

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

JUNE 5 and 12, 1936.*

I.—GENERAL; PLANT; MACHINERY.

Boiler troubles through inadequate feed-water control. O. NIEZOLDI (Chem.-Ztg., 1936, 60, 317—318).—Instances are cited of troubles which have arisen from inappropriate H₂O treatment; the importance of regular supervision is stressed. D. F. T.

High-efficiency method applicable to certain classes of compounds—amplified distillation. A. C. BRATTON, JUN., W. A. FELSING, and J. R. BAILEY (Ind. Eng. Chem., 1936, 28, 424—430).—The increase in the efficiency of separation of liquid mixtures by distillation, brought about by the preliminary addition of an inert "carrier" solvent such as hydrocarbon oil, has been studied for various mixtures. Max. efficiency is obtained by the use of a uniformly-boiling carrier structurally unlike the substances to be separated, and therefore producing the max. positive deviation from ideality in the v.p. of the mixture. The process is explained by the tendency to form azeotropic mixtures of min. b.p. The efficiency may be predicted for different mixtures by a consideration of the v.-p. curves. The method may be applied to the micro-separation of small quantities of a mixture. M. S. B.

Rectification of binary mixtures. Plate efficiency of bubble-cap columns. W. K. LEWIS, JUN. (Ind. Eng. Chem., 1936, 28, 399—402).—Theoretical. Formulae showing plate efficiencies in the bubble-cap column for the separation of binary liquid mixtures under various conditions of flow are deduced. A relation between the plate efficiency and the no. of plates required for a given separation is derived. M. S. B.

Nephelometry as an aid in investigating mineral substances. J. GRANT (Sands, Clays, and Min., 1936, 2, No. 4, 91—97).

Use of the spectrograph in industry. H. W. LOHSE (Sands, Clays, & Min., 1936, 2, No. 4, 133—141).—Analytical applications are discussed.

Refrigeration board.—See V. **Wollastonite wool.**—See VII. **Heat transmission in rotary kilns.**—See IX. **Welding pressure vessels.**—See X.

PATENTS.

Apparatus for treating [heating] bulk material. F. KRUPP A.-G. (B.P. 444,225, 21.2.35. Ger., 3.3.34).—Low-temp. distillation, drying, or the like is effected in retorts extending vertically across a horizontal gas conduit forming a continuous path for circulation of hot gases. The circulation and temp. of the gases are maintained by injection of fresh gases burned under explosive conditions. Various uses for the exhaust gases are claimed. B. M. V.

Drying of [comminuted] materials. ESCH-WERKE K. G. MASCHINENFABR. U. EISENGIESSEREI (P. ESCH) (B.P. 444,017, 6.9.34. Ger., 7.9.33).—The total material is dropped into a current of gas rising at such a speed that the finer dried material is carried away, the coarser material is transferred to another faster upward current, and at the top of the second lift the very large particles are allowed to fall again. B. M. V.

Drying of descending material. TOMLINSONS (ROCHDALE), LTD., and J. N. TOMLINSON. From F. HAAS (B.P. 444,411, 6.10.34).—In an apparatus in which the material descends from floor to floor alternately over the edge or through the centre, a substantial horizontal circulation of air is maintained by fans in side chambers, where also heaters may be situated, the general upward flow of air being comparatively slow. B. M. V.

Tubular heat-exchange apparatus, particularly economisers. J. N. D. HEENAN (B.P. 444,195, 14.9.34).—A horizontal tubular apparatus is arranged in such a way that tubes may be withdrawn obliquely in min. space. B. M. V.

Plate heat-exchange apparatus for fluids. J. STONE & Co., LTD., and E. W. COTTER (B.P. 444,073, 12.9.34).—Ribbed plates are constructed of rubber or other resilient material and are enclosed in sheet-metal casings. B. M. V.

Jaw breaker. F. KRUPP GRUSONWERK A.-G. (B.P. 444,784, 5.7.35. Ger., 1.9.34).—The gap is oblique and the inclination increases in the direction of travel of material owing to the curvature of the jaws. The lower jaw is (or both jaws are) oscillated and the vertical acceleration is at times > that due to gravity. B. M. V.

Beating mills. P. E. HAMRING (B.P. 444,684, 30.11.35. Swed., 24.7.35).—The output of a beater surrounded by a perforated drum is increased by permitting entry of air (at an adjustable rate) to both the interior of the drum and to the space between it and the imperforate casing, the air being drawn with the disintegrated material into a suction conduit. B. M. V.

Determining the moisture content of powdery and granular material. JAEGER TRUCK MIXERS (ENGLAND), LTD., and R. T. BELL (B.P. 444,077, 26.10.34).—In a weighing machine an index mark on the dial is set to the val. of the *d* of dry material (*e.g.*, sand) and the moist sand is charged to a vessel of definite vol. until the pointer reaches this mark, then H₂O is added until the vessel is full, at which point % of moisture will be read on another scale. B. M. V.

Continuous rotary mixing machines. A. WILSON, and J. & W. MAXWELL, LTD. (B.P. 444,509, 30.1.35).—A

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

hollow ring-shaped chamber is rotated about a horizontal axis which is also the axis of the ring; slicing, shredding, or like devices extend through the inside circumference of the ring, the wall being \odot -shaped.

B. M. V.

Apparatus for screening materials. C. ARNOLD. From W. S. TYLER Co. (B.P. 444,170, 13.6.34).—Spring-tension means for the screen cloth or like in a vibratory apparatus are described.

B. M. V.

Apparatus for treatment of molten material. [Manufacture of foam slag.] W. BENZINGER (B.P. 444,699, 25.9.34).—Tilting ladles are formed with two compartments, each being filled and emptied in turn, and the treating fluid is supplied through the hollow and perforated shafts of the ladles. Preferably there are two superposed ladles, and slag is treated in the upper one with air to eliminate impurities (*e.g.*, S) and then poured into the lower one for treatment with steam, to create a foam.

B. M. V.

Centrifugal spraying machines [for impregnation of solids]. F. H. LORING (B.P. 444,833, 3.12.34).—The liquid is fed down a stationary tube within a hollow shaft to the centrifugal basket (*B*), which has a perforated or porous wall; the solid material is caused to fall in an annular stream around *B*, being also caused to swirl by means of blades attached to the rotor.

B. M. V.

Apparatus for reception of sludge. SHELVOKE & DREWRY, LTD., and J. S. DREWRY (B.P. 444,007, 22.10.35).—Sludge is settled in a closed tank and between the major part and a minor part, in the latter of which the draw-off for clear liquid is situated, is placed a hinged flap permitting liquid to flow across above and sludge below, and merely preventing the latter accumulating under the draw-off to the same height as elsewhere.

B. M. V.

Suction strainers. DRYSDALE & Co., LTD., and J. W. W. DRYSDALE (B.P. 444,512, 1.4.35).—Inner and outer shells are provided with perforations through the bottom and top or sides, respectively.

B. M. V.

Filtering apparatus. BRIT. CELANESE, LTD., E. KINSELLA, and C. W. ADDY (B.P. 443,960, 1.9.34).—In a press the supporting surfaces for the filter medium are composed of a pair of perforated plates with a space between for free flow of filtrate, the distance pieces in the space being shaped to act as guides for the filtrate to the outlet ports. The supporting frame is preferably rather thicker than the plate sandwich.

B. M. V.

Fractional distillation of mixtures of substances. J. SCHMIDLIN (B.P. 444,014, 9.7.34).—The still head is constructed to hold extensive films of liquid in nearly stationary condition on almost level plates, fibrous matter or surface roughening being applied to the plates if desired. The vapours are also caused to flow in thin layers horizontally, the plates being closely spaced for this purpose. At starting, the head is heated by hot inert gases.

B. M. V.

Separation or extraction of gas from mixtures of gas and dust. GOERIG & Co. A.-G., Assees. of K. VON HAKEN and S. VON KULISITSCH (B.P. 444,290, 3.8.35. Ger., 7.8.34).—Preferably after preheating, the

mixture is passed through a vortical apparatus in which the axial collector for the clean gas is of the louvred type. The gas removed is replaced by other gases to complete or repeat a reaction in an extension of the same apparatus.

B. M. V.

Air cleaners. E. J. L. COTTON (BURGESS PRODUCTS Co.) (B.P. 443,965, 4.9.34).—A filter mass consists of strands of wood formed with angular cross-section and with jagged projections, the sizes and finished *d* being specified. Impregnation with oil is optional.

B. M. V.

Air-conditioning apparatus. SULZER FRÈRES SOC. ANON. (B.P. 444,342, 23.11.34. Switz., 9.12.33).—Artificially cooled liquid is sprayed centrifugally and/or passed centrifugally through a porous wall, and the air is moved inwards against the spray at a speed insufficient to overcome the centrifugal force on the liquid.

B. M. V.

Rotary machines for creating a partial vacuum or for compressing gases. A. TEBALDI (B.P. 444,610, 5.6.35. Italy, 6.6.34).—A trap for entrained lubricant is embodied.

B. M. V.

Thermostats. MECANO G.M.B.H. SPECIALARTIKEL F. KRAFTFAHRZEUGE, and M. GAUL (B.P. 444,038, 8.11.34).—A thermostat bellows (*B*) is of no great thickness and itself forms a butterfly valve to regulate the flow of heating/cooling fluid, suitable gearing being provided to convert expansion of *B* into a tilting motion.

B. M. V.

Recording hygrometers. C. L. BURDICK (B.P. 444,831, 21.11.34).—Changes in length of a hygrometric filament, or pair of filaments, are magnified and recorded on a clockwork drum.

B. M. V.

Friction material for brake linings and the like. R. BALLÖ and E. MOLNÁR (B.P. 444,210, 24.10.34. Hung., 24.10.33).—Every fibre of asbestos or other fibrous material is coated with 5–20% of finely-powdered metal (*e.g.*, Cu, Al, or alloys applied by the Schoop process), and 10–30% of a binding agent, *e.g.*, synthetic resin, is incorporated.

B. M. V.

Apparatus [vibrating screen] for grading materials. W. L. WETTLAUER (B.P. 438,892, 22.5.34).

Furnace linings.—See VIII. Preventing wear on moving machinery (etc.) parts.—See X. Heating solids or liquids. Pptg. particles from gas. Measuring the thickness etc. of materials.—See XI.

II.—FUEL; GAS; TAR; MINERAL OILS.

Coal for coke manufacture in Manchukuo. Y. YOSHIMURA (J. Fuel Soc. Japan, 1936, 15, 20–22).—The 4 types of coal found are briefly described; they include both anthracite and bituminous coals.

H. C. M.

Coal for coke manufacture. M. FUKUNAGA (J. Fuel Soc. Japan, 1936, 15, 24–25).—Japanese coals on account of their high % of volatile matter yield very friable cokes; it is concluded that strong metallurgical cokes can be produced only by blending.

H. C. M.

Caking coals in Karafuto (Southern Sakhalin). A. SIMOMURA and T. SIMOMURA (J. Fuel Soc. Japan,

1936, 15, 26—28).—The coal resources of Karafuto (Japanese territory) are estimated at 2×10^9 tons, the total production to date being only 7×10^8 tons. Of the 3 types of caking coals produced, one is of new and two are of old Tertiary origin. Data are given relating to proximate analysis, calorific val., S content, ash fusibility, and coking properties (as determined by the K-B-S and Nedelmann methods). It is concluded that the new Tertiary coal would yield a strong coke if carbonised under a high bulk d in narrow ovens with a very high flue temp., and that the old Tertiary coals should be blended with "X-coal" (special semi-coke) or other coals low in volatile matter if they are to be employed for making blast-furnace cokes. H. C. M.

Coal preparation on the Continent. W. G. RUMBOLD (Fuel Econ., 1936, 11, 258—262).—A review with special reference to German practice.

Coal. Banded ingredients of No. 6 coal and their heating values as related to washability characteristics. L. C. McCABE, D. R. MITCHELL, and G. H. CADY (Ill. State Geol. Surv. Rept. Invest., 1934, No. 34, 7—44).—Tests on samples of Herrin (No. 6) coal from 10 mines in S.W. and S. Illinois are described.

CH. ABS. (e)

Rheolaveur [coal] washery. A. G. SMITH (Fuel Econ., 1936, 11, 267—270).—The different characteristics of coals as affecting their cleaning or washing are discussed, and results obtained with a Rheolaveur washery operating on coal high in "middlings" given.

H. C. M.

Drying of washed coal. ANON. (Fuel Econ., 1936, 11, 279—283).—A description of modern plants.

Influence of temperature correction on calculation of calorific power of solid and liquid fuels. H. H. MÜLLER-NEUGLÜCK (Angew. Chem., 1936, 49, 180—185).—Series of calorific val. determinations have been carried out and the temp. corrections worked out by the methods of Roth, Regnault-Pfaundler, Langbein, and Schultes-Nübel, the results confirming that the deviations of the Langbein formula are too great. A curve is given showing deviations in the calorific power, using Langbein's formula, against % volatile matter in the H_2O and ash-free coal. It is concluded that the Langbein simplification of the Regnault-Pfaundler formula is too untrustworthy for general use, but that the equations of Regnault-Pfaundler, Roth, and Schultes-Nübel give satisfactory calorific vals. which are independent of the composition of the fuels. D. M. M.

