Conditions which must be observed in the dyeing of woven fabrics to ensure the necessary soft wool-like handle in the finished fabric are described with reference to the properties of rayon staple-fibre yarns. Dyeing in a winch machine is preferred. A. J. H.

Dyeing and printing of acetate rayon. J. ROLLAND (Rev. Gén. Mat. Col., 1936, 40, 65—77).—"Copper" NH_2Ph -black (I) is produced on acetate-rayon fabric (II) by padding it successively with a mixture of NH_2Ph (50 c.c.), $\text{CHCl}_2\text{-CCl}_2$ (11), and solvent naphtha (39) emulsified with 10% aq. Igepon-T (I.G.) and thickened with gum tragacanth, and an oxidising liquor containing (per litre) NaClO_3 (42 g.), CuSO_4 (4), and HCl (118, *d* 1.18), then ageing in a warm moist atm., and afterchroming and soaping. Alternatively, this method is simplified by padding once only with a liquor consisting of $\text{NH}_2\text{Ph.HCl}$ (80 g.), NH_2Ph (5), NaClO_3 (50), CuSO_4 *cryst.* (5), COMeEt (173), $(\text{CH}_2\text{-OH})_2$ (86), and H_2O (600). An excellent shade of "prussiate" (I) is produced by padding (II) with a liquor consisting of $\text{NH}_2\text{Ph.HCl}$ (80 g.), NH_2Ph (5), HCO_2H (300), $\text{K}_4\text{Fe(CN)}_6$ *cryst.* (70), NaClO_3 (26), and H_2O (514), followed by drying at a low temp., ageing, afterchroming, and soaping, but when clear white reserves are required it is preferred to use a less acid padding liquor consisting of $\text{NH}_2\text{Ph.HCl}$ (100 g.), NH_2Ph (6), HCO_2H (150), $\text{K}_4\text{Fe(CN)}_6$ *cryst.* (68), NaClO_3 (37), 6% aq. gum tragacanth (421), and H_2O (217) although the resulting black shade is less intense. Methods are described and suitable dyes listed for dyeing and printing mixture fabrics of acetate rayon with one or more of cotton, viscose rayon, wool, and silk. A. J. H.

Dyeing and finishing of rayons. A. J. HALL (Text. Mercury & Argus [Rayon Suppl., May 8], 1936, 94, 25—26).—Recent developments are reviewed with reference to woven and knitted fabrics. A. J. H.

Determination of dyes in residual [dye] liquors. T. KENNEDY (Dyer, 1936, 75, 353—354, 359).—Dyeing and chemical methods are discussed and details given of a photometric method found useful for controlling large-scale dyeing. In examining dye liquors containing direct (I) and acetate-rayon dyes (II), the liquor is first filtered [(I) is determined in the filtrate] and the residue of (II) dissolved in EtOH for photometric determination. β -Hydroxynaphthoic acid is pptd. and determined as its Ag salt. A. J. H.

Printing [textiles] with Algol Blue. C. SUNDER and C. FROSSARELLI (Rev. Gén. Mat. Col., 1936, 40, 77—78).—Deeper shades are obtained in printing with Algol Blue (I) when there are present during steaming borax (to maintain the leuco-dye in solution) and certain commercial brands of light-coloured glycerin to act as antioxidant. A satisfactory printing paste consists of glycerin (200 g.), (I) (300), H_2O (125), anhyd. $\text{Na}_2\text{S}_2\text{O}_4$ (40), aq. NaOH of *d* 1.19 (80), borax (80), thickening gum (160), and Rongalite-C (15). A. J. H.

Practice and prospects of the cleaning industry: problems in laundering. J. W. BARDLSEY (J. Soc. Dyers & Col., 1936, 52, 161—165).—A lecture.

Textile uses of talc. R. BENA (Dyer, 1936, 75, 463).—Talc is a useful "binder" constituent of yarn-sizing compositions. Typical sizing recipes are given.

A. J. H.

Use of rubber latex with textiles. B. A. HAROLD (Amer. Dyestuff Rep., 1936, 25, 111—115).—Uses of latex in the manufacture of viscose rayon, artificial leather, and suede fabrics, and the application of compounded latex to fabrics are described. A compound latex suitable for backing carpets consists of latex (26 gals.), clay (90 lb.), whiting (90), ZnO (3), S (I), a vulcanising accelerator (1), an anti-oxidant (0.5), and 128 gals. of an alkaline paste containing 55 lb. of tapioca flour; NaOH is preferred to NH_3 for stabilising such latex compositions. Dry starch and gum karaya are more suitable than starch pastes for thickening 50—70% latex concentrates. The stability of a latex composition is measured by the time required for coagulation after the introduction of a high-speed mixer revolving at 10,000 r.p.m.

A. J. H.

Wetting-out [agents].—See III. Leather dyeing. —See XV.

PATENTS.

Apparatus for refining [bleaching] of pulp and the like. C. B. THORNE (U.S.P. 2,008,603, 16.7.35. Appl., 21.9.31).—For reaction with bleaching agent low-*d* pulp is caused to flow through a long, shallow conduit by gravity and is checked by flow regulators which produce mild agitation at a no. of points.

B. M. V.

Manufacture of [sheet material carrying] bleaching and stripping agent. M. AISEN (U.S.P. 2,005,448, 18.6.35. Appl., 18.3.32).—A thin sheet of, e.g., paper is impregnated with a bleaching agent, e.g., NaBO_3 , sulphonylates, etc., an adhesive, e.g., gum arabic, an adherent carrier, e.g., gum tragacanth, a softening agent, e.g., glycerol, and a surface-tension-reducing compound, e.g., Turkey-red oil. Such prepared paper, e.g., in booklet form, provides a simple means of preparing a bleaching bath, by immersion of a sheet in H_2O .

A. W. B.

Bleaching, washing, and cleansing agents, particularly for use in water containing iron. W. J. TENNANT. From HENKEL & Co., G.M.B.H. (B.P. 443,731, 31.8.34).—Mixtures containing 1 pt. of O-yielding compounds, e.g., NaBO_3 , Na_2O_2 , 2—6 pts. of foaming agents, e.g., soap, sulphonated alcohols, etc., and 1—3 pts. of phosphates having less H_2O than has H_3PO_4 , e.g., NaPO_3 , poly- or pyro-phosphates, are claimed; known wetting, emulsifying, cleansing, or penetrating agents or solvents may also be added. A. W. B.

Preparation of impregnating baths for producing azo dyes on textile fibres. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 443,638, 28.8.34).—Passive coupling components (I) of ice colours are dissolved with the aid of H_2O -sol. org. N bases (II), containing at least one *n*-C chain of $\leq \text{C}_8$, capable of forming salts with (I), e.g., $\text{C}_{12}\text{H}_{25}\text{N}(\text{C}_2\text{H}_4\text{-OH})_3\text{-OH}$. (II) may also be added to a bath made with the aid of NaOH .

A. W. B.

Dyeing and printing vegetable fibres or artificial fibres of regenerated cellulose by means of leuco-

sulphuric acid ester salts of vat dyes. I. G. FARB-ENIND. A.-G. (B.P. 443,588, 31.8.34. Ger., 1.9.33).—The fibres are treated, prior to dyeing, with org. bases or salts thereof (I) capable of forming sparingly sol. salts with sulphuric esters of leuco-vat dyes; (I) need not have affinity for the fibre, and an extremely wide range of compounds are applicable, *e.g.*, $C_{18}H_{37} \cdot NC_5H_5Br$, $CH_2Ph \cdot PPh_3Cl$. Faster, deeper, and brighter shades are claimed. A. W. B.

Production of prints on cloth. J. G. KÄSTNER (B.P. 444,838, 31.12.34. Ger., 30.12.33).—Fabrics are printed with dyes requiring alkali for fixation, thickened with vegetable mucilages (previously decomposed) which are not coagulable by alkali, *e.g.*, carob-bean kernel perisperms, and the dried prints are padded in alkaline baths containing reducing agents other than hyposulphite, *e.g.*, Formosul, squeezed out, steamed, and finished. A. W. B.

[Hydroextraction] treatment of textile material. SOC. À RESPONS. LIM. "GANEVAL & ST.-GENIS" (B.P. 443,672, 15.5.35. Fr., 15.5.34, 26.12.34, and 27.2.35).—Much higher dehydration is obtained during the hydro-extraction of wet textile materials, especially cakes of rayon, by operating in an atm. of steam at 100°. A. J. H.

Glossing of textile materials [containing organic derivatives of cellulose]. BRIT. CELANESE, LTD., A. MELLOR, and R. J. MANN (B.P. 443,787, 5.9.34).—Ribbon, fabric, etc. is surface-glossed by passage through a 2-bowl calender the upper, steam-heated, steel bowl of which (at \sphericalangle 125°, but 130° for black materials) rotates 1.8–2.2 times faster than the lower, blanket-covered, soft paper bowl. A. J. H.

Treatment of thread and compositions suitable for use therein. BOSTON BLACKING CO., LTD., ASSEES. OF G. H. BROTHER (B.P. 444,691, 25.9.34. U.S., 5.10.33).—The threads are treated with a H_2O -in-oil type of emulsion, *e.g.*, H_2O rendered alkaline with Na_3PO_4 , NH_3 , etc., with rosin, a plasticiser (rosin oil), rubber, and a drying oil dissolved in a solvent (naphtha). F. R. E.

Manufacture and use of textile-treating baths. DEUTS. HYDRIERWERKE A.-G. (B.P. 444,605, 22.12.34. Ger., 22.12.33).—Fat-solvents which are insol. in alkaline liquors, *e.g.*, $BuOH$, $C_8H_{17} \cdot OH$, $CH_2Ph \cdot OH$, acetals and ethers of polyhydric alcohols, or chlorinated hydrocarbons, dissolve in alkaline baths (I) containing hydrogenation products of furfuraldehyde, *e.g.*, tetrahydrofurfuryl alcohol. Such mixtures are claimed for increasing the wetting-out capacity of (I). A. W. B.

Size composition for artificial silk. H. S. BOSLAND and F. G. LA PIANA, ASSS. TO STEIN, HALL & CO., INC. (U.S.P. 2,010,134, 3.8.35. Appl., 9.9.31).—Casein 65–90 (70), an org. hydroscopic material 10–35 (27.5), and a preservative (NaF , 2.5%) are dissolved in an alkaline aq. solution. B. M. V.

[Manufacture of] yarns, threads, and the like containing staple fibre made of or containing an organic derivative of cellulose. BRIT. CELANESE, LTD. (B.P. 445,645, 2.4.35. U.S., 5.4.34).—Staple fibre produced by cutting continuous filaments of org. derivatives of cellulose is weighted with a Sn compound

before or after cutting, mixed with natural fibres (cotton or wool) if desired, and spun into yarn. Mixed yarns may be dyed a uniform colour with a single dye. F. R. E.

Delustring of lustrous fibrous materials. BÖHME FETTCHEM.-GES.M.B.H. (B.P. 443,758, 16.7.35. Ger., 28.8.34).—Artificial silk is treated with H_2O -insol. compounds derived from org. bases or quaternary NH_4 or phosphonium or ternary sulphonium salts containing at least one hydrocarbon chain of $\sphericalangle C_6$ (I), *e.g.*, dodecyl pyridinium bisulphate (II), and suitable acid components (III), *e.g.*, resin acids, HPO_3 , H_3BO_3 , peptised by an excess of (I) and then after-treated with (III). (I) and (III) must not give intensely coloured products with Fe salts. In an example, material is treated with the compound derived from (II) and colophony, (II) being in excess, and then after-treated with resin soap. A. W. B.

Testing the imperviousness to water of impregnated textiles. R. KERN, ASSR. TO CHEM. FABR. R. BAUMHEIER A.-G. (U.S.P. 2,012,762, 27.8.35. Appl., 7.8.33. Ger., 13.8.32).—The textile is subjected on one side to a comparatively non-conducting liquid (*e.g.*, pure H_2O) under controlled condition of dropping or static pressure head, and the time of penetration of H_2O is determined by applying to the other side of the textile porous electrodes which have been impregnated with a conducting salt and dried, the circuit being completed through a battery and current indicator. B. M. V.

Dyeing or analogous treatment of [coiled slivers of] textile fibres [on perforated tubes] in the preparatory stages of spinning. J. BRANDWOOD (B.P. 446,260, 25.7., 30.8., 18.10., and 19.12.34).

Flame-proofing (etc.) compositions.—See V. **Artificial leather.**—See XV.

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

Preparation of chromic acid. ANON. (J. Chem. Eng. China, 1936, 3, 39–42).—If $K_2Cr_2O_7$ is treated with 68% HNO_3 , H_2CrO_4 is obtained of 98% purity and in 90% yield. It may be separated from the KNO_3 by fractional crystallisation and the excess of HNO_3 returned to process. C. I.

Silica gel from nepheline. M. O. CHARMANDARIAN and N. I. TROITZKAJA (J. Appl. Chem. Russ., 1936, 9, 298–303).—Active SiO_2 gel is obtained from nepheline (I) and 22% H_2SO_4 at 80°, taking 1 g. of H_2SO_4 per kg. of (I). R. T.

Wettability by fused sulphur of the minerals quartz, calcite, and gypsum. K. N. SAMOCHVALOV and N. A. GELD (J. Appl. Chem. Russ., 1936, 9, 198–207).—The angle of contact, θ , of fused S at 120–140° is 54° with $CaSO_4 \cdot \frac{1}{2}H_2O$ (I), and 24° with calcite (II); gypsum (III) and quartz (IV) are not wetted by S. When the S contains \sphericalangle 1% of bitumens θ remains unchanged for (I) and (II), but becomes 81° for (IV). In absence of bitumens (III) is the most objectionable impurity, in view of its ready conversion into (I), whilst in their presence (IV) is the chief cause of low yields in the melting-out of S from minerals. The beneficial

action of Na silicate, oak-bark extract, or Na_2CO_3 is ascribed to reduction of wetting by S of inert minerals present in the ore. R. T.

Technical applications, present position, and prospects of the use of oxygen. E. KARWAT (Brennstoff-Chem., 1936, 17, 141—149).— O_2 can now be produced for 1.53 Pf. per cu. m. The advantages of the use of O_2 in place of air in various technical operations are reviewed, with reference to the literature of the subject. A. B. M.

Handling and use of liquid chlorine. F. HOLT (Chem. & Ind., 1936, 245—255, 269—271).—Liquid Cl_2 is handled in welded or solid drawn-steel containers; a summary of the regulations for the design and manufacture of these in different countries is given. Care should be taken that moisture does not get into the containers. Jointing material for pipe-lines should be compressed asbestos fibre impregnated with graphite. Steel valves with monel or stainless-steel spindles and rings should be fitted. No section of a pipe-line between two closed valves should be left full of liquid Cl_2 . The uses of liquid Cl_2 are discussed. D. K. M.

Urea.—See III. **Determining active Cl in bleach liquors.**—See VI.

PATENTS.

Manufacture of sulphuric acid. C. B. CLARK, Assr. to AMER. CYANAMID & CHEM. CORP. (U.S.P. 1,995,292, 26.3.35. Appl., 5.9.29).—In the manufacture of SO_3 by the contact process the catalyst is arranged in a vertical column between two concentric perforated screens and the gas mixture is caused to take a zig-zag course through the catalyst; the whole apparatus is enclosed in a jacket through which cooling air is passed. A. R. P.

Nitric acid manufacture. N. TITLSTAD, Assr. to CHEM. CONSTRUCTION CORP. (U.S.P. 1,998,106, 16.4.35. Appl., 3.12.31).—A multiple-drum absorption system interconnected with perforated pipes is claimed for converting the gases from NH_3 oxidation into HNO_3 . A. R. P.

Purification of caustic [alkali] solutions. W. H. KOCH, Assr. to MATHIESON ALKALI WORKS, INC. (U.S.P. 1,997,691, 16.4.35. Appl., 16.5.32).—Colloidal $\text{Fe}(\text{OH})_3$ is removed from 18—50% aq. NaOH or KOH by agitating the solution with 0.15% of light MgO or $\text{Mg}(\text{OH})_2$ and allowing the ppt. to settle. A. R. P.

Purification of concentrated caustic soda solutions. R. E. VAN DER COOK and E. SWEETLAND, Assrs. to PENNSYLVANIA SALT MANUF. CO. (U.S.P. 1,998,471, 23.4.35. Appl., 17.2.34).—The NaCl is removed by addition of Na_2SO_4 as the triple compound $\text{NaOH}\cdot\text{NaCl}\cdot\text{Na}_2\text{SO}_4$ and the ppt. is washed with H_2O at $> 80^\circ$ to leave a residue of Na_2SO_4 and yield a solution of NaCl containing $\approx 16\%$ of NaOH. A. R. P.

Conversion of sodium sesquicarbonate into sodium [carbonate] monohydrate. R. B. MACMULLIN and G. L. CUNNINGHAM, Assrs. to MATHIESON ALKALI WORKS, INC. (U.S.P. 1,994,892, 19.3.35. Appl., 6.7.32).—Aq. $\text{NaHCO}_3\cdot\text{Na}_2\text{CO}_3$ is treated with $\text{Ca}(\text{OH})_2$ until the ratio of $\text{CO}_3^{''}:\text{Na}'$ is < 0.6 , the pptd. CaCO_3

is removed, and the solution treated with NH_3 to ppt. $\text{Na}_2\text{CO}_3\cdot\text{H}_2\text{O}$ without forming $\text{NH}_2\cdot\text{CO}_2\text{Na}$. A. R. P.

Production of alkali sulphite solutions. G. HAGLUND, Assr. to PATENTAKTIEB. GRÖNDAL-RAMÉN (U.S.P. 2,010,077, 6.8.35. Appl., 12.1.33. Ger., 29.4.32).—The raw material is roasted to eliminate org. matter and form Na_2SO_4 substantially free from S' and $\text{S}_2\text{O}_3^{''}$. An aq. solution is treated with SO_2 and CaCO_3 to convert all S in solution into HSO_3' , and then more Ca compound is added until all Ca salts are pptd. as CaSO_3 and the alkali salts are converted into monosulphite and/or bisulphite as desired. B. M. V.

Production of anhydrous alkali hyposulphites [thiosulphates]. B. M. VANDERBILT and H. ADLER, Assrs. to VICTOR CHEM. WORKS (U.S.P. 2,010,615, 6.8.35. Appl., 31.7.33).—Alkali formate, SO_2 , an alkali-metal compound (hydroxide or carbonate), and MeOH and/or EtOH (70—80% of total alcohol) are caused to react. The SO_2 is introduced at $< 30^\circ$; the mixture is heated rapidly to 50—60°, slowly to 65—75°, and maintained in the latter range for several hr. Superatm. pressure is advantageous. B. M. V.

Recovery of crystalline salts from solutions. S. H. DAVIS, C. O. ANDERSON, and R. J. STENGL, Assrs. to OZARK CHEM. CO. (U.S.P. 2,007,956, 16.7.35. Appl., 9.9.32).—For obtaining $\text{Na}_2\text{SO}_4\cdot 10\text{H}_2\text{O}$ from natural brines of high concn. a considerable vol. of brine is maintained in closed circulation with countercurrent surface cooling. The crystals are maintained in suspension until they have grown, and are mechanically scraped off the heat-transferring walls. A portion of the crystal pulp is removed at one point and fresh uncooled brine added at an adjacent point. B. M. V.

Flaked sodium bisulphate composition. E. R. BOLLER, Assr. to GRASELLI CHEM. CO. (U.S.P. 1,998,605, 23.4.35. Appl., 31.5.34).—A paste of ground NaHSO_4 and org. adhesive, e.g., glue or gelatin, is dried on rollers to produce a flaky, readily sol. product. A. R. P.

Manufacture of stable sodium hypochlorite. C. W. KUEHNE (U.S.P. 1,996,769, 9.4.35. Appl., 1.6.32).— $\text{NaOCl}\cdot 4\text{H}_2\text{O}$ crystals are treated at 18° with dry air free from CO_2 until 1—2 mols. of H_2O are removed. L. C. M.

Physiologically balanced salt mixture. E. J. WOLF (U.S.P. 1,998,179, 16.4.35. Appl., 22.12.31. Ger., 27.12.30).—The mixture contains Na, K, Mg, and Ca salts in 40 : 2 : 1 : 1 molar proportions, e.g., NaCl 86.81, KCl 5.54, MgCl_2 3.53, and CaCl_2 4.10%, or NaCl 74.55, K_2 tartrate 7.47, Mg lactate 8.15, and Ca lactate 9.78%. A. R. P.

Fusion process [for treating phosphate rock]. E. LITTLE (U.S.P. 1,998,631, 23.4.35. Appl., 14.4.32).—A 1 : 5 mixture of the finely-ground rock and $(\text{NH}_4)_2\text{CO}_3$, or a mixture thereof with $(\text{NH}_4)_2\text{SO}_4$, is heated at 150—200° under pressure to increase the proportion of H_2O - and citrate-sol. P_2O_5 . A. R. P.

Production of disodium phosphate. F. M. ANABLE and G. KLEIN, Assrs. to VICTOR CHEM. WORKS (U.S.P. 1,998,182, 16.4.35. Appl., 16.7.32).— AlPO_4 and FePO_4 are removed from aq. Na_2HPO_4 by adjusting the p_{H} to

8.85—9.0 (8.9) at d 1.38 and boiling until the ppt. coagulates. A. R. P.

Saturator for production of ammonium salts and manufacture of such salts. W. TIDY, Assr. to SEMET-SOLVAY ENG. CORP. (U.S.P. 1,997,757, 16.4.35. Appl., 15.8.31).—An acid solution of $(\text{NH}_4)_2\text{SO}_4$ is circulated continuously through a saturator into which the ammoniacal gas is supplied, the solution being sprayed into the top of the vessel, which is kept about half full of solution so that the crystals formed have an opportunity to grow as they fall to the bottom of the vessel. A. R. P.

Manufacture of ammonium and alkali formates. A. LEROUX, Assr. to FRANCO-BELGE D'OUGRÉE (U.S.P. 1,995,211, 19.3.35. Appl., 11.3.31. Fr., 12.3.30).—Aq. NaHCO_3 or NH_4HCO_3 is treated at 250° —crit. temp. of the solution with H_2 at ≤ 50 atm. in presence of a reduced Ni catalyst. A. R. P.

Production of carbides and manufacture of acetylene therefrom. R. G. WULFF, Assr. to WULFF PROCESS Co. (U.S.P. 1,996,185, 2.4.35. Appl., 14.10.29).—Coke impregnated with BaO , CaO , Na_2O , or SrO is treated at 500 — 1500° with gas containing CH_4 and C_2H_6 ; the carbide-coated material is continuously decomposed by an atm. containing H_2O , producing C_2H_2 , and the oxide is returned to the next cycle. L. C. M.

Production of copper sulphate. H. WEIDMANN, Assr. to AMER. LURGI CORP. (U.S.P. 1,995,555, 26.3.35. Appl., 8.10.32. Ger., 19.10.31).—Roasted cement Cu is suspended in dil. brine and the suspension treated in towers with a mixture of SO_2 and air at 80° . A. R. P.

Manufacture of zinc oxide. E. H. BUNCE, C. J. LENTZ, and G. T. MAHLER, Assrs. to NEW JERSEY ZINC Co. (U.S.P. 1,998,440, 23.4.35. Appl., 24.3.30).—The CO-Zn vapour mixture evolved from heating coked briquettes of ZnO and C in vertical continuous retorts is sucked into a combustion chamber by the natural draught from a stack connected to the retort, and is burned therein by streams of hot air injected at an angle to the direction of gas flow. A. R. P.

Extraction of beryllium oxide directly from minerals. G. PANEBIANCO and C. ADAMOLI (U.S.P. 1,998,685, 23.4.35. Appl., 28.8.31. It., 5.9.30).—Be pegmatite is roasted at 850 — 900° and ground wet to a fine pulp which is treated with CO_2 at room temp. for several days to obtain a solution of $\text{Be}(\text{HCO}_3)_2$. A. R. P.

Apparatus for manufacture of basic alum. A. FLEISCHER, Assr. to KALUNITE Co. (U.S.P. 1,995,343, 26.3.35. Appl., 30.6.33).—A combination of autoclave, receiver for the discharge therefrom, and valves for introducing steam into and withdrawing the products from the system is claimed. A. R. P.

Apparatus for treating gilsonite ores. C. J. NEAL (U.S.P. 2,010,272, 6.8.35. Appl., 17.1.33).—Crude gilsonite is melted and settled in a vertical, tapering, cylindrical vessel which is heated from an external jacket and an internal flue, the latter emerging through the side above the bottom. Gentle agitation is provided and the purified gilsonite is withdrawn at a point above the bottom. B. M. V.

Purification of silver iodide. C. W. GIRVIN, Assr. to DEEPWATER CHEM. Co., LTD. (U.S.P. 1,998,010, 16.4.35. Appl., 26.10.33).—AgI containing AgCl and/or AgBr is dissolved in conc. aq. KI and the filtered solution diluted to obtain a ppt. of pure AgI. A. R. P.

Manufacture of catalysts. L. G. JENNESS, Assr. to DAVIS EMERGENCY EQUIPMENT Co., INC. (U.S.P. 1,995,353, 26.3.35. Appl., 18.8.31).—In the prep. of manganites a mixture of H_2O_2 and a solution of a metal salt (I) is added to aq. KMnO_4 previously neutralised to p_{H} 7 by addition of H_2SO_4 , and the mixture is treated with sufficient base to neutralise the acid of the (I). A. R. P.

Purification [of nickel catalysts from sulphur]. H. S. TAYLOR, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,998,470, 23.4.35. Appl., 28.1.32).— NiCO_3 pptd. on kieselguhr from aq. NiSO_4 is washed free from SO_4^{2-} with dil. aq. $(\text{NH}_4)_2\text{CO}_3$. A. R. P.

Production of [hydrogenation] catalysts containing molybdenum and tungsten. J. KOENIG, Assr. to I. G. FARBENIND. A.-G. (U.S.P. 1,998,626, 23.4.35. Appl., 24.8.32. Ger., 3.9.31).— MoO_3 and/or WO_3 is sintered at 900 — 1000° in N_2 at 10 — 30 atm. pressure. A. R. P.

Decomposition and further treatment of material [rutile] containing titanium dioxide. S. S. SVENDSEN, Assr. to C. F. BURGESS LABS., INC. (U.S.P. 1,995,334, 26.3.35. Appl., 4.6.32. Norw., 9.6.31).—Rutile is heated with $(\text{NH}_4)_2\text{SO}_4$ and Na_2SO_4 to produce $\text{Na}_2\text{Ti}(\text{SO}_4)_3$ (I) and NH_3 . The (I) is then mixed with NaF and heated to volatilise TiF_4 , which is treated with H_2O and NH_3 to ppt. $\text{Ti}(\text{OH})_4$. The NH_4F filtrate is mixed with part of the Na_2SO_4 residue from the volatilisation furnace to ppt. NaF and regenerate $(\text{NH}_4)_2\text{SO}_4$ for the first stage. A. R. P.