Chemical nature of extracts from a bituminous coal. B. S. BIGGS (J. Amer. Chem. Soc., 1936, 58, 484—487).—The material (14.5%) extracted by C_6H_6 at 220—260° from a Pittsburgh seam coal is separated into the following fractions: (A) (16.2%), sol. in a large excess of cold light petroleum (I), (B) (50.4%), softens at about 120°, insol. in (I) but sol. in Et_2O , and (C) (33.4%), softens and decomposes at about 300°, insol. in Et_2O . A consists almost entirely of hydrocarbons. B and C are amorphous, reddish-brown solids which contain 4.53 and 6.66%, respectively, of O [of which 75 and 40%, respectively, is present as OH, determined by methylation (method: Waliaschko, A., 1904, i, 760)], are free from CO_2H , CO_2R , CO, and OAlk, have mol.

wts. of approx. 285 in $o-C_6H_4(OH)_2$ (but 470 and > 1000 , respectively, in Ph_2), and in solution show strong green fluorescence. Hydrogenation (Adkins) of B and C at 425° (lowest temp. for removal of O, S, and N originally present) gives in each case about 20% of gaseous products (CO_2 , CH_4 , and mainly C_2H_6), steam-distillable oil (D), b.p. 70—400° (\equiv 50% of original C), and viscous oil (E), M about 250, of low v.p. D consists almost entirely of wholly or partly reduced aromatic hydrocarbons; the fraction, b.p. $> 200^\circ$, contains a hydrocarbon, $C_{18}H_{16}$ (picrate, m.p. 210°). Dehydrogenation (Pt-C) of D gives mono-, di-, and poly-cyclic aromatic hydrocarbons; $C_{10}H_8$, 2- $C_{10}H_7Me$, two (probably) $C_{10}H_6Me_2$, and $C_{16}H_{10}$ (picrate, m.p. 218°) are isolated as picrates. A hydrocarbon, $C_{20}H_{14}$ (picrate, m.p. 183°), is obtained by Se-dehydrogenation of E. The structure of the so-called "resinous" fractions, i.e., B and C, probably consists of a network of C rings interspersed with O (as ring or ether); differences between B and C are probably due to mol. size. H. B.

Gases liberated from Virginia coals by thermal decomposition at various temperatures. F. H. FISH and J. L. PORTER (Bull. Virg. Polytech. Inst. Eng. Exp. Sta., 1933, Ser. 16, 4—10).—Tests on samples of bituminous coal from 10 mines, and on a semi-anthracite coal, distilled at 500—900°, are described.

CH. ABS. (e)

Underfeed combustion, effect of preheat, and distribution of ash in fuel beds. P. NICHOLS (U.S. Bur. Mines, Bull. 378; Fuel, 1935, 14, 205—211, 242—247, 264—270, 300—305, 318—321, 370—376; 1936, 15, 21—27, 51—54).—The experiments were carried out in a furnace of 20 in. internal diam.: in the first series, with an overfeed fuel bed, this was allowed to come to equilibrium of burning and was maintained at a depth of 24 in.; in the second series, with underfeed burning, a fuel bed of 42 in. depth was ignited at the top. The tests of the effect of preheat (air temp. of 400°, 600°, and 800°, respectively) in an overfeed fuel bed, using high-temp. coke, show that, at the rate of primary air used, about 50% of the additional sensible heat of the air was used in increasing the rate of combustion, being absorbed in the endothermic conversion of CO_2 into CO, and the other 50% appeared as sensible heat in the gases produced. The tests with underfeed burning which were carried out with high- and low-temp. cokes, petroleum coke, three anthracites, Illinois and Pittsburgh coals, and splint coal, led to the following conclusions: (1) all fuels showed the same general characteristics, except that up to a certain air rate the bituminous coals closed the openings between the particles and gave non-uniform distribution of air and rate of burning over the area of the bed; (2) at low rates of air the rate of ignition (I) was $>$ the rate of burning (B), and the fuel bed did not reach an equilibrium thickness; (3) each fuel reached equilibrium at a certain air rate; for all higher rates the fuel bed would reach equilibrium, its thickness decreasing with increasing air rate; (4) I increased, passed through a max., and again decreased as the air rate was increased; (5) I , and consequently the max. B , increased with decrease in the size of fuel; (6) preheating increased I of all fuels materially at all air rates. In the overfeed the

only limit to *B* is that the fuel shall not be blown out of the bed; in the underfeed the max. *B* for each rate of air supply is fixed by *I*, and these factors automatically fix the thickness of the fuel bed and the combustible gasified per lb. of air. Studies were made of the process of ignition and of burning in underfeed beds, and of the distribution of ash and clinker in fuel beds with the two methods of burning. The results are used to deduce what happens in stokers.

A. B. M.

Phosphorus distribution in the products of coke-oven operation. W. DEMANN and W. TER-NEDDEN (Tech. Mitt. Krupp, 1936, 4, 1—6).—P occurs almost entirely in inorg. combination in coal, the % present being directly \propto the ash content. Determination of P in the products of carbonisation of coal in a coke oven showed that > 98% of the P was present in the coke and the balance in the tar and aq. liquor. Wet-quenching did not remove P from coke. Addition of chemicals to coal with the object of removing P during coking is not considered feasible at the coking temp. employed.

R. B. C.

Relation of carbonising temperature and rank of coal to reactivity, electrical conductivity, and hygroscopicity of coke. J. D. DAVIS and A. C. FIELDNER (Proc. Amer. Gas Assoc., 1935, 636—659).—Standardised laboratory methods for determination of reactivity (*R*), electrical resistivity (*E*), hygroscopicity (*H*), ignition temp. (*I*), and min. air-blast have been applied to representative cokes made in large laboratory-scale apparatus at carbonising temp. (*t*) of 500—1100° from coals covering the entire range of coking rank. All properties determined are practically straight-line functions of *t* over the medium-temp. coking range. The vals. of *R*, *H*, and *E* of the coke decrease, and of *I* increase, and the coke requires more air to sustain combustion, as *t* is raised. The variation for each 100° temp. interval is pronounced. Curves showing the relation of *H* and of *E* in CO₂ to *t* tend to flatten out over the high- and low-temp. ranges. *R* as determined by *I* and the min. amount of air required for combustion is practically a straight-line function of *t* over the whole range. Cokes made at 500° and 600° scarcely conduct electricity; conductivity rapidly increases in the case of cokes made at 600—700°, whilst a conductivity val. comparable with that of graphite is given by coals carbonised at 1000—1100°. The practical significance of the results is briefly discussed.

R. B. C.

Testing of coke hardness. T. SHIMMURA (J. Fuel Soc. Japan, 1936, 15, 9—10).—The drum test of the Yawata Steel Works, in which 10 kg. of coke pieces are rotated in a cylindrical drum 30 times in 2 min., is described, the hardness index being measured by the % of coke retained on a sieze of 15-mm. aperture. Results obtained by this method are compared with those by the "Micum" drum and the A.S.T.M. shatter tests, taking 4 kinds of blast-furnace cokes as samples.

H. C. M.

Rapid calculations concerning the combustion of coal. R. L. REES (Ind. Chem., 1936, 12, 119—121, 126, 170—173).—Nomographs for calculating (*a*) the lb.-mols. and vol. of dry flue gas produced by the combustion of coal, (*b*) the heat lost in the dry flue gas,

(*c*) the sensible heat in O₂, N₂, CO, SO₂, and CO₂ above 0°, and (*d*) the heat in the H₂O vapour above any temp. are given. The bases of (*a*—*c*) are derived. D. K. M.

Mechanism of flame extinction by carbon tetrachloride. C. DUFRAISSE and J. LE BRAS (Compt. rend., 1936, 202, 227—230; cf. B., 1934, 815).—The quenching of flames by CCl₄ is, in general, a complex phenomenon. In certain cases, e.g., with CO, the effect may be sp., whilst in others it must be attributed to simple dilution with an inactive gas. The possibility of negative catalysis cannot be excluded.

F. L. U.

Hydrocyanic content of coke-oven gas. W. TER-NEDDEN (Tech. Mitt. Krupp, 1936, 4, 8—9).—The HCN content of coke-oven gas was determined at the various stages of its treatment and purification. Approx. 42% of the total HCN in the gas is removed during NH₃ absorption and 55% in the oxide purifiers.

R. B. C.

Removal of sulphur from chimney gases. D. BROWNLEE (Steam Eng., 1935, 4, 331—333).—A review of recent developments.

CH. ABS. (e)

Behaviour of sulphur in fuel gas and the properties of its products of combustion with respect to condensation and corrosion. L. SHNIDMAN (Proc. Amer. Gas Assoc., 1935, 706—725).—A review, supplemented by a summary of 30 replies to a questionnaire sent to the largest natural gas and town's gas companies in the United States.

R. B. C.

Reaction equilibrium between carbon, hydrogen, methane, and acetylene at high temperatures. A. V. FROST (Mat. on Cracking, 1935, No. 2, 98—106).—A 95% conversion of CH₄ into C₂H₂ occurs at 1800° abs./1 atm. or 1500° abs./0.1 atm. Synthesis of C₂H₂ from the elements occurs at > 2500° abs. C causes catalytic decomp. of C₂H₂ and CH₄. Its separation is prevented by dilution with inert gas or H₂.

CH. ABS. (e)

Inflammation of firedamp by the filaments of incandescence electric lamps. E. COTTÉ (Compt. rend., 1935, 201, 1484—1485).—Danger of explosion is diminished by using a wide bulb and ensuring its complete breakage when damaged. Partial fracture may lead to inflammation.

T. G. P.

Modification of the present miscibility test [for asphalt emulsions] and its relationship with probable settlement results. C. A. DOWNING (Proc. Amer. Soc. Test. Mat., 1935, Preprint No. 78, 6 pp.).—The asphalt emulsion in the usual test is diluted in the ratio 50 ml. to 150 ml. of distilled H₂O. The results are thus obtained more rapidly.

CH. ABS. (e)

Analysis of primary tars. G. STADNIKOV and N. KARAKASCH (Brennstoff-Chem., 1936, 17, 86—87).—Errors in published analyses of kukkersite and boghead tars and tar oils are due to overlooking the presence of O compounds (alcohols, ketones, ethers, and esters). Such compounds can be extracted from admixture with hydrocarbons by means of a saturated solution of FeCl₃ in conc. HCl (I). Solutions of AlCl₃ or SnCl₄ in HCl extract only ketones and alcohols. Errors are avoided therefore by first extracting the tars etc. with (I). (I) does not extract thiophen. It cannot be used for extracting O compounds from C₆H₆ in which the complex

compounds formed are sol.; difficulties also arise with certain other mixtures.

A. B. M.

So-called free carbon of bituminous coal tar.

H. MALLISON (Asphalt u. Teer, 1935, 35, 1001—1003; Road Abs., 1936, 3, No. 97).—The term "free C" should be replaced by "insol. matter," and the solvent used indicated. The C_6H_6 -insol. residue in a German road tar consisted of tar resins and soot-like substances with coal and coke dust.

T. W. P.

Phosphorus in [coke-oven] tar.

W. DEMANN and F. GRIMMENDAHL (Tech. Mitt. Krupp, 1936, 4, 6—7).—The distribution of P in the various tar fractions was investigated. 99.6% of the total P in the tar was present in the pitch, and none in the tar oils. P was distributed among the pitch fractions as follows: α 92.3%, β 6.1%, γ nil.

R. B. C.

Physical properties of asphaltic mixtures at low temperatures. L. F. RADER (Proc. Amer. Soc. Test. Mat., 1935, Preprint No. 79, 13 pp.).—Tests for determining the modulus of rupture and elasticity and the toughness are described. Results are given for various reduced and oxidised asphalts.

CH. ABS. (e)

Hydrogenation of coal tar. C. M. CAWLEY (Gas World, 1936, 104, Coking Sect., 31—36).—A review. (Cf. B., 1935, 707; B., 1936, 177.)

A. B. M.

Action of hydrogen sulphide and hydrogen selenide on the hydrogenation of naphthalene, *m*-cresol, and tar oil. J. VARGA and I. MAKRAY (Brennstoff-Chem., 1936, 17, 81—83).—The experiments were carried out in rotating autoclaves of 4.5 litres capacity, with an initial H_2 pressure of 100 atm. and a reaction temp. of 400—500°. Hydrogenation was effected in presence of 2% of MoO_3 with and without the addition of 2—4% of S or 2% of Se. S or H_2S accelerated the hydrogenation of $C_{10}H_8$ (to tetralin + decalin), *m*-cresol (I) (to aromatic and hydroaromatic hydrocarbons), tar oil and petroleum residue (to lower-boiling hydrocarbons). H_2Se acted selectively, accelerating the hydrogenation of $C_{10}H_8$ more effectively than did H_2S , but inhibiting the hydrogenation of (I) and the tar phenols. H_2Se was less active than H_2S in the hydrogenation of the petroleum residue.

A. B. M.

Determination of asphalts in oils. P. WOOG, J. GIVAUDON, F. DAYAN, and A. BIDEZ (Bull. Soc. Chim., 1936, [v], 3, 97—102).—Causes of variations in the results obtained when determinations of asphalts are made in the same sample of an oil or petrol derivative are examined. When the oil is stored in contact with air the proportion of asphalt is continually increasing; hence, the process is one of oxidation. Exposure to light and rise in temp. increase the asphalt content. Temp. plays an important part in the pptn. of the asphalt. Directions for obtaining concordant results are given.

E. E. A.

Selection of the type of tube still for petroleum-distillation equipment. B. I. BONDARENKO and V. S. FEDOROV (Azer. Neft. Choz., 1934, No. 5, 78—79).—The relative merits of the Badger, Foster-Wheeler, and Alco tube-still furnaces are discussed.

CH. ABS. (e)

Acid demulsification of the Kala crude oil. D. N. BUCH (Azer. Neft. Choz., 1934, No. 4, 37—43).—

Emulsions were broken by addition of 1% of 25% H_2SO_4 , at $> 50^\circ$, sea- H_2O being used to wash away the acid subsequently. Detail of the technique is given.

CH. ABS. (p)

Cracking and refining [oil]. Investigations on the plant "Chimgaz," 1926—1931. M. B. MARKOVITSCH. (i) Cracking of Grozny paraffinic fuel oil, and combined cracking and dewaxing by light cracking and simultaneous deep cracking of the light distillates. M. B. MARKOVITSCH, R. P. ROMANOV, D. A. TSCHERNAEV, and G. A. ISAKOV. (ii) Vapour-phase cracking of shale tars. E. I. ARON *et al.* (iii) Treating vapour-phase-cracked gasoline with fuller's earth. K. V. BART, D. A. TSCHERNAEVA, and E. V. BART. (iv) Determining toluene in pyro-gasoline and vapour-phase-cracked gasoline. S. A. NAZAROV and S. S. CHAIN. (v) Distribution of benzene and toluene in fractions of vapour-phase-cracked gasoline and their separation. N. D. GADASKINA, I. N. PETROVA, E. A. BALANDINA, and K. A. MALKOVITSCH. (vi) Application of the Bepalov method to analysis of vapour-phase-cracked gasolines. V. A. BALANDINA. (vii) Chemical composition of vapour-phase-cracked gasolines. N. D. GADASKINA, I. N. PETROVA, and V. A. BALANDINA. (viii) Determination of aromatics in cracked gasoline and similar products by the "specific gravity" method. A. F. DOBRIANSKI and I. N. PETROVA. (ix) Preparing varnish driers from the benzene "overhead." S. A. NAZAROV (Mat. on Cracking, 1935, No. 2, 58—60).—(iii) The activity of fuller's earth is examined in relation to H_2O content, temp., and poisoning.

(v) Possible extraction of C_6H_6 and PhMe from gasoline and the prep. of nitrotoluene from the vapour-phase concentrate is examined.

(vi) Negative results are recorded. CH. ABS. (p)

Desulphurising petroleum fractions from Ischimbajevo crude by hydrogen under pressure. P. V. PUTSCHKOV (Petroleum, 1936, 32, No. 15, 1—7).—The distillate (final b.p. 335°) was cut into two fractions corresponding to benzene and kerosene and the latter were hydrogenated using MoS_2 on SiO_2 gel as catalyst. Max. desulphurisation (0.62—0.1% and 1.66—0.125%) were obtained on the two samples at $400^\circ/25$ atm. and $400^\circ/50$ atm., respectively. The reaction is accelerated by increase in pressure, but is less effective when the rate of throughput is increased. The yield of desulphurised product varied from 96% to 99%, 0.25—0.30 wt.-% of H_2 being used and 1—1.5% of gas formed.

C. C.

Mechanism of vapour-phase cracking process. A. F. DOBRIANSKI, E. K. KANEP, and S. V. KATZMAN (Mat. on Cracking, 1935, No. 2, 60—71).—The max. yields of C_6H_6 and PhMe were observed at a tar yield of 40%. C_6H_6 condenses at 650 — 700° with unsaturated hydrocarbons. A light vapour-phase cracking causes the appearance of PhMe and only small amounts of C_6H_6 . The % of C_6H_6 increases with the temp. The origin of the aromatic compounds formed in cracking is discussed.

CH. ABS. (e)

Chemical methods for converting synthetic petroleum gases used by the Azneft. L. POTOLOVSKI

and V. GUTIRIA (Azer. Neft. Choz., 1934, No. 5, 62—69).—A review. CH. ABS. (e)

Preparation of ethyl alcohol from ethylene obtained from petroleum gases. VI. V. S. GUTIRIA and M. A. DALIN (Azer. Neft. Choz., 1934, No. 5, 58—62; cf. B., 1935, 395).— C_2H_4 was separated from cracked gas by passage through a charcoal absorber, and discarding the first 17% of the gas (mainly CH_4 and H_2). The second portion (approx. 50% of the total) contained H_2 , CH_4 , C_2H_6 , and C_2H_4 . It was treated with H_2SO_4 at 65—75°/15—20 atm., and the resulting $EtHSO_4$ converted into EtOH. CH. ABS. (e)

Recent developments in propane technique. R. E. WILSON and P. C. KEITH, JUN. (Proc. 15th Ann. Meet. Amer. Petroleum Inst., Sect. III, 1934, 15, 106—119).—The use of C_3H_8 for separating wax, asphalt, heavy ends, naphthenic compounds, and colour substances is reviewed. CH. ABS. (e)

Pyrolysis of gasoline. E. K. KANEP (Mat. on Cracking, 1935, No. 2, 74—82).—Tests on the cracking of Krasnodar gasoline free from C_5H_{12} (d 0.7197, b.p. 65—100°) are described (650—750°). Much more gas was formed than in cracking kerosene or gas oil. The amount of polymerides increased rapidly with temp., reaching 8.5% of the stock at 750°. The C_6H_6 was \gg the PhMe. This was attributed to dehydrogenation of naphthenes. A naphtha with a $C_{10}H_8$ base (d 0.752, b.p. 95—110°), when cracked at 650°, yielded smaller amounts of C_3H_6 and C_2H_4 . The C_6H_6 was $>$ the PhMe. The polymerides were highest in cracking a naphthene-base gasoline, and lowest for cyclohexane. Butadiene is formed at all the cracking temp. used. CH. ABS. (e)

Benzol extraction at gasworks. J. BISHOP (Gas J., 1936, 214, 218—219).—A brief survey.

Decolorising power of decolorising agents, in particular fuller's earths. E. ERDHEIM (Petroleum, 1936, 32, No. 11, 5—8).—The effects of 21 decolorising agents on solutions of oil in benzine have been determined. The decolorising power of Floridin XXF, Montana S, Frankonit H, and various active charcoals did not decrease with increasing depth of colour of the original solution; with other agents a more or less marked decrease was observed. Results of decolorising a paraffin wax with a no. of the earths are also recorded. A. B. M.

Reactions of organic peroxides and the discovery of tetralin peroxide. H. KIEMSTEDT (Brennstoff-Chem., 1936, 17, 83—86; cf. B., 1933, 421; A., 1935, 481).—Experiments carried out in 1926 on corrosive S in benzol showed that in some cases hydrocarbons containing no S could blacken Hg, and that others containing S did not attack Cu; both effects were traced to the presence of org. peroxides, in particular to tetralin peroxide (I). (I) was isolated and its reactions were studied. Org. peroxides decompose $Fe(CO)_5$ and the reaction can be used as a test for the former. Attention is directed to the harmful effect of (I) on the skin. A. B. M.

Comparison of Rumanian fuel and engine oils. O. WESP (Petroleum, 1936, 32, No. 11, 9).—The properties of a no. of oils are tabulated and the relation

between nett calorific val., composition, and d is briefly discussed. A. B. M.

Pyrolysis of individual kerosene fractions. E. K. KANEP (Mat. on Cracking, 1935, No. 2, 71—74).—Fractions of b.p. $<$ 150°, 150—210°, 210—270°, and 270—300° were cracked at 700°. The yield of C_6H_6 , PhMe, and xylene from the fraction of b.p. $<$ 150° was 20.9 wt.-%. It decreased to 15.6% for the 150—210° fraction, and was stabilised at 12% for heavier fractions. Gas oil is an unsatisfactory stock. CH. ABS. (e)

Separating oil from alkali sludge. D. GOLDBERG, N. TSCHIKAREVA, and K. ANTONOVA (Azer. Neft. Choz., 1934, No. 5, 55—59).—80—95% of the oil in the alkali sludge can be recovered by heating a mixture of kerosene sludge and lubricating oil sludge in an autoclave for 5 hr. at 153°/5 atm. The contents then form a soap solution and an upper layer containing oil with \approx 0.1% of soap. Increase in pressure or amount of kerosene sludge, or rise in temp., promotes the separation of lubricating oil. CH. ABS. (e)

Economic aspects of solvent refining of lubricating oils. R. E. WILSON and P. C. KEITH, JUN. (Proc. 4th Mid-Year Meet. Amer. Petroleum Inst., Sect. III, 15 M, 38—45).—A review and discussion. CH. ABS. (e)

Commercial situation of automotive extreme-pressure lubricants. H. C. MOUGEY (Proc. 15th Ann. Meet. Amer. Petroleum Inst., Sect. III, 15, 60—68).—Pb soap-mineral oil lubricants may produce a protective film on the bearing surface without addition of active ingredients. Film formation is aided by adding a little dissolved S to the lubricant. It induces corrosion in presence of H_2O , but Pb soaps inhibit the corrosive action. CH. ABS. (e)

Road tar.—See IX. **Corrosion-resisting materials for gas appliances.** **Welding and oil transport etc.**—See X. **Paint in petroleum industry.**—See XIII. **Disposal of sewage sludge.** **Sludge as fuel.**—See XXIII.

PATENTS.

Coal-washing plant. INTERNAT. COMBUSTION, LTD., and G. W. DAVIDSON (B.P. 444,577, 19.9.34).—The fines are run to a slurry sump (S) whence the lighter material is run with a reagent to a flocculating tank (T); from T the H_2O is pumped back to the plant supply and the flocculated material back to S. The heavier material from S is deslimed and filtered, the cake being marketable. B. M. V.

Vertical retorts for carbonisation of coal and the like. F. J. WEST, E. WEST, and WEST'S GAS IMPROVEMENT CO., LTD. (B.P. 442,918, 15.11.34. Addn. to B.P. 408,738; B., 1934, 564).—The discharge door of the retort (R) described in the prior patent is provided with a fireclay ring which extends up into the annular carbonisation chamber well above the level of the floor of the combustion chamber so that when the coal is fed into R without a preliminary charge of coke breeze satisfactory carbonisation of the whole of the charge is effected. The combustion chamber in the modified design is made as a single, central, cylindrical chamber with a no. of flame ports in its base. A. B. M.

Conversion of solid fuels and products derived therefrom or other materials into valuable liquids. C. KRAUCH and M. PIER, Assrs. to STANDARD-I. G. Co., (U.S.P. 1,996,009, 26.3.35. Appl., 29.7.32. Ger. 14.2.25).—Carbonaceous materials are destructively hydrogenated at 300–700°/ < 20 atm. in presence of an oxide of a metal of group IV. A. B. M.

Cooling of coke or the like. W. B. MITFORD, C. H. LANDER, E. W. BROCKLEBANK, and A. E. DILLEY (B.P. 443,593, 1.9.34).—Coke leaving a rotary retort at approx. 500° is passed through an apparatus similar to a Herreshoff roaster except that it is airtight, is constructed of metal, and is provided with both surface coolers and sprays of H₂O, the supply of the latter being insufficient to wet the coke. B. M. V.

Carbon-black production. T. P. KELLER, Assr. to DOHERTY RES. Co. (U.S.P. 1,999,541, 30.4.35. Appl., 5.9.31).—Parallel streams of air and gaseous hydrocarbon (I) are caused to flow upwardly within a heated unobstructed space in such manner that adjacent streams come in contact while maintaining stream-line flow. The air is employed in amount sufficient for the combustion of 55–80% of (I). Combustion of (I) takes place at the surface of contact with formation of C black. The ratio of the velocities of the gas and air streams is maintained between 1:0.67 and 1:2, and the abs. velocities are such that the C black remains in the high-temp. zone for 0.05–0.4 sec. It is then cooled and recovered. A. B. M.

Carbon black. KREBS PIGMENT & COLOR CORP. (B.P. 443,470, 20.5.35. U.S., 18.5.34).—The dispersion properties of C black are improved by incorporating 1–10% of an alkaline-earth naphthenate therewith. This is effected by dispersing the C black in an aq. solution of an alkaline naphthenate, adding an alkaline-earth salt, filtering, washing, and drying. A. B. M.

Carbon black. W. W. ODELL (U.S.P. 1,999,573, 30.4.35. Appl., 29.8.30).—Finely-divided C black produced by the thermal decomp. of hydrocarbons or CO is treated at a suitable temp. (700°) with the vapour of a rubber-compounding catalyst which is stable at < 420°, e.g., Zn, Se, Sb, or their oxides, in such manner that a thin layer of the catalyst is adsorbed on the surface of the C particles. A. B. M.