Oxidation catalyst [for carbon monoxide]. J. F. EVERSOLE, Assr. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 1,995,274, 19.3.35. Appl., 10.8.32).— Al_2O_3 is soaked in aq. $\text{Fe}(\text{NO}_3)_3$ containing KMnO_4 and/or $\text{K}_2\text{Cr}_2\text{O}_7$, baked at 700° , and then heated in CO at 660° to reduce the Fe_2O_3 to Fe admixed with Cr_2O_3 and Mn_2O_4 . The product is an active catalyst for the reaction $\text{CO} + \text{H}_2\text{O} = \text{CO}_2 + \text{H}_2$ at 550 — 650° . A. R. P.

Recovery of carbon dioxide from waste gases. R. H. MCKEE and E. A. WINTER (B.P. 445,319, 3.4.35. U.S., 20.12.34).—After having been scrubbed with H_2O to remove SO_2 and the like, the gases are brought in contact successively or simultaneously with aq. alkali carbonate at 40 — 60° and aq. NH_3 . To regenerate the reagents the $(\text{NH}_4)_2\text{CO}_3$ is caused to react with incompletely carbonated alkali-metal base to produce bicarbonate and NH_3 , and the bicarbonate from both stages is merely heated. B. M. V.

Manufacture of liquid and solid carbon dioxide. F. B. HUNT, Assr. to LIQUID CARBONIC CORP. (U.S.P. 2,012,587, 27.8.35. Appl., 26.3.32).—In a coke-lye process, steam from the lye boiler is condensed in the generator coil of an NH_3 refrigerator and the CO_2 gas is separated from the H_2O and afterwards condensed by the NH_3 refrigerant. Previously the steam may provide the mechanical work of the process. B. M. V.

Manufacture of solid carbon dioxide. R. L. HASCHE, Assr. to CARBONIC DEVELOPMENT CORP. (U.S.P. 2,011,550, 13.8.35. Appl., 26.12.30).—CO₂ as a constituent of a mixture of gases under a partial pressure > 1 atm. is cooled to slightly above the f.p. of CO₂ and next expanded adiabatically with external work. The finely-divided, solid CO₂ formed inside the mechanism is carried away in the gas to a filter bag which is vibrated by the pulsations of the engine. B. M. V.

Stabilisation of hydrogen peroxide solutions. C. R. HARRIS and J. L. FAHS, Assrs. to E. I. DU PONT DE NEMOURS & Co., INC. (U.S.P. 1,995,063, 19.3.35. Appl., 21.10.32).—Claim is made for the use of *p*-C₆H₄(OH)₂ or a derivative thereof as stabiliser. A. R. P.

Ozone generator. F. E. HARTMAN, Assr. to F. H. and W. R. MONTGOMERY (U.S.P. 2,010,081, 6.8.35. Appl., 7.3.31).—In an apparatus employing currents of electricity at high frequency and high c.d. both the hollow live electrode and the outer jacketed electrode are cooled by oil. B. M. V.

Treatment of sulphur-bearing ore. R. P. CROTHERS (U.S.P. 2,011,039, 13.8.35. Appl., 15.7.33).—For obtaining S and/or plaster from ores in which native S and CaSO₄ are present in finely-dispersed condition, the ore is heated to the vaporising point of S by a stream of chemically inert gas which is itself condensable at > the m.p. of S (e.g., superheated steam at 250°), the conditions being also adjusted so that CaSO₄·½H₂O is formed. B. M. V.

Preparation of iodine from impure silver iodide. S. B. HEATH and M. F. OHMAN, Assrs. to DOW CHEM. Co. (U.S.P. 1,998,014, 16.4.35. Appl., 17.8.33).—AgI obtained in the recovery of I from brine is dissolved in aq. FeI₂ (*d* 1.8), the filtered solution is diluted to *d* 1.2, the pure AgI ppt. removed and reduced to Ag with scrap Fe, and the resulting aq. FeI₂ treated with Cl₂ to recover the I. A. R. P.

Separation and purification of helium from a gaseous mixture. W. L. DE BAUFRE (U.S.P. 2,012,080, 20.8.35. Appl., 15.11.33).—The gas mixture, e.g., natural gas, is expanded through a throttle and partly liquefied; the liquid after scrubbing with reflux gas is removed through heat exchangers. The gas is further cooled by a separate refrigerant, leaving reasonably pure He gas and a liquid containing impurities and He. B. M. V.

Calcination of diatomaceous earth. DICALITE Co. (B.P. 445,776—7, 15.10.34. U.S., 29.3.34).—See U.S.P. 1,966,362—3; B., 1935, 1043.

Fire-extinguishing composition.—See I. H₂S from gases.—See II. Ca acetylsalicylate.—See III. Waste pickling acid.—See X. Electro-decomp. of H₂O. Electrolyser.—See XI. Fertilisers.—See XVI.

VIII.—GLASS; CERAMICS.

Influence of cullet on the reactions occurring during the melting of glass. M. A. BESBORODOV, N. D. ZAVJALOV, and E. N. ZELIGER (J. Soc. Glass Tech., 1936, 20, 95—103 T).—The binary and ternary reactions between Na₂CO₃, CaCO₃, and SiO₂ alone or in presence of 40% of cullet were studied for the composition

SiO₂ 75, CaO 10, Na₂O 15%. Addition of cullet accelerated the reactions in the batch. With CaCO₃ and cullet the reaction was complete after 3 hr. at 700°. Reactions between Na₂CO₃ and SiO₂, or cullet were complete at 900°. In the ternary mixtures the effect of cullet on reaction velocity increased with decrease in grain size. The reaction of Na₂CO₃ and CaCO₃ with cullet was more rapid than with the individual components. J. A. S.

Viscosity of glass. P. GILARD, L. DUBRUL, G. HENRY, SCOHY, and PIÉRET (Bull. Soc. chim. Belg., 1936, 45, 131—176).—A review. η formulæ, methods for the determination of η , and the influence of composition, heat-treatment, and temp. of glasses on their η are discussed in detail. η vals. of glass at temp. important in the industry are tabulated and the relations between the corrosion of refractories by glass, electrical resistance, and η are given. R. S.

Viscosity of glass in relation to temperature and composition. P. E. FRANK (J. Appl. Chem. Russ., 1936, 9, 234—248).—Temp.- η curves of glasses containing 3% of PbO, ZrO₂, ZnO, B₂O₃, Al₂O₃, K₂O, or MgO suggest that mol. transformations occur at 1025—1200°. R. T.

Effect of width on breaking strength of sheet glass. A. J. HOLLAND and W. E. S. TURNER (J. Soc. Glass Tech., 1936, 20, 72—83 T).—The modulus of rupture (*S*) of glass strips progressively increases with decrease in width (*W*). The Karmarsch type of equation, $S = k_1 + (k_2/W_1)$, can be applied. Fire-polishing of the cut sides of the strips gave complex (not straight) fractures. J. A. S.

Absorption of X-rays by lead glasses and lead-barium glasses. G. SINGER (J. Res. Nat. Bur. Stand., 1936, 16, 233—251).—Data are recorded for a no. of commercial flint and Ba-flint X-ray-protective glasses. The protective power depends only on the Pb and Ba content. L. J. J.

Theoretical and experimental demonstration of the absurdity of using buffered solutions in testing the neutrality of glass. M. CINT (Boll. Chim. Farm., 1936, 75, 157—165).—Polemical against Mauri (L'Ind. Vetro e Ceramica, 1935, No. 3), who recommends the use of H₂O buffered to neutrality by means of KH₂PO₄ and Na₂HPO₄. Such a solution requires more alkali to bring it to a given degree of alkalinity than is required by distilled H₂O containing enough CO₂ to bring the initial *p*_H to 5.6. The production of turbidity in 2% strychnine nitrate solution forms a sensitive test for alkalinity. D. R. D.

Glass and ceramic materials [in the food industry]. ANON. (Food Ind., 1936, 8, 137—138).—A table of the chemical and physical properties of glass, glass lining and piping, chemical stoneware, and brick and tile for use in food-manufacturing plant is given. E. B. H.

Fused silica: its recent development and applications. G. E. STEPHENSON (Chem. & Ind., 1936, 389—395).—A review.

New enamelling procedure [for iron]. VIELHABER (Emailwaren-Ind., 1935, 12, 137—138; Chem.

Zentr., 1935, ii, 100).—The Fe is treated with a solution of a Co salt, and then with two coatings of white enamel. J. S. A.

Roughening of iron surfaces [to be enamelled]. VIELHABER (Emailwaren-Ind., 1935, 12, 71—72; Chem. Zentr., 1935, ii, 100).—The surface is roughened by the electrolytic action of an a.c. in presence of CoSO_4 . J. S. A.

Chemical activity of refractories. J. F. HYSLOP (J. Soc. Glass Tech., 1936, 20, 61—62 T).—The refractory block upon which rests a small cylinder of corrodent (e.g., dolomite) is heated at a fixed rate (16° per min.) to, e.g., 1450° . The time necessary for the consumption of a given amount of corrodent is taken as the chemical activity at that temp. An examination of the slag-refractory interface will show whether the wear is smooth or whether there is excessive penetration of slag. J. A. S.

Green shale.—See II.

PATENTS.

Lehrs for annealing glassware. O. MAETZ (B.P. 445,599, 11.10.34).—Air is sucked from the warm zone, through the floor, to the regenerator, where it is reheated and passed into the hot zone through staggered inlets. B. M. V.

Muffle kiln. F. M. HARTFORD (U.S.P. 2,010,261, 6.8.35. Appl., 22.12.33).—In a tunnel kiln the dividing walls which prevent any substantial contact between the gases of combustion and the ware are composed of panels which at the lower part are as thin as possible and inclined sharply inwards so that heat may be radiated upwards to the centre of the ware-supporting platform or grid on the truck. B. M. V.

Glass-melting furnace. L. SHOWERS and K. G. KUTCHKA, Assrs. to PITTSBURGH PLATE GLASS Co. (U.S.P. 2,010,419, 6.8.35. Appl., 26.8.33).—In a tank furnace, arrangements of regenerators and an adjustable suspended roof are described. B. M. V.

Furnace construction for production of molten glass. J. L. DRAKE, Assr. to LIBBEY-OWENS-FLINT GLASS Co. (U.S.P. 2,010,064, 6.8.35. Appl., 29.5.33).—In a continuous furnace the glass materials are melted at a low temp. until the Na_2O has substantially combined with the acidic materials; the temp. is then raised to remove seeds and lowered again during the refining and working. B. M. V.

Borosilicate glass composition. W. C. TAYLOR, Assr. to CORNING GLASS WORKS (U.S.P. 2,012,552, 27.8.35. Appl., 24.5.32).—A glass which will not recrystallise on reheating and having a coeff. of expansion of 5×10^{-6} comprises SiO_2 72, MgO 12, B_2O_3 8, Na_2O 6, and K_2O 2% (approx.). B. M. V.

[Glass for] electrical sealed container [mercury switch]. C. J. WARNEKE, Assr. to ADAMS & WESTLAKE Co. (U.S.P. 1,996,845, 9.4.35. Appl., 31.10.31).—A glass for switch bulbs contains SiO_2 68—71, MgO 10—14, B_2O_3 8—10, and Na_2O 10—7%. Such glass should be free from Pb, Sn, Sb, and the like, and has a coeff. of thermal expansion of $\approx 64 \times 10^{-6}$. L. C. M.

Manufacture of coloured glass. Soc. ANON. HOLBREVER (B.P. 445,653, 14.5.35. Fr., 5.6.34 and

13.4.35).—A tank melting clear glass is provided with a chamber between the tank exit and feeder, in which the temp. is raised and the velocity of the glass stream increased while the colouring agent (preferably a molten glass) is continuously admixed. The mixing chamber is provided with suitable heating burners and baffles for adjusting the turbulence of the glass stream. By this process one tank may feed several glasses of different colour, and a rapid change-over of colour may be effected. J. A. S.

Light-filtering media. THERMAL SYND., LTD., and A. J. MADDOCK (B.P. 445,592, 31.12.34).—To SiO_2 or other glass which transmits radiation below 3000 Å. addition of Sn or its compounds is made to cause the glass to absorb radiation below any desired $\lambda < 3000$ Å., according to the proportion of Sn. Stages of manufacture comprise fusing at ≈ 1 atm. to combine the constituents, cooling, crushing, cleaning and fusing under vac. to remove bubbles, and blowing or drawing. B. M. V.

Composite safety glasses. Soc. DU VERRE TRIPLEX (B.P. 445,674, 6.9.35. Fr., 7.9.34).—Condensation of moisture on the glass is prevented by employing electrical heating wires embedded in the plastic laminating sheet. J. A. S.

Media for cleaning and polishing glassware and the like. F. FATH (B.P. 445,880, 19.10.34).—A fibrous material, e.g., cotton waste, is impregnated with a solution of distilled olein, xylol, pine oil, and NH_3 , containing powdered silicious limestone, H_2O , and denatured EtOH in given proportions, and, optionally, colouring matter. B. M. V.

Enamelling of metal articles. H. F. STALEY (U.S.P. 1,996,840, 9.4.35. Appl., 24.5.32).—Fe articles are heated to the fusing point of the enamel, and one or more coatings of powdered enamel are applied by an air spray in the muffle. L. C. M.

Manufacture of vitreous enamel-coated [iron] sheets. J. C. ECKEL (U.S.P. 1,998,045, 16.4.35. Appl., 21.11.33).—Mild-steel sheet ($< 0.12\%$ C) is hot-rolled to ≈ 30 (50—60)% thicker than the finished size, then cold-rolled to finished size, and given a stress-relief anneal prior to enamelling. A. R. P.

Ceramic [insulating] product. H. L. CROWLEY, Assr. to H. L. CROWLEY & Co., INC. (U.S.P. 2,011,173, 13.8.35. Appl., 8.2.33).—A stable cathode insulator for audions and other electron-discharge devices comprises extruded and baked MgO 60, SiO_2 38, and Co_2O_3 2% (approx.). BeO , ZrO_2 , and Pb or Bi oxides may also be present. B. M. V.

Mould for casting basic refractories. H. M. KRANER and F. W. SCHROEDER, Assrs. to CORHART REFRACTORIES Co. (U.S.P. 2,011,489, 13.8.35. Appl., 14.2.34).—Sillimanite, mullite, or fosterite composed of free SiO_2 nil, combined SiO_2 ≈ 50 , and alkaline earths $> 60\%$ is used as a sand mould for fusion-casting of basic refractory material containing substantial proportions of MgO and/or CaO . B. M. V.

Manufacture of moulded glassware. BRIT. HEAT RESISTING GLASS Co., LTD., and P. V. W. GELL (B.P. 445,905 and 445,915, 19.2.35).

Heat insulation.—See I. Protective coating for metal.—See X. Condensation products for safety glass.—See XIII.

IX.—BUILDING MATERIALS.

Suction-draught sinter process and its application to cement burning. H. B. WENDEBORN (Z. Ver. deut. Ing., 1935, 79, 541—545; Chem. Zentr., 1935, ii, 101—102).—A mixture of raw cement meal and coal is burned in a suction draught. No metal or ceramic material comes in contact with the hot zone, and CO_2 may be removed completely below 800° .

J. S. A.

Properties of cement in relation to its preparation. G. HAEGERMANN (Zement, 1935, 24, 243—248; Chem. Zentr., 1935, ii, 101).—The mechanical properties of cement are reviewed in relation to the fineness of the raw powder, the temp. of burning, and the composition (CaO and SiO_2), and in relation to the ternary $3\text{CaO}, \text{SiO}_2-3\text{CaO}, \text{Al}_2\text{O}_3-4\text{CaO}, \text{Al}_2\text{O}_3, \text{Fe}_2\text{O}_3$ diagram.

J. S. A.

Thermal constants of setting concrete. H. SHEARD (Proc. Physical Soc., 1936, 48, 498—512).—In order to obtain data for the calculation of the temp. rise of concrete during setting, thermal conductivity and diffusivity have been measured for fresh setting concrete. Results are given for typical specimens and vals. compared with those for dry concrete.

N. M. B.

Determination of the breaking value of road emulsions. W. GEISSLER and H. KLEINERT (Asphalt u. Teer, 1935, 35, 1019—1022, 1038—1040; Road Abs., 1936, 3, No. 217).—Bitumen emulsions for road surfaces are classified as unstable, semi-stable, and stable. The first (quick-breaking) is suitable for surface dressings, the second (intermediate) for coated chippings or penetration work, and the third (slow-breaking) for cold pre-mix surfacings. Test-methods for determination of the rate of breaking are discussed. The English liability test gives discordant results with different observers and does not test the emulsion in contact with stone. A test is described which enables emulsions to be classified with respect to stability and in which the emulsion may be tested in contact with the actual stone to be used.

T. W. P.

Salts for prevention of winter frost [in streets etc.]. H. WERNER (Chem.-Ztg., 1936, 60, 409).—Suitable properties, ease of distribution, grain size, and ice-melting action are examined.

A. G. P.

Road tar. Green shale.—See II. Fused wood.—See V.

PATENTS.

Manufacture of cement. R. E. WINDECKER (U.S.P. 1,997,782, 16.4.35. Appl., 7.3.31).—Hydraulic cement clinker having a CaO modulus > 2.1 is ground with 0.4—1.5% of Na_2SO_4 and 0.5—5% of CaO to induce a high early strength and quick-hardening properties.

A. R. P.

Oxychloride cements. A. G. BLOXHAM. From TAJMAL, LTD. (B.P. 445,613, 5.10.34).—A saccharine material (e.g., cane sugar, molasses) is added to an oxychloride cement mixture when in the plastic state, to improve the physical properties of the latter.

T. W. P.

Water- and weather-proofing of magnesia cement. F. OTTMAN (U.S.P. 2,008,034, 16.7.35. Appl., 26.3.34).—A H_2O -insol. metallic soap is peptised with a small quantity of fatty oil and emulsified into the MgCl_2 solution with the aid of a suitable agent (oil-sol. gum or resin). The product is then rendered slightly caustic alkaline to stabilise it.

B. M. V.

Coloured caulking cement. C. S. REEVE, Assr. to BARRETT Co. (U.S.P. 2,011,607, 20.8.35. Appl., 21.1.32).—A permanently elastic cement which can be applied at room temp. by trowel or gun comprises paracoumarone resin, m.p. $50-60^\circ$, 60 wt.-% asbestos fibre 20, a metallic oxide 5, xylol 15%, and a pigment.

B. M. V.

Concrete. K. P. BILLNER (B.P. 445,628, 8.11.34. U.S., 8.11.33).—To cement, sand, and aggregate in the usual proportions enough Al powder is added (e.g., $< 0.03\%$ of the dry cement) to increase strength greatly without noticeably reducing the d .

B. M. V.

Covering for curing concrete. D. FINLEY, Assr. to PARAFFINE COMPANIES, INC. (U.S.P. 1,999,152, 23.4.35. Appl., 1.6.31).—The surface of the concrete is covered with a moisture-retaining material, the narrow space between which and the concrete is flooded with H_2O until the latter sets hard.

A. R. P.

Manufacture of gypsum plaster. C. K. ROOS, Assr. to UNITED STATES GYPSUM Co. (U.S.P. 1,999,158, 23.4.35. Appl., 13.10.32).—Claim is made for an artificially aged, calcined gypsum plaster containing a small quantity of CaCl_2 and substantially free from sol. anhydrite.

A. R. P.

Manufacture of plaster compositions. J. E. MEADE and E. W. NYSTROM, Assrs. to FLORIDIN Co. (U.S.P. 2,012,069, 20.8.35. Appl., 26.3.34).—In a CaSO_4 plaster, spent oil-decolorising clay is substituted for part of the usual sand.

B. M. V.

Hydraulic composition [moulding plaster]. H. F. GARDNER, Assr. to CERTAIN-TEED PRODUCTS CORP. (U.S.P. 1,996,372, 2.4.35. Appl., 30.1.33).—Mixtures of calcined gypsum with gum arabic (0.4—3), $\text{Ca}(\text{OH})_2$, NaOH , Na_2CO_3 , or borax (0.2—3), and PbO (0—10%) are claimed to require less H_2O to produce a pouring consistency.

L. C. M.

Colloidal inorganic bonding composition. W. A. BOUGHTON, Assr. to NEW ENGLAND MICA Co. (U.S.P. 2,004,030, 4.6.35. Appl., 5.4.34).—A bonding composition for mica (cf. U.S.P. 1,975,077—81; B., 1936, 243) comprises a viscous mass containing 35—60% of a compound containing the PO_3 radical, or $> 30\%$ of BeSO_4 , or $> 35\%$ of NaBO_2 , and controlled amounts of a restrainer of crystallisation, the balance being mainly colloiddally associated H_2O .

B. M. V.

Manufacture and use of artificial stone. D. ANDERSON (B.P. 445,264, 1.8. and 8.12.34).—Moulds suitable for use even in a hydraulic press are formed of aluminous cement low in Fe, fused or sintered Al_2O_3 , and H_2O .

B. M. V.

Preparation of [bituminous] paving mixtures. C. F. CARROLL, Assr. to AMER. BITUMULS Co. (U.S.P. 2,012,496, 27.8.35. Appl., 14.7.31).—Hot dry aggregate is mixed with bitumen from two sources in succession

in either order, one being in the molten state, solid at room temp., and the other an aq. dispersion.

B. M. V.

Dust fixative [for roads]. F. M. ARCHIBALD, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,995,598, 26.3.35. Appl., 2.9.32).—A solution containing an alkali sulphionate from petroleum refining 3—20, a hygroscopic material, e.g., glycerin 1—10, and a plasticiser, e.g., glucose 1—10% is sprayed on roads to lay the dust.

A. R. P.

Binding agents for road construction. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 445,473, 9.10.34).—A chlorinated polyvinyl chloride (58—70% Cl) is added to road tar either as powder or in solution in a suitable solvent (e.g., CH_2Cl_2). The product has improved adhesive properties.

T. W. P.

(A) **Colouring of gob [crushed rock].** (B) **Preparation of roofing granules.** S. G. WRIGHT (U.S.P. 2,010,619—20, 6.8.35. Appl., [A] 3.11.33, [B] 4.12.33).—(A) A permanent matt colouring is formed by a suspension of pigment (Fe_2O_3) in Na silicate, the latter being 1% of a non-absorbent rock or up to 5% of an absorbent rock, e.g., "gob." Baking is effected at 790—900°. (B) Flakes of slag, pigment, powdered glass, and a glue binder are fritted together.

B. M. V.

Surfacing of floors, walls, roofs, and other structures. UNITED LIMMER & VORWOLLE ROCK ASPHALTE Co., LTD. From R. LATTORF (B.P. 445,811, 29.3.35).—To the foundation are applied (1) felt, (2) adhesive, (3) slabs as described in B.P. 433,017 (B., 1935, 951).

B. M. V.

Manufacture of moulded articles from fibrous materials. A. E. BRADSHAW (B.P. 444,630, 15.9.34).—Wood wool which has not been subjected to chemical treatment, together with an insecticide and/or fungicide (FeCl_2 or FeCl_3), is mixed with Portland or other calcareous cement containing a drier (CaCl_2) to induce quick setting, if desired, and moulded. An outer casing of millboard, wood pulp, paper, or plaster may be attached to the article before or after moulding.

F. R. E.

Treatment of wood. S. D. BUTTERWORTH, Assr. to J. M. BUTTERWORTH and C. P. GABLE (U.S.P. 1,996,567, 2.4.35. Appl., 7.11.30).—Pine flooring blocks are treated at 74° with a solution of paraffin wax (20) and tung or linseed oil (5%) in petroleum, and then with 25% aq. Na silicate containing NaOH.

L. C. M.

Wood filler. H. A. DE PHILLIPS (U.S.P. 2,011,041, 13.8.35. Appl., 16.9.31).—A resinous condensation product of benzophenonedicarboxylic acid with a polyhydric alcohol is dissolved in a volatile solvent (xylol or the like) and emulsified, with the aid of an agent, in H_2O and a slow-drying oil; a finely-powdered filler, e.g., silex or gypsum, may be present in the form of a suspension.

B. M. V.

Prevention of damage [to wood] by termites. A. C. CHANDLER (U.S.P. 1,994,752, 19.3.35. Appl., 9.3.31).—The soil surrounding wood structures is impregnated with a solution of Cu salt and then treated with aq. NaSiO_3 , Na_2CO_3 , NaOH, or borax to ppt. a finely-divided Cu compound in the soil.

A. R. P.

Manufacture of fire-resisting article [wall-board]. J. FLETCHER, Assr. to PLASTERGON WALL BOARD Co. (U.S.P. 2,010,015, 6.8.35. Appl., 10.10.33).—Dry fibrous material is impregnated with Na silicate and coated with a sol. chlorinated Ph_2 which is solid at room temp.

B. M. V.

Thermostatic control [for buildings]. S. C. MOUNT, R. GRIERSON, and R. CRITTALL & Co., LTD. (B.P. 446,168, 19.9.34).

[Plaster from] S-bearing ore.—See VII.

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

Gas flow in relation to the method of charging in blast furnaces. W. FELDMANN and J. STOECKER (Stahl u. Eisen, 1936, 55, 1559—1564).—The gas flow in blast furnaces is partly influenced by the methods of charging ore and coke. The degree to which it is influenced, however, is largely governed by the dimensions and contour of the furnace lining.

W. P. R.

Utilisation of scrap metal in blast furnaces. W. LENNINGS (Stahl u. Eisen, 1936, 56, 349—351).—The effect on the coke consumption when scrap metal is used in the blast furnace has been studied in relation to the production of both high- and low-Si pig irons. Experiment indicates that the coke consumption per ton of pig Fe is 495 kg. for foundry Fe and 378 kg. for pig Fe suitable for steel-making.

W. P. R.

Production of pig iron with the aid of electric energy. R. DURRER (Z. Elektrochem., 1936, 42, 337—341).—A review.

Influence of temperature on the impact-resistance of cast iron. E. VON RAJAKOVICS (Giesserei, 1935, 22, 95—96; Chem. Zentr., 1935, i, 3977).—Impact tests have been made at -20° to 580° on specimens cut from a sand-cast ingot of Fe containing C 3.35, Si 1.89, Mn 0.67, P 0.29, and S 0.012%. The impact val. for plain test-pieces increases with rise in temp. to 30° , falls to a min. at 50° , then rises to a max. at 200° ; for notched bars these effects occur at 30° , 75° , and 150° , respectively. At 580° both types have the same impact-resistance as at room temp. Between 0° and 30° the vals. for plain bars increase by 18%, whilst those for notched bars increase by 27%.