(A) Recovery of ammonia from [coal] gas by contact with acid phosphate. (B) Removal of ammonia from gases. (C) Manufacture of fertilisers. (D) By-product ammonia recovery. (A–C) M. SHOELD, (D) F. W. SPERR, JUN., Assrs. to KOPPERS Co. OF DELAWARE (U.S.P. 1,980,006—8 and 1,980,010, 6.11.34. Appl., [A] 14.10.31, [B] 15.12.31, [C] 7.5.32, [D] 27.12.30).—(A) Coal gas is passed countercurrent to an agitated moving bed of superphosphate (I) under such conditions as to produce a product (II) containing 4–5% of NH₃. (B) A mixture of (I) and (II) is used as the absorbent for the NH₃. (C) The proportions of (I) and (II) in the charge are so arranged that the temp. in the absorbent does not exceed a val. above which caking occurs. (D) The process of (A) with minor modifications is claimed. A. R. P.

Removal of sulphur compounds from gases. GAS LIGHT & COKE Co., W. K. HUTCHISON, and G. U.

HOPTON (B.P. 443,094, 18.5.35).—Oil-sol. S compounds, e.g., CS₂ and thiophen compounds, are removed from gases by scrubbing with wash oil (< 20 gals./1000 cu. ft.), and the wash oil is stripped by distillation with direct steam at < atm. pressure, e.g., 200 mm., and at < 100°, e.g., 70–75°. A. B. M.

Removal of hydrogen sulphide and other sulphur compounds from gases, especially coal-distillation gases. H. KOPPERS' INDUSTRIEEL MAATS. N.V., Asses. of H. KOPPERS GES.M.B.H. (B.P. 443,407, 1.7.35. Ger., 29.6.34).—The gases are washed with an alkaline solution of As, Sn, or Sb salts ("Thylox" process), to which a small proportion of Mn and/or Cu compounds is added. A. B. M.

Production of asphalt bitumen free from paraffin. K. KELL and W. H. SCHMITZ (B.P. 443,287, 23.7.34. Ger., 4.12.33).—Crude oils or residues, after distillation and/or dilution if necessary, are mixed with a solvent, e.g., liquid aliphatic ethers or esters, such that on cooling the mixture the whole of the paraffin wax and all or part of the asphalt resins are pptd., whilst the soft asphalt remains in solution. The pptd. materials are separated by filtration and the soft asphalt is recovered from the filtrate, e.g., by distillation or selective pptn. A. B. M.

Production of pure phenols from lignite tar, shale tar, and low-temperature tars. J. MEYER (B.P. 443,285, 14.12.34).—The tar is heated to about 300° during or prior to fractionation in order to effect a mild cracking. The oils are extracted with aq. NaOH and the phenoxide solution is first oxidised in the cold, e.g., with air, then, after separation of any resinous deposit, is treated with steam at 105–120° to remove impurities, and is finally acidified to liberate the phenols. A. B. M.

Conversion of hydrocarbons. R. E. BURK, Assr. to STANDARD OIL Co. (U.S.P. 1,989,737, 5.2.35. Appl., 15.4.32).—A mixture of cracking-coil tar and naphtha is heated at 370–600°/10–150 lb. per sq. in., in presence of a controlled amount of O₂ to produce motor fuel. L. C. M.

Production of liquid hydrocarbons by destructive hydrogenation of carbonaceous materials. INTERNATIONAL HYDROGENATION PATENTS Co., LTD., Asses. of I. G. FARBENIND. A.-G. (B.P. 443,133, 25.6.35. Ger., 7.7.34).—Hydrogenation is effected in presence of acid, and any acid constituents in the volatile reaction products are neutralised or removed by bringing the latter, before condensation, in direct contact with the liquid initial materials (coal paste etc.) to be subjected to destructive hydrogenation. A. B. M.

Treatment [desulphurising] of hydrocarbon oils. G. EGLOFF and J. C. MORRELL, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,997,861, 16.4.35. Appl., 19.9.31).—Petroleum distillate vapours are treated with aq. HOCl containing a sol. Cu salt. D. K. M.

Refining of [hydrocarbon] oils. N. E. LOOMIS, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,997,938, 16.4.35. Appl., 6.1.32).—The oil is heated to approx. 200–370° (260–340°), mixed with clay, e.g., Attapulugus fines (0.125–0.375 lb. per gal.), and passed through an insulated coil into a fractionating tower from

which light vapours are distilled off. The residual heavy oil-clay suspension is separated by filter-pressing.

D. K. M.

Refining of asphalt-base petroleum. W. S. BAYLIS, Assr. to FILTROL Co. OF CALIFORNIA (U.S.P. 1,997,896, 16.4.35. Appl., 17.2.30).—The crude oil is agitated with H_2SO_4 and after separation of the sludge is mixed with an acid-treated clay, *e.g.*, Filtrol, heated to 204° , steam being injected if desired, and passed into a fractionating column from which gasoline vapour leaves at the top and other vapours are removed as side streams. The residual lubricating oil is separated from the clay by filter-pressing.

D. K. M.

[Acid-treated petroleum] sludge treatment. L. B. SMITH, Assr. to ATLANTIC REFINING Co. (U.S.P. 1,997,980, 16.4.35. Appl., 5.9.31).—Sludge from H_2SO_4 -refined petroleum oils is passed into a large bulk of liquid, *e.g.*, hydrocarbon oil or other liquid with suitable properties, at 85 – 538° . Gases (SO_2 , SO_3) and hydrocarbon vapours are evolved and the latter are scrubbed out with a high-boiling oil. The liquid is freed from coke-like solids (which may be used as fuel) by settlement or filtration, then reheated, and re-used.

D. K. M.

(A, B) **Breaking of oil-water emulsions.** (c) **Breaking of petroleum emulsions.** (A, B) J. C. WALKER, (c) C. H. M. ROBERTS, Assrs. to TRETOLITE Co. (U.S.P. [A] 2,000,725, [B] 2,000,802, and [C] 2,000,717, 7.5.35. Appl., [A] 5.12.21, [B] 2.9.21, [C] 13.4.33).—The use is claimed of: (A) the mixture obtained on sulphonation of oleic acid (I) and containing free (I) and stearylactone; (B) the mixture obtained on sulphonating (I) in presence of an aromatic hydrocarbon (*cf.* Twitchell reagents); (C) the products of interaction of polyhydric alcohols and polybasic acids, *e.g.*, a fatty acid-modified glyptal resin from o - $C_6H_4(CO)_2O$, glycerin, and castor oil prepared under specified conditions. In (A) and (B) apparatus is described.

A. W. B.

Removal of gum and gum-forming constituents from cracked petroleum distillates. S. M. MARTIN, JUN., and W. A. GRUSE, Assrs. to GULF REFINING Co. (U.S.P. 2,002,902, 28.5.35. Appl., 8.1.32).—Fractions of such distillates (I) with boiling ranges 68 – 79° , 96 – 107° , and 124 – 135° and containing the greater part of the gum-forming constituents are distilled off. The latter are removed from these fractions by known processes, or by heating in air or O_2 at 93 – 150° in a closed vessel followed by distillation and re-mixing the distillates with the remainder of (I).

D. K. M.

Separation and recovery of naphthenic acids and phenols [from petroleum extracts and distillates]. D. R. MERRILL and A. L. BLOUNT, Assrs. to UNION OIL Co. OF CALIFORNIA (U.S.P. 2,000,244, 7.5.35. Appl., 25.7.33).—The mixed naphthenic acids (I) and phenols (II) are partly neutralised, so as to saponify only (I), and (II) are removed by steam-distillation, in presence of Edeleanu extract to prevent frothing.

A. W. B.

Refining of hydrocarbon mixtures. N. V. DE BATAAFSCHE PETROLEUM MAATS., Assces. of H. F. LINDEKE and B. S. GREENSFELDER (B.P. 444,535, 29.7.35. U.S., 17.8.34).—Hydrocarbon oil mixtures are separated into a raffinate consisting mainly of non-aromatic con-

stituents and/or the impurities, and a layer of aromatic substances, by extraction with a selective solvent, *e.g.*, EtCN, using a hydrocarbon with an aromatic ring and at least one other ring which may be aromatic also, *e.g.*, $C_{10}H_8$, Ph₂, anthracene, indene, or their alkyl derivatives, as diluents.

D. K. M.

Acid treatment of light mineral oil. F. O. BLAIR, Assr. to STANDARD OIL Co. (U.S.P. 2,001,899, 21.5.35. Appl., 11.12.29).—In the treatment of light petroleum oils with H_2SO_4 , the acid sludge is accumulated and used instead of H_2SO_4 for treating fresh supplies of oil. The sludge from this treatment is similarly collected and used, and the process repeated until the sludge is practically free from H_2SO_4 .

D. K. M.

Refining of gasoline produced by cracking. C. R. PAYNE and D. R. STEVENS, Assrs. to GULF REFINING Co. (U.S.P. 2,002,250, 21.5.35. Appl., 19.9.31).—By treating petroleum products at 150 – $400^\circ/1000$ lb. per sq. in. when produced by liquid- and at 150 – $400^\circ/2000$ lb. per sq. in. when produced by vapour-phase cracking with $AlCl_3$ (0.5–3.0%) the S and gum-forming constituents are reduced.

D. K. M.

Production of motor fuels from hydrocarbon oils. M. L. CHAPPELL (U.S.P. 2,002,729, 28.5.35. Appl., 28.5.34).—The oil is heated to 428 – $705^\circ/50$ – 1000 lb. per sq. in. and passed into a reaction chamber (C) from which the unvaporised oil is withdrawn and in which gas containing 5–18% of O_2 heated to 428 – 705° is added in such quantity as to reduce the H content of this oil to approx. 14.3%. In the upper part of C further cracking and other reactions occur and the vapours are passed into a fractionating column the vapours from which on condensation yield a motor spirit of high anti-knock val.

D. K. M.

Manufacture of motor fuel. W. A. SMITH (U.S.P. 2,003,158, 28.5.35. Appl., 24.6.31).—Motor fuel produced by cracking is rendered colour-stable by addition of a small quantity of quinhydrone (I) either alone or in solution in a mixture of a higher alcohol, *e.g.*, *sec.*-amyl alcohol, and a phthalic ester. Preferably 100 barrels of gasoline should contain 0.3–5 lb. of (I).

D. K. M.

Motor fuel. C. W. HANNUM, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,000,283, 7.5.35. Appl., 8.8.34).—The use of amino-phenols, -naphthols, or -cresols, *N*-substituted with a cyclohexyl group or a derivative thereof, as gum inhibitors is claimed. They are highly sol. in the fuels and do not discolour on storage. A prep. of *p*-cyclohexylaminophenol from *p*- $C_6H_4(OH)_2$ and $C_6H_{11}NH_2$ is disclosed.

A. W. B.

Treatment of motor fuel. V. IPATIEFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 2,001,907, 21.5.35. Appl., 26.10.32).—Gasoline is cracked under suitable conditions, *e.g.*, at $540^\circ/400$ lb. per sq. in., and then fractionated. The condensate is mixed with 80–100% H_2SO_4 and treated with the gaseous products of the cracking process, yielding a liquid of high anti-knock val.

D. K. M.

Lubricating compositions. STANDARD OIL DEVELOPMENT Co. (B.P. 444,778, 1.5.35. U.S., 19.10.34).—To a lubricating oil is added a product (0.5–2.5%) obtained by oxidising with O_2 -rich gas at $< 200^\circ$ one

of the following: a glyceride, *e.g.*, palm oil, a naturally-occurring ester, an alcohol, ester, or acid with $\leq C_{10}$ in a straight chain and having I val. < 60 . Alternatively, such an acid, ester, or alcohol is hydrogenated to give I val. < 20 , mildly oxidised as above, and the product blended with a suitable lubricating base oil. D. K. M.

(A—D) **Manufacture of high-viscosity index [lubricating] oils.** (E) **Separation of mineral oils.** H. T. BENNETT, Assr. to MID-CONTINENT PETROLEUM CORP. (U.S.P. 2,003,233—6 and 2,003,238, 28.5.35. Appl., [A] 2.3.31, [B] 21.4.32, [C] 2.5.32, [D] 22.10.32, [E] 23.6.33).—(A—D) Constituents giving rise to the low η index, *i.e.*, the predominantly naphthenic fractions, are extracted from the oil by admixture with a halogenated ether, *e.g.*, $\beta\beta'-(C_2H_4Cl)_2O$. The solvent is removed separately from the fractions by distillation. (B) A neutralising agent, *e.g.*, NH_3 , is added to the oil before distillation, which may be assisted by steam, the recovered solvent being freed from H_2O by passing through fuller's earth. (C) By using several mixing tanks and settlers the extraction is carried out continuously and countercurrently. (D) The high- η oil is refined by successive treatments with H_2SO_4 and clay. (E) After the distillation of solvent from each of the fractions separately, the last traces of solvent are removed by treating the residual oil from each fraction separately with H_2SO_4 , removing the sludge, mixing with clay, and injecting steam in the mixture at $> 95^\circ$. The clay is then removed from the oil by filtration. D. K. M.