A. R. P.

Influence of the shape of the test-piece, method of fixing, rate of testing, and type of machine used on the upper and lower yield points of steel. F. KÖRBER and A. POMP (Mitt. K.-Wilh. Inst. Eisenforsch., 1934, 16, 179—188; Chem. Zentr., 1935, i, 2241—2242).—Tests on round rods of mild and medium-hard steels in 9 different types of tensile machines showed that only the upper yield point (Y) is affected by the type of machine used. With rods of rectangular cross-section the type of machine had no effect on either Y. With increasing rate of application of the load the upper Y tends to be higher, but the lower Y is only very slightly affected. Square rods give higher Y vals. and a bigger gap between them than do flat rods with a 1:4 ratio between the sides.

A. R. P.

Dependence of the yield point [of steel] on the stress distribution and the material. E. SIEBEL

and H. F. VIERGE (Mitt. K.-Wilh. Inst. Eisenforsch., 1934, 16, 225—239; Chem. Zentr., 1935, i, 2241).—The results of tensile, bending, torsion, and compression tests on steel containing Cr 0.78, Ni 1.28, Mn 0.6, Si 0.34, and C 0.3% and on mild steels containing C 0.04—0.55% show that the upper yield point (*Y*) is raised to an extent which is greater the more the local stress max. exceeds the mean applied stress. Even after flow begins in the elastically stressed regions under the influence of the stress distribution there is an increase in the upper *Y*. This increase varies with the composition of the steel as well as with the stress distribution; on the other hand, the lower *Y* shows only slight variations under similar conditions. The bearing of these results on steel structural work is discussed.

A. R. P.

Action of solutions of sodium silicate and sodium hydroxide at 250° on steel under stress. W. C. SCHROEDER and A. A. BERK (Combustion, 1936, 7, No. 8, 29—33).—No appreciable effect on the tensile load (*T*) which steel will sustain is produced at 250° by solutions containing up to 50 g. of NaOH (I) per 100 g. of H₂O. Addition of small amounts of Na silicate (II) to the (I) reduces the *T* which can be carried. In the case of specimens subjected to both tension and bending the endurable *T* at 250° was reduced from 65,000 lb./sq. in. in H₂O to < 20,000 lb./sq. in. in (I)-(II) solutions. A characteristic effect of (I) is the production of fine, intercryst. cracks in the steel near the fracture.

R. B. C.

Ageing of steel. J. GALIBOURG (Rev. Mét., 1936, 33, 73—84).—The effects of ageing low-C steel at 100—200° on various properties are recapitulated. The cause of these effects is not completely understood, although they may be partly explained by the known change in solid solubility of C, N, and O. W. P. R.

Ageing of steels. A. SAUVEUR (Rev. Mét., 1936, 33, 85—88).—The ageing of steel after quenching from < the A₁ point is almost wholly caused by the pptn. of Fe₃C from a saturated solution of C in α -Fe. The usual N content is not sufficiently high in ordinary mild steel to contribute to the ageing. After cold-work both N and O may, however, be responsible for ageing effects; the success in making "non-ageing" steels by complete deoxidation of the molten steel indicates the importance of O content. W. P. R.

Influence of cold-work and subsequent ageing on some properties of a semi-mild steel. S. GERSZONOWICZ (Chim. et Ind., 1936, 35, 27—40).—The Charpy notched-bar impact val. of 0.26% C steel is lowered from 5.5 to 4.7 by a 10% elongation in the cold. The val. is 1.5 with > 16% elongation and varies from 1.5 to 4.7 in the intermediate range. Similar results are obtained when cold-working is by compression or flexion. Ageing at 100° or 300° has little effect on the Charpy val., but reduces to 5% the elongation at which fragility is first met. Endurance to repeated impacts steadily increases with degree of prior cold-work and is markedly enhanced by ½-hr. ageing at 100° or 300°.

E. H. B.

Vacuum furnace and its use for determining oxygen in steel. G. THANHEISER and E. BRAUNS (Arch.

Eisenhüttenw., 1935—6, 9, 435—439).—A quartz tube, H₂O-cooled top and bottom, contains a graphite crucible (*C*) heated by resistance, using about 500 amp. at 13 volts; *C* is heated to 1700° while the tube is evacuated, the specimen is lowered into *C*, and heating continued until no further gas is evolved. The results obtained with this furnace agree closely with those obtained in a high-frequency furnace and the blank is much less, rarely exceeding 0.2 c.c. A. R. P.

Determination of arsenic in steel, pig iron, and iron ores. A. STADELER (Arch. Eisenhüttenw., 1935—6, 9, 423—432).—A crit. examination of the various methods that have been proposed for determining As in Fe and steels has shown that the best results are obtained by dissolution in HNO₃ or in Br-H₂O followed by distillation of the As as AsCl₃ and subsequent volumetric determination or gravimetric determination as As₂S₃ or Mg₂As₂O₇. Any insol. WO₃ or carbides may contain As and should therefore be collected and fused with alkali, the solution of the melt being added to the distillation flask. For Fe ores dissolution in Br-HCl gives the best results. A. R. P.

Determination of the solubility of steels in acids. R. WALZEL and F. NEUWIRTH (Arch. Eisenhüttenw., 1935—6, 9, 451—457).—The reproducibility of the results obtained in dissolution tests of various steels in acids under varying conditions has been studied. No conditions to give reproducible results in cold or warm acids could be discovered, but fairly well reproducible results are obtained in boiling acids using a reflux condenser; there is, however, no relation between the solubility in hot acids and the behaviour of the metal under atm. exposure. A. R. P.

Acid-solubility and rusting of unalloyed constructional steels. K. DAEVES and F. EISENSTECKEN (Stahl u. Eisen, 1936, 56, 417—418).—The rates of dissolution in H₂SO₄ of ordinary mild steels, ingot Fe, and Cu-bearing mild steels do not give a trustworthy indication of their resistance to atm. corrosion. Basic Bessemer steel with 0.33% Cu has better rust-resisting properties than open-hearth steel of similar composition. W. P. R.

Recent progress in resistant steels. M. DUDOUET (Chim. et Ind., 1936, 35, 1011—1021).—A lecture.

Present state of the technique of nitriding steel and cast iron. F. GIOLITTI (Rev. Mét., 1936, 33, 145—156).—A very complete review. Steels are divided into six groups and the prep., details of nitriding, and applications of each group are fully discussed. W. P. R.

Binding of screw joints at high temperatures. H. VOLLBRECHT (Arch. Eisenhüttenw., 1935—6, 9, 397—404).—Tests on plain steels, non-scaling Cr-Mo austenitic steels, and nitrided Cr-Al-Mo steels at temp. up to 500° have shown that the tendency of screwed joints of the metal to bind at high temp. is smaller the smaller is the difference in hardness between the screw and the socket and the thinner is the oxide film. No binding occurs when the oxide film is thinner than 150 m μ . With metals of equal hardness the surface pressure has no effect on the tendency to binding, but it should not

exceed the tensile strength of the oxide film when the film is thicker than the above crit. val. A. R. P.

Influence of alloying elements on the scaling of iron. E. SCHEIL and K. KIWI (Arch. Eisenhüttenw., 1935—6, 9, 405—416).—In all steels heated in air at 900—1200° the oxide scale forms in layers which can be detached from one another and analysed, and in all cases except that of Mn steels the layer of metal next to the scale is enriched in the alloying element. Al, Cr, and Si considerably reduce the tendency of Fe to scale at high temp., while Ti, Be, and V have a small beneficial effect; in all these cases a protective film is formed. Addition of Cu, Ni, and especially Pt to Fe increases the tendency to scale. Scaling appears to be due to diffusion of the Fe into the FeO layer first formed and not to diffusion of O₂ into the Fe, hence it can be reduced only by addition of elements which retard the diffusion of Fe into the oxide or which form a non-porous skin over the Fe, thus preventing diffusion. A. R. P.

Hydrogen-permeability of steel in electrolytic pickling. W. BAUKLOH and G. ZIMMERMANN (Arch. Eisenhüttenw., 1935—6, 9, 459—465).—The amount of H₂ which diffuses through mild steel sheets in electrolytic pickling is the greater the more highly polished is the surface, and is considerably increased by rusting, etching in HNO₃, or annealing in air to produce an oxide scale; it increases with the c.d. to a max. at 3 amp. per sq. dm. in 10% H₂SO₄, and with the [H₂SO₄] to 10N, after which it decreases in both cases. Addition of Bi, P, Sb, and As compounds to the acid increases the permeability to an extent which increases rapidly in the order given. The presence of H₂S, H₂Se, or H₂Te in the acid results in an even greater increase in the H₂ absorption and penetration. It is suggested therefore that the presence of traces of some or all of these elements in the acid is the cause of H₂ embrittlement in pickling baths, although none of them increases the H₂-permeability of Ni, Cu, Zn, Al, or Mg. A. R. P.

Corrosion. E. COHEN and W. A. T. COHEN-DE MEESTER (Proc. K. Akad. Wetensch. Amsterdam, 1936, 39, 361—365).—The corrosion of tinfoil in 0.1N-HCl has been studied at 25°; 8 identical samples gave vals. varying by —8 to 20% from the mean. Similar discordant results are obtained when the corrosion medium is renewed by convection instead of diffusion, at 10°, e.g., by rotating the plate. It is inferred that the current practice of merely duplicating experiments gives results of little val. R. S. B.

Water-line corrosion. G. D. BENGOUGH and F. WORMWELL (Chem. & Ind., 1936, 262).—Evans' hypothesis of alkali sensitivity (B., 1936, 510) is criticised. The differential aëration theory cannot be accepted as a general principle, as the most intense corrosion may occur at the most or least aërated parts of a metal according to the exact condition of the experiment. W. P. R.

Work of the French Commission on corrosion of metals used in aëronautics. GRARD, R. LEGENDRE, and R. LECŒUVRE (Rev. Mét., 1936, 33, 178—188).—The general work of the Commission is described and the researches undertaken since 1926 are enumerated. In

addition, nine recent studies on corrosion are summarised by various authors. W. P. R.

Cathodic reduction of oxides on iron surfaces, as a method of estimating corrosion. E. A. NIKIFOROV and L. M. GLUCHOVSKAJA (J. Appl. Chem. Russ., 1936, 9, 217—224).—The amount of oxide present in the surface film of Fe containing C 0.05—1, Cu 0.1—4, Mo 0—0.3, Mn 0—3, and Cr 0—0.09% is determined by cathodic reduction, with a c.d. of 0.4—0.6 m.-amp./sq. cm., in 0.5—1.0N-Al₂(SO₄)₃. R. T.

Spectrographic determination of small quantities of copper, lead, arsenic, and antimony in nickel and nickel sulphate solutions. E. H. S. VAN SOMEREN (J.S.C.I., 1936, 55, 136—138 T).—For the determination of Cu, Pb, As, and Sb to the extent of 1—50 p.p.m. in aq. NiSO₄ used as an electrolyte a technique of co-pptn. and arcing is described and lines for quant. analysis by the internal standard method are specified.

Action of xanthates on lead glance. W. D. WILKINSON (Metall u. Erz, 1935, 32, 157—160; Chem. Zentr., 1935, ii, 112).—The adsorption of xanthates (I) on Pb glance (II), and the influence of the thickness of the adsorbed film on the wettability etc. have been investigated. The length and orientation of the hydrocarbon chains govern the effects. Oxidation of (I) is also involved, oxide-free (II) being hydrophilic towards both H₂O and aq. (I), whilst partly oxidised (II) is hydrophobic in aq. (I). J. S. A.

Tarnishing of silver and its prevention. E. RAUB (Mitt. Forsch.-Inst. Prob. Edelmet. Schwäb.-Gmünd, 1935, 8, 61—67, 77—84, 105—112; Chem. Zentr., 1935, ii, 116).—No Ag alloy yet obtained fulfils the requirements of completely corrosion-resistant Ag. Tarnishing can be prevented by a coating of suitable lacquer or of a stable metal (Cr or Rh), or by passivation. J. S. A.

Metals and alloys in the chemical industry. III. Non-ferrous metals and alloys. F. A. ROHRMAN (J. Chem. Educ., 1936, 13, 106—110; cf. B., 1936, 550).—Industrial plant made of Al, Cu and its alloys, Pb, Ni and its alloys, and Cr is described and illustrated by photographs. L. S. T.

Welding together of metals by application of heat and pressure. L. C. GRIMSHAW (Engineering, 1936, 141, 383—386).—The method described consists essentially of plating two dissimilar ferrous metals with electrolytic Fe and forge-welding the two plated surfaces together. Thus steels of high alloy content, e.g., 18:8 Ni-Cr steels, can be used for surfacing plain C steels. The weld is continuous and free from inclusions and is not harmed by heat-treatment. It is sufficiently tough to withstand a large amount of cold-deformation, which may be necessary in the fabrication of the finished article. W. P. R.

Recent progress in welding. R. GRANJON and J. BRILLIÉ (Rev. Mét., 1936, 33, 89—95).—Notes are given on the welding of a large no. of ferrous and non-ferrous alloys. W. P. R.

Forging properties [of metals]. A. PORTEVIN, E. PRÉTET, and J. DE LACOMBE (Rev. Mét., 1936, 33,

114—132).—An attempt is made to correlate the hot-working properties of alloys by means of torsion, tensile, bending, impact, and compression tests carried out, at elevated temp., on a no. of ferrous and non-ferrous alloys. The results do not serve, however, to indicate the power necessary to deform metals by hot-working, but are useful in indicating any resistance to deformation new alloys may possess and in fixing approx. the min. temp. at which forming operations can conveniently be carried out. W. P. R.

Mechanical tests [on metals] at elevated temperatures. J. GALIBOURG (Rev. Mét., 1936, 33, 157—163).—The methods used in evaluating the results of creep tests at high temp. are discussed. It is pointed out that the safe loading at 500° for a Cr-Mo steel, as determined by 7 different authorities, is given as 10, 10, 13, 15, 16, 20, and 21 kg./sq. mm. Unification of method is advised. W. P. R.

Fatigue tests on metals. R. CAZAUD (Rev. Mét., 1936, 33, 164—176).—A review. The influence of the surface and contour of the test-pieces is emphasised. W. P. R.

Evaluation of creep tests. F. GENTNER (Arch. Eisenhüttenw., 1935—6, 9, 441—450).—A mathematical discussion of the shape and significance of time-elongation curves, with particular reference to the effect of temp. and load. A. R. P.

Recrystallisation phenomena [of metals]. A. E. VAN ARKEL (Rev. Mét., 1936, 33, 197—202).—The no. of recrystallisation centres depends on the degree of deformation, which, in turn, determines the no. of places where the deformation exceeds a certain mean val. If a single crystal is deformed by a crit. amount and then heated, recrystallisation occurs with the formation of a large no. of small crystals. Further heating causes the crystals to grow, and finally a single crystal is again formed. This crystal growth is termed secondary recrystallisation. W. P. R.

Experimental study of the heterogeneity of metals and alloys. A. PORTEVIN and P. CHEVENARD (Rev. Mét., 1936, 33, 96—113).—Heterogeneity in solid solutions and supersaturated solid solutions is discussed. The methods of studying its effects are: (1) chemical, qual. and quant., (2) physico-chemical, *e.g.*, determination of the Curie point, and (3) by means of micro-mechanical tests such as are made by the Chevenard micro-machine. The existence of micro-heterogeneity in tempered solid solutions may account for the hardness increase which occurs first on tempering and the subsequent softening on further tempering, and also the phenomenon of intercryst. corrosion in certain alloys. The theory advanced is well illustrated by complete data correlating the degree of heterogeneity and the physical, mechanical, and chemical properties of a tempered 18:8 stainless steel. W. P. R.

Application of microchemistry to metallurgy. C. BENEDICKS and R. TREJE (Rev. Mét., 1936, 33, 203—208).—The use of microchemical methods of analysis for determining the composition of non-metallic inclusions in steels is described. The distribution or segregation of an element can be studied by attacking a

polished surface with acidified gelatin papers and subsequently "developing" the papers with suitable reagents. In this way Cu, Co, and Ni have been estimated. Microchemical methods have proved of great val. in the study of corrosion. W. P. R.

Corrosion of magnesium. L. WHITBY (Korros. u. Metallschutz, 1935, 11, 88—89; Chem. Zentr., 1935, ii, 118).—Evolution of H₂ occurs, not at inclusions, but at the seat of dissolution. The protective action of Mn is due to the formation of a film with a high cathodic overvoltage (cf. Kroenig and Pavlov, B., 1935, 808). J. S. A.

Corrosion of magnesium containing manganese. W. KROENIG and S. PAVLOV (Korros. u. Metallschutz, 1935, 11, 89; Chem. Zentr., 1935, ii, 118—119).—Whitby's views (cf. preceding abstract) are regarded as probable. J. S. A.

Summary of recent progress in the welding of aluminium and its alloys. J. DOUCHEMENT (Rev. Aluminium, 1935, 12, 3099—3107).—A review of developments in fusion (blow-pipe and arc) and resistance (spot, continuous, and butt) welding of Al and its alloys. E. H. B.

Welding of aluminium. S. HAARICH (Z. Ver. deut. Ing., 1935, 79, 495—499; Chem. Zentr., 1935, ii, 117).—Characteristics of Al welding by flame and electric processes are described. In all cases the gas content of the metal in the weld is raised, the effect extending to the surrounding metal with gas-welding. The mechanical and metallographic properties of the weld are discussed. J. S. A.

Progress in electric welding of light metals, with special reference to point- and seam-welding. C. HAASE and O. PLASS (Aluminium, 1935, 17, 209—216; Chem. Zentr., 1935, ii, 117).—A review of current methods and their effects on the mechanical properties of the welded metal. J. S. A.

Oxidation films on aluminium and its alloys; their production and properties. A. G. C. GWYER and N. D. PULLEN (Rev. Mét., 1935, 32, 658—667).—The type of anodic film which has a moderate electrical resistance is discussed, and an account given (with photomicrographs) of the films formed in H₂SO₄, H₂Cr₂O₇, and H₂C₂O₄ on alloys containing Cu 3—12, or Zn 13, or Si 10—12%. E. H. B.

Electrodeposition of coloured films on metals. P. N. PETROV and M. S. BOROZDINA (J. Appl. Chem. Russ., 1936, 9, 229—233).—A durable, green, metallic coating is deposited on metal surfaces from an electrolyte containing CuSO₄·5H₂O 60, ZnSO₄·7H₂O 45, (NH₄)₂Mo₇O₂₄·4H₂O 30, KCN 7 g., 30% aq. NaHSO₃ 10—15 ml., and H₂O 1 litre, with a c.d. of 0.2—0.4 amp./sq. cm. and a voltage of 2.5 volts, at room temp. R. T.

Corrosion of metals by oils.—See II. Enamelled Fe.—See VIII.

PATENTS.

Blast furnace [for smelting of iron ores]. H. A. SPALDING (U.S.P. 1,997,603, 16.4.35. Appl., 30.7.29).—To obtain a low-S Fe from the blast furnace a suspension

of BaO in heated flue gas is continuously passed into the reduction zone. A. R. P.

Blast furnace. M. FRÄNKL, Assr. to AMER. OXY-THERMIC CORP. (U.S.P. 2,010,073, 6.8.35. Appl., 14.10.31. Ger., 18.11.30).—A blast furnace for operation with enriched air has the bosh and hearth portion where the max. heat is developed of larger diam. than the stack, so that an inert lining of charge is formed. To lower the temp. of the upper part of the charge a diluent gas (heated but not as hot as the gases already present, and of reducing, inert, or oxidising character according to circumstances) is introduced at the change of section of the furnace. B. M. V.

Blast furnaces and their operation. K. KOLLER and Z. GÁLÓCSY (B.P. 442,478, 11.5.35. Hung., 12.5.35).—A hot mixture of steam and CO₂ from direct combustion of fuel is passed into the tuyère zone of the Fe blast furnace to enrich the flue gases in H₂ and CO. A. R. P.

Sintering or roasting of ores and the like. H. G. TORULF (ALLMÄNNA INGENJÖRSBYRÅN H. G. TORULF) (B.P. 442,090, 31.7.34. Swed., 3.8.33).—An arrangement of sintering pans, suction boxes and fans, and feeding and discharging means is claimed. A. R. P.

Metallurgical process [for oxidised ores]. R. F. MEYER, Assr. to MEYER MINERAL SEPARATION CO. (U.S.P. 1,990,299, 5.2.35. Appl., 18.12.33).—The ore is given a partial reducing roast with 5% of coal dust at 750–800°, moistened with aq. FeCl₃, and leached after storage for some time to allow the Cu, Zn, etc. to become converted into chlorides. A. R. P.

Ore-reduction furnace and condensing chamber. A. A. ANDERSON, Assr. to W. P. TOTTEN (U.S.P. 2,012,092, 20.8.35. Appl., 13.11.33).—A box-like cradle (B) mounted on trunnions makes a flat, inclined, rapidly-broken joint with a vapour-condensing and fume-catching system. Within B is a very narrow crucible (C) having a taphole as well as the aperture matching the vapour outlet. C is heated by fluid fuel and air in inclined or helical passages on each side, the outer metallic casing being lined with suitably-grooved refractory material. B. M. V.

Operation of a reducing furnace. A. J. MASON (U.S.P. 1,990,296, 5.2.35. Appl., 17.2.33).—A mixture of powdered fuel and air is fed into a pipe surrounding a cylindrical furnace in such a way that the CO formed enters the melting zone throughout the operation. A. R. P.

Production of low-carbon metal [iron]. H. A. BRASSERT, Assr. to H. A. BRASSERT & CO. (U.S.P. 1,991,008, 12.2.35. Appl., 8.1.32).—The blast furnace is charged in the centre with a mixture of coarse ore and scrap Fe and around the periphery with a mixture of fine ore and coke necessary for the reduction. A mixture of carbonaceous fuel and air is injected into a circular reverberatory furnace (R) surrounding the lower part of the shaft so that the charge in the latter is melted by the hot gases and the Fe which collects in R is partly refined. A. R. P.

Refining molten metal [e.g., iron]. R. ROBINSON, Assr. to F. S. and N. CHRISTY (U.S.P. 1,997,602, 16.4.35.

Appl., 10.3.32).—Molten Fe in the open-hearth furnace is treated, after refining, with 0.5–40 lb. (per ton) of a mixture of Na₂CO₃ and NaNO₃ (< 20% of either) 2–56, CaF₂ 40–112, C 16–56, and Fe₂O₃ 48–128 lb. A. R. P.

Means for annealing material [metal]. H. P. ARKEMA, Assr. to WESTERN ELECTRIC CO., INC. (U.S.P. 1,994,629, 19.3.35. Appl., 14.9.33).—The metal is annealed on a support within a high-frequency induction furnace, means being operated by the support to regulate the current through the primary coil by the wt. of the charge. A. R. P.

Heat-treatment of white cast iron. M. P. GRAY, Assr. to INDUSTRIAL FURNACE CORP. (U.S.P. 1,999,153, 23.4.35. Appl., 17.12.31).—White-Fe castings containing 0.6–1.5% Mn to retard the decomp. of pearlitic cementite at < the crit. temp. are annealed in a non-oxidising atm. at 910° for 18–38 hr. to graphitise the free Fe₃C, quenched, and reheated first at 620° and then at 730° for 10–60 hr. to produce a spheroidised structure and high tensile strength. A. R. P.

Production of electric steel. W. SCHWIER (B.P. 442,026, 30.7.34. Ger., 2.7.34).—Steel prepared in open-hearth furnaces or converters is poured into a mixer, then into the electric furnace, and desulphurised and refined therein. A. R. P.

Manufacture of composite metal strip [for journal bearings]. C. ARNOLD, From CLEVELAND GRAPHITE BRONZE CO. (B.P. 441,467, 23.4.34).—Tinned steel strip is passed through a pouring gate provided with a movable wall forming a well into which the molten babbitt metal is poured. A. R. P.

Copper-containing steel. H. HARRIS, Assr. to A. O. SMITH CORP. (U.S.P. 1,990,647, 12.2.35. Appl., 27.6.32).—Steel containing Cu 2–3, Mn 0.5–2, and C > 0.25% is case-hardened at 925°, quenched, and aged at 400–500° to produce grains in the carburised case having an area of (1.25–5) × 10⁻⁵ sq. in. A. R. P.

Production of [corrosion-resistant ferrous] alloys. W. B. ARNESS, Assr. to ALLOY RES. CORP. (U.S.P. 1,994,679, 19.3.35. Appl., 15.8.31).—In the manufacture of Ni-Cr steels by reducing Cr₂O₃ in the bath of molten Fe by means of Fe-Si, a small quantity of CaSi₂ is added with the Fe-Si to remove adsorbed H from the metal. A. R. P.

Heat-resistant [chromium-aluminium] alloy [steel]. H. JAEGER, Assr. to A. O. SMITH CORP. (U.S.P. 1,990,650, 12.2.35. Appl., 25.6.32).—Steel resistant to scaling at high temp. contains Al 16–20 (17.5), Cr 5–8.5 (8.5), Mn 0.4–1.5 (0.4), Ti 0.1–0.5 (0.4), and Si > 0.25%. A. R. P.

Alloy steel [for cutting tools]. A. H. KINGSBURY, Assr. to CRUCIBLE STEEL CO. OF AMERICA (U.S.P. 1,996,725, 2.4.35. Appl., 1.9.34).—Steels containing C 0.6–1.25 (0.7–1), V 1–3 (1.4–1.9), Cr 3.5–6 (4–4.5), and Mo 5–11 (6.5–7.3)%, where C + V + Cr ≈ 1–1.5% Mo, are claimed. L. C. M.

(A, D, E) **Ferrous alloys.** (B, C) **Alloy steels.** J. V. EMMONS, Assr. to CLEVELAND TWIST DRILL CO. (U.S.P. 1,998,953–7, 23.4.35. Appl., [A, B] 22.12.34, [C–E]

11.3.35).—The steel contains: (A) C 0.15—1.6 (0.79), Cr \geq 10 (3.75), Mo 6—15 (11), W 0.02—0.045% of the Mo content, Si \geq 3 (0.25), Mn \geq 2 (0.13), and V \geq 5 (1%); (B) C 0.15—1.6, Cr 3.25—6.0, W 8—20, Mo 0.125—0.28% of the W content, Si \geq 3, and V \geq 6%; (C) as (B) but with \geq 16% Co in place of the V; (D) as (B) but with the Co in addition to the V; (E) as (A) but with \geq 16% Co in addition. A. R. P.

Magnetic [iron] alloy. V. B. BROWNE, Assr. to ALLEGHENY STEEL CO. (U.S.P. 1,995,562, 26.3.35. Appl., 3.7.34).—The alloy contains Al 1—4 (3) and Mn 1—8 (3)% with the min. amount of C, S, P, and Si.

A. R. P.

Magnetic [iron-nickel alloy] material and treatment thereof. V. E. LEGG, E. PETERSON, and L. R. WRATHALL, Assrs. to BELL TELEPHONE LABS., INC. (U.S.P. 1,998,840, 23.4.35. Appl., 13.4.34).—Rolled sheets of Fe-Ni alloy containing Ni 78 and Cr, Mo, or W 3—8% are annealed to obtain the optimum grain size, then acid-etched to remove a layer \leq 0.002 in. thick. A. R. P.

[Heat]-treatment of ferrous metals. W. R. BENNETT (U.S.P. 1,997,567, 16.4.35. Appl., 20.6.34).—A type of cylindrical bright-annealing or case-hardening furnace is claimed in which an oil or gas fuel is burned internally to supply the necessary heat and atm. for the desired process. A. R. P.

Heat-treatment [of ferrous articles] in circulatory gases. F. A. HANSEN and H. E. KOCH, Assrs. to HEVI DUTY ELECTRIC CO. (U.S.P. 2,012,165, 20.8.35. Appl., 5.10.31).—An atm. for nitriding is prepared by mixing in a retort old cracked and new uncracked hydrocarbon gases, the temp. and velocity of flow being raised until cracking starts again; the mixture is then admitted to undergo violent collision with the ferrous articles at a still higher temp. Nitriding is effected and cracking completed, and the old gas is partly withdrawn and re-used. B. M. V.

Preparing and nitriding a ferrous article. A. W. MORRIS, Assr. to MOORE DROP FORGING CO. (U.S.P. 1,997,004—8, 9.4.35. Appl., [A] 17.12.31, [B—E] 25.8.34).—The articles are first given a thin coating of Al or Al alloy by hot-dipping at $>$ 650° (A) under ordinary immersion conditions, (B) under pressure and agitation of the metal bath, (C) under pressure without agitation, (D) under the action of compressed N₂, or (E) under the action of an electric current. When the diffused surface layer is sufficiently thick the articles are nitrided in the usual way. A. R. P.

Casing [case-hardening] of steel articles. A. W. MACHLET (U.S.P. 1,995,314, 26.3.35. Appl., 21.11.31).—A hard, malleable case is obtained by heating the articles in a 3:1-vol. mixture of NH₃ and hydrocarbon gas at 705—785°. A. R. P.

Armour plate [steel]. R. J. SULLIVAN (U.S.P. 1,995,484, 26.3.35. Appl., 19.11.32).—The steel contains Al 0.8—1.1, C 0.4—0.5, Mn 0.6—0.8, Cr 1—1.25, Mo 0.6—0.8, and V 0.2—0.3% and is case-hardened in NH₃ to produce a bullet-resistant surface layer. A. R. P.

Cleaning of iron or steel. H. SCHAGRIN, Assr. to R. L. KAHN (U.S.P. 1,995,192, 19.3.35. Appl., 4.6.31).—Scale produced on the surface of Fe or steel machine parts during hardening is removed by treating the metal cathodically in 10—15% H₂SO₄ at 50°, and later in a solution containing NaOH 5 and Na₃PO₄ 2.5—5 oz. per gal. A. R. P.

Base metal [sheet steel] for vitreous enamel. C. H. BUTTS, Assr. to NEWTON STEEL CO. (U.S.P. 1,996,568, 2.4.35. Appl., 11.7.32).—Claim is made for a steel containing S 0.025—0.040, P 0.004—0.020, C 0.012—0.060, Mn 0.040—0.300, and Si 0.030—0.100%, which is rolled, box-annealed at 650—820°, and normalised. L. C. M.

Utilisation of waste [metal]-pickling acid. A. W. HARRIS (U.S.P. 1,994,702, 19.3.35. Appl., 23.2.33).—Waste acid from the pickling of ferrous metals is passed continuously through a series of towers in which it is treated with gases containing NH₃ and O₂ and heated to ppt. Fe(OH)₃ and form aq. (NH₄)₂SO₄, which is evaporated to recover the salt. A. R. P.

Corrosion inhibitor. C. A. THOMAS and C. G. GROSSCUP, Assrs. to SHARPLES SOLVENTS CORP. (U.S.P. 1,996,730, 2.4.35. Appl., 11.10.33).—The addition of 1% each of an NR₂NO compound (R = Me or amyl) and of di-*o*-tolyl- or diamyl-thiourea to the acid pickling baths is claimed. L. C. M.

Preventing the corrosion of metal walls of tanks. A. B. BUTTERWORTH (U.S.P. 1,996,747, 9.4.35. Appl., 7.4.33).—The interiors of tank ships, which are filled alternately with petroleum and sea-H₂O, are sprayed with milk-of-CaO (1½ lb. per gal.). L. C. M.

Coating of lead, tin, cadmium, copper, or alloys thereof. W. W. TRIGGS. From METAL FINISHING RES. CORP. (B.P. 442,130, 30.5.34).—The metal is immersed in an org. acid solution which produces an insol. ppt. of the metal on the surface, e.g., in hot aq. H₂C₂O₄, malic, malonic, or salicylic acid, containing an inorg. oxidising agent and/or accelerator, e.g., NaNO₃. A. R. P.

Gold-coloured [copper] alloy. K. F. KINDLER (B.P. 442,593, 7.8.34).—The alloy consists of Cu 80—82 (81), Zn 11—15 (13), Sn 3—5 (4), and Ni 2% and is suitable as a base for the prep. of rolled-Au sheet and wire. A. R. P.

Manufacture of composite metal articles [copper alloy castings]. ELECTRO METALLURG. CO., Asses. of W. J. PRIESTLEY (B.P. 442,509, 8.5.34. U.S., 20.1.34. Addn. to B.P. 439,878; B., 1936, 553).—The surface of Cu or Cu alloy castings is rendered resistant to wear and/or corrosion by coating the mould internally with a powdered alloy containing Cu 20—70, Cr 20—50, Si 10—40, C \geq 5, and Fe $<$ 50%, so that the powder becomes intimately united with the surface of the casting. A. R. P.

Metallic compositions for bearings, packings, etc. J. M. M. PRATT (B.P. 442,657, 16.8.35).—Suspensions of graphite or other soft form of C in alloys of Cu, Sb, Zn, Pb, and Sn are claimed. A. R. P.

Refining of lead. L. GUTLOHN (B.P. 442,696, 6.2.35. Austr., 3.3.34).—Molten Pb is passed through a long,

slowly rotating tube furnace so that the whole of the interior surface is wetted by the metal in a thin layer; oxidation of the impurities is thus accelerated.

A. R. P.

(A) Engraver's etching acid of increased efficiency. (B) Etching zinc plates. E. R. BOLLER, Assr. to GRASSELLI CHEM. CO. (U.S.P. 1,994,499—500, 19.3.35. Appl., 31.12.32).—(A) The etchant comprises 10% HNO_3 containing 0.1—2% of Cu dissolved therein, and (B) a small quantity of citric or other hydroxy-carboxylic acid.

A. R. P.

Composition of matter [dental alloy]. E. G. TOUCEDA, Assr. to CONSOLIDATED CAR-HEATING CO., INC. (U.S.P. 1,996,711, 2.4.35. Appl., 21.2.34).—Alloys containing Cr 28—36 (32), Co 50—60 (57), W 2—5 (2), Si 1—3 (1), Mn 4—6 (5), and Ti 2—4 (3)% are claimed.

L. C. M.

Manufacture of tools and the like from sintered hard metal carbides or like materials. K. M. TIGERSCHILD and G. STERKY (U.S.P. 1,996,220, 2.4.35. Appl., 3.11.32. Swed., 4.11.31).—A mixture of powdered carbides, borides, silicides, and nitrides of Cr, Cb, Mo, Ta, Ti, U, V, W, and Zr, with Fe, Co, or Ni, and NH_4Cl , is pressed into the desired shape and heated at $\text{> } 600^\circ$ (400—500°).

L. C. M.

Production of surface alloys by diffusion. F. BERGMANN (B.P. 442,629, 7.3.35. Ger., 8.3.34).—The alloying element, e.g., W, Mo, or Cr, is suspended in a fused, neutral salt bath and the article to be coated is moved about in the bath until the surface has absorbed the desired amount of alloy.

A. R. P.

Extraction of concentrates from ores and the like. H. RICHARDS (B.P. 442,083, 30.7.34).—A series of corduroy-covered trays rotatably mounted in a suitable framework is claimed for use in recovering Au from a ground ore pulp.

A. R. P.

Precipitation of gold or other metals from metallurgical cyanide solutions. MERRILL Co. (B.P. 442,315, 17.11.34. U.S., 27.12.33).—Au or Ag is pptd. from very dil. NaCN solutions by adding NaHSO_3 or $\text{Cu}(\text{HSO}_3)_2$ to $p\text{H}$ 6.5—6.7 and then adding Zn dust.

A. R. P.

Preventing tarnishing of metal [silver] articles. E. RAUB, Assr. to K. MICHAELIS (U.S.P. 1,995,225, 19.3.35. Appl., 20.5.32. Ger., 23.5.31).—Ag articles are immersed in dil. aq. K, Na, or NH_4 chromate until covered with a thin, practically invisible film of Ag_2CrO_4 , which prevents tarnishing of the Ag in atm. containing S compounds.

A. R. P.

Solution for removing silver from the back of mirrors. S. S. BOYD (U.S.P. 1,994,633, 19.3.35. Appl., 29.12.33).—The film is loosened by immersing the mirror in a 1:16:6 mixture of tartaric acid, conc. HCl, and H_2O .

A. R. P.

Facing material for sand moulds. M. W. DUNDORE, Assr. to BELoit IRON WORKS (U.S.P. 1,996,283, 2.4.35. Appl., 28.2.30).—Moulds for casting metals are made from green sand faced with a cement incorporating a thermoplastic rubber isomeride (cf. U.S.P. 1,605,180; B., 1927, 85).

L. C. M.

[Frothing agent for use in the] froth flotation of ores. H. G. C. FAIRWEATHER. From AMER. CYANAMID Co. (B.P. 441,976, 29.9.34).—Claim is made for the mixture of C_7 — C_{10} alcohols with hydrocarbons comprising the "alcohol still bottoms" from the distillation of petroleum fractions.

A. R. P.

Heat-treatment of easily oxidisable metals. F. KELER, JUN., Assr. to ALUMINUM Co. OF AMERICA (U.S.P. 1,996,379, 2.4.35. Appl., 2.3.32).—Intercryst. oxidation during the annealing of Al and Mg and their alloys is prevented by the use of an atm. containing < 1 mg. of H_2O per litre.

L. C. M.

[Magnesium] alloys. R. E. PAINE, Assr. to MAGNESIUM DEVELOPMENT CORP. (U.S.P. 1,998,168—71, 16.4.35. Appl., [A—D] 4.10.33. Renewed [C, D] 16.10.34).—The alloy consists of Mg with (A—D) 0.5—22 (5—10)% Pb and (B) Mn 0.1—1 (0.85), (c) Si 0.1—2 (1) and Zn 1—10 (3.25), or (d) Zn 1—10 (3.25), Al 1—15 (7), and Si 0.1—2%.

A. R. P.

[Casting of] magnesium alloys. E. STRASSER (B.P. 441,797, 12.12.34).—A method of gating sand moulds to produce homogeneous castings of solid-solution Mg alloys is claimed.

A. R. P.

Soldering flux [for aluminium and its alloys]. (A—C) C. C. CALLIS and (B, c) R. B. DERR, Assrs. to ALUMINUM Co. OF AMERICA (U.S.P. 1,996,360—2, 2.4.35. Appl., 29.12.32. Renewed [B] 22.9.34).—Claim is made for mixtures containing (A) solid Cl-derivatives of Ph_2 (I), fluxing salts (ZnCl_2 , NH_4Cl , etc.), and an org. solvent, (B) (I) and $p\text{-C}_6\text{H}_4\text{Cl}_2$ (II), and (c) (I) and chlorinated C_{10}H_8 , with or without (II).

L. C. M.

Treatment of aluminium-base alloys. P. T. STROUP, Assr. to ALUMINUM Co. OF AMERICA (U.S.P. 1,998,467, 23.4.35. Appl., 30.6.34).—Alkali and alkaline-earth metals are removed from Al by treating the molten metal with a stream of CCl_2F_2 , CCl_3F , or $\text{C}_2\text{Cl}_2\text{F}_4$.

A. R. P.

Apparatus provided with a protective coating for handling molten metal. H. M. E. HEINICKE, Assr. to WESTERN ELECTRIC Co., INC. (U.S.P. 1,995,349, 26.3.35. Appl., 26.5.33).—Apparatus for use in the die-casting of Al alloys is made of steel coated with a black undercoat enamel consisting of a Na_2O — CaO borosilicate containing MnO_2 , Cr_2O_3 , and CoO ; the enamel becomes plastic at the temp. of casting.

A. R. P.

Production of aluminium reflector surface. J. D. EDWARDS, C. S. TAYLOR, and W. W. WENTZ, Assrs. to ALUMINUM Co. OF AMERICA (U.S.P. 1,999,042, 23.4.35. Appl., 25.1.32).—Al containing Cu 0.06—0.3 and Si $\text{> } 0.5\%$ is formed into the desired shape, then annealed at 450° to produce a homogeneous solid-solution alloy, and finally the reflecting surface is etched with a mixture of HF and HNO_3 to produce a corrosion-resistant, light-reflecting film thereon.

A. R. P.

[Self-]lubricating metal foil. T. A. TORRENCE and F. L. ENDEAN, Assrs. to ALUMINUM Co. OF AMERICA (U.S.P. 1,996,392, 2.4.35. Appl., 5.9.30).—Al foil for the manufacture of pressed containers is coated with a film of stearin, applied in 0.2—15% EtOH solution.

L. C. M.

Metal polish. H. W. WITZEL, Assr. to AMER. CYANAMID & CHEM. CORP. (U.S.P. 1,997,989, 16.4.35. Appl., 22.6.31).—Claim is made for the use of maleic acid and its acid salts together with a filler, *e.g.*, kieselguhr or a mild abrasive. The acid used is preferably that obtained as a by-product in the catalytic oxidation of $C_{10}H_8$, and may contain some phthalic acid. A. R. P.

Applying metal-forming lubricants. R. C. WILLIAMS, Assr. to IRONSIDES CO. (U.S.P. 1,995,528, 26.3.35. Appl., 16.3.32).—The metal wire before passing to the dies is lubricated by the deposition of tallow or fat from a suspension of the lubricant in aq. soap by electrophoresis. A. R. P.

Furnace-lining protection. F. WEVER, Assr. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,997,988, 16.4.35. Appl., 27.8.32).—In the refining of Fe in high-frequency induction furnaces the action of the slag on the walls of the crucible is prevented by confining it within a shallow, bottomless cylinder of refractory material floating on the surface of the metal. A. R. P.

Coating of metal [*e.g.*, steel with zinc]. A. H. STEVENS. FROM NAT. STANDARD CO. (B.P. 441,502, 24.7.34).—The metal is first given a thin coat of Cd or Zn by hot-dipping and wiping, and then an outer coat of Zn or Cd is applied by electrolysis. A. R. P.

Fluxes and flux-coated [ferrous-metal] electrodes for electric welding. M. R. MORITZ, T. C. R. SHEPHERD, and ASSOCIATED ELECTRICAL INDUSTRIES, LTD. (B.P. 441,639, 15.8.34).—The flux consists of mixtures of Fe_2O_3 , MnO_2 or ferromanganese, TiO_2 or SiO_2 , and $Si(OEt)_4$. A. R. P.

Manufacture of [a ferrous metal] welding electrode. J. M. WEED, Assr. to GEN. ELECTRIC CO. (U.S.P. 1,998,947, 23.4.35. Appl., 1.10.30).—The Fe rods are etched in dil. HCl and then coated with a 1:1:2:4 mixture of $CaCO_3$, $BaCO_3$, TiO_2 , and NaOAc or water-glass. A. R. P.

Welding rod. W. B. MILLER, Assr. to OXWELD ACETYLENE CO. (U.S.P. 2,010,605, 6.8.35. Appl., 10.8.33).—A core of stainless steel (Cr 18, Ni or Mn 8%) is covered with a closely adherent coating of Cu or Al and with a flux comprising CaF_2 50, SiO_2 40, Na borosilicate 10%, and a binder. B. M. V.

Production of nickel, capable of being rolled and annealed, directly by electrolysis. FALCONBRIDGE NIKKELVERK A/S. (B.P. 442,622, 14.1.35. Norw., 15.1.34).—The electrolyte is rigorously freed from Fe, As, and Pb, treated with $KMnO_4$ to oxidise org. matter, filtered, adjusted to p_H 5–6 (5.7), and electrolysed at 25–45° with < 1 amp. per sq. dm. A. R. P.

Surface plating of metals with alloys. M. FIEDLER (U.S.P. 1,998,496, 23.4.35. Appl., 11.9.30. Can., 9.4.29).—A thin layer of corrosion-resistant metal, *e.g.*, a Cr, Co, or Ni alloy, is applied to a ferrous metal rod by enclosing the rod in a tightly fitting tube of the coating metal and subjecting it to an induced high-frequency current until sufficient alloying action has taken place between the two metals. A. R. P.

Obtaining bearing-metal surfaces resistant to wear and to seizure. BOZEL-MALETRA SOC. INDUSTR.

DE PROD. CHIM. (B.P. 441,812, 14.5.35. Fr., 14.5.34).—The surfaces are plated with Co. A. R. P.

Manufacture of metallic sodium. R. HARA and S. ABE (B.P. 441,753, 20.7.35).—A solution of NaCl in liquid NH_3 is electrolysed in a divided cell with a cathode of Al, Mg, Cd, Zn, or Sn and the Na is recovered by evaporation of the resulting blue catholyte. A. R. P.

Manufacture of beryllium alloys. BERYLLIUM CORP. (B.P. 441,532, 22.6.35. U.S., 26.6.34).—Baths of a fused BeF_2 derivative are electrolysed with a Cu, Ni, or Fe cathode at a temp. < the m.p. of the cathode, but > the m.p. of the Be eutectic with the cathode metal. The eutectic alloy thus drips from the cathode as it is formed by electrolysis. A. R. P.

Disc for phonographic recording. H. KUBO (U.S.P. 2,012,134, 20.8.35. Appl., 22.8.33).—Al is anodically treated and the oxidised surface is impregnated with a colouring matter which reacts with the oxide to form a lake. The film is stated to reduce noise of needle scratching and visually to indicate the limit of life. B. M. V.

[Palladium] metal coating for electroplated articles [*e.g.*, gramophone master records]. A. G. RUSSELL, Assr. to BELL TELEPHONE LABS., INC. (U.S.P. 1,994,668, 19.3.35. Appl., 31.3.33).—The surface of a thermoplastic record is sputtered with Pd by cathodic disintegration to form a surface for electroplating. A. R. P.

Manufacture of sheets of iron-silicon alloys. COLD METAL PROCESS CO. (B.P. 442,211, 25.6.34. U.S., 7.8.33).—See U.S.P. 1,965,559; B., 1935, 999.

Roasting furnace. Hg boilers. Thermostatic material. Minerals separation.—See I. Enamelled Fe.—See VIII. Storage-battery plates. Alloy for electron emitters. Welding electrode.—See XI.

XI.—ELECTROTECHNICS.

Change of the dipole moment of transformer oil by alteration in practice. L. S. ORNSTEIN, D. T. J. TER HORST, and G. H. FREDERIK (Proc. K. Akad. Wetensch. Amsterdam, 1936, 39, 325–326).—The change in transformer oil during use, due to atm. oxidation, has been followed by measuring the dipole moment, which changes from a mean val. of 0.41 to 0.52×10^{-18} e.s.u. after 9 months; the mean mol. wt. is taken as 250. R. S. B.

Design of hydrogenation converters.—See II. Analysis of viscose solutions.—See V. Absorption of X-rays by glasses.—See VIII. Pig Fe. Pickling of steel. Estimating corrosion. Welding. Determining Cu etc. in Ni solutions. Welding Al. Oxide films on Al. Coloured films on metals.—See X.

PATENTS.

Lead [alloy plates for] storage batteries. GOODLASS WALL & LEAD INDUSTRIES, LTD., W. SINGLETON, OLDHAM & SON, LTD., and H. HOLT, JUN. (B.P. 442,558, 30.8.34. Addn. to B.P. 411,524; B., 1934, 846).—The plates are made of Pb or a Sb-Pb alloy containing > 0.25% Te and are cast flat and then stamped to

shape to impart work-hardness to all the plate or only to the ribs and other prominences. A. R. P.

Gas[permeable carbon] electrode [for primary cells]. E. A. SCHUMACHER, V. C. HAMISTER, and G. W. HEISE, Assrs. to NAT. CARBON CO., INC. (U.S.P. 2,010,608, 6.8.35. Appl., 11.8.31).—In a Zn-NaOH cell the positive element is composed of 1 pt. of charcoal and 0.05—1 pt. of a C black, especially coal-tar oil black. An electrolyte-repellent means, *e.g.*, paraffin or heavier oil, is applied to the surface. B. M. V.

Plates for secondary batteries. J. STONE & Co., LTD., A. H. CHILTON, and W. SCHOFIELD (B.P. 445,708, 16.10.34).—A perforated insulating tube (ebonite) is lined with fibrous material (glass wool), a core wire of Pb is provided, and the annular space is filled with active material in the form of dry powder, which is packed tight by vibration. A no. of these rods are assembled, *e.g.*, in a row to form a plate. B. M. V.

Apparatus for electrolytic decomposition of water. SIEMENS & HALSKE A.-G. (B.P. 444,709, 20.10.34. Ger., 24.10.33).—Frames forming the body of the decomposer consist of tubes of rectangular or square cross-section, or of U-section Fe the open side of which is covered by welded-on metal sheets. J. S. G. T.

Electrolysing apparatus. J. C. BAKER, Assr. to WALLACE & TIERNAN PRODUCTS, INC. (U.S.P. 2,011,171, 13.8.35. Appl., 10.4.31).—A cell for the prep. of Cl₂ comprises a horizontal anode and cathode, the former being slightly domed to draw off the Cl₂; an insulating ring forms the vertical wall of the cell. An asbestos or like diaphragm is placed between a porous ceramic plate above and a perforated cathode below, the latter also being formed with a large no. of grooves on the upper surface. The apparatus is maintained full of brine by a slight aspirating effect, and to stop working either the current or the vac. may be cut off. B. M. V.

Electrolytic process and apparatus. J. E. JEWETT, Assr. to NAT. ANILINE & CHEM. Co., INC. (U.S.P. 2,012,046, 20.8.35. Appl., 31.1.30).—In the electro-reduction of NO₂, azoxy-, or azo compounds the cathode liquor is circulated to keep the cathode diaphragm free from incrustations. B. M. V.

Electrolytic device [condenser]. R. C. SPRAGUE and J. F. McCANN, Assrs. to SPRAGUE SPECIALTIES Co. (U.S.P. 2,011,461, 13.8.35. Appl., 8.5.34. Can., 19.9.32).—The anode comprises Al foil pleated in such a way as to be suitable for insertion into a cylindrical case, the supporting and lead-in wire or frame being attached only along lines parallel to the folds. B. M. V.

Apparatus for electrical precipitation of suspended particles from gaseous fluids. LODGE-COTTRELL, LTD. From SIEMENS-LURGI-COTTRELL-ELEKTROFILTER-GES. M.B.H. F. FORSCHUNG U. PATENT-VERWERTUNG (B.P. 445,258, 23.12.35).—The gas flows vertically in a flue through a no. of superposed groups of precipitators without substantial diversion, the pptd. dust being led down through hollow electrodes of the next lower group and eventually outwards, sideways, and downwards. B. M. V.

Electrical precipitation [of suspended particles from gases]. W. DEUTSCH, Assr. to INTERNAT. PRECIPITATION Co. (U.S.P. 2,008,246, 16.7.35. Appl., 11.5.32. Ger., 22.5.31).—The apparatus is divided into two zones, rectified charging current being supplied to the first and a.c. to the second; in the latter both electrode surfaces are alike and are spaced close enough for the particles to travel to one surface or the other during each half-cycle. B. M. V.

(A) **System for precipitation of solid particles from gases.** (B) **Precipitator.** C. C. LEVY, Assr. to WESTINGHOUSE ELECTRIC & MANUFACTURING Co. (U.S.P. 2,010,599—600, 6.8.35. Appl., 14.2.34).—(A) Valve rectifiers are provided in duplicate, and automatic means serve to switch in the spare device on failure of the one in use. (B) Means for reducing the voltage from the rectifier in the event of a flash-over are described. B. M. V.

Apparatus for measuring by means of photo-electric cells the reflecting power of surfaces. C. ZEISS, Asses. of PAPIRINDUSTRIENS FORSKNINGSSINSTITUT (B.P. 445,009, 20.9.35. Norw., 5.9.34).—Rays from a single source of light are divided: (1) through two adjustable diaphragms to the interior of a BaSO₄-coated globe and out by reflexion at right-angles to a thermo-electric device; and (2) through a condensing lens into another globe coated with BaSO₄ except opposite the point of entry where is a window occupied by the test-piece, and thence out by reflexion to another thermo-electric device. B. M. V.

Manufacture of electron emitters and alloy used therein. A. C. SPARK PLUG Co. (B.P. 441,464, 17.4.34. U.S., 22.4.33).—Cu-Ni alloys with 5—95% Cu and 0.1—8.5% Ba are prepared by wrapping the Ba in Ni foil and inserting it below the surface of the molten Cu-Ni alloy, which is covered with a flux containing BaO 32.6, B₂O₃ 8.7, K₂O 5.4, Al₂O₃ 13.1, and SiO₂ 40.2%. A. R. P.

[Gas-filling for] cathode-ray tubes. F. J. G. VAN DEN BOSCH (B.P. 445,975, 13.2.35).—A filling consisting of a rare gas, *e.g.*, A, Ne, or He, together with H₂ at a total pressure of 5—250 mm. of Hg is claimed. J. S. G. T.

Electrode for vacuum tubes [for flood-lighting]. H. C. JENNISON and W. S. GIRVIN, Assrs. to AMER. BRASS Co. (U.S.P. 1,995,180, 19.3.35. Appl., 8.11.34).—The tube is sealed with an anode cap consisting of an alloy of Cu with 0.01—0.1% Si. A. R. P.

Electric glow-discharge vessel. E. KOCH, Assr. to ROVO A.-G. (U.S.P. 1,998,371, 16.4.35. Appl., 13.4.33. Ger., 6.3.33).—The inner surface of Ne tubes and the like is coated with a film of glycerin containing 16% of H₃BO₃ and then dusted with luminous ZnS powder and heated at 300° in vac. A. R. P.

Electric gaseous-discharge lamps. F. J. G. VAN DEN BOSCH (B.P. 441,895, 13.10.34. Fr., 27.10.33).—The lamps are filled with a low-pressure mixture of a noble gas with > 20% of N₂ and > 5% of H₂, and the electrodes consist of W containing TaN and surface-hardened with B. A. R. P.