Manufacture of highly viscous [lubricating] oils. COURTS & Co., and F. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 444,244, 13.9.34. Addn. to B.P. 424,569; B., 1935, 346).—The products of the prior patent are improved by extraction with one or more suitable solvents, *e.g.*, $PhOH$, NH_2Ph , cyclohexanone. D. K. M.

Heating bulk material.—See I. **Carboxylic acid [EtCO₂H]. Pb alkyls.**—See III. **Hydrogenation catalysts.** N_2-H_2 .—See VII. **Road surfaces.** **Macadam.** **Paving mixture.**—See IX. **Furnace-gas control.**—See X. **Vulcanised asphalt oil.** **Emulsions of thermoplastics.**—See XIII. **Coal-tar ointment.**—See XX.

III.—ORGANIC INTERMEDIATES.

Nessler's reagent test for aldehydes in ether.

(A) **Comparison with other tests.** (B) **Modified test.** F. N. VAN DERIPE, E. C. BILLHEIMER, and F. W. NITARDY (J. Amer. Pharm. Assoc., 1936, 25, 207—209, 209—211).—(A) The U.S.P. Nessler's reagent (I) and pyrogallol-fuchsin- SO_2 tests give positive responses for 1 p.p.m. of $MeCHO$ in Et_2O ; (I), but not the latter, is also sensitive to 0.5% of $EtOH$. The reagents are not affected by presence of unsaturated compounds. Aq. $AgNO_3-NH_3$ is an unsatisfactory reagent for $MeCHO$.

(B) Increased sensitivity to $\cdot CHO$ and absence of reaction with $EtOH$ are obtained by diluting (I) with saturated aq. $NaCl$ (1:17) and shaking 7 c.c. of this mixture with 20 c.c. of the Et_2O at 25° for 10 sec.

F. O. H.

Reaction between C, H_2, CH_4 , and C_2H_2 . **Hydrogenation of $C_{10}H_8$ and *m*-cresol.** C_6H_6 and $PhMe$ in gasoline fractions. $EtOH$ from C_2H_4 . C_3H_8 . Re-

actions of org. peroxides, and tetralin peroxide.—See II. [Solvents from] pentosan-containing materials.—See XVII. Cobaltamines in photography.—See XXI.

PATENTS.

Drying of acetylenic fluids. T. H. CHILTON, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,999,397, 30.4.35. Appl., 6.10.33).—Gases containing C_2H_2 and its highly reactive polymerides (vinyl- and divinyl-acetylene) are precooled to 0° , and dried by passage through a no. of layers of granular CaC_2 . Further polymerisation is prevented, and economies of time and plant are effected. Apparatus is described. E. J. B.

Production of olefine oxides and of catalysts therefor. A. H. STEVENS. From SOC. FRANÇ. DE CATALYSE GÉNÉRALISÉE (B.P. 444,186, 13.9.34).— C_2H_4 and a limited amount of air are passed at $150-400^\circ$ over fine flakes of Ag containing a small amount of Cu and Au and produced by rolling the alloy to foil and shredding this in aq. gum. A. R. P.

Purification of tetrachloroethylene. G. H. COLEMAN, Assr. to DOW CHEM. Co. (U.S.P. 2,000,881, 7.5.35. Appl., 20.11.33).—Toxic impurities, *e.g.*, other org. halides, $COCl_2$, are removed by treatment, *e.g.*, refluxing, with about 1 wt.-% of anhyd. $AlCl_3$ until HCl ceases to be evolved, followed by washing out the $AlCl_3$ (with alkali) and fractionally distilling. A. W. B.

Preparation of [$\beta\gamma$]-dichlorobutadiene. W. H. CAROTHERS and G. J. BERCHET, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,998,442, 23.4.35. Appl., 26.1.32).— $\alpha\beta\gamma\delta-C_4H_6Cl_4$ is treated with an alkali, *e.g.*, 30% $KOH-MeOH$ at $10-18^\circ$ or solid $NaOH$. H. A. P.

[Preparation of] **organic fluorine compounds [for use as dielectrics].** BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 443,340, 29.7.35. U.S., 28.7.34).—Paraffin wax (I) is fluorinated by treatment of chlorinated (I) with SbF_3 (II), in presence of 5—10 (wt.-%) of $SbCl_5$, in, and at the b.p. of, a solvent, *e.g.*, C_6H_6 . Excess of (II), over the original Cl content, is avoided. Products containing 25—45% of F are obtained. They are chemically stable, liquid, non-inflammable dielectric materials. A. W. B.

Manufacture of condensation products. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 443,436, 27.8.34).—Products of condensation of alkylene oxides with NH_3 , OH -, CO_2H -, NH_2 -, or hydroxyalkylamino-compounds, *e.g.*, $NH_2\cdot C_2H_4\cdot OH$ or reaction products of $(CH_2)_2O$ with oleic acid, sorbitol, etc., are heated, *e.g.*, at $70-200^\circ$ ($100-150^\circ$), with urea, $CS(NH_2)_2$, or $NH\cdot C(NH_2)_2$. The products are textile assistants, fungicides, etc. A. W. B.

Preparation of condensation products. W. A. LAZIER, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,999,196, 30.4.35. Appl., 25.11.32. Cf. U.S.P. 1,895,516; B., 1933, 905).—*sec*-Alcohols, *e.g.*, Pr^sOH , are brought in contact with a catalyst consisting essentially of Cr_2O_3 and Mn_2O_3 or ZnO , *e.g.*, $Zn-Cu-Cd$ chromite, at $200-500^\circ/2-750$ atm. The products contain a mixture of lower hydrocarbons and higher alcohols, ketones, and condensation products. A. W. B.

[Manufacture of] **emulsifying and like agents.** W. E. BILLINGHAME (B.P. 443,719, 25.8.34).—Alcohols

of C_6-22 , or mixtures thereof, are mixed with alkalinized casein, *i.e.*, casein mixed with an equal wt. of alkali, *e.g.*, NaOH or borax in 4—8 times its wt. of H_2O , and the mixture is sulphonated, neutralised, and dried.

A. W. B.

Preparation of glyoxal sulphate. M. A. PERKINS, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,999,995, 30.4.35. Appl., 10.11.33).—The slow addition ($1\frac{1}{2}$ —5 hr.) of $C_2H_2Cl_4$ (I) to 25—65% oleum containing $HgSO_4$, at 45—66° (cf. G.P. 362,743; B., 1923, 628A), leads to smooth reaction and good yields [70—73% on (I)] of glyoxal sulphate, which is filtered off, washed, and dried (at $\geq 80^\circ$).

E. J. B.

Preparation of higher alkyl esters of the carboxylic acids. D. J. LODER, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,999,976, 30.4.35. Appl., 25.5.33).—Carboxylic acid esters, RCO_2R' , where R is an alkyl, aryl, or aralkyl group and R' is an alkyl group, *e.g.*, MeOAc, are halogenated, the halogenoalkyl ester obtained is condensed with an olefine, *e.g.*, C_2H_4 , at 0—250° (100°)/1—100 (50) atm. in presence of a catalyst, *e.g.*, $AlCl_3$, BF_3 , and the higher halogenoalkyl ester thus obtained is dehalogenated, preferably with H_2 at 150—350°/100—4000 lb. per sq. in.

A. W. B.

Conversion of carbon monoxide into formic acid and its aluminium, chromium, and iron salts. C. AMMON (B.P. 438,796, 18.5.34).— HCO_2Et is prepared by treatment of EtOH containing NaOEt with CO under pressure, and this is hydrolysed by H_2O under pressure in a rectifying column or with $Al(OH)_3$, $Fe(OH)_3$, or $Cr(OH)_3$.

A. R. P.

[Manufacture of] acetic acid [from propylene]. E. C. BRITTON, H. S. NUTTING, and M. E. HUSCHER, Assrs. to Dow Chem. Co. (U.S.P. 2,000,878, 7.5.35. Appl., 6.12.33).— $CHMe:CH_2$ is heated at 300—420° (350—390°)/ >1 atm. for 1—10 hr. with an aq. solution of an alkali hydroxide (I), *e.g.*, KOH, in presence of a basic Al compound, *e.g.*, Al_2O_3 , aluminate, in about 3% of the mol. equiv. of (I). Alkali acetate is formed in about 30% yield of theory; thus $C_3H_6 + KOH + H_2O \rightarrow KOAc + CH_4 + H_2$.

A. W. B.

Manufacture of alkoxyacetaldehydes and alkoxyacetic acids. C. J. MALM, G. F. NADEAU, and N. F. DIESEL, Assrs. to EASTMAN KODAK Co. (U.S.P. 2,000,604, 7.5.35. Appl., 18.9.33).—Lower monoalkyl ethers, *e.g.*, Me, Et, Pr, of $C_2H_4(OH)_2$ are oxidised, *e.g.*, with O_2 , air, or ozonised air, in presence of an activated metal catalyst, *e.g.*, Ag, Cu, Cu alloys, Fe—Mo alloys, in the vapour phase and, preferably, in presence of 10% of H_2O , to form alkoxyaldehydes. Further oxidation, in the liquid phase at 50—70°/1—3 atm. in presence of about 1% of a sol. Mn, Cl, or Co salt, yields the corresponding acid.

A. W. B.

Manufacture of [aliphatic] carboxylic acid. W. E. VAIL, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,000,053, 7.5.35. Appl., 24.8.31).—An olefine, *e.g.*, C_2H_4 or gaseous products from cracked petroleum, mixed with CO and steam, is passed at 200—500° (275—375°)/25—900 atm. over an alkali or alkaline-earth fatty acid salt, alkoxide, carbonate, or hydroxide to produce chiefly $EtCO_2H$.

A. W. B.

Preparation of lead alkyls. F. B. DOWNING and L. S. BAKE, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,000,069, 7.5.35. Appl., 24.5.32).—Pb alloys containing Na 10 and Mg 0.05—1.0% are claimed for use in the manufacture of Pb alkyls, *e.g.*, $PbEt_4$. The Mg is said to eliminate agglomeration of Pb in the distillation and to give higher yields.

A. W. B.

Preparation of amines. H. T. BÖHME A.-G. (B.P. 443,863, 15.1.35. Ger., 17.3.34).—The manufacture of *N*-alkyl-arylamines and -aralkylamines by evolution of CO_2 from α -arylamino- and α -aralkylamino-fatty acids of $> C_9$ by heating them, finally to about 280°, in inert solvents of high b.p., *e.g.*, paraffin oil, is claimed to give markedly higher yields than the process of B.P. 7404/10 (B., 1911, 16). *E.g.*, α -anilino-stearic acid yields $CO_2 + NHPPh-C_{17}H_{35}$ almost quantitatively.

A. W. B.

Manufacture of substituted aromatic amino-compounds. I. G. FARBENIND. A.-G. (B.P. 442,869, 15.8.34. Addn. to B.P. 439,295; B., 1936, 139).—An azo dye of the type *o*-halogenoaniline \rightarrow a phenol or naphthol is heated with a salt of a sulphinic acid, whereby replacement of the *o*-halogen occurs, and the product is then reduced. *E.g.*, $o-NH_2 \cdot C_6H_4Cl \rightarrow o-OH \cdot C_6H_4 \cdot CO_2H$ is heated with $PhSO_2Na$ in H_2O (+ Cu powder) at 155°; the product, $o-NH_2 \cdot C_6H_4 \cdot SO_2Ph \rightarrow o-OH \cdot C_6H_4 \cdot CO_2H$, gives on reduction 2- $NH_2 \cdot C_6H_4 \cdot SO_2Ph$, m.p. 120—121°. Other examples describe the prep. of: *phenyl*-, m.p. 116—117°, *benzyl*-, m.p. 159—160°, and *p*-*tolyl*-2-*amino*-*m*-*tolyl*sulphone, m.p. 117—118°; 4:4', m.p. 125°, and 5:4'-*dichloro*-2-*aminodiphenyl*-, m.p. 138—140°, *p*-*chloro*-*phenyl*-5-*chloro*-2-*amino*-*m*-*tolyl*-, m.p. 127—128°, 2-*amino*-5-*methoxyphenylethyl*-, and *o*-aminophenylmethylsulphone, m.p. 88—89°, and 2:6-*bismethylsulphonylaniline*-, m.p. 155—157°.

H. A. P.

[Preparation of] hydrazo compounds and inversion thereof [to benzidines]. W. S. CALCOTT, F. B. DOWNING, and N. C. SOMERS, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,998,488, 23.4.35. Appl., 28.6.30).—The reduction (Zn—NaOH) of aromatic NO_2 - to hydrazo compounds is carried out in presence of a protective colloid (soap) and of sufficient H_2O to keep the products in suspension. The resulting hydrazo compound is relatively stable to O_2 and is rapidly isomerised by addition to aq. acid.

H. A. P.

Precipitation of metal halide additive compounds of diazonium halides. L. H. FLETT, Assr. to NAT. ANILINE & CHEM. Co., INC. (U.S.P. 1,999,723, 30.4.35. Appl., 28.9.33).—Double salts of diazonium and heavy-metal (*e.g.*, Zn, Zn + Sn^{IV}) halides are pptd. from the reaction mixture by a halide of Mg, Sr, or Ca ($MgCl_2$).