Electric-discharge devices. GEN. ELECTRIC Co., LTD., and V. J. FRANCIS (B.P. 445,575, 12.10.34).—A

single rod of an alkaline-earth metal compound is surrounded by a no. of spirals of W or other metal wire of successively increasing diam., forming a grid to prevent spattering on the bulb while permitting the discharge to pass through the interstices. B. M. V.

Vacuum tubes or electric-discharge devices. BRIT. THOMSON-HOUSTON Co., LTD., L. J. DAVIES, and C. E. FENWICK (B.P. 445,578, 12.10.34).—A method of introducing a substance (I) into a vac. tube subsequent to sealing-off comprises enclosing (I) in a frangible small bulb, causing this to adhere to the interior of the main bulb within reach of the deflexion of a bimetallic strip. After completing the manufacture and sealing-off the lamp or other device, heat is applied sufficient for the strip to fracture the small bulb. B. M. V.

Thermionic electron-emissive electrodes for gas or vapour electric-discharge devices. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 444,737, 7.8.35. U.S. 10.8.34).—A heating element, *e.g.*, of W, is arranged axially within a tube (T), *e.g.*, of Ni or "Konel," wound with a helical coil (C), *e.g.*, of W, to which is applied electron-emissive material which is adherent to both C and T. J. S. G. T.

Luminous electric-discharge devices. GEN. ELECTRIC Co., LTD. From PATENT-TREUHAND-GES. F. ELEKTR. GLÜHLAMPEN M.B.H. (B.P. 445,187, 3.9.34).—Two luminescent materials are provided: A (ZnS or ZnSiO₃) being excited by the discharge and B (rhodamine) by radiation from A. A is usually inside and B outside the bulb, and B may be in the form of letters, signs, etc. on a background of A. B. M. V.

Manufacture of a magnet made of metal oxide. MITSUBISHI DENKI KABUSHIKI KAISHA (B.P. 441,714, 8.9.34. Jap., 14.6.34).—Mixtures of powdered Fe₂O₃, Fe₃O₄, and CoO or NiO are pressed into shape, sintered at 850–1150°, and magnetised at 300–500° before cooling. A. R. P.

Asymmetric conductor [dry rectifier]. J. A. BECKER, Assr. to BELL TELEPHONE LABS., INC. (U.S.P. 1,994,632, 19.3.35. Appl., 11.5.33).—The rectifier consists of a disc of PbS, SiC, Te, or Se waxed on one side and making contact on both sides with a disc of Pb or Sn foil. A. R. P.

Manufacture of electrodes. L. D. PREE, Assr. to DOW CHEM. Co. (U.S.P. 1,996,643, 2.4.35. Appl., 10.8.31).—C, graphite, or graphitised C electrodes are evacuated and treated with a solution of pine rosin in tung or linseed oil at 175–200° to render them resistant to oxidation at ordinary temp. L. C. M.

Electrodes and electrical contacts. E. SCHATT-ANECK (B.P. 445,982, 15.4.35. Austr., 3.9.34 and 16.3.35).—Porous electrodes or electrical contacts impregnated with a switch- or quenching-liquid in order to obtain rapid quenching of an arc which may be formed on breaking a circuit are claimed. J. S. G. T.

Welding electrode. J. H. DEPPELER (U.S.P. 1,996,794, 9.4.35. Appl., 18.7.33).—A coated steel rod containing C 0.2–0.3 and non-ferrous impurities < 4% is claimed. L. C. M.

Electrodes for use in arc welding. SOUDURE AUTOGÈNE FRANÇ. (B.P. 445,210, 2.11.34. Ger., 23.11.3).

—The metal rod is coated with a cellulose compound (and, if desired, with Na silicate), the former being of the type which does not swell on addition of the usual pasting materials. B. M. V.

Insulation of electric conductors. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 445,682, 30.10.35. Ger., 31.10.34).—A conductor coated with oxide (Al₂O₃) is treated to remove all occluded H₂O and the pores are filled with styrol. B. M. V.

Resistor. S. BLOOMENTHAL, Assr. to RADIO CORP. OF AMERICA (U.S.P. 2,010,133, 6.8.35. Appl., 25.11.33).—A resistance that remains const. under change of current comprises an inert filler which is mixed with a solution of PhOH-CH₂O resin, dried, remixed with an emulsion of graphite and/or C black, and again dried. The composition is then moulded, preferably in the form of a rod, and baked. B. M. V.

Electric-resistance bodies of semi-conducting materials. PATENT-TREUHAND-GES. F. ELEKTR. GLÜHLAMPEN M.B.H. (B.P. 445,386, 11.2.35. Ger., 12. and 19.2.34).—A material having sp. resistance > 1 (10³–10⁶) ohm per cm. cube is composed of oxides, sulphides, selenides, or tellurides of metals, especially the unsaturated oxides of Co and Ni. Means are provided to control the loss of heat so that the fall in temp. is parallel to the flow of current. B. M. V.

Corrosion-resistant product [oil for transformers]. J. G. FORD, Assr. to WESTINGHOUSE ELECTRIC & MANUFACTURING Co. (U.S.P. 1,994,911, 19.3.35. Appl., 15.2.33).—The metal parts of transformers are protected from corrosion by the oil filling by a polymerised halogen- (Cl-) substituted product of vinyl acetate. A. R. P.

Ceramic electric-insulating material. W. BLOCH (B.P. 445,269, 4.9.34).—A fired insulator of high ϵ is composed of a Mg compound, other than asbestos, 80–90%, and 5–20% of bentonite or clay + bentonite, the Al₂O₃ content being > 7%. Other substances (except felspar) may be substituted for part of the Mg compound. B. M. V.

[Electrically] testing the fatigue strength of material. BRIT. THOMSON-HOUSTON Co., LTD., W. B. PARKER, and I. JONES (B.P. 445,887, 19.10.34).—A test-piece is vibrated synchronously with an a.-c. supply to an amplitude (and stress) determined by the setting of a relay. The damping produced by formation of an incipient crack destroys synchronisation and stops an electric clock. B. M. V.

Separating dust from gases. Fog dispersion. Gas-analysis apparatus.—See I. Gas testing.—See II. Treating hydrocarbons.—See III. Dyes of anthracene series.—See IV. Testing imperviousness of textiles.—See VI. O₃ generator.—See VII. Ceramic insulator. Hg switch.—See VIII. Annealing metal. Electric steel. Magnetic alloys. Nitriding ferrous articles. Cleaning Fe. Applying metal-forming lubricants. Furnace-lining protection. Coating steel with Zn. Welding electrodes and rod. Ni. Surface-plating metals. Bearing-metal surfaces. Na. Be alloys. Gramophone records. Phonographic disc.—See X. Purifying alcoholic liquors.—See XVIII.

[Sealing-in of electrodes of] electron-discharge devices. TELEFUNKEN GES. F. DRAHTL. TELEGRAPHIE M.B.H. (B.P. 446,231, 9.9.35. Ger., 8.9.34. Addn. to B.P. 445,287).

XII.—FATS; OILS; WAXES.

Fatty acids of margosa oil. R. CHILD and S. RAMANATHAN (J.S.C.I., 1936, 55, 124—127 r).—The mixed fatty acids of margosa oil (seed oil of *Azadirachta indica*, A. Juss.) have been submitted to Pb salt separation and fractional distillation of the Me esters. The results indicate the composition: palmitic 13.1, stearic 18.5, arachidic 2.3, oleic 47.5, linoleic acid 15.3, unsaponifiable matter 0.9, undetermined (probably resinous acids) 2.4%. The original oil contains > 1% of fully saturated glycerides, determined by KMnO_4 oxidation. The results of thiocyanometric analysis are compared with the results from fractionation, and the reliability of the former method is discussed. Consts. are recorded for samples of oil from different districts of Ceylon.

Essang oil. A. STEGER and J. VAN LOON (Rec. trav. chim., 1935, 54, 988—994).—The *n*, Reichert—Meissl, I, CNS, sap., acid, and Ac sap. vals. of essang oil (I) and the I, acid, and *n* vals. of the acids (II), m.p. 36—37°, obtained on saponification of the oil, have been determined. From these acids α -elæostearic, Δ^9 12-linoleic, and Δ^9 -oleic acid (or a derivative of these) have been isolated, and the presence of linolenic acid is inferred. The % of these and other constituents in (I) and (II) is given. (I) when heated in CO_2 at 280° (1 hr.) is converted into a stand oil suitable for paint manufacture. H. G. M.

Anda-assu oil from Brazil. H. A. GARDNER (Nat. Paint Var. Lacquer Assoc. Inc., Sci. Sect. Circ. No. 481, 1935, 155—158).—Oil expressed from the seeds of *Johannes Princeps* (syn. *Anda brasiliensis*, probably a species of *Aleurites triloba*) had $d_{15.5}^{15.5}$ 0.923, I val. 140.2, acid val. 0.5, sap. val. 192, colour (Gardner scale) 5, η A, *n* 1.4739. Previous work suggests composition of the oil acids to be oleic 46.0, linoleic 46.7, myristic 2.4, and palmitic 5.4%. It is a semi-drying oil and possesses powerful laxative properties. F. C. B. M.

Wetting-out [agents].—See III. **Tung oil for varnishes etc.**—See XIII. **Ghee.**—See XIX.

PATENTS.

Treatment of fatty animal raw material, particularly whale blubber, in pressure-steam digesters. H. P. CHRISTENSEN (B.P. 444,619, 19.10.35. Nor., 24.10.34).—Ground whale blubber etc. is pumped into a steam digester (*D*), during the operation thereof under pressure, by means of a pressure supply-pipe provided with a non-return valve which connects with a hollow trunnion for a rotating, perforated drum located inside *D*. E. L.

Bleaching of fatty acids, oils, and fats. L. MELLERSEH-JACKSON. FROM MATHIESON ALKALI WORKS (B.P. 444,813, 21.9.34).—Fatty acids or fats are bleached by treatment in (4—5) stages with successive increments of a bleaching solution (*B*) containing Ca (or similar) hypochlorite, with or without NaCl; in each stage the fat etc. is heated to > 100°, cooled by addition of *B*, and repeatedly agitated and settled before removing the spent

aq. liquor. After each, or the final, bleaching treatment the fat may be treated with HCl. E. L.

Manufacture of soap [filaments]. A. PATERSON (B.P. 446,342, 23.10.34).—Apparatus is claimed whereby soap is produced in the form of cut filaments, which may be dried by an air-current and used as such, or for the prep. of powdered or milled soaps. E. L.

Lubricants.—See II. **Textile-treating baths.**—See VI. **Applying metal-forming lubricants.**—See X.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Paints for ships' bottoms. ANON. (Chem.-Ztg., 1936, 60, 397—398).—A short historical survey of anti-fouling paints is made, typical formulæ being given.

F. C. B. M.

Preparation of emulsion media [for paints]. H. WAGNER (Chem.-Ztg., 1936, 60, 393—395).—Emulsions containing glue may give rise to the following film types: (1) hydrophilic films with a glue-cellular structure, (2) two-layer films with a continuous oil surface and an under surface interspersed with glue cell-walls, and (3) films of true varnish type. Emulsions yielding type-(1) films should be based on casein rather than on animal glue, which is the more easily reversible. Excess of alkali may be incorporated into emulsions containing saponifiable oils on account of the emulsifying action of the soaps produced. Emulsifiers such as sulphonated fatty alcohols or $\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$ esters should be added to media containing unsaponifiable matter, and hydrophilic wetting agents to pigmented emulsions. F. C. B. M.

Glycerol phthalate solid colours. L. P. HART and H. A. GARDNER (Nat. Paint Var. Assoc., 1935, Circ. 481, 159—161).—Pigmented red, yellow, and green varnishes prepared from five glycerol phthalate (alkyd) resins, from phenol resin, and from bodied tung oil, and painted on metal panels, were compared as to their resistance to exposure over periods of 12, 22, and 34 months. The colours used were 10% C.P. toluidine-red, 30% chrome-yellow, and 14% chrome-green. All finishes withstood weathering well, the appreciable superiority of the yellows being perhaps due to their heavier pigmentation. F. C. B. M.

Tung oil as raw material for varnishes and synthetic resins. E. FONROBERT (Farben-Chem., 1936, 7, 5—10, 49—54).—A lecture.

Severe test for "gas checking" [of varnish]. G. G. SWARD (Nat. Paint Var. Assoc., 1935, Circ. 481, 153—154).—An oven is described which permits the continuous passage of gases over drying varnish panels. F. C. B. M.

Adhesion of exposed plasticised lacquers. A. W. VAN HEUCKEROTH (Nat. Paint Var. Assoc., 1935, Circ. 481, 162—164).—Panels coated with nitrocellulose films containing different plasticisers were exposed for 16 months, the films then broken by impact, and the panels re-exposed for a further 21 months. The tests show that large amounts of plasticiser are more valuable than resins in extending durability, and should be present in sufficient quantity even when resins are used to enhance gloss and adhesion. F. C. B. M.

Production of artificial sponges from cellulose derivatives. G. BONWIT (Brit. Plastics, 1936, 7, 501—502).—A typical method of manufacture is to mix 280 g. of viscose (I) solution, containing 20 g. of (I), with 20 g. of finely-divided cotton and 400 g. of NaCl or Na₂SO₄. After moulding, the material is soaked in dil. AcOH to ppt. the cellulose and dissolve out the salt. Several variations of this process are described. Such sponges have the advantages over the natural product of lesser cost and greater absorptive capacity; they can be made any desired shape and also bleached and dyed. A. G.

Fused wood.—See V. **Essang oil.**—See XII.

PATENTS.

Printing inks. C. F. P. MILLAR (B.P. 444,683, 27.11.35).—A mixture of vulcanised rubber-containing fabric (old motor tyres) and/or vulcanised rubber, together with mineral oils if desired, is destructively distilled with agitation, to decompose the rubber and carbonise or destroy the fabric as such, pungent material being liberated, *e.g.*, by the use of superheated steam, if desired, after transfer to a separate vessel, and the resultant product is worked up with oily materials, pigments, gums, driers, etc. S. S. W.

Printing ink. E. J. KELLY (U.S.P. 2,002,537, 28.5.35. Appl., 14.2.34).—Printing ink which dries quickly at 149—204° comprises dry pigment (5—65), high-m.p. org. wax, *e.g.*, carnauba, montan (2—10), nitrocellulose of η $\frac{1}{2}$ —5 sec. (3—18), volatile solvent thinner, *e.g.*, Bu lactate (30—70), and plasticiser, *e.g.*, Et phthalate (10—40 wt.-%), ground to a homogeneous mass. S. S. W.

Melting and treating organic substances [varnish]. BECK, KOLLER & Co., INC., Asses. of W. KRUMBHAAR (B.P. 445,980, 12.4.35. U.S., 5.5.34).—A varnish kettle is heated from below (by fire) and up the sides and at the top (electrically), and an agitator is provided which draws the foam downwardly at the middle into the body of the varnish. A vent, a supply pipe for inert gas, and a suction pipe for emptying are provided. B. M. V.

Plastic masses, paints, and lacquers. H. HUNSDIECKER (B.P. 444,740, 27.8.35. Ger., 3.9.34).—The use of approx. 0.2% of cryst. BiOI to produce glistening mother-of-pearl effects in lacquers etc. is claimed. S. S. W.

Synthetic plastic materials containing rubber or allied products. D. D. PRATT (B.P. 446,343, 26.10.34).—A solution of a phenol-aldehyde or other synthetic resin is mixed with a dispersion of latex or solid rubber in a volatile solvent, *e.g.*, COMe₂, and the solvents are evaporated. S. M.

Manufacture of plastic masses. W. KRAUS, Assr. to AMER. CYANAMID Co. (U.S.P. 2,002,540, 28.5.35. Appl., 16.6.30. Austr., 21.12.29).—Thiodicyanodiamidine, NH₂·C(NH)·NH·CS·NH₂, or a compound capable of yielding it under the reaction conditions, *e.g.*, CS(NH₂)₂, dicyanodiamide, in presence of H₂S, is treated with aldehydes (CH₂O), preferably in aq. alkaline solution. Plastic masses are obtained. They increase the fluidity of other plastic masses, *e.g.*, urea-CH₂O, to which they are added. A. W. B.

Cold-moulding and rolling fibre plastic. C. BATCHELLER (U.S.P. 1,995,412, 26.3.35. Appl., 12.1.34).—A moulding mixture of asbestos fibres with a small proportion of calcined magnesite and bentonite bonded with gilsonite or raw linseed oil is claimed. A. R. P.

Manufacture of thin-walled hollow bodies from cellulose esters, artificial resins, and the like plastics. A. NADAI (B.P. 444,815, 27.9.34).—The preformed hollow body (H) is placed in a mould, both are simultaneously heated, and H is softened by immersion in a heated liquid (high-boiling paraffin oil), after which H is expanded to the shape of the mould by blowing with (preheated) air or other gas, under moderate pressure, *e.g.*, 0.1—0.3 atm. To prevent the cellulose ester etc. becoming cloudy or opaque, solvent vapours (COMe₂, EtOH, MeOH) are added to the pressure air. The process may be carried out in stages in a series of moulds. S. S. W.

Manufacture of polymerisation products. H. STAUDINGER (B.P. 446,580, 1.11.34. Ger., 1.11.33).—Styrene is polymerised by prolonged heating in presence of \approx approx. 1% of divinylbenzene; the products are insol. in org. solvents. S. M.

Manufacture of condensation products [for use in safety glass etc.]. I. G. FARBENIND. A.-G. (B.P. 446,276, 25.10.34. Ger., 25.10.33).—The condensation of maleic anhydride with castor oil (cf. B.P. 363,933; B., 1932, 262) is accelerated by preheating or blowing the oil so as to reduce the OH content and increase the no. of double linkings. S. M.

Resinous composition. T. S. CARSWELL, Assr. to MONSANTO CHEM. Co. (U.S.P. 2,006,345, 2.7.35. Appl., 22.6.34).—A monohydric phenol ester of an aliphatic dicarboxylic or aromatic mono- or di-carboxylic acid, *e.g.*, *o*-C₆H₄(CO₂Ph)₂, is incorporated with a molten phenol-aldehyde or alkyd resin. The product shows increased resistance to fracture, H₂O, and alkalis. S. M.

Manufacture of rods and other elongated articles from artificial resin. P. KOPP (B.P. 446,591, 6.12.34. Ger., 12.12.33. Addn. to B.P. 380,824).

Presses for artificial resins. C. and W. BERGES (C. & W. BERGES MASCHINENFABR.) (B.P. 446,021, 9.11.34. Ger., 10.11.33).

Converting liquids into solids.—See I. **Ozonisation products of terpene alcohols.**—See III. **Pigmented paper.**—See V. **Coloured cement.** **Wood filler.**—See IX. **Gramophone master records.**—See X. **Casein products.**—See XIX.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Protection of rubber and gasoline by antioxidants. H. W. ELLEY (Trans. Electrochem. Soc., Preprint, 1936, 69, 239—255).—The mechanism of the action of antioxidants is discussed. A list of commercially successful inhibitors for rubber and gasoline is given; these have a crit. oxidation potential within a certain range. D. K. M.

Oil-resisting rubber. VI. **Solvents for the cold-vulcanisation process.** J. R. SCOTT (J. Res. Assoc. Brit. Rubber Manufrs., 1936, 5, 37—47; cf. B., 1935,

1154).—A solvent for the cold-vulcanisation process should possess not only a high max. swelling power, but also a high rate of swelling; the latter is dependent on the η of the liquid. CS_2 has a marked advantage in both respects. Mixtures are indicated with high swelling power, e.g., CCl_4 (35), C_6H_6 (30), and light petroleum (35 pts.), but these generally are inferior to CS_2 .

D. F. T.

Oil-resistance of rubber. III. Viscosity and molecular polarisation of rubber solution. S. KAMBARA (J. Soc. Chem. Ind., Japan, 1936, 39, 138—140 B; cf. B., 1936, 161).—Investigation of solutions of crude and purified rubber shows no relation between η and the small degree of mol. polarity. Ultra-violet irradiation reduces η without markedly affecting the mol. polarity. The results support the view that rubber in C_6H_6 is in a micellar condition rather than in long-chain mols.

D. F. T.

Influence of fillers on light-ageing of vulcanised rubber. Measurement of absorption of light-radiation of different wave-lengths and their influence on the ageing. V. MARGARITOV (J. Rubber Ind., U.S.S.R., Jan., 1936; Kautschuk, 1936, 12, 94—96).—Experiments with ultra-violet light from a Hg lamp and with filtered sunlight show that vulcanised rubber absorbs all waves up to 3980 Å. and measurements can be made only over the range λ 5600—3980 Å. Light of λ 4800 Å. appears to be active. This part of the absorption spectrum normally appears after 3 hr. and disappears after 5 hr. The presence of fillers such as whiting or kaolin delays the occurrence of these changes, which are attributed to the development of surface cracks and consequent exposure of unaffected rubber; otherwise fillers are substantially inactive. Diphenylguanidine causes these changes in the absorption spectrum to occur more rapidly. Light of λ 5300 Å. is not absorbed even after 18 hr., being apparently quite inactive towards rubber.

D. F. T.

Hydrocaoutchoucs. F. KIRCHHOF (Kautschuk, 1936, 12, 80—85).—A review of investigations on the hydrogenation of rubber and the character of the products.

D. F. T.

Rubber latex with textiles.—See VI.

PATENTS.

Rubber compounding. A. B. COWDERY, Assr. to BARRETT Co. (U.S.P. 2,006,310, 25.6.35. Appl., 20.8.32).—Rubber is compounded with a mixture of coumarone resin (1—5 pts.) and coal-tar oil (5—1 pt. substantially free from cryst. material at 25°, and b.p. \leq 170°), as a softening and dispersing agent.

D. F. T.

Production of compositions from rubber and the like. DUNLOP RUBBER Co., LTD., D. F. TWISS, and F. A. JONES (B.P. 445,940, 22.10.34).—Thermoplastic products are obtained by chemical combination of vulcanised or unvulcanised rubber with at least one arylamine with the aid of heat in presence of a catalyst (a hydrohalide or its NH_4 salt, or an arylamine hydrohalide).

D. F. T.

Wrapping. WINGFOOT CORP. (B.P. 446,224, 24.7.34. U.S., 2.8.33).—A thin sheet of flexible rubber hydrochloride compounded with an age resister (if desired) is

sealed by heat (110—120°). The compounds of B.P. 437,304 (B., 1936, 31) are excluded.

B. M. V.

[Condensed-rubber] base for artificial denture. WINGFOOT CORP. (B.P. 445,341, 2.7.34. U.S., 2.8.33).—Rubber is condensed by means of chlorostannic acid or similar substance.

B. M. V.

Manufacture of chlorinated rubber. W. D. SPENCER, S. STEELE, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 446,103, 23.10.34).—A solution of rubber in a suitable solvent (CCl_4) is passed in countercurrent with a stream of Cl_2 which may previously have been saturated with the solvent vapour at the reaction temp. (50—75°). The η of the rubber solution is previously reduced to \leq 4.0 poises (0.2—1 poise), e.g., by exposure to actinic rays.

D. F. T.

Production of reaction product of butadiene derivatives with hydrogen chloride. MARSENE CORP. OF AMERICA (B.P. 446,818, 6.10.34. U.S., 23.12.33).—See U.S.P. 1,980,396; B., 1935, 963.

Printing inks. Rubber plastics.—See XIII. **Artificial leather.**—See XV.

XV.—LEATHER; GLUE.

Hides from curing experiments in Southern Rhodesia: report by the Imperial Institute Advisory Committee on Hides and Skins. (Bull. Imp. Inst., 1936, 34, 16—32).—A detailed study of the hides (and resultant leathers) obtained by 6 different methods of curing showed that excellent results are obtained by dry-salting, or by shade-drying, or by sun-drying by suspension (cf. B., 1934, 640); "pitting" and sun-drying on poles cannot be recommended, and sun-drying on the ground is highly unsatisfactory.

E. L.

Leather dyeing, leather body colours, and the manufacture of patent leather. H. HERFELD (Farben-Chem., 1936, 7, 11—15, 54—56, 127—130, 165—175).—A review.

PATENTS.

Production of fibrous material from animal skins. C. FREUDENBERG GES.M.B.H., and H. FREUDENBERG (B.P. 445,721, 9.11.34).—Skin waste, e.g., glue pieces, is well limed, mechanically disintegrated, delimed with acids, swollen at p_{H} 2.0—3.0, and again disintegrated.

D. W.

Manufacture of tanning materials. A. CARPMAEL. FROM I. G. FARBENIND. A.-G. (B.P. 444,591, 22.9.34).—The materials obtained by the comparatively mild condensation of an aromatic OH-compound and S and/or a S-halogen compound are mixed (with heating, if required) with sulphite-cellulose waste liquor (3—6 pts., calc. on the dry wt.). Addition of nuclei-linking reagents (CH_2O , glyoxal, etc.) is also claimed; the leathers obtained by using aq. solutions or dispersions of these tanning agents are soft and pliable.

E. J. B.

Tanning of hides and skins. TANNING PROCESS Co., Assees. of M. M. MERRITT (B.P. 444,690, 25.9.34. U.S., 2.10.33).—A mixture of basic $\text{Cr}_2(\text{SO}_4)_3$, $\text{Na}_2\text{Cr}_2\text{O}_7$, and H_2SO_4 is used for the first bath of the 2-bath Cr-tanning process.

D. W.

Tanning. HALL LABS., Inc., Assees. of R. E. HALL (B.P. 445,612, 8.8.34. U.S., 18.8.33).—An alkali

(Na or NH₄) hexametaphosphate and a vegetable tan liquor or sulphite-cellulose waste extract with Fe as an impurity is claimed. D. W.

Manufacture of ornamented leather. G. D. SART, ASSR. to AGOOS LEATHER COMPANIES, INC. (U.S.P. 2,002,792, 28.5.35. Appl., 26.4.35).—The grain of leather is embossed with a design, the raised portions are buffed off, and the skins dyed to produce contrasting colours or depths of shade on the buffed and unbuffed portions. D. W.

Producing patterns on dark-coloured skins or leathers. H. ENGELS, ASSR. to O. RÜGNER (U.S.P. 2,004,043, 4.6.35. Appl., 16.7.31. Ger., 19.7.30).—The skins are pickled, covered with a stencil, the bleaching agent applied through the stencil openings, treated with aq. NaHSO₃, rinsed, and finished as usual. D. W.

Artificial leather. B. HOLM, ASSR. to UNITED STATES RUBBER Co. (U.S.P. 1,995,179, 19.3.35. Appl., 13.6.33).—Claim is made for a product consisting of a 3—5 : 4 mixture of a fibrous material (e.g., a 12—20 : 3—6 mixture of leather and cotton) and rubber. A. R. P.

Preparation of glue and a plastic material and product thereof. L. J. FUHRMANN, ASSR. to ALLIED MILLS, INC. (U.S.P. 2,006,736, 2.7.35. Appl., 27.6.32).—Soya-bean cake is powdered, immersed in 10% aq. NaOH or other alkali for 15—20 hr., and the product agitated for 1 hr. at 90° with a phenol and CH₂O. S. M.