H. A. P.

Preparation of organic disulphides. WINGFOOT CORP. (B.P. 442,954, 19.9.34. U.S., 23.11.33).—Mercaptobenzthiazole, or its NO_2 -, NH_2 -, or alkyl derivatives, or their alkali or alkaline-earth salts, are oxidised with H_2O_2 [and an inorg. acid (H_2SO_4)] in solution or suspension in a non-aq. medium (EtOH).

H. A. P.

Preparation of benzyl esters of halogenated *o*-benzoylbenzoic acids. F. A. CANON and A. ZIMMERLI, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,998,489, 23.4.35. Appl., 27.5.31).—The CH_2Ph esters of *o*- $COPh \cdot C_6H_4 \cdot CO_2H$, m.p. 64°, and its *p*-Cl-derivative,

m.p. 82—83°, are prepared by heating the appropriate acid with excess of $\text{CH}_2\text{Ph}\cdot\text{OH}$ and allowing the H_2O to distil off as formed. H. A. P.

Manufacture of chloropyrenequinones. Soc. CHEM. IND. IN BASLE (B.P. 443,408, 8.7.35. Switz., 7.7.34 and 8.6.35).—Pyrenequinone, in a solvent or suspension medium, e.g., C_6H_6 , AcOH , PhNO_2 , ClSO_3H , is treated with Cl_2 or SO_2Cl_2 at 130—190° in presence, if desired, of I. Three types of tetrachloropyrenequinone, m.p. 338°, 362°, and 350°, are obtained and reference is made to the Cl_1 , Cl_2 , and Cl_3 -compounds. A. W. B.

Preparation of (A) [di]benzanthronyl, (B) mixed benzanthrone-anthraquinone, (C) [di]anthraquinonyl, and (D) benzanthrone, selenoethers. M. A. PERKINS, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,999,996—9, [A—D] 30.4.35. Appl., 20.12.33).—(A) 1:1'-Dibenzanthronyl diselenide (I) or 1-benzanthronylselenol (II) or its alkali-metal derivatives, or their substitution products, are heated in a solvent (containing an acid binding agent) at > 170° (185—205°). E.g., (I) is heated in paraffin at 185—190°, or the Na salt of (II) at the b.p. in PhNO_2 . (B—D). An appropriate halogen derivative is heated (in a solvent of high b.p.) with the appropriate Se H (or its alkali salt) or Se_2 derivative. Unless an alkali salt is used an acid-binding agent is also present. Cu may be used as catalyst. E.g., (B) 1-chloroanthraquinone (IV) is heated with (I) and NaOAc in boiling C_{10}H_8 to give 1-anthraquinonyl 1'-benzanthronyl selenide. Other examples describe selenoethers from (I) and 2-bromo-, 1-chloro-2-amino-, 6-chloro-1-amino-, and 2-bromo-1-amino-anthraquinone. (C) 1:1'-Dianthraquinonyl diselenide, (IV), and Cu in C_{10}H_8 at 220—225° give 1:1'-dianthraquinonyl selenide; similarly, 2-anthraquinonylselenol and 1-chloro-4-benzamido-anthraquinone give 4-benzamido-1:2'-dianthraquinonyl selenide. 2:2'-Dimethyl-1:1', 5:5'-diamino-2:2', and 5'-benzamido-2-methyl-1:2'-dianthraquinonyl selenide are also described. (D) The prep. of 1:1'-dibenzanthronyl selenide, m.p. 336—337°, and its 9-Br-, 2-NHAc-, 2-Cl-, 9-NH₂-, and an x-NH₂-derivative are described.

H. A. P.

Readily water-soluble dry alginate. R. J. WIG, Assr. to KELCO Co. (U.S.P. 2,000,807, 7.5.35. Appl., 7.7.33).—Na alginate is mixed with a H_2O -sol. sugar (I), e.g., sucrose, so that the dried product (II), usually containing 15% of H_2O , contains 15—60% of (I). (II), when ground, is readily H_2O -sol. A. W. B.

S compounds from gases. Phenols from tars. Separating naphthenic acids and phenols.—See II. Dielectrics.—See XI.

IV.—DYESTUFFS.

Azoic dyes from the dyestuff manufacturer's viewpoint. H. BLACKSHAW (J. Soc. Dyers and Col., 1936, 52, 9—10; cf. B., 1935, 541). A. F. WILLIAMS (Ibid., 10—11).—Short general accounts are given of recent progress in the manufacture of such dyes and in their application. S. M. N.

Metalliferous dyes. J. L. BOYLE (Dyer, 1936, 75, 401—402).—Developments in the manufacture of complex derivatives of dyes with metals (e.g., Cu, Ni, Cr) which constitute the fast-to-light and washing Neolan

(C.A.C.) and Palatine (I.G.) ranges of wool dyes and the Chlorantine (C.A.C.) cotton dyes are traced during the past 50 years. In applying metalliferous dyes (I) to wool it is necessary to complete the dyeing process by adding 4% (on the wool) of H_2SO_4 to the dyebath and continue boiling for 1.5 hr. Dye vessels resistant to the high acid concn. of the dye liquor are made with austenitic steel containing Mo. (I) give clear discharges with $\text{Na}_2\text{S}_2\text{O}_4$, especially the blue dyes; they have less affinity for silk than for wool, but dye evenly unequal qualities of viscose rayon. A. J. H.

Dyes in photography.—See XXI.

PATENTS.

[Preparation of] triarylmethane dyes. IMPERIAL CHEM. INDUSTRIES, LTD., F. W. LINCH, and H. H. STOCKS (B.P. 443,104, 16.8. and 28.12.34).—A *p*-aminophenyl β -hydroxy-, -methoxy-, or -ethoxy-ethyl ether is caused to interact with a CHPh_3 dye derived from PhCHO in which the *p*-position is substituted by a replaceable group (SO_3H , Cl , NO_2 ; cf. B.P. 237,096; B., 1925, 876). E.g., Light Green SF is heated with *p*-aminophenyl β -ethoxyethyl ether (I) in presence of a little aq. HCl; the product is a blue wool dye having good light-fastness. Other examples describe the interaction of the dye from *p*- $\text{C}_6\text{H}_4\text{Cl}\cdot\text{CHO}$ (II) and sulphobenzylethylaniline with (I), and *p*-aminophenyl β -methoxy-, b.p. 125—130°/8 mm., and β -hydroxy-ethyl ether, m.p. 73—74°, and of the dye from (II) and *m*-toluidinesulphonic acid with (I). *p*-Nitrophenyl β -ethoxyethyl ether has m.p. 71—72°.

H. A. P.

Manufacture of [anthraquinone] vat dyes. COUTTS & Co., and F. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 442,949, 29.8.34).—The 2- and 4-hydroxy-*m*-toluoyl derivatives of 1-aminoanthraquinone, made by direct condensation, are green-yellow dyes of good fastness to steam, washing, and light. H. A. P.

Manufacture of indigoid dyes. Soc. CHEM. IND. IN BASLE (B.P. 443,275, 10.4.35. Switz., 20.4.34).—A 7-halogeno- or 5:7-dihalogeno-4-alkylindoxyl is oxidised, or it or the corresponding isatin or reactive α -derivative is condensed with an indigoid dye component. The products may (optionally) be halogenated. E.g., 5:7-dichloro-4-methylisatin α -chloride is condensed with 2-hydroxy- (red-blue) or 5-chloro-2-hydroxy-3-methylthionaphthen (violet), or 4-methoxy- α -naphthol (blue); 7-chloro-4-methylisatin α -chloride (I) is condensed with 4-chloro- α -naphthol (II); or chlorinated (I) (SO_2Cl_2 in PhCl) is condensed with (II) (both blue); 5:7-dichloro-4-methylindoxyl is air-oxidised (blue); or 5:7-dichloro-4-methylisatin is condensed with 2:1-naphthathioindoxyl in AcOH (brown). H. A. P.

Colour lake.—See XIII.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Relation between inner fine structure of hairs and their mechanical properties. Suitable X-ray diagram for determining the degree of parallelism of the crystallites in fibres. Y. GO and T. KUBO (J. Cellulose Inst., Tokyo, 1936, 12, 79—80).—It is recommended to roll the photographic film into a cylinder with the incident X-ray beam as axis. A. G.

Micro-determination of cotton-fibre maturity in polarised light. E. R. SCHWARZ and G. H. HOTTE (Rayon & Melland Text. Month., 1935, 16, 343—345).—Fuller details are given of the method described previously (cf. B., 1935, 843), and its theoretical basis is further supported (cf. *loc. cit.*). A. J. H.

Preservation of fishing nets by treatment with copper soaps and other substances. III. W. R. G. ATKINS (J. Marine Biol. Assoc., 1936, 20, 627—641; cf. B., 1930, 366).—Olie's method (cutch and ammoniacal CuSO_4 , preferably applied every 4 months) preserves cotton netting for long periods and is preferable to cutch alone (frequent application of which is injurious) or cutch + $\text{K}_2\text{Cr}_2\text{O}_7$. Cotton treated with cutch alone is improved by dipping in neutral tar oil from the "Coalite" process. The best Cu soap for preserving is Cu naphthenate (Cuprinol), but all are improved by addition of tar, C_6H_6 , petrol, or "oil A" from Coalite being used as solvent. Bolting silk plankton nets are also best preserved by treatment with a dil. solution of Cu naphthenate and tar in petrol, but Cu oleate or resinate, without or with very little tar, can also be used. Cotton and flax fishing lines can be similarly preserved. The preserving effects of Cu and Zn soaps can be compared by testing the salt or fresh H_2O in which the samples have been immersed with $\text{NaCS}_2\cdot\text{N}(\text{Et})_2$. J. W. S.

Preservation of fibre ropes for use in sea-water. W. R. G. ATKINS and J. PURSER (J. Marine Biol. Assoc., 1936, 20, 643—654).—Manila rope was maintained at >70% of its initial strength after 10½ months' immersion in sea- H_2O when treated with green Cuprinol containing tar, 10% of Cu oleate in light coal tar, 10% of Cu resinate in Coalite heavy oil or creosote oil, or 10% of Cu oleate with 20% of coal tar in Coalite neutral oil, whereas the untreated samples had only 13% of their initial strength. Cu resinate (10%) in light coal tar or Coalite tar maintained the strength of 2-in. sisal rope at 80—97% of its initial val. after 1 year's immersion. Used alone, coal tars are superior to wood tars, but all are improved by addition of 10% of Cu oleate or resinate. J. W. S.

Manufacture of artificial wool in Italy and its effect on the dairy industry. G. RAY (Lait, 1936, 16, 148—152).—The manufacture (Ferretti process), properties, and uses of casein-wool are outlined. The economic effect of this new use of casein on the Italian dairy industry is discussed. W. L. D.

Moisture and mildew on textiles. ANON. (Text. Manuf., 1935, 60, 180—181).—Deliquescent substances, e.g., glycerol, MgCl_2 , KCl, NaCl, favour mildew formation. CH. ABS. (p)

Textile viscometry. ANON. (Text. Colorist, 1936, 58, 227—231, 282).—Apparatus for measuring the viscosity of cuprammonium solutions of cotton and other cellulosic fibres are described, and the interpretation of the results obtained is discussed. A. J. H.

Micellar structure as related to cellulose. J. W. McBAIN and D. A. SCOTT (Ind. Eng. Chem., 1936, 28, 470—473).—The relation of micellar structure and association to η is discussed. From the marked changes in the val. of η for nitrocellulose brought about by changes in solvent, concn., and temp., as well as the increase in η

which can be obtained by simple physical treatment, it may be concluded that cellulose derivatives form association colloids comparable with the micelles in soap solutions. Staudinger's η method for the determination of mol. wts. does not allow for the effect of a tendency to association. M. S. B.

Preparation of cellulose by the nitric acid decomposition process. III. Decomposition of rice straw with dilute nitric acid (2). I. SCHIMODA (J. Cellulose Inst., Tokyo, 1936, 12, 71—75).—A suitable after-treatment for rice straw which has been decomposed by boiling for 1 hr. with 2% HNO_3 is digestion at 100° with 10 times its wt. of 1% aq. NaOH; the yield of cellulose is 32% of the straw. The gas evolved during the HNO_3 treatment consists of HCN, CO, NO, and CO_2 . (Cf. B., 1936, 448.) A. G.

Utilisation of bagasse. VI. Physical properties of Celotex (4). Ignition point. H. KATO (J. Cellulose Inst., Tokyo, 1936, 12, 76—78).—The ignition points of four samples were 203 — 222° . A. G.

Chemical nature of lignin. W. M. FUCHS (Paper Trade J., 1936, 102, TAPPI Sect., 181—184).—Recent advances are reviewed, and changes in lignin structure which occur during the various pulp-making processes are briefly discussed. H. A. H.

Current trends in sulphite[pulp] digester operation. R. T. STEEDMAN (Pulp & Paper Mag. Canada, 1936, 37, 192—194).—The possibility of investigating the advantages of new developments in sulphite digester equipment from a consideration of the reacting quantities is outlined. The influence of ideal conditions such as uniform feed and size of wood chips on the functioning of auxiliary digester equipment is discussed. H. A. H.