Wool from skins.—See V. Flaked NaHSO₄[—glue] composition.—See VII. Casein products.—See XIX.

XVI.—AGRICULTURE.

Podsols and brown forest soils. II. K. LUNDBLAD (Soil Sci., 1936, 41, 295—313; cf. A., 1934, 388).—Data for base exchange, cataphoresis, ultimate *p*_H, exchange neutrality, and combining capacity serve to differentiate between soil types, and to characterise the process of formation. Soil types examined are developed by an acid process of weathering, podsols being formed by the more acid conditions. A. G. P.

Determination by the adsorption method of the mean specific surface of finely granular powders. A. V. ZNAMENSKI (J. Appl. Chem. Russ., 1936, 9, 208—216).—The mean sp. surface of soils is given by $S = 10,082a$, where *a* is Freundlich's adsorption coeff. for methylene-blue. R. T.

Aggregate analysis [of soils] by Tiulin's method and determination of the aggregate fraction, size of aggregates, and ability of soils to form aggregates. L. MEYER and U. VON RENNENKAMPF (Z. Pflanz. Düng., 1936, 43, A, 268—280).—Apparatus and technique are described. A. G. P.

Neutralising the acidity of podsol soils with lime. I. F. RADU (Landw. Versuchs-Stat., 1936, 125, 201—227).—The hydrolytic acidity of podsols increases with the org. matter contents and is higher in the less degraded types. The neutralising power of basic Ca compounds decreases as neutrality is approached and is still less on the alkaline side. The resistance of adsorbed H⁺ to displacement by Ca⁺⁺ from Ca(OH)₂ decreases with increasing soil acidity, the relative resistance over the *p*_H

ranges, original —6.0, original —7.0, original —7.7, increasing in the proportion 1 : 2 : 5. In all soils, irrespective of their *p*_H, the increase in *S* val. following treatment with Ca(OH)₂ is greater than the decline in *T*—*S*. This is ascribed to the decrease in degree of dispersion and to changes in the mol. structure of the absorbing complex. The general effects of Ca(OH)₂ on soil are discussed and methods for determining the CaO requirement compared. A. G. P.

Rate of loss of exchangeable lime from North Welsh agricultural soils. R. WILLIAMS (Empire J. Exp. Agric., 1936, 4, 61—68).—The annual loss of exchangeable CaO averaged 0.00473% and tended to increase with the amount originally present. A. G. P.

Soil swelling. II. Swelling in solutions of electrolytes; microscopic and X-ray investigations. D. I. SIDERI (Soil Sci., 1936, 41, 275—293; cf. B., 1936, 421).—Swelling in solutions of salts and of H₂SO₄ is < that in H₂O, except in the cases of 0.1*N* and 0.5*N* solutions of NaCl and MgCl₂. The absorption curve for cations has an opposite trend to that of the swelling curve. The latter is regarded as a coagulation curve of the sol of the soil colloid. Structural and structureless soils are differentiated by the absorption of H₂O and of inert liquids. X-Ray examination shows that the swelling phenomena are associated with amorphous and not with cryst. particles. Columnar alkali-soil suspensions contain minerals unlike those of typical soil colloids (montmorillonite, bentonite, or galloisite). A. G. P.

Hydration of minerals and soil colloids in relation to crystal structure. W. P. KELLEY, H. JENNY, and S. M. BROWN (Soil Sci., 1936, 41, 259—274).—Soil colloids contain OH⁻ as part of the crystal-lattice structure, but lose the lattice H₂O at lower temp. than other minerals of known structure. At least 2 classes of soil colloids are distinguished: (1) those resembling kaolinite and halloysite, and (2) those related to but not identical with beidellite. A. G. P.

Periodic cycle of the nitrogen, phosphorus, and potassium of forest soils. D. FEHÉR and M. FRANK (Z. Pflanz. Düng., 1936, 43, 5—33).—The total N content of forest soils reaches a max. in late autumn, winter, or spring, and a min. at the height of the vegetation season. Variations in NO₃⁻ are similar. Seasonal changes in the humus content are inverse to those of total N. The citric acid-sol. K and P are low in summer and high in autumn and winter. The mechanism of these changes is discussed in relation to cycles of microbiological activity and the assimilation of nutrients by plants. A. G. P.

Determination of the manurial requirement of soils for potassium and phosphate by means of the soil solution. A. KAWÉ (Z. Pflanz. Düng., 1936, 43, 69—83).—The soil solution is obtained by adding H₂O to soil to bring the content to the max. capacity and, after 24 hr., allowing the surplus to drain. The dil. soil solution (1 : 1) is used to extract a further soil sample. The additional K and P removed is utilised in calculating the nutrient status of the soil. Results agree with those of other methods. A. G. P.

Seedling method [for determining soil-nutrient values]. H. NEUBAUER (Z. Pflanz. Düng., 1936, 43, A,

257—267).—Points of detail in the author's technique are discussed. A. G. P.

Purification of Hohenbockaer sand for nutrient-deficiency experiments. II. W. SCHOLZ (Z. Pflanz. Düng., 1936, 43, 1—5).—The sand, purified as before (B., 1934, 416), did not permit the growth of small-seeded plants receiving customary nutrient solutions without Ca, Fe, or the secondary nutrients. Addition of these to the medium, or the use of unwashed sand, produced healthy growth. A. G. P.

Determination of carbonate, organic carbon, and total nitrogen in the same sample [of soil]. T. R. MHASKARAN, C. R. H. IYER, R. RAJAGOPALAN, and V. SUBRAHMANYAN (J. Indian Inst. Sci., 1936, A, 19, 45—52).—CO₃'' is determined as CO₂ by the action of H₃PO₄, org. C as CO₂ after oxidation with H₂SO₄—H₂CrO₄, and total N in the residue after reduction by the Kjeldahl method. H. D.

Semi-micro-method of determining total nitrogen of air-dry soils. K. P. BASU and S. N. SARKAR (J. Indian Chem. Soc., 1935, 12, 797—798).—Pregl's micro-Kjeldahl method can be successfully applied to the determination of total N in a 0.5-g. sample of soil. H. G. M.

Influence of liming on the solubility of the phosphates of acid soils. O. ENGELS (Z. Pflanz. Düng., 1936, 43, B, 350—356).—The action of CaO in increasing the availability of PO₄''' varies with soil type and reaction, and is related to its ability to prevent the fixation of PO₄''' by Al and Fe. A. G. P.

Field experiments with [fertiliser] phosphates. C. F. NOLL, C. I. IRVIN, and F. D. GARDNER (Penn. Agric. Exp. Sta. Bull., 1935, No. 315, 14 pp.).—On a P-deficient soil the order of efficiency of fertilisers when used in conjunction with NaNO₃ and KCl was basic slag (I) > bone meal > superphosphate (II) > rock phosphate (III). When used with farmyard manure on limed land the order was similar, but on unlimed land (II) gave as good results as (I). The yields obtained with (III) were unaffected by liming, but were increased by supplementary dressings of CaSO₄ or S. (II) and (III) were no more effective when ploughed-in than when harrowed into the surface layers. A. G. P.

Series principle in field trials. O. DE VRIES (Z. Pflanz. Düng., 1936, 43, 83—93).—The arrangement of field trials and the expression and interpretation of results are discussed. Results obtained by series experiments, i.e., "growth curves" obtained by a series of increasing applications of fertiliser, give more valuable information than those obtained by replication of individual treatments. A. G. P.

Plant-physiological evaluation of the phosphoric acid of stall manure. W. SAUERLANDT (Z. Pflanz. Düng., 1936, 43, B, 341—350).—High P contents in manure are associated with high physiological activity, the effect being more marked in the P intake of the crop than in the total yield. Manure facilitates the intake by plants of P from mineral fertilisers. A. G. P.

Fertiliser experiments in the Morganthau orchard: six years' results with nineteen treatments. R. C. COLLISON and L. C. ANDERSON (New York

State Agric. Exp. Sta. Bull., 1936, No. 661, 32 pp.).—On a light soil of p_H 5.5—6.0 various types of N fertilisers produced similar increases in growth and yield of trees. CaO and K and P fertilisers produced no positive results. A. G. P.

Pasture fertilisation. F. D. GARDNER, S. I. BECHDEL, P. S. WILLIAMS, C. F. NOLL, J. W. WHITE, E. S. ERB, E. B. COFFMAN, G. C. FULLER, and C. R. ENLOW (Penn. Agric. Exp. Sta. Bull., 1935, No. 323, 24 pp.).—Effects of manuring and management on the yield, nutrient val., and composition of herbage are examined. A. G. P.

Manurial value of calcium cyanamide. C. LARSON and I. BACHÉR (Medd. Centralanst. Försöksv. Jordbruks, 1935, No. 90, 40 pp.; Chem. Zentr., 1935, ii, 105).—Oats, potatoes, and rutabagas utilise CaCN₂ efficiently, whereas for sugar beet and rye the fertiliser is less satisfactory than NaNO₃. Weather and soil conditions influence the action of CaCN₂. A. G. P.

Nitrogenous manuring of sugar beet. E. T. SYKES (Empire J. Exp. Agric., 1936, 4, 152—164).—Field trials are recorded. Various N fertilisers are compared. Supplementary treatment with K is likely to be beneficial when heavy dressings of N [especially as (NH₄)₂SO₄] are given. A. G. P.

Green-manuring test [for sugar beet]. K. DE HAAN (Med. Inst. Suikerbiet., 1935, 5, 235—244; Internat. Sugar J., 1936, 38, 108).—A field planted in strips with clover and vetches was turned under as green manure, the intervening strips receiving no green manure; otherwise the treatment of the field was uniform. A subsequent crop of sugar beets plainly marked the green-manured strips by a more vigorous growth, though the yield from these strips was not raised above 4%, and the crops of leaves had increased 20—30%. However, the purity of the juice dropped to such an extent that the nett yield of sugar per hectare remained the same as for the unmanured portions of the field. J. P. O.

Drought-resistance in spring wheat. O. S. AAMODT and W. H. JOHNSTON (Canad. J. Res., 1936, 14, C, 122—152).—Factors influencing drought-resistance are examined. Addition of superphosphate to culture media tended to decrease the no. of primary roots formed by wheat plants. Rates of germination of seeds in aq. KCl, NaCl, or sucrose declined with increasing concn., but the relative order of germinability in different varieties was unchanged. Drought-resistance is not closely related to the ability of seeds to germinate in conc. salt solutions. A. G. P.

Inhibition of arsenic injury to plants by phosphorus. A. M. HURD-KARRER (J. Washington Acad. Sci., 1936, 26, 180—181).—With H₂O-cultured wheat plants injury caused by addition of Na₃AsO₄ to the nutrient was prevented by increasing the [PO₄''']. Similar effects were obtained in sandy but not in clay soils. A. G. P.

Influence of varying supplies of potassium on yield and properties of various species of barley, with special reference to utilisation of assimilated potassium. G. WIMMER and H. LÜDECKE [with O. UNVERDORBEN, J. GRIMM, and G. STORCK] (Landw. Versuchs-Stat., 1936, 125, 129—200).—In pot cultures,

progressively increasing supplies of K produced increasing yields of grain, straw, and roots. Varietal differences in the response to K in respect of yield, starch (I), and protein contents were considerable. In field trials, K improved the wt. per 1000 grains and the hectolitre-wt. (I) contents were decreased in some cases. The (I)/protein ratio for a given variety in the same season is not const. With increasing dosages of K the N content of grain increased and of straw declined; the K content varied in the reverse manner, whereas the P content decreased in all cases. A. G. P.

Resorption of salts by oats with special reference to ammonium salts and nitrate. R. KREYZI (Z. Pflanz. Düng., 1936, 43, A, 281—321).—Oats grown in complete nutrient solutions were temporarily transferred to single salt solutions. Under these conditions $\text{Ca}(\text{NO}_3)_2$, CaCl_2 , $\text{Ca}(\text{H}_2\text{PO}_4)_2$, and Mg salts behaved as physiologically alkaline substances, CaSO_4 was neutral, and CaHPO_4 acid. KCl, NaCl, KNO_3 , and NaNO_3 were physiologically alkaline, the sulphates were acid, and the phosphates showed no definite reaction. NH_4 salts, except $(\text{NH}_4)_2\text{HPO}_4$, were all physiologically acid. The permeability of young plant roots to nitrates was in the order $\text{Ca}^{+2} > \text{K}^+ > \text{Na}^+ > \text{NH}_4^+ > \text{Mg}^{+2}$. In older plants the order varied somewhat. The intensity of intake of NH_4 salts varied with the concn. of the solution used and with the length of the preliminary period of growth in complete nutrients. From solutions of NH_4NO_3 young plants absorbed relatively more NH_4^+ and old plants more NO_3^- . In solutions containing NH_4 salts and nitrates the cation of the latter increased the intake of NH_4^+ in the relative order $\text{Ca}^{+2} < \text{K}^+ < \text{Na}^+ < \text{Mg}^{+2} < \text{NH}_4^+$ and restricted the intake of NO_3^- in the order $\text{Mg}^{+2} < \text{Ca}^{+2} < \text{K}^+ < \text{Na}^+ < \text{NH}_4^+$. Max. yields were obtained with $\text{NH}_4\text{NO}_3 + (\text{NH}_4)_2\text{SO}_4$. Temporary N starvation during the first 2 weeks of growth was counteracted by subsequent generous supplies, but more prolonged deficiency caused markedly reduced yields, later additions of N being assimilated only to a small extent. A. G. P.

Effect of a copper-containing ground limestone on plant production. F. GIESECKE and W. LESCH (Landw. Versuchs-Stat., 1936, 125, 229—234).—The presence of 0.6% of Cu in powdered CaCO_3 stimulated the growth of barley and oats on a high-moor soil. A. G. P.

Relation of the degree of saturation of a colloidal clay by calcium to the growth, nodulation, and composition of soya beans. G. M. HORNER (Missouri Agric. Exp. Sta. Res. Bull., 1936, No. 232, 36 pp.).—Growth of the plants is examined in electrodialysed clay to which had been added varying proportions of $\text{Ca}(\text{OH})_2$. In Ca-H-clays the total growth, nodulation, N fixation, and Ca absorption increased with the total Ca available at a const. degree of saturation, and with the degree of saturation when the available Ca was const. Addition to the clay of Ba, Mg, or K as a supplement to Ca produces the same general tendency. Supplementary addition of methylene-blue (I) almost eliminated effects due to variations in Ca saturation. H^+ excreted by roots was probably unable to exchange with the (I) cation and its entire displacing power was utilised in

replacement of Ca. The growth and N-fixing activities of legumes were closely related to the Ca present in the plant, and this in turn depended on the Ca available and the degree of saturation of clay with Ca. A. G. P.

Use of graphite to prevent clogging of drills when sowing dusted pea seed. E. L. ARNOLD and J. G. HORSFALL (New York State Agric. Exp. Sta. Bull., 1936, No. 660, 23 pp.).—Friction between seeds treated with non-lubricating fungicides, e.g., Cu_2O , may cause clogging in drills. Admixture of fine-flake graphite corrects this. A. G. P.

Phosphorus content of citrus and factors affecting it. A. R. C. HAAS (Soil Sci., 1936, 41, 239—257).—The % P in fruiting organs of lemons is highest in the flowers, and in the formed fruit declines with advancing maturity. Varietal differences are marked. Vals. for peel and pulp of lemons are $>$ those for oranges, and were increased by manuring with NaNO_3 . The % P in mottled is $>$ that in healthy leaves. In the latter, low vals. are associated with heavy N manuring. The % of inorg. P in leaves exceeds the sum of the org. and phospholipin P fractions. A. G. P.

Growth-accelerating and -inhibiting action of fluorescein on plants, with special reference to "Fotosensin." J. SELLEI (Z. Pflanz. Düng., 1936, 43, A, 321—340; cf. A., 1935, 905).—Small amounts of Fotosensin (a condensation product of phthalic acid and resorcinol containing small proportions of Cu and Fe) increased the growth of roots and aerial parts of many plants examined. Larger proportions had inhibitory effects. Stimulation results from increased sensitivity of plants to light. A. G. P.

Factors influencing germination and development of dormancy in cocklebur seeds. N. C. THORNTON (Contr. Boyce Thompson Inst., 1935, 7, 477—496).—Dormancy is induced by storage in an O_2 -free atm. (N_2 , H_2 , or CO_2) and is associated with a lowered catalase activity. Subsequent germination of such seeds results in an initial period of deformed growth. A. G. P.

Rôle of organic matter in plant nutrition. XI. Effect of manuring on growth and intake of silicon by wet- and dry-cultivated rice. A. SREENIVASAN (Proc. Indian Acad. Sci., 1936, 3, B, 258—277; cf. B., 1936, 967).—In swamped soils, better growth and yields were obtained and mineral intake (notably of Si) was $>$ in dry soils. The use of silicate-bearing fertilisers is discussed. A. G. P.

Chemical and toxicological studies of organic thiocyanates [as insecticides]. A. HARTZELL and F. WILCOXON (Contr. Boyce Thompson Inst., 1935, 7, 497—502).—Lauryl thiocyanate (I) was more toxic to *Aphis rumicis* than was trimethylene thiocyanate (II), but less toxic than rotenone (III). Toxicity of 1:1 mixtures of (I) and (III) was the same as that of (I) at a total concn. corresponding to that of the mixture. (II), phenacyl thiocyanate, and Ph γ -thiocyanopropyl ether were ineffective as stomach poisons. Food sprayed with (II) had no ill-effects on rats. A. G. P.

Fish-poison plants as insecticides. F. TATTERSFIELD (Empire J. Exp. Agric., 1936, 4, 136—144).—A review. A. G. P.

Chemistry of fungicides used on farm crops. H. MARTIN (Agric. Prog., 1936, 13, 105—112).—Recent developments in Cu and org. Hg preps. are discussed.

A. G. P.

Bush sickness at Glenhope, Nelson, New Zealand. T. RIGG and H. O. ASKEW (Empire J. Exp. Agric., 1936, 4, 1—5; cf. A., 1934, 434).—The val. of drenches prepared from certain soils is confirmed. Acid extracts (1 pt. of soil, 10 pts. of 0.125*N*-HCl) of these soils also gave good results. Extracted residues of soils had no beneficial action. Constituents of extracts other than Fe are concerned in the curative process.

A. G. P.

Oils for codling-moth control. C. R. CLEVELAND (J. Econ. Entom., 1935, 28, 715—726).—New types of emulsible oils described have a much increased general efficiency and may be satisfactorily combined with Pb arsenate or nicotine.

A. G. P.

Barium silicofluoride as a control for cabbage worms (*Pieris rapæ*, L.). V. R. DIAMOND (J. Econ. Entom., 1935, 28, 714—715).—BaSiF₆ dusts gave higher % control than did Pb arsenate-CaO preps.

A. G. P.

Control of the flea-beetle in hops. H. HAMPP (Tages-Ztg. Brauerei, 1935, 33, 287—288; Chem. Zentr., 1935, ii, 109).—Use of nicotine preps. coupled with good cultivation and manuring is recommended.

A. G. P.

Control of tobacco wildfire. II. W. S. BEACH (Penn. Agric. Exp. Sta. Bull., 1935, No. 322, 29 pp.; cf. B., 1935, 567).—Sanitary measures, cultural practices directed towards facilitating the decomp. of infected refuse in soil, and early and thorough spraying with Bordeaux mixture are recommended.

A. G. P.

Behaviour of ordinary tobacco mosaic virus in the soil. I. H. HOGGAN and J. JOHNSON (J. Agric. Res., 1936, 52, 271—294).—The virus may be leached from decaying tissue of infected plants and enter the soil. Inactivation of virus by soils varies considerably, but in no case approaches that produced by adsorption on C. In soil, inactivation is unaffected by the H₂O content (above a low min.) and reaction, but increases on aëration. Drying of soils containing virus causes almost complete inactivation. Soil temp. between 5° and 30° does not affect inactivation, which, however, becomes greater at 40° and 0°. Neither freezing nor desiccation affects the activity of virus in undecayed plant tissues present in soil.

A. G. P.

Contact poisons for forest pests. IV. K. MÖBIUS and E. WEDEKIND (Mitt. Forstw., 1934, 282—295; Chem. Zentr., 1935, i, 2238—2239).—The efficacy of *o*- (I), *p*- (II), and di-nitrophenol (III) as insecticides for pine-tree pests has been investigated; (III) has the greatest and (II) by far the poorest action. Dust sprays should contain about 10% of (I) or (III) to obtain the max. insecticidal effect.

A. R. P.

Sheep ailment in Southland. J. K. DIXON (New Zealand J. Sci. Tech., 1936, 17, 600—619).—The ailment, known as "Morton Mains disease" and remedied by drenches prepared from certain soils, is discussed. Analysis of healthy and sick soils reveal no mineral deficiency which can explain the disease.

A. G. P.

Furfuraldehyde and AcOH from agricultural waste. Paris Green.—See III. Algarroba.—See XVII.

PATENTS.

Production of fertilisers. H. TRAMM and C. CLAR, Assrs. to RUHRCHEMIE A.-G. (U.S.P. 1,999,026, 23.4.35. Appl., 9.11.32. Ger., 12.11.31).—Dil. HNO₃, H₃PO₄, and NH₃ are added continuously to a fused mixture of NH₄NO₃ and (NH₄)₂HPO₄ at 115° at such a rate that the reaction mixture is kept neutral and the heat evolved serves to evaporate the whole of the H₂O in the system. KCl, K₂SO₄, or other K fertiliser may be added before cooling the product.

A. R. P.

Composition for destruction of undesired vegetation. V. SAUCHELLI, Assr. to KOPPERS Co. of DELAWARE (U.S.P. 1,997,750, 16.4.35. Appl., 10.10.31).—Aq. NH₄CNS, preferably the crude salt from gas liquors, is claimed.

A. R. P.

Preparation of a new insecticide and anticryptogamic products of nicotine base. C. DE GENDRE and P. BARY (B.P. 446,368, 22.5.35).—A paraffin extract of an alkaline tobacco extract is treated with a low-mol. wt. fatty acid, e.g., HCO₂H, AcOH, lactic acid, and the insol. liquid nicotine salt is separated and used directly for spraying, preferably mixed with a wetting agent.

E. H. S.

XVII.—SUGARS; STARCHES; GUMS.

Composition of commercial beet syrup. J. GROSSFELD and H. R. KANITZ (Z. Unters. Lebensm., 1936, 71, 181—185).—The % of ash, solids, sucrose, total sugar, total N, and basic N, and the conductivity of 4 samples of beet juice and 17 samples of syrup are recorded. Correlation factors for % of ash and conductivity and for % of ash and % of basic N are given. Sr was detected in samples with high ash content.

E. C. S.

Identity of the crystalline sugar extracted from the carob (*Ceratonia siliqua*, L.) and from the algarroba of Peru (*Prosopis horrida*, *Inermis pallida*, etc.) with sucrose from cane and beet sugar. G. ODDO and A. ALGERINO (Annali Chim. Appl., 1936, 26, 89—95; cf. B., 1928, 29, 831).—The sugar from the carob is identical with the sucrose of cane and beet sugar. The algarroba, of which the growth, properties, and possibilities of cultivation are described, contains, if free from parasites, 20.5% of sucrose and 1—2% of glucose, which may be extracted by H₂O-MeOH, MeOH, or EtOH.

L. A. O'N.

Recording the density [of sugar solutions]. O. SPENGLER, F. TÖDT, and S. BÖTTGER (Z. Wirts. Zuckerind., 1935, 85, 680—688).—Apparatus is described for the continuous measurement and recording of *d* of sugar solutions, consisting of a 5-litre vessel fixed at top and bottom to the central ends of two horizontal spiral tubes, the outer ends of which are connected to the supply and delivery pipes. Change of *d* in the liquid flowing through the spirals and vessel results in the latter rising or falling, the movement being transmitted to the recording pencil. The variations of the measurements with changing temp. and purity of the liquid are small.

P. G. C.

Starch in papermaking.—See V. **Sugar beet.**—See XVI. **Honey diastase.**—See XVIII. **Detecting lactose and glucose in milk.**—See XIX.

PATENT.

Sugar-juice press etc.—See I.

XVIII.—FERMENTATION INDUSTRIES.

Detection of white wine in red wine. H. MOHLER and W. HÄMMERLE (Z. Unters. Lebensm., 1936, 71, 186—189).—The natural pigment of the wine is selectively adsorbed as described previously (B., 1936, 40), eluted, and the intensity of the colour determined spectrophotometrically, colorimetrically, or chromatographically. By comparison with unadulterated wine of the same origin the degree of adulteration can be approx. determined. E. C. S.

Determination of activity of honey diastase. K. TÄUFEL, M. DE MINGO, and H. THALER (Z. Unters. Lebensm., 1936, 71, 190—194).—The diastase val. is defined as the no. of mg. of glucose produced by the action, under specified conditions, of the diastase in 1 g. of honey on an excess of starch. The vals. of several samples of honey were approx. parallel to Gothe's diastase nos. (cf. B., 1914, 1217; 1915, 1024) but occasional divergences were observed. E. C. S.

PATENTS.

Carrying out oxidative fermentations by moulds or fungi. O. E. MAY, H. T. HERRICK, A. J. MOYER, and P. A. WELLS, ASSS. to H. A. WALLACE (U.S.P. 2,006,086, 25.6.35. Appl., 24.8.34).—Sterilised solutions containing glucose and nutrient salts are inoculated with spores of a suitable fungus and the cultures are maintained at pressures $>$ atm. under gases containing substantial amounts of O_2 ; agitation is effected by blowing air through the cultures, the fungus growths being submerged. *Aspergillus flavus* may thus be employed in the prep. of kojic acid, and *Penicillium chrysogenum* in the prep. of gluconic acid. Compared with similar cultures at atm. pressure, the yields of oxidation products are increased and the fermentation times decreased. I. A. P.

Production of [pressed] yeast. VEREIN. MAUTNER MARKHOF'SCHE PRESSHEFE FABRIKEN, and A. SZILVINYI (B.P. 445,714, 19.10.34. Austr., 20.10.33 and 9.8.34).—Fruit and vegetable juices (e.g., tomato) and extracts ($EtOH$, Et_2O , CS_2) of plant and animal materials (e.g., malt germ) are rich in yeast-growth complementary substances (completins, BP yeast factors). A method of determining the concn. of such factors is described. In the manufacture of pressed yeast by growth on worts or molasses poor in BP factors, additions of the BP factors from the above sources are made such that the added concn. lies between definite limits, thus ensuring a max. acceleration of yeast multiplication. I. A. P.

Hop extractor. D. C. BLESER (U.S.P. 2,005,770, 25.6.35. Appl., 23.5.32).—A cylindrical metal strainer (S) with a flat bottom is supported concentrically inside a somewhat larger vessel with a dished bottom. Wort containing hops is delivered tangentially against the inner wall of S and in a slightly downward direction, and so is set in rapid circulation. A second inlet may

discharge similarly to the bottom of S. The rapid separation of the wort and hops which results prevents the extraction of undesirable hop principles, whilst the open top to the apparatus allows the escape of objectionable vapours. Wort is run off from the highest point of the dished bottom; a second outlet at the lowest point may also be used for running off, or solely for removing sediment. The apparatus is fitted to trunnions to facilitate cleaning. I. A. P.

Manufacture of malt. H. J. H. KING and W. S. HOPPER (B.P. 445,511, 8.8.35).—A no. (e.g., 8) of superposed endless bands move intermittently or continuously, the uppermost receiving steeped grain through a water-tight valve from a steeping tank; each band (floor) discharges to the one below, whilst the lowest discharges into a kiln with a sloping floor. The speed of travel of the grain is so regulated that germination is completed before the final discharge to the kiln. By means of partitions between the drums of each band and of movable flaps at the discharge end of each, each floor is enclosed in a separate chamber. Air is drawn in from a double-walled external chamber through the upper side of each band, and air and moisture are removed from above each band by independent fans. The finished malt is withdrawn from the foot of the kiln by an extracting worm, so that the process may be continuous. I. A. P.

Producing a special malt. DEUTS. SOJAWERKE G.M.B.H. (B.P. 445,650, 17.4.35. Ger., 21.4.34).—Malt, especially after kiln-drying, is treated with hot H_2O , or with hot alkali lyes (5—40%), or preferably with hot (30—80°) 15—50% acid, or with aq. mixtures of the last with neutral salts (e.g., 10—20% aq. NaCl). The husk is removed from the treated malt by mechanical brushing after a preliminary washing with H_2O . The product may be washed in presence of a neutralising agent, and then finally again with H_2O , after which it may be kiln-dried for storage. For use, the product is mixed with an equal bulk of normal malt. I. A. P.

Conversion of unmaturred spirits into brandy or whisky. W. G. GEIGER (B.P. 445,536, 12.9.34).—A Cu or Cu-lined pressure pot is provided with a steam-heating coil in the lower part. Oak, preferably as shavings, is placed on a perforated platform above the heater, and rectified, unmaturred spirit is volatilised in the vessel at 80—100 lb./sq. in. Undesirable vapours, being those of highest volatility, escape (after assisting the extraction of oak principles) through a pressure valve at the top to an expansion chamber and thence to a condenser. The "brandyised" residual vapours, selected according to the desired d by one of 3 outlet valves in the lower half of the vessel, are passed to a rectifier wherein independent by-pass tubes lead from each baffle plate, thus allowing the condensate to be run from each plate without coming in contact with the rising vapours, and facilitating control of the rectification. The rectified vapours pass to a dephlegmator and thence to a condenser and receiving tank. The product has the properties of matured brandy or whisky, the process occupying 3—24 hr. I. A. P.

Apparatus for purifying alcoholic liquors. A. M. WERNER (U.S.P. 2,012,365, 27.8.35. Appl., 11.7.34).—

In a still for removal of fusel oil and $\text{C}_2\text{H}_5\text{O}$, which remain as residue, heating is effected by bath resistance between spaced, electrically conducting blocks connected to the various poles of an a.-c. system, the blocks comprising bone C 72, flake MoS_2 18, ground molybdenite 7, and white-oak charcoal 3%.
B. M. V.

XIX.—FOODS.

Variations in the protein content of wheat and barley grains within one ear. M. I. KNIDGINITSHEV (Compt. rend. Acad. Sci., U.R.S.S., 1936, 1, 139—143).—In all the varieties of wheat examined the abs. and % wt. of protein (I) is directly \propto the wt. of the grain, although grains from the same ear exhibited wide variations in (I) content. In barley grains there is a marked inverse relation between (I) content and wt.
W. McC.

Talc content of rice and detection of talc treatment. V. MOUCKA (Z. Unters. Lebensm., 1936, 71, 175—180).—The rice is treated for 4 min. with 1% aq. I + 2% KI, rinsed with H_2O , and dried with $\text{EtOH-Et}_2\text{O}$. Talc-treated grains have a metallic lustre, whereas untreated grains appear dull black. Alternatively, the talc is dislodged by shaking with Et_2O , the suspension is evaporated, and the residue ignited and examined under the microscope.
E. C. S.

Use of a large zinc container with a drying device for storing incompletely dried rice. M. KONDÔ (Proc. Imp. Acad. Tokyo, 1936, 12, 75—77).—Rice containing approx. 15% of H_2O was successfully preserved in Zn containers in presence of CaCl_2 or, preferably, CaO . The moisture content of the rice was lowered by 1—2%.
W. O. K.

Soft-curd milk. F. J. DOAN and R. C. WELCH (Penn. Agric. Exp. Sta. Tech. Bull., 1934, No. 312, 35 pp.; cf. B., 1935, 873; 1936, 249).—The curd tension (T) of normal milk is a linear function of the casein (I) content. Other constituents have little direct influence on T although the ash and Ca contents, titratable acidity, and buffer capacity are indirectly related, since these vary, as does (I), with the solids-not-fat. T varies with season and with the stage of lactation, but is characteristic of individual cows. It is lowered by heating, by dilution, and by addition of alkalis. Small amounts of acid increase T , which is lowered by larger additions of acid through the formation of pre-coagulated caseinogen which is not affected by the coagulating enzyme. Hill's test does not give the max. val. of T . This is obtained with pepsin-HCl mixtures when the p_{H} of the serum is 6.0—6.1. Ca pptn. destroys the coagulability of milk with pepsin; HCl renews this. Low T by the Hill test is not necessarily evidence of a diseased udder. Soft-curd milk has no inherent characteristics which render it more easily digested than hard-curd samples. Differences in digestibility of raw milks are explicable by the difference in (I) content of hard-curd milks.
A. G. P.

Factors in the reduction of methylene-blue in milk. C. J. JACKSON (J. Dairy Res., 1936, 7, 31—40).—The oxidation-reduction potential of anaerobically drawn milk is much $<$ that of the same milk after exposure to O_2 . Methylene-blue (I) tests accord with this

finding. Evidence is given for the existence of a redox system in milk, possibly related to lactoflavin. Reduction of (I) is catalysed by light in the visible spectrum.
A. G. P.

Modified methylene-blue reduction tests for the grading of raw milk on the basis of bacterial cleanliness. G. S. WILSON (Vet. Rec., 1936, 16, 494—497).—A review.
R. N. C.

Technique for obtaining anaerobic milk; its carbon dioxide content. C. J. JACKSON (J. Dairy Res., 1936, 7, 25—28).—A method of sampling is described and its use in conjunction with determinations of oxidation-reduction potential and of (Van Slyke) gas analysis explained. The total CO_2 of cow's milk is approx. 50% of that of the blood-plasma.
A. G. P.

Walker method of determining casein in milk, and its application to preservatives composite samples. F. H. McDOWALL and R. M. DOLBY (New Zealand J. Sci. Tech., 1936, 17, 619—637).—Results of formol titrations are influenced by temp.; operation at 21—24° is recommended. Preliminary addition of $\text{C}_2\text{O}_4^{2-}$ (cf. Pyne, A., 1932, 1154) is not beneficial. Dilution of milk lowers results obtained. Use of stale, neutralised CH_2O is unsatisfactory. Neutralisation is preferably omitted and the equiv. acidity is deducted from the formol titre. Composite samples may be preserved with HgCl_2 in cool storage. Other preservatives are unsuitable.
A. G. P.

Detection of lactose and glucose in milk. T. S. G. JONES (J. Dairy Res., 1936, 7, 41—46).—An application of Somogyi's method is described. Washed yeast neither ferments lactose nor adds reducing material to tungstic acid filtrates. Reducing substance in milk, removable by yeast, can be determined with an accuracy of $\pm 3\%$.
A. G. P.

Lipoid phosphorus and phosphatides of cow's milk. J. E. LOBSTEIN and M. FLATTER (Lait, 1935, 15, 946—954).—The lipoid P determined by 6 methods in a bulk sample of milk averaged 293 mg. of lecithin per litre (range 269—324 mg.). Probable sources of error in various methods are considered and a method for the purification of phosphatides is outlined, based on pptn. with AcOH and successive extraction of the dry coagulum with Et_2O and EtOH .
NUTR. ABS. (m)

Effect of variations in feeding on dairy cow yielding milk of poor quality. A. W. STEWART and J. F. TOCHER (J. Dairy Res., 1936, 7, 1—13).—With cows giving milk of low solids-not-fat (S) content the change from winter rations to pasture increased the yield and S of the milk. Continued supply of well-balanced rations produced small increases but the S did not rise $> 8.5\%$. A high-protein ration (protein ratio 1:2.76) did not alter yields or casein content, decreased the S and lactose, and increased the total, albumin-, and globulin-N of the milk. High-carbohydrate rations (protein ratio 1:9.9) did not affect yield, fat, or ash, but slightly decreased S .
A. G. P.

Replacement of oil-cake protein by ammonium bicarbonate during feeding of beet silage to milch cows. P. EHRENBURG and VON PRITZWITZ (Landw. Versuchs-Stat., 1936, 125, 101—118).—Use of NH_4HCO_3 tended to lower milk yields and, in some cases, to increase

the % of fat. Results are discussed in conjunction with those obtained previously (B., 1935, 78). A. G. P.

Refraction of the calcium chloride serum and the f.-p. depression of milks from a number of herds during one year. BURR, H. SCHLAG, and E. KOLLSTEDE (Chem.-Ztg., 1936, 60, 407—408).—The angle of refraction was in all cases between 36° and 39°; in a very high proportion of the samples it occurred in the range 36.1—37°. The val. $\Delta \times 10^2 = 54$ represents the lower limit for unwatered milk. A. G. P.

Chloride content of cows' milk. W. J. CAULFIELD and W. H. RIDDELL (Cornell Vet., 1935, 25, 333—343).—There was no breed difference in Cl' content of milk between Holstein, Ayrshire, Jersey, and Guernsey cows, but Holsteins tended to higher Cl' content for the first half of the lactation. The range of vals. was 0.07—0.29% in 1006 samples, but 96% of the vals. lay between 0.08 and 0.20% (average 0.129%). After an initial high level at calving, the Cl' content fell for the first 6—28 days and thereafter rose steadily.

NUTR. ABS. (m)

Flavours of milk and their control. C. L. RHOADHOUSE and J. L. HENDERSON (Univ. Calif. Coll. Agric., Agric. Exp. Stat. Bull. No. 595, Sept., 1935, 30 pp.).—Certain feeds (full rations of lucerne hay, green lucerne, corn silage, green barley, wild oats, foxtail, and filaree) when consumed during the 5 hr. before milking impart a flavour that varies in intensity according to the kind, quantity consumed, and length of time between feeding and milking. Salty taste was observed in milk from certain cows which were advanced in lactation or had suffered from mastitis. Flavours due to contact with metals are discussed.

NUTR. ABS. (m)

Chlorine content of milk as an indication of mastitis. J. M. BLOOD and A. ROWLANDS (J. Dairy Res., 1936, 7, 47—54).—Rosell's method (A., 1935, 516) for detecting mastitis is compared with other standard methods. Titration of Cl' in milk with AgNO_3 , without removal of proteins, leads to high vals. The end-point is unsatisfactory. Mastitis is not justifiably diagnosed by Cl' vals. for "quarter" milk $> 0.14\%$. A. G. P.

Silage and butter quality. C. CRASEMANN and A. WIDMER (Schweiz. Milchztg., 1935, No. 93).—Silage (ordinary grass, A.I.V., and maize) produced an unpleasant odour in the treated cream, a soft butter with unpleasant taste, and a reduction of keeping quality. A.I.V.-silage butter was least affected, and maize-silage butter most.

NUTR. ABS. (m)

Methods of making clarified butter (ghee). M. H. FRENCH (Bull. Imp. Inst., 1936, 34, 32—44).—The quality of ghee prepared by the usual method from creamery butter is improved by ripening the cream for the shortest possible time, thoroughly washing the churned butter, and clarifying (boiling) it immediately afterwards. A first-class product was obtained (in Tanganyika) by clarifying washed, fresh (unsoured) cream.

E. L.

Examination and composition of ice cream. K. BRAUNSDORF (Z. Unters. Lebensm., 1936, 71, 160—166).—Commercial samples contained 4—18% of fat (2.5—14.8% of milk fat, 1.6—3.9% of egg fat) and 3.3—4.8% of N. The refractometer val. of the fat in

samples containing $< 6.8\%$ of fat was 50—54 at 40° and in those containing $> 10\%$ was < 50 . Egg fat is detected by its brown colour and high n and % N.

E. C. S.

Manufacture of Trappist-type cheese. J. C. MARQUARDT (New York State Agric. Exp. Sta. Bull., 1936, No. 662, 23 pp.).—A method of prep. is devised by which common defects in this type of cheese are eliminated. Humidity control during curing appears to be one of the prime essentials in the process. Successful curing was effected at $< 15^\circ$. Properly cured cheese requires the presence of 40—45% of moisture and a salt content of 1—2.5%. Higher salt contents retard and prevent curing.

A. G. P.

Increasing the vitamin-A content of margarine by adding carotene. S. N. MATZKO (Problems of Nutrition, Moscow, 1935, 4, No. 6, 144—151).—When carotene was incorporated in margarine, the -A potency was retained for < 3 weeks in a cool, dark place.

NUTR. ABS. (m)

Correlation between weight and composition of hen's egg. J. KRÍŽENECKÝ (Z. Unters. Lebensm., 1936, 71, 137—149).—Composition bears no relation to the wt. of the egg.

E. C. S.

Nutritive value of leaves, flowers, and stems of lucerne. J. HERZIG (Sborn. čsl. Akad. Zeměd., 1935, 10, 193—195).—In respect to org. and mineral constituents there were considerable differences in composition between leaves, flowers, and stems. The leaves had the lowest fibre and the highest crude protein, digestible protein, ash, Ca, Mg, Na, and S contents, whilst the flowers were richest in P and Cl.

NUTR. ABS. (m)

Chemical composition and nutritive value of lucerne at different stages of growth. T. M. BETTINI (Riv. Zootec., 1935, 12, 425—438).—The chemical composition of lucerne varies greatly. It may have nutritive val. comparable with that of concentrates, very rich in protein and Ca, or it may have digestibility like that of cereal straw. Productivity is much influenced by season, and chemical composition is dependent on the time of cutting. For the July crop digestible protein, which was 21% (dry basis) at incipient flowering, fell to 14.5% at seed ripening. CaO increased from 2.56 to 3.35%, whilst P_2O_5 fell from 0.79 to 0.10% and crude fibre increased from 23.7 to 40%. As the season advanced, the optimum period of cutting was progressively displaced towards the earlier stages of growth.

NUTR. ABS. (m)

Examination of leguminous seeds and other foodstuffs attacked by weevils and treated with hydrocyanic acid. V. MOUCKA (Z. Unters. Lebensm., 1936, 71, 166—175).—HCN is detected and determined approx. by distillation in CO_2 and applying the Prussian-blue and CNS' tests to the filtrate, or by pptn. as AgCN . Peas etc. exposed for 24 hr. to 1.5 vol.-% HCN contained $\succ 40$ mg. of HCN per kg. immediately after removal and $\succ 5$ mg. after 6 days. Flour and bran contained $\succ 9$ and 27 mg., respectively, falling to 0 and 12 mg. after 1 and 2 days. Fungi absorbed 85 mg. per kg., falling to 46 mg. after 14 days and to 17 mg. after 6 weeks.

E. C. S.

Dissolved carbon dioxide and the ripening of tomatoes. B. N. SINGH and P. B. MATHUR (Nature, 1936, 137, 704—705).—During ripening, increasing amounts of CO₂ accumulate in the fruit tissue. Respiration data indicate that the process of senescence in tomatoes is initiated by this accumulation and that during senescence the resistance offered by the superficial tissues to gaseous exchange is lessened. L. S. T.

Composition of Scottish raspberries. A. DARGIE (Analyst, 1936, 60, 251—252; cf. A., 1935, 1432).—Vals. obtained were: insol. solids 3.93—4.95, sol. solids 8.20—11.18%, no. of seeds per 10 g. 246—402. The amount of fruit in raspberry jam can be determined with accuracy only if the composition of the fruit from which the jam is made is known. E. C. S.

Apple jam with and without added vitamin-C (fir-needle extract) as source of the antiscorbatic vitamin. Roast potatoes as source of vitamin-C. N. JARUSOVA (Problems of Nutrition, Moscow, 1935, 4, No. 6, 126—128, 128—130).—Addition of 10% of the extract produced a jam which was protective for guinea-pigs in doses of 3.8 g. daily. The human requirement is calc. to be 60 g. daily. The antiscorbatic activity of roast potatoes was about half that of boiled potatoes of the same variety. NUTR. ABS. (m)

Pectin compounds of the Kendyr plant. N. D. PRIANISCHNIKOV and R. A. FROLOVA (J. Appl. Chem. Russ., 1936, 9, 279—283).—The pectins are completely extracted by H₂O at 100°, in a difficultly purifiable form. The chief product of hydrolysis is tetragalacturonic acid-B. R. T.

Alimentary herbs. I. M. TALENTI and A. RAGNO (Annali Chim. Appl., 1936, 26, 115—125).—The loss in alimentary principle due to steaming a no. of vegetables, as compared with cooking in boiling H₂O, is about ½ of the org. matter and N and ⅔ of the mineral matter. The loss by simple infusion with cold H₂O is much less. L. A. O'N.

Vitamin-A and -D content of canned salmon. G. M. DEVANEY and L. K. PUTNEY (J. Home Econ., 1935, 27, 658—662).—The Chinook variety contained 8 international units of -A per g., the Chum 0.25, and the others intermediate amounts. The red variety contained 8 international units of -D per g., the pink 6 to 7, the Chinook 2 to 3, and the Chum 2. NUTR. ABS. (m)

Antiseptics for saké. B. KATO and I. MATSUDA (J. Agric. Chem. Soc. Japan, 1936, 12, 249—255).—The antiseptic power of β-OH·C₁₀H₆·CO₂H and its salts and esters is > that of o-OH·C₆H₄·CO₂H or Bu p-hydroxybenzoate. J. N. A.

Zinc content of foods and its importance to health. V. P. SOTOVA and N. I. ORLOV (Problems of Nutrition, Moscow, 1935, 4, No. 5, 40—55).—As regards Zn content edible and poisonous mushrooms showed no notable difference either in quantity or in distribution in the different parts. NUTR. ABS. (m)

Rapid determination of carotene, xanthophyll, and chlorophyll in artificially-dried grass meals. M. PYKE (J.S.C.I., 1936, 55, 139—140 T).—100 mg. of grass meal are shaken in a centrifuge tube with 3 ml. of 25% KOH in abs. MeOH and 10 ml. of Et₂O, and the

alkaline solution is washed with Et₂O. The combined ethereal solutions contain all the carotenoid pigments. These are partitioned between light petroleum and 85% MeOH. Chlorophyll (I) is completely extracted by two further treatments of the meal with alkali. Amounts of pigments are determined on a tintometer; a curve for (I) is given.

Effects of partial field drying on composition of freshly-cut grass. A. W. GREENHILL (Empire J. Exp. Agric., 1936, 4, 145—151).—Partial drying under various field conditions had no appreciable effect on the final content of dry matter, Stutzer- or pepsin-digestible N of grass. The carotene content decreased by approx. 22% in 54 hr. A. G. P.

Experiments on grass silage. C. BOYLE and J. J. RYAN (J. Dept. Agric. Irish Free State, 1935, 33, 149—159).—The loss in dry matter in grass silage made by the A.I.V. method in a wooden silo containing 6—7 tons was 7.3% and 15.5% if inedible waste material was included. The replacement val. of the silage was calc. as 33% of that of good hay and twice that of roots. A feeding experiment with 4 dairy cows indicated that it was rather higher. Grass ensiled by the ordinary method in a concrete pit lost 11—12% (15% including inedible waste). In farm practice the A.I.V. method is more difficult to apply but very greatly reduces losses due to fermentation and respiration. NUTR. ABS. (m)

Silage making with tops and leaves of sugar beet. Feeding experiment with milch cows. Comparison with grass silage made by the Dutch method. J. C. DE RUYTER DE WILDT (Versl. landb. Onderzoek, 1935, No. 41 C, 211).—Soiling of the material causes considerable losses in silage making and probably decreases the digestibility of protein but not of crude fibre. The food val. of the fodder decreases. Beet and grass silage having equal starch vals. give equal milk production. 24 kg. of beet silage (equiv. to 15 kg. of grass silage) were readily eaten daily. The Reichert-Meissl, Polenske, and I vals. of the butter fat were slightly higher with beet than with grass silage. NUTR. ABS. (m)

Mineral content and feeding value of natural pastures in the Union of South Africa. IV. Influence of season and frequency of cutting on yield, persistency, and chemical composition of grass species. P. J. DU TOIT, J. G. LOUW, and A. I. MALAN (Onderstepoort J. Vet. Sci., 1935, 5, 215—270).—Grasses cut monthly were highest in protein (I) and P and lowest in crude fibre, and with decreased frequency of cutting (I) and P fell markedly and the crude fibre rose. Ca and Mg varied little with frequency of cutting. Appreciable differences in composition were noted between different species grown and cut under comparable conditions. Rainfall appreciably affected yield and % of (I), fibre, and mineral constituents. Cutting at two-monthly intervals appeared to give the best yield of dry matter, particularly if account is taken of the total yield of (I) and P. NUTR. ABS. (m)

Nutritive value of forage at different stages of growth. T. DEVALLE (Riv. Zootec., 1935, 12, 439—448).—The best time for the third cutting of a permanent

well-watered meadow is 20—30 days after the second cutting. After this the nutritive val. (*N*) and digestibility (*D*) are much diminished. The third cutting of two-year-old lucerne should be carried out at the beginning of flowering. Prolongation of the vegetative period in permanent and temporary meadows caused appreciable lowering in the *D* of protein, increase in crude fibre, and very marked widening of *N*.

NUTR. ABS. (*m*)**Analysis of pasture from acid soils in Sweden.**

O. SVANBERG, E. HANNERZ, and T. WIJKSTRÖM (Lantbruksöfösk. Ann., 1935, 2, 31—50).—In the Norrbotten district there are large areas of sterile alum soils, with v_H about 4.8 or less, which are used for hay production for horses. Pernicious anaemia is common amongst these animals. Hay from acid soils in the area had a low CaO content, the val. being usually < the P_2O_5 content. The % of Na_2O and Cl tended to be low whereas those of K_2O and MgO were normal and of SO_3 and SiO_2 high. The Fe, Al, and Cu contents of the hay were not affected by the high soil acidity, but the Mn content tended to be high.

NUTR. ABS. (*m*)**(A) Nutritive value, (B) mineral content, of lucerne at different stages of growth.**

J. HERZIG and J. ŽÁK (Sborn. čl. Akad. Zeměd., 1935, 10, 185—189, 190—192).—(A) Vals. are given for the composition of lucerne at 7 stages of growth up to the flowering and partly withered stage, and for subsequent second and third cuts at different stages of growth. On the basis of crude and digestible protein, fibre, and ash content, there was a steady fall in nutritive val. with advance in age. Yield per acre of dry matter increased up to the full-flower stage, but the yields of crude and digestible protein reached their max. before flowering.

(B) Vals. are given for % of Ca, Mg, K, Na, P, S, Cl, and Si at different stages of growth and for first and second cuts. The Ca and Mg contents (dry basis) tended to run parallel, falling until the full flower stage is reached and rising at seeding. The change in the P content of the cuts approx. paralleled that in the crude protein content. Total base content tended to rise steadily with age up to the commencement of flowering, whilst total acids remained approx. const., so that total alkalinity, which was markedly positive, rose with age.

NUTR. ABS. (*m*)

Cottonseeds. I. Nutritive value of cottonseed meal. K. C. CHANG and Y. S. CHAO (J. Chem. Eng. China, 1936, 3, 30—38).—Cottonseed husks after extraction with EtOH and H_2O and autoclaving gave a non-toxic, oil-free meal containing vitamin- B_1 and - B_2 and a high % of protein.

H. D.

Cakes of dried carrot, with or without added vitamin-C as fir-needle extract, as source of the antiscorbutic vitamin. N. JARUSOVA (Problems of Nutrition, Moscow, 1935, 4, No. 5, 125—129).—With guinea-pigs the cakes were inactive as sources of -C, whether the extract had been added or not, but -C may have been destroyed in cooking. The cakes showed some reducing activity.

NUTR. ABS. (*m*)

Vitamin-A requirements of growing chicks. I. Use of "reference" cod-liver oil. J. BIELY and W. CHALMERS (Canad. J. Res., 1936, 14, D, 21—24).

Chicks receiving 75 units of -A daily showed no symptoms of avitaminosis during 8 weeks. A. G. P.

Technique of digestibility trials with sheep and its application to rabbits. S. J. WATSON and E. A. HORTON (Empire J. Exp. Agric., 1936, 4, 26—35).—An appropriate method and equipment are described. Correction of the digestibility coeff. for protein by allowing for metabolic N in faeces is discussed. Retention of the uncorr. vals. is preferred. Sheep and rabbits are comparable for these experiments only in relation to protein vals. Rabbits digest fibre less efficiently. Use of indicator substances is examined. A. G. P.

Vegetable protein in turkey rations. J. E. HUNTER, D. R. MARBLE, and H. C. KANDEL (Penn. Agric. Exp. Sta. Bull., 1935, No. 321, 13 pp.).—Plant proteins (soya bean, maize gluten) may be substituted for part (up to 50%) of the customary animal protein (fish and meat meals, dried milk) and produce satisfactory growth provided the Ca and P requirements are met. Maize gluten improved the fleshing condition. A. G. P.

Brood rearing by honey bees confined to a pure carbohydrate diet. M. H. HAYDAK (J. Econ. Entom., 1935, 28, 657—660).—Adult bees receiving a pure carbohydrate diet can rear their brood but the brood period is curtailed. Bees utilise materials from their own body tissues (notably from the abdomen) for producing larval food. The N content of the abdomens (but not of heads or thoraces) of emerging bees from a colony reared on a sugar solution was < normal. Approx. the same amount of N was used in the catabolism of nurse bees and first instars as was contained in the emerging bees. A. G. P.

Glass and ceramic materials in food manufacture.—See VIII.

PATENTS.

Determining the degree of dough fermentation. F. X. NODLER, Assr. to M. NODLER (U.S.P. 2,005,592, 18.6.35. Appl., 19.1.34).—The degree of bread-dough fermentation is standardised by allowing an aliquot of the dough to ferment in a closed vessel fitted with a pressure gauge, fermentation being complete when an optimum pressure, determined by experiment, is attained in the vessel. E. B. H.