Rôle of base in sulphite pulping. C. R. MITCHELL and F. H. YORSTON (Pulp & Paper Mag. Canada, 1936, 37, 195—198, 209).—The quantity of CaO required in sulphite cooking liquors is determined by the S consumption, which, it is suggested, is approx. = the amount of S present in the liquor as $\text{Ca}(\text{HSO}_3)_2$. The quantity of S theoretically necessary for sulphonation of the lignin to a degree sufficient for cooking is much < the actual consumption. A distinction is made between the quantity of CaO supplied in the cooking liquor relative to the quantity of wood, and the [CaO] in the liquor. By cooking at const. concns. of total and of combined SO_2 it is shown that, at a given total [SO_2] the rate of cooking and the rate at which carbohydrates are dissolved vary with variations in the concn. of combined SO_2 . The yield of pulp, and possibly its strength also, are determined by the relative rates of these two processes and not by either alone. Owing to the maintenance of const. concns. of total and combined SO_2 , these conclusions are not directly applicable to mill conditions. H. A. H.

Control of sulphur consumption in the manufacture of sulphite pulp. C. B. DAVIES (Pulp & Paper Mag. Canada, 1936, 37, 140—148).—By the use of a new type of SO_2 recorder (described), a considerable economy of S in the digestion of sulphite pulp is claimed. Examples of its application, especially in the control of digester relief gases, are given. H. A. H.

Relation between the chemical and physical characteristics of representative types of pulp. G. H. MCGREGOR (Paper Trade J., 1936, 102, TAPPI Sect., 155—167).—Three types of papermaking pulps (first-quality rag, spruce α -pulp, and bleached Mitscherlich sulphite) have been degraded by acid (2% H_2SO_4), bleach liquor [$Ca(OCl)_2$, 5 g. of Cl per litre], and heat (105°), and tested by chemical methods [cuprammonium viscosity (η), α -cellulose content (α), and Cu no.], and for physical strength [burst (B), tear (T), tensile (S), and fold (F)]. Degradation was allowed to proceed until a certain η was reached with each pulp, and the chemical constns. and physical properties of laboratory sheets were then determined. Decrease in η , caused by acid, bleach, or heat, is accompanied by an increase in Cu no., and a decrease in α , B , T , S , and F . There appears to be a definite relation between η and F , irrespective of the method of pulp manufacture, but this relation does not exist for other kinds of physical strength. Similarly, there is no correlation between α or Cu no. and strength. The effect of the degrading medium on strength is in the decreasing order: heat, bleach, acid. H. A. H.

Heavy chemicals in the paper industry. H. RAWLINSON (Proc. Tech. Sect. Paper Makers' Assoc., 1936, 16, 483—493).—A survey. H. A. H.

Fastness to light of coloured papers. ANON. (Paper-Maker, 1936, 91, TS 54—61, 64).—A Committee report. Seven possible methods of preparing a range of standard fadings are discussed. Statistical data based on gradings of 45 paper samples by 120 observers, by comparison with the Soc. of Dyers and Colourists blue-wool standards, indicate that wide disagreement occurs when the faded patterns are judged visually without optical aids, but that agreement becomes much more close when a viewing box is employed. The other methods include measurement of loss of fluorescence, the prep. of paper standards dyed with mixtures of colouring materials of different fastness (limited to yellow), the prep. of paper standards by dyeing to different depths of shade, and the use of hexadecylpyridinium bromide to afford a range of fastness standards from a single dyestuff and fibrous furnish. The most promising method involves the use of a fugitive coloured paper of specified characteristics, in conjunction with a wedge, made either from glass or from suitable paper, which is capable of transmitting a range of light intensities. The degree of contrast between faded and unfaded portions of the sample has been adopted as a measure of light-fastness throughout this work. Such contrast, it is believed, meets the greatest range of paper-trade requirements, but a no. of difficulties inherent in this conception of fastness are pointed out. A brief survey of modern fading lamps is given. H. A. H.

Factors affecting the production of insulation board. Development of the commercial production of refrigeration board and press board. T. R. NAFFZIGER (Iowa State Coll. J. Sci., 1934, 9, 183—185).—Analyses and physical properties of commercial boards are recorded. Maize pith makes better refrigeration board than does the whole stalk. A method of manufacture is described. CH. ABS. (p)

China clay.—See VIII.

PATENTS.

Manufacture of films and foils from cellulose esters and ethers by the dry-spinning process. E. BERL (B.P. 442,515, 6.7.34).—A solution of the cellulose derivative in a volatile solvent is extruded through a slit in any desired direction and is solidified while freely suspended by hot gas containing any desired concn. of solvent vapour. Further transport is then carried out by rollers. [Stat. ref.] F. R. E.

Drying [of artificial thread]. J. BRUGGEMAN. ASSR. to DU PONT RAYON Co. (U.S.P. 1,999,585, 30.4.35. Appl., 20.4.31. Belg., 9.5.30).—To ensure uniform shrinkage, the inner windings are dried at a greater rate than the outer (O) by passing a heated gas through the core of the package while (1) enclosing it in a shaped casing with which its O are kept in contact during shrinkage, or (2) impregnating the O with a hygroscopic substance or with moisture. F. R. E.

Preparation of fibrous material. E. OLSSON (U.S.P. 2,006,559, 2.7.35. Appl., 6.11.33).—Pulp is blown from a digester, through a grinder, and into a receiving chamber. B. M. V.

Manufacture of cellulose derivatives. BRIT. CELANESE, LTD. (B.P. 444,935, 20.7.35. U.S., 20.7.34. Addn. to B.P. 357,781; B., 1931, 1135).—Cellulose acetates of normal or high η are separated into fractions of different solubility characteristics by extraction with aq. $COMe_2$ (> 20 or $> 40\%$ of H_2O). F. R. E.

Production of artificial cellulosic products containing nitrogen. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 444,626, 20.8.34. Ger., 19.8.33).—A nitrogenous extract obtained by treating hair, wool, or horn with non-aq. alkali ($EtOH-NaOH$), together with a little $EtOH$, glycerin, or phenol, is added to the cellulose solution before or after sulphidising. F. R. E.

Manufacture of thin sheets of cellulose. F. A. PARKHURST and G. J. ESSELEN, ASSRS. to FIBERLOID CORP. (U.S.P. 2,002,711, 28.5.35. Appl., 2.5.32).—After stretching a web of cellulose ester plastic both longitudinally and transversely, sufficient solvent is removed to give the necessary tensile strength and the web is calendered while subjected to a second longitudinal stretching; finally the desired amount of residual solvent is removed. F. R. E.

Building slabs. Materials simulating wood.—See IX. **Rubber thread.**—See XIV. **Food wrappings.**—See XIX.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Azoic dyes and bleaching. W. KERSHAW (J. Soc. Dyers and Col., 1936, 52, 9).—Yarn should be properly soaped off and cleared. In kiering, low temp. should be used, and Na_2CO_3 is generally safer in use than $NaOH$. Marking off may occur either in kiering or in peroxide bleaching. S. M. N.

Theory of dyeing animal fibres. A. PORAI-KOSCHITZ (J. Soc. Dyers and Col., 1936, 52, 19).—Additional evidence is adduced in support of the author's view that definite salts are formed in the dyeing of animal fibres in the acid and substantive dyes; reference

is made to his work (B., 1934, 571) on the interaction between NH_4Cl and wool. S. M. N.

Azoic dyes in cotton dyeing. E. B. ADAMS (J. Soc. Dyers and Col., 1936, 52, 5—6).—Azoic dyes are suitable for heavy shades fast to washing, but suffer from such defects as the difficulty of matching and stripping, rubbing off, "blinding" of mercerised yarns, the unsatisfactory nature of dark blues. S. M. N.

Dyeing and finishing of cotton fleecy fabrics. ANON. (Text. Recorder, 1936, 53, April, 45—47).—Methods and machinery used for scouring, bleaching, dyeing, and raising cotton fabric so as to give it a wool-like handle are described. Raising is facilitated by first impregnating the fabric with softening agents, e.g., soap. A. J. H.

Dyeing and finishing of lace fabrics. G. RICE (Text. Colorist, 1936, 58, 242—243).—Practical methods are described. A spider type of dyeing machine is used. A. J. H.

Azoic dyes on silk. C. M. KEYWORTH (J. Soc. Dyers and Col., 1936, 52, 7).—The alkalinity of Naphthol baths must be carefully controlled. Side-reactions, such as diazotisation of NH_2 -groups in the silk, are troublesome. Difficulties are such that azoic dyes are not commonly used on silk. S. M. N.

[Removal of] chafe marks in dyed silk fabrics. ANON. (Text. Recorder, 1936, 53, April, 60).—The chafed parts are rubbed with a pad soaked in olive oil, and then smoothed with a clean pad. A. J. H.

Dyeing and finishing of pocketing [fabrics]. A. DEMPSTER (Text. Colorist, 1936, 58, 246—247).—Twill, satin-top, and Wigan pocketing fabrics are rope-bleached, coloured by padding methods, and calendered or beetle-finished. Typical colouring and "filling" recipes are given. A. J. H.

Azoic dyes on viscose rayon. C. M. WHITTAKER (J. Soc. Dyers and Col., 1936, 52, 6—7).—Various practical points are discussed. Rubbing is not serious with viscose, but marking off is a common trouble. S. M. N.

Effect of extreme cold on dye-affinity of [viscose] rayon. K. RISCH (Text. Colorist, 1936, 58, 261).—The dyeing properties of skeins of viscose rayon, as shown by dyeing with Sky Blue FF and Methylene Blue, were unaffected after (a) wetting, storage for 4 days at -20° , thawing, and drying, or (b) storage for 7 days at -80° while dry. A. J. H.

Dyeing of a developed black on acetate-rayon crêpe fabrics. E. HERZOG (Rayon & Melliand Text. Month., 1935, 16, 437, 457).—Dyeing procedure is described for applying simultaneously to the two fibres dyes which can be both diazotised and developed with β -hydroxynaphthoic acid. Brownish-black shades arise from incomplete diazotisation, or over-development, or development in a bath which is too alkaline. A. J. H.

Boil-off, dyeing, and finishing of acetate-rayon and acetate-silk crêpes. E. HERZOG (Rayon & Melliand Text. Month., 1935, 16, 341—342, 350).—Practical methods are described for preparing the fabric for boiling-off, and boiling-off (crêping in a hot soap liquor). Even crêping is ensured by pre-embossing

the fabric with a suitable all-over design. Crêping by a continuous method is described, and the usual methods in which the fabric is hung in hank or book form in a soap liquor are outlined. A. J. H.

Dyeing of wood. K. S. COURSER (Text. Colorist, 1936, 58, 268—270).—Basic, direct, and acid dyes (suitable dyes are listed) are mainly used, good penetration being obtained by applying the dye liquor under 70—80 atm. pressure to the ends of the (fully-seasoned) logs so that it travels along the capillaries. Logwood is chiefly used for black shades. Pre-bleaching of the wood (necessary for dyeing bright shades) is effected with $\text{Na}_2\text{S}_2\text{O}_4$, Na_2O_2 , or KMnO_4 followed by NaHSO_3 . A. J. H.

Azoic colours in calico printing. R. J. HANNAY (J. Soc. Dyers and Col., 1936, 52, 7—8).—Various recent developments, by which practical difficulties have been overcome, are described. The stabilisation of diazo salts is discussed. The Rapidogen and Rapid-azol colours are valuable in printing. Pale shades are not satisfactory. S. M. N.

Production of fur imitations on plush. F. S. VERDLANT (Text. Colorist, 1936, 58, 235—237).—Plush fabrics, mainly those having a pile surface of mohair, cross-bred worsted, alpaca, camel hair, and real silk with a cotton backing, are stencil-printed with acid dyes so as to obtain especially uniform gradation of colour [this is attained by using the dyes in an alkaline medium, or by adding K alum, SnCl_4 , or Na_2WO_4 to the printing paste to retard fixation of the dyes] and then steamed. Certain brown shades are enriched by overprinting with an Fe-logwood black, or can be obtained by means of KMnO_4 (especially with mohair and alpaca plush). Typical printing recipes are given. A. J. H.

Souring of desizing liquors. G. RORDORF (Text. Manuf., 1935, 61, 161, 167).—The $[\text{H}^+]$ of the desizing liquid remains at p_{H} 6.6—6.8 if Vival-S is used. Replenishment becomes unnecessary. CH. ABS. (p)

Azoic dyes.—See IV. Wetting of aq. solutions.—See XII.

PATENTS.

[Manufacture of] bleaching agents and the like. W. J. TENNANT. From HENKEL & Co. G.M.B.H. (B.P. 438,063, 31.5.34. Addn. to B.P. 435,861; B., 1936, 285).—The Mg silicate of the prior patent is replaced by sparingly sol. or insol. silicates of the alkaline earths, Zn, or Cd. H. A. P.