Production of a food product. LIBBY, McNEILL, & LIBBY (B.P. 446,226, 13.6.35. U.S., 25.6.34 and 5.4.35).—Seeds of leguminous vegetables, cereals, and similar foods are cooked in fat or oil at $\blacktriangleright 163^\circ$, removed, and further cooked in presence of moisture. E. B. H.

Heat-treatment [of foodstuffs]. O. H. HANSEN (U.S.P. 2,011,631, 20.8.35. Appl., 2.5.31).—Green peas, grain, etc. before canning are sterilised by subjection to hot H_2O under pressure to prevent boiling, the period of exposure being short and the hot H_2O rapidly replaced by cold H_2O or "other sterile material." B. M. V.

Manufacture of stabilised yeasted milk suspension. L. WARNCKE, Assr. to C. L. PATTERSON (U.S.P. 1,994,496, 19.3.35. Appl., 21.12.31).—Milk containing 0.6% of gelatin as a stabiliser is pasteurised, then cooled to 50° , mixed with 1.5 oz. of yeast per quart, run through a homogeniser, and rapidly cooled to room temp. or lower. A. R. P.

Treatment of milk and milk preparations. HALL LABS., INC., Asses. of R. E. HALL (B.P. 446,529, 31.10.34. U.S., 10.11.33).—Milk may be rendered more digestible by reducing the $[Ca^{++}]$ present by addition of certain metaphosphates. It is the ionised Ca which contributes to the "hardness" of the curd produced in the stomach. E. B. H.

Preparation of casein products. H. V. DUNHAM (U.S.P. 2,005,730, 25.6.35. Appl., 28.11.32).—Casein (I) compounds with metallic salts and other substances are prepared by treatment of commercial (I) with H_2O and mixing with the metallic salt or other substance. The mixture is kneaded in a machine fitted with a conveyor-screw, and forced out of the machine through a nozzle as a plastic mass. These (I) products can be utilised in some instances as foods, or medicinally, and others can be used as a basis for paints or glues. E. B. H.

Preparation of [desiccated] egg products. N. C. FISCHER, Assr. to ARMOUR & Co. (U.S.P. 1,996,800—1, 9.4.35. Appl., 24.1.34).—Egg-white is treated at 27° for $\frac{1}{2}$ hr. with 4% of 0.1N aq. (A) HCl, or (B) H_2SO_4 , H_2SO_3 , H_3PO_4 , citric, lactic, malic, or malonic acid; the mixture (p_H 5.2) is (B) neutralised with NaOH and then (A, B) spray-dried, or dried in pans at a low temp. L. C. M.

Refining of pineapple juice. A. T. SCOTT, Assr. to SHARPLES SPECIALTY Co. (U.S.P. 1,994,670, 19.3.35. Appl., 1.10.32).—The juice is treated with $Ca(OH)_2$ to p_H 8.5, the ppt. of colouring matter removed by centrifuging, the clear liquor heated to 82°, acidified to p_H 5, cooled to separate Ca citrate, and filtered, and the filtrate evaporated in vac. A. R. P.

Stabilised citrus beverage and syrup. R. H. HIGBY, Assr. to CALIFORNIA FRUIT GROWERS EXCHANGE (U.S.P. 2,005,786, 25.6.35. Appl., 19.3.34).—The colour of conc. or dil. citrus beverages is stabilised by addition of approx. 0.01—0.05% of a quinoid compound (e.g., naphthol-yellow S). Both natural and added colour are then stable. E. B. H.

Manufacture of a pectous material. MUTUAL CITRUS PRODUCTS Co., INC. (B.P. 445,481, 12.10.34. U.S., 16.10.33).—Fruit pulp is ground, washed with H_2O , and treated with HCl at p_H 2.40—2.65. The pectin is pptd. with EtOH after neutralisation. The dried ppt. is standardised by addition of a predetermined quantity of filter-aid and extraction by H_2O filtration is made when the pectin is required for use. E. B. H.

Jelly manufacture. G. MACLEAN (U.S.P. 2,005,095, 18.6.35. Appl., 26.11.32).—The setting power of fruit jellies is improved by subjecting the pulp (with or without a cooking process) to mechanical agitation to disrupt the cells and render more pectin available. E. B. H.

Production of essence of coconut and synthetic coconut water. E. LUQUE, Assr. to LUQUE & FUERTES (U.S.P. 1,998,375, 16.4.35. Appl., 29.12.33).—A mixture of equal wts. of coconut oil and EtOH is treated with 1.5 pts. of boiling H_2O ; the resulting aq. layer is essence of coconut from which coconut H_2O beverage is prepared by addition of 7% of sugar and small amounts of KNO_3 and NaOBz (as preservatives) and carbonating. A. R. P.

Utilisation of whale meat. D. A. HANSEN (B.P. 445,545, 6.10.34. Nor., 11.10.33).—The subdivided raw meat is lixiviated for 15—30 min. with H_2O at about 10—40° above the temp. of the meat. The meat is then allowed to drain, pressed, and dried. E. B. H.

Treatment of fresh whale flesh and similar flesh containing fish oil. D. HILDISCH (B.P. 446,065, 6.9.35. Nor., 8.9.34).—Cut-up, fresh whale flesh etc. is treated with aq. glycerin (70—90% concn.) with or without addition of, e.g., 0.5% of gelatin or agar-agar and/or 1—10% of NaCl, KNO_3 , or $NaNO_3$, in order to preserve it in a palatable state for human consumption and prevent the development of a fishy taste. E. L.

Treatment of the flesh and other tissue of marine mammals. H. SCHMALFUSS and H. WERNER (B.P. 445,462, 5.7.34. Ger., 27.3. and 15.5.34. Addn. to B.P. 431,143; B., 1935, 827).—The subdivided flesh of a freshly killed mammal is preserved by cooling, pickling, smoking, or a combination of these treatments. Subsequently the flesh is stirred with cold H_2O and heated to 96°; after cooling, the liquid part is filtered off and evaporated under reduced pressure. The solid part, after centrifuging, pressing, and drying, yields a meal containing about 86% of albumin and 11% of fat. E. B. H.

Spray drying [of milk].—See I. Sausage casings. —See V.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Examination in filtered ultra-violet light of ointments and similar preparations compounded according to Ph. Hg. IV. E. J. KOCISIS (Magyar gyóg. Társ. Ert., 1935, 11, 99—106; Chem. Zentr., 1935, i, 2046).—The colours observed under the fluorescence microscope show distinct variations in tone according to whether white or yellow vaseline is used as the basic material. A. R. P.

Determination of santonin in [*Artemisia*] *cina* according to the methods of Massagetov and of D.A.B. VI. O. HIERONIMUS (Pharm. Ztg., 1936, 81, 514—515).—Massagetov's method (B., 1932, 1007, 1136) is superior to the D.A.B. VI method; it is more accurate, the recovered santonin is of better quality, only half the quantity of drug is required, and the correction is smaller. E. H. S.

Sesquiterpenes from male myrrh and its detection. F. ROST and B. DORO (Annali Chim. Appl., 1936, 26, 126—130).—A di- and a tri-cyclic sesquiterpene are isolated from male (herabol) myrrh, which give all the characteristic colour reactions of the gum resin. L. A. O'N.

Pharmacological evaluation of ergot. III. B. VON ISSEKUTZ and M. LEINZINGER (Magyar gyóg. Társ. Ert., 1935, 11, 171—179; Chem. Zentr., 1935, ii, 82; cf. A., 1928, 444).—The method described previously (*loc. cit.*) is amplified. H. N. R.

Characteristic reaction of cinchona alkaloids. R. MONNET (J. Pharm. Chim., 1936, [viii], 23, 454—459).—Grahe's reaction is sp. for cinchona-bark alkaloids and may be used for their rapid characterisation in salts, esters, and preps. It may be made more sensitive

by addition of lactic acid (I); e.g., by heating 0.25–0.5 g. of the drug and 1 drop of (I) gently to red heat, white fumes are evolved followed by violet-red vapours which condense to carmine oily drops. E. H. S.

Valuation of fermented tobaccos from the chemical viewpoint. C. PYRIKI (Pharm. Zentr., 1936, 77, 314–316).—The carbohydrate content is the most important indication of quality; generally with lighter tobaccos the quality improves with increasing sugar content and the smoking is favourably influenced because the nitrogenous compounds are more easily decomposed and the acidity is increased. For cigarette tobaccos, especially those with high nicotine (I) contents, an acid reaction of the smoke is preferable because the (I) and other bases are partly neutralised and the smoke is milder. E. H. S.

Efficacy tests for tobacco-product preservatives. P. KOENIG and W. MÜLLER (Z. Unters. Lebensm., 1936, 71, 121–137).—The effects of Chinosol, esters of Na *p*-hydroxybenzoate, BzOH, NaOBz, salicylic acid (I), H₃BO₃ (II), and HCO₂Na (III) on the growth of *Penicillium* and *Aspergillus* on agar and moist tobacco are compared. (I), (II), and (III) are not recommended as preservatives for tobacco products. E. C. S.

Use of the earthworm for the evaluation of vermicides. G. L. JENKINS and L. L. MANCHEY (J. Amer. Pharm. Assoc., 1936, 25, 194–201).—Vermicides are assayed by the rate of change of toxicity on *Lumbricus terrestris* with change in mol. concn., the fatality or survival time being defined as the min. time of immersion in aq. solution lethal to 2 out of 3 worms in 18 hr. Pulegone and carvone have, respectively, 40 and 24% of the vermicial activity of thymol. F. O. H.

Leaf oils of Washington conifers. *Abies grandis*. C. SCHWARTZ, JUN. (Amer. J. Pharm., 1936, 108, 152–156).—Steam-distillation of the leaves and twigs of *A. grandis* yields 0.62% of oil having d_{20}^{20} 0.8983, n_D^{20} 1.4710, $[\alpha]_D^{25}$ –43.78°, sap. val. 82.79 (after acetylation 99.80), acid val. 0.79, ester val. 82.0, total alcohol (as borneol) 27.51%, and containing bornyl esters (chiefly acetate) 28.7%, *l*-camphene 23.87%, *l*- α -pinene 14.0%, *l*- β -pinene 5.87%, borneol 4.76%, *l*- β -phellandrene 2.37%, and traces of free acids and phenols. Sesquiterpenes are absent. E. H. S.

Anda-assu oil.—See XII. Tobacco mosaic and wildfire.—See XVI.

PATENTS.

Inhalant capsule. K. D. PAINTER, H. P. CADY, and G. C. HENSON (U.S.P. 2,010,318, 6.8.35. Appl., 21.6.33).—Aromatic volatile substances are put up in metallic capsules at least a part of which is an alloy melting at < 100°. B. M. V.

Substances for treatment of hæmorrhagic diathesis. S. M. PECK (U.S.P. 1,995,037—8, 19.3.35. Appl., [A] 6.8.32, [B] 3.3.34).—Claim is made for a solution of the venom of (A) the cotton-mouth mocassin, or (B) the copperhead, in physiological NaCl solution. A. R. P.

Production of assimilable organic bismuth salts in oil. D. GARDNER (B.P. 443,860, 13.12.34).—A solution of a Bi salt, e.g., Bi(NO₃)₃, in a polyhydric

alcohol, e.g., glycerol, is treated with an aq. solution of an alkali salt of (a) an aromatic or hydroaromatic hydroxycarboxylic acid, e.g., *o*-C₆H₄(OH)·CO₂H, and (b) an unsaturated higher fatty acid, e.g., oleic or ricinoleic. The pptd. double salt is dried and dissolved in a dry (animal or vegetable) oil, e.g., poppyseed oil. A. W. B.

Stabilisation of calcium gluconate solutions. J. A. AUSTIN, Assr. to JENSEN-SALSBERY LABS., INC. (U.S.P. 2,007,786, 9.7.35. Appl., 20.11.33).—Solutions prepared by mixing 10–40 wt.-% of Ca gluconate, 86–38% of H₂O, and 1–4% of H₃BO₃ are specified. E. H. S.

Production of a gonad-stimulating substance. H. H. COLE and H. GOSS (U.S.P. 2,007,328, 9.7.35. Appl., 10.3.32. Cf. U.S.P. 1,994,853; B., 1936, 299).—The blood-serum is fractionally pptd. with salts, e.g., Na₂SO₄, and the potent material recovered from the final ppt. E. H. S.

Manufacture of acyloctahydrofollicle hormones. SCHERING-KAHLBAUM A.-G. (B.P. 446,641, 9.11.34. Addn. to B.P. 423,287 and 438,753; B., 1935, 333; 1936, 172).—Monoacyl derivatives are used as starting materials for the prep. of diacyl derivatives. E. H. S.

Errata.—In the abstract of B.P. 441,007 and 441,132, **Manufacture of acridine derivatives**, B., 1936, 524, in each case where it occurs “10” should be replaced by “5” and in the third line, “10(N)” should be “5.”

Drying cigarettes etc.—See I. Ca acetylsalicylate.—See III. Physiologically balanced salt mixture.—See VII. Nicotine products.—See XVI. Casein products.—See XIX.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Photographic behaviour of colloid-free silver bromide layers. G. OLLENDORFF and R. RHODIUS (Z. wiss. Phot., 1936, 35, 81–118).—Positive, negative, and “isoelectric” AgBr sols were prepared in states approaching suspensions, and the AgBr was allowed to settle on glass plates bearing adhesive rubber layers. The sensitivities, development, and fixation of these layers were studied in detail; the speeds of these layers were 1/30 to 1/300 of those of commercial films; a developer was found giving no fog. The influence of KBr, KI, etc. was studied, and the results are discussed with regard to the Rabinovitsch theory. The influence of adsorbed crystalloids and colloids was also examined. The spectral sensitivity of positive AgBr sol treated with TiNO₃ was > that of the other sols similarly treated. KI sensitised the negative sol, Na₂S and AgNO₃ the positive sol, and thiosinamine acted on both. The influence of H₂O, AgNO₃, KBr, HNO₃, KBr + HNO₃, and Br was studied. Experiments were made to try to elucidate the desensitising action of, e.g., methylene-blue. J. L.

Preliminary preparation of photographic layers. E. FUCHS (Phot. Ind., 1936, 34, 552, 554).—Good adhesion of emulsion to film may be attained by (a) superficial hydrolysis of the film to cellulose hydrate; application of an intermediate layer of gelatin hardened

with Cr alum is advantageous; (b) substrating or roughening by means of a solvent common to both film and gelatin. An account is given of the agents which have been used for securing adhesion and for preventing brittleness. F. M. H.

Photographic ripening accelerator and sensitive analytical reagent. A. STEIGMANN (Phot. Ind., 1936, 34, 499—500).—The prep. of a mercaptan-like substance, named thiocarin (I), from boiling glycerin and $\text{Na}_2\text{S}_2\text{O}_3$ is described; the Et_2O extract or original filtrate gives the same reactions. (I) is a very sensitive reagent for traces of Cu, Au, Ag, Hg, Cd, or Pb, giving Cu-red, red-brown, orange-yellow, yellow, bright yellow, and red-brown ppts., respectively, in acid solution. The colloidal ppt. is coagulated on shaking with CCl_4 . Small amounts of (I) in photographic developer causes no fog, and may act as desensitiser. (I) tones AgI, but not Ag_2S , images to yellow-orange. It is a very good sensitiser for emulsions, both in slightly acid and alkaline solutions, with short ripening periods. J. L.

Thiocyanines as optical sensitizers for photo-emulsions. M. M. SOBOLEV, M. V. BONDAREVA, and M. F. EVTEEVA (J. Appl. Chem. Russ., 1936, 9, 335—352).—A study of 39 thiocyanine dyes indicates that they are divisible into 3 chief groups: ortho-, iso-, and pan-chromatic. The sensitising action of certain of the dyes is very considerably $>$ that of cyanines and phthal-ins; the most important in this respect are the thio-carbocyanines, in particular, their NH_2 - and dibenz-derivatives. Certain of the dyes have a stabilising effect on the emulsions. R. T.

Methods of stereophotomicrography. J. R. BAKER (Phot. J., 1936, 76, 275—279).—A special tilting microscope stage, rotatable through 15° , is described, by the use of which truly stereoscopic photomicrographs may be made, using dry or oil-immersion objectives. J. L.

PATENTS.

Manufacture of photographic films and of carriers therefor. M. RENKER (U.S.P. 1,997,745, 16.4.35. Appl., 20.8.31. Ger., 24.8.29).—Satinised greaseproof paper is coated with a thin film of 10—20% EtOH solution of shellac, dried, coated with a solution of cellulose nitrate in EtOAc containing 10—20% of EtOH to form a firm bond with the first film, and then, after drying, coated with the usual film of sensitised emulsion. A. R. P.

Production of multi-colour photographic materials. B. GASPAR (B.P. 444,669, 4.2.35. Ger., 14.2.34).—In multi-colour films or films comprising several super-imposed coloured layers on one support, dye creeping from the bottom layer into the support is destroyed by incorporation in the support of substances destroying such dye directly, or in combination with the developing and fixing baths. Direct-acting substances are, e.g., ZnCrO_4 , or, for leuco-dyes, Hg_2Cl_2 ; substances acting on development of the picture may be colloidal Ag, or ordinary Ag halide emulsion which has been exposed to light. The residual Ag is dissolved on fixing, and no interference with the transparency of the image occurs. J. L.

Screen for receiving projected images. F. EARLE, Assr. to MEARL CORP. (U.S.P. 2,002,733, 28.5.35. Appl., 9.3.33).—The screen consists of a coating of pearl essence (natural or "H-scale") and a vehicle (e.g., nitrocellulose lacquer), on a suitable support. J. L.

Toning of photographic prints. T. T. BAKER, and DUFAYCOLOR, LTD. (B.P. 444,773, 2.2.35).—Ag halide images are toned magenta by first bleaching (e.g., with a Cu salt, or by conversion into AgI or AgCl.HgCl_2) and then treating with *p*-dimethylaminobenzylidenerhod-anine. The toned image is suitable for use in a 2- or 3-colour process. J. L.

Reducing η of cellulose ester waste.—See V.

XXII.—EXPLOSIVES; MATCHES.

New solvent for fulminates and azides. A. MAJRICH (Z. ges. Schiess- u. Sprengstoffw., 1936, 31, 147—148).— $\text{NH}_2\cdot\text{C}_2\text{H}_4\cdot\text{OH}$, especially when mixed with aq. NH_3 , is a convenient solvent for Hg_3N_2 , which can be reprecipitated in a very pure and less spontaneously explosive form by dilution or acidification. By acidifying dil. solutions relatively coarse crystals may be obtained. $\text{Hg}(\text{N}_3)_2$, Ag_3N , and AgN_3 can be purified similarly, but $\text{Pb}(\text{N}_3)_2$ cannot be obtained in a form suitable for use in detonators from solutions in this solvent. J. W. S.

Theory of shock waves produced in a gaseous atmosphere by a solid explosive. E. JOUQUET (Compt. rend., 1936, 202, 1320—1322).—A theoretical discussion. H. J. E.

PATENTS.

Ignition composition. C. P. SPAETH, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,007,223, 9.7.35. Appl., 8.11.33).—A primary charge for detonators consists of nitrocellulose, preferably in the form of smokeless powder (I), impregnated with a liquid nitric ester, e.g., nitroglycerin (II), mixed with an inorg. salt. A suitable composition contains (I) 63, (II) 27, and KClO_3 10%. W. J. W.

Pyrotechnic composition. J. B. DECKER and H. C. CLAUSER (U.S.P. 2,012,866, 27.8.35. Appl., 12.3.32).—Zr is mixed with a perchlorate, in proportion to detonate when confined, and a colour ingredient. The Zr is sufficiently coarse to produce stars in the field of flash; alternative metals are Ti, Th, Yt, Se. B. M. V.

Pulverising mineral aggregates.—See I.

XXIII.—SANITATION; WATER PURIFICATION.

[Toilet-]bath preparations. F. GSTIRNER (Chem.-Ztg., 1936, 60, 396—397).—The requirements of O_2 , herbal, and ordinary bath preps. are discussed. F. C. B. M.

Effect of sodium citrate on the disinfectant power of ethyl alcohol. J. VIGNATI and M. RAUCHENBERG (Compt. rend. Soc. Biol., 1936, 121, 1642—1643).—The disinfectant power is strengthened. R. N. C.

Germ-injuring action of thiocyanates. II. Germicidal action of alkaline thiocyanate solutions. G. LOCKEMANN and W. ULRICH (Z. Hyg., 1936, 117, 768—777).—The germicidal actions of OH' and CNS' are mutually strengthened by one another. The

strengthening effect of CNS' on OH' is $<$ on H'. Further addition of NaCNS to NaOH does not weaken the germicidal action again as in the case of NaCl. R. N. C.

[Water-]purification methods at New Orleans. C. C. FRIEDRICH, JUN. (J. Amer. Water Works Assoc., 1936, 28, 537—541).—Approx. 112×10^6 gals. per day of raw Mississippi H₂O, after removal of grit, are treated with Ca(OH)₂ (average 4.33 grains per gal.) and coagulated with FeSO₄ (average 0.5 grain per gal.). The settled H₂O is given NH₃-Cl₂ treatment, before filtration, in amounts sufficient to retain a residual of 0.5 p.p.m. in the finished product. The addition of all chemicals is automatically regulated. C. J.

Improved odour test on water. J. R. BAYLIS and O. GULLANS (J. Amer. Water Works Assoc., 1936, 28, 507—527).—The H₂O is diluted with odour-free H₂O until a further dilution has no perceptible odour; then a 1:1 vol. mixture of air and the diluted H₂O is agitated in a 500-c.c. flask and the supernatant air conveyed to the nostrils through a close-fitting glass nosepiece to prevent dilution with the surrounding air. Then, 100 + the % of the sample in which the odour is just detectable gives the "threshold" no. C. J.

Germicidal properties of silver in water. J. JUST and A. SZNIOLIS (J. Amer. Water Works Assoc., 1936, 28, 492—506).—The disinfectant action of Ag is independent of the way in which it is introduced, whether as sol. Ag salts or as metallic Ag which dissolves in the H₂O or by electrochemical methods; the dose depends on the org. purity of the H₂O. Temporary use of such H₂O will not cause symptoms of poisoning, but const. use may be harmful as shown by tests on rats. The amount of electro-katadynised Ag added cannot be determined solely from the current used as certain substances, e.g., Cl', influence the degree of utilisation of the current. C. J.

Colorimetric determination of nitrates in water in presence of chlorides. H. CARON and D. RAQUET (J. Pharm. Chim., 1936, [viii], 23, 446—447; cf. B., 1936, 254).—Freshly-prepared phenolsulphonic acid should be used. A more satisfactory method and one not affected by the presence of Cl' is to evaporate 10 c.c. of the H₂O with 1 c.c. of 1% Na salicylate solution, cool the residue in a desiccator, and then treat it with 1 c.c. of H₂SO₄. After mixing and adding 10 c.c. of H₂O and 10 c.c. of aq. NH₃ the colour is compared with a standard similarly treated. E. H. S.

Anaerobic fermentation of [paper-pulp] sulphite waste liquor by bacteria of fresh-water muds. A. M. PARTANSKY and H. K. BENSON (Proc. Nat. Acad. Sci., 1936, 22, 153—158; cf. B., 1934, 1118).—Anaerobic fermentation at 36° for 340 days of mud-inoculated, neutralised, sulphite waste liquors removes all org. matter except lignin. Of the total gas produced, about 40% is CO₂ and about 60% is CH₄; about 1% of H₂ is evolved in the early stages. F. A. A.

PATENTS.

Filters and purifiers employed for conditioning air, e.g., for respiration, by freeing it from poisonous gases and other injurious or undesired constituents. SOC. ITAL. PIRELLI (B.P. 445,457, 9.7.35.

Ital., 21.9.34).—To indicate the approaching exhaustion of a gas filter, the filtered gas is passed through a moisture-sensitive device adapted to close an electric circuit in presence of H₂O; e.g., a dry hygroscopic substance placed between electrodes may be employed. B. M. V.

Distribution of [irritating] gases or vapours. D. B. WILLIAMS, ASSR. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 2,008,235, 16.7.35. Appl., 29.7.32).—Crotonaldehyde is rendered visible by simultaneous release from the bomb of SiCl₄, TiCl₄, or similar tetrahalide. B. M. V.

Digestion of sewage sludge. J. MONTGOMERY (B.P. 445,697, 11.10.34).—Digestion is facilitated by circulating the upper portion of the tank contents. The partly digested sludge is sprayed over the surface by means of a rotary distributor which also carries stirrers to agitate the upper layers of sludge. C. J.

Purification of sewage or of gases containing air or oxygen. H. BLUNK (B.P. 446,066, 6.9.35. Ger., 24.12.34. Addn. to B.P. 412,065; B., 1934, 782).—Sewage and air which may contain some obnoxious gases are purified by passing downwards through a totally enclosed filter. The issuing air is passed through sieves to remove flies. C. J.

Treatment of slimy materials. J. G. THOMAS (U.S.P. 2,005,812, 25.6.35. Appl., 12.5.31. Renewed 2.2.35).—Large pieces of refractory material are coated with sludge and after the removal of surplus H₂O are fed into a vertical furnace, so arranged that, in the lower portion, hot gases containing O₂ are drawn through the material to assist its combustion and at a higher level are reintroduced to dry the raw material. The refractory base is freed from ash and re-used. C. J.

Preparation and use of water-purifying material. G. BORROWMAN (U.S.P. 1,994,682, 19.3.35. Appl., 24.8.32. Renewed 31.1.34).—Powdered lignite is boiled with 1% aq. NaAlO₂ or with ammoniacal Cu solution. A. R. P.

Chlorinating device for water. W. L. SAVELL, ASSR. to MATHIESON ALKALI WORKS, INC. (U.S.P. 2,012,406, 27.8.35. Appl., 19.9.33).—A system for periodic use comprises (1) an eductor, supply connexions (2) for H₂O and (3) for Cl₂, (4) a time-controlled valve in (2), (5) a valve in (3) responsive to the pressure in (2) at a point between (4) and (1) and also to that in (3) at a point between (5) and (1). B. M. V.

Purification of water. L. MELLERSH-JACKSON. FROM MINING & INDUSTRIAL WORKS (B.P. 446,662, 29.8.34).—Any excess of reagent may be removed from H₂O which has been treated with sterilising and clarifying reagents by passing over neutral or basic CaSO₃ in the form of H₂O-resistant lumps. The basic form may be used for the removal of Ca and Mg, but the H₂O must be treated afterwards with alkali carbonate or phosphate. C. J.

Gas masks. ÉTABLS. LUCHAIRE, and C. F. J. M. BERTIN (B.P. 445,988, 11.5.35). B. M. V.

[Heating stove for] destruction of insects and the like. I. RENNERFELT (B.P. 445,690, 4.9.34).

Flakes for H₂O softening.—See I. Paper- and pulp-mill effluent.—See V.