Laundry sour composition. A. B. GERBER, ASST. to SWANN RES., INC. (U.S.P. 1,989,312, 29.1.35. Appl., 27.5.33).—Adsorbed alkali and soap are removed from washed fabrics by immersion in a solution containing NaHF_2 (50), $(\text{NH}_4)_2\text{SiF}_6$ (30), and $\text{NH}_4\text{H}_2\text{PO}_4$ (20 g. per litre). A. R. P.

Thickening agents. KAMMGARNSPINNEREI STÖHR & Co. A.-G. (B.P. 443,365, 26.7.34. Ger., 5.8.33).—Mixtures of a hydrophile H_2O -insol. substance, e.g., cetyl alcohol, with a H_2O -sol. emulsifying agent, e.g., a soap or higher alkyl sulphate, to which a hydrophobe substance, e.g., higher paraffins, waxes, may also be added

are claimed as non-adhesive thickening agents for addition to printing compositions. A. W. B.

Compositions for setting animal fibres such as wool or hair. IMPERIAL CHEM. INDUSTRIES, LTD., H. A. PIGGOTT, and J. B. SPEAKMAN (B.P. 443,359, 20.6.34).—Treatment of animal fibres with an aq. (6%) solution of an inorg. salt of H_2SO_3 , a salt of the H_2SO_4 ester of a higher fatty alcohol (wetting and/or cleaning agents), and, if desired, other agents, *e.g.*, borax, soap, fuller's earth, or H_2O -sol. neutral org. compounds, *e.g.*, urea, sucrose, improves the setting properties and lustre. *E.g.*, worsted is steeped for 20 min. at 60° in a solution of 5 lb. of a mixture of Na cetylsulphate 50, Na_2SO_3 40, borax 40 pts. by wt., in 100 gals. of H_2O . E. J. B.

Manufacture of waterproof textile material. G. COGNO (B.P. 443,207, 22.5.34. Italy, 23.5.33).—Textiles are coated on one or both sides with a (rubber) waterproofing composition, and a portion of the nap, with the colour and pattern, of an auxiliary fabric is transferred to the coating(s) by contact under pressure for a suitable time. The transfer material is removed before or after vulcanisation, and the transferred nap forms a fibrous coating. E. J. B.

Rubber-fabric material. R. F. MCKAY. From INTERNAT. LATEX PROCESSES, LTD. (B.P. 438,758, 5.1.35).—The fabric is given a thin ground-coat of NH_3 -dispersed latex containing NaOH or Na_2S and vulcanising agents and accelerators; then a skin-coat of similar material, but containing little or no fixed alkali, is applied and the two layers are vulcanised together. A. R. P.

Condensation products. See III. **Depositing metals on threads.**—See X.

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

Sulphuric acid from hydrogen sulphide. ANON. (Ind. Chem., 1936, 12, 167—169).—A plant for the production of 89—90% H_2SO_4 is described with costs and illustrations. $H_2S + O_2$, *e.g.*, in the exit gas from an $(NH_4)_2SO_4$ saturator, are passed through a pebble filter to prevent striking back and burned, and the products passed through a V catalyst bed at 350 — 400° , the temp. being maintained by air-cooling. The H_2SO_4 is condensed by fractional cooling. The effluent gas contains 0.1% of SO_2 . D. K. M.

Anhydrous sodium sulphate from saline deposits or brines by a four-stage process. J. E. CONLEY and E. P. PARTRIDGE (U.S. Bur. Mines, Mar., 1936, Rept. Invest. 3299, 18 pp.).—The conditions for an evaporation process for the production of anhyd. Na_2SO_4 from NaCl and $MgSO_4$ have been determined. By recycling the mother-liquors, recovery of SO_4^{--} (80%) and Na (87%) is shown to be theoretically possible. $MgSO_4 \cdot 7H_2O$ or its aq. solution is added to the mother-liquors, and crystal crops are recycled from subsequent stages; by evaporation at 75° crystals of $Na_2SO_4 \cdot MgSO_4 \cdot 4H_2O$ are obtained. These are added to the mother-liquors from the crystallisation of Na_2SO_4 and evaporated at 107 — 108° , yielding $3Na_2SO_4 \cdot MgSO_4$.

After dissolving in H_2O and adding the requisite amount of NaCl, agitation at 55° causes deposition of Na_2SO_4 . The modifications necessary for crystallising $Na_2SO_4 \cdot MgSO_4 \cdot H_2O$ in presence of K_2SO_4 were investigated. C. R. H.

Occurrence of selenium in natural phosphates, superphosphates, and phosphoric acid. L. F. RADER, JUN., and W. L. HILL (J. Agric. Res., 1935, 51, 1071—1083).—Analyses of many samples are recorded. Data indicate that org. matter and, to a less extent, inorg. sulphides are carriers of Se in phosphatic rock. The Se contents of primary deposits are $>$ those of secondary deposits, highest vals. occurring in Permian and Cretaceous samples. The Se in phosphate deposits is of the same order as that in other sedimentary deposits of the same region. A. G. P.

Mineral wool from wollastonite. J. T. THORNDYKE (Min. & Met., 1936, 17, 133—135).—A snow-white, long-fibred mineral wool can readily be obtained by melting wollastonite in an arc furnace and blowing a stream of the molten material with air or steam. The product finds extensive use as a heat insulator in commercial and domestic appliances. A. R. P.

Colorimetric determination of atmospheric carbon dioxide. Y. KAUKO and T. YLI-UOTILA (Suomen Kem., 1936, 9, B, 3—4).—Air is bubbled through 0.1N-KCl + 0.0002N- $NaHCO_3$ containing bromothymol-blue, and the p_H of the solution compared colorimetrically with standard KH_2PO_4 -borax buffers. The CO_2 is calc. from the equilibrium p_H of the solution. By passing the air over, *e.g.*, heated CuO, the method may be applied to the determination of org. vapours (*e.g.*, poison gases) in air. J. S. A.

Catalytic preparation of sulphuryl chloride. M. TARLÉ *et al.* (Bull. Mukden Arsenal, No. 8, 9 pp.).—The combination of SO_2 and Cl_2 in presence of active C is examined. The catalytic activity of C gradually declines through poisoning by HCl, H_2SO_4 , etc. CH. ABS. (p)

Heavy chemicals in paper industry.—See V. **Lithopone.**—See XIII. **Determining Mg in fertilisers.**—See XVI.

PATENTS.

Production of nitric acid and liquid nitrogen tetroxide. N. CARO, A. R. FRANK, R. WENDLANDT, and T. FISCHER (U.S.P. 1,989,267, 29.1.35. Appl., 5.7.29. Ger., 9.11.26).—The gases produced by catalytic oxidation of NH_3 are cooled to condense most of the H_2O and then cooled further to condense the remainder of the H_2O as HNO_3 ; the residual gases are mixed with O_2 or air and cooled below 0° to condense N_2O_4 . A. R. P.

Manufacture of phosphoric acid. I. HECHENBLEIKNER, AssT. to CHEM. CONSTRUCTION CORP. (U.S.P. 1,990,233, 5.2.35. Appl., 24.3.31).—Yellow P is burned with a regulated air supply, and the P_2O_5 produced is absorbed in a spray of H_2O , which is passed through a coke filter down which dil. H_3PO_4 trickles. L. C. M.

Manufacture of hydrocyanic acid. (A, B) E. I. DU PONT DE NEMOURS & Co., and (B) P. J. CARLISLE and A. D. MACALLUM (B.P. 441,632 and 442,737, [A]

23.7.34, [B] 13.8.34. U.S., [A] 21.7.33).—A 1:2—5:3-vol. mixture of NH_3 , CH_4 , and O_2 (or the equiv. air) is passed at 1300° through a SiO_2 tube (A) containing wood charcoal, (B) empty. A. R. P.

Manufacture of sodium carbonate. H. E. COCKSEGE, E. F. BURNS, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 443,101, 15.8.34).—Anhyd. Na_2CO_3 is prepared by boiling a suspension of $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$ in H_2O containing a salt, e.g., NaCl , which raises the b.p. of the solution and lowers the transition temp. A. R. P.

Production of water-resistant bodies consisting mainly of calcium hydroxide. MINING & INDUSTRIAL WORKS [J. D. STARCK] (B.P. 438,676, 29.8.34. Czechoslov., 12.3.34).—Moulded lumps of $\text{Ca}(\text{OH})_2$ are treated at room temp. with CO_2 and then gradually heated to 100° to expel free H_2O and produce porous pieces of $\text{Ca}(\text{OH})_2$ coated with CaCO_3 . A. R. P.

Manufacture of ammonium sulphate. I. R. WESTBROOK, Assr. to GRASSELLI CHEM. CO. (U.S.P. 1,989,124, 29.1.35. Appl., 24.3.30).—A gas mixture of SO_2 , NH_3 , moist air, and NO (from NH_3 oxidation) is passed through a reaction chamber at 20 – 50° and the resulting $(\text{NH}_4)_2\text{SO}_4$ is collected in a bag plant. A. R. P.

Manufacture of coarsely crystalline ammonium sulphate. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 440,807, 2.7.34).—Small quantities of MgSO_4 , MnSO_4 , $\text{Fe}_2(\text{SO}_4)_3$, $\text{Cr}_2(\text{SO}_4)_3$, or an org. sulphonic acid are added to the neutral $(\text{NH}_4)_2\text{SO}_4$ solution during evaporation. A. R. P.

Production of ammonium nitrate having a low weight per unit volume. I. G. FARBENIND. A.-G. (B.P. 442,980, 15.3.35. Ger., 28.3.34).—Hot conc. aq. NH_4NO_3 is atomised into a chamber the pressure in which is < 1 atm. A. R. P.

Production of crystallised ammonium nitrate with utilisation of the reaction heat for the evaporation of water. BAMAG-MEQUIN A.-G. (B.P. 441,586, 21.2.35. Ger., 24.2.34).— NH_3 and 55–65% HNO_3 are introduced in fine sprays into fused NH_4NO_3 at about 150° , the steam evolved being used to preheat the reactants. A. R. P.

Production of ammonium cyanide. G. SIEGLE & Co. G.M.B.H., and W. KÖNIG (B.P. 438,402, 10.5.34).—An intimate mixture of finely-powdered Cu , Zn , or Fe with NH_4CNS or urea is heated rapidly to 300° and then more slowly to 500° , whereby NH_2CN is volatilised and a residue of metal sulphide obtained which is reconverted into metal by roasting and reduction. (Cf. B.P. 438,358; B., 1936, 505.) A. R. P.

Manufacture of stable, highly concentrated preparations containing alkali hydrosulphides. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 441,856, 23.7.34).—Aq. NaHS , with or without Na_2S , is evaporated in a vac. pan heated by steam at 4 atm. A. R. P.

Apparatus for treatment of [alkali-containing silicate] ores. P. E. BILLINGHURST (U.S.P. 1,989,072, 29.1.35. Appl., 29.6.33).—Finely-divided K feldspar (I) is allowed to fall in a thin stream through a long, narrow,

vertical tower in which a carbonaceous fuel is burned to produce a CO-N_2 mixture at 1700 – 1900° . The K_2O content of the (I) is thus volatilised and the Al_2O_3 and SiO_2 are reduced to Al and Si nitrides suitable for use as fertilisers. Apparatus is claimed. A. R. P.

Chlorinated alkaline silicate. [Detergent.] P. LOGUE and W. N. PRITCHARD, JUN., Assrs. to SWANN RES., INC. (U.S.P. 1,989,759, 5.2.35. Appl., 22.6.31).—A mixture of water-glass and NaOH ($\text{Na}_2\text{O} : \text{SiO}_2 = 2 : 1$) with Na_3PO_4 is granulated, the granules are treated with Cl_2 until 1–6% of the gas is absorbed, and the product is finally coated with oleic acid. L. C. M.

Sodium metasilicate detergent. H. V. MOSS and F. D. SNELL, Assrs. to SWANN RES., INC. (U.S.P. 1,989,765, 5.2.35. Appl., 25.6.30).—A mixture of water-glass and NaOH is evaporated to a paste, which is mixed with Na_2CO_3 , borax, or Na_3PO_4 , granulated, and dried, and the product sprayed with 0.1% of oleic acid. L. C. M.

Manufacture of alkali titanates. TITANGES.M.B.H. (B.P. 443,155, 21.8.34. Ger., 22.8.33).—An intimate mixture of calcined TiO_2 and dry KOH or NaOH is heated at 150 – 220° . A. R. P.

Production of alkali and alkaline-earth nitrates. ATMOSPHERIC NITROGEN CORP., Asses. of H. A. BEEKHUIS, JUN. (B.P. 438,541, 13.8.34. U.S., 12.8.33).— NaCl or other chloride is heated with HNO_3 of $> 40\%$ concn. until the $[\text{HNO}_3]$ is about 7*N* and Cl_2 and NOCl cease to be evolved; the solution is neutralised with Na_2CO_3 or CaO and evaporated. A. R. P.

Production of granulated calcium nitrate. G. E. COX, Assr. to AMER. CYANAMID Co. (U.S.P. 1,989,684, 5.2.35. Appl., 27.4.32).—A dry, free-flowing product is prepared by drying and granulating a mixture of hydrated CaCN_2 (1 pt.) and $\text{Ca}(\text{NO}_3)_2$ (1–4 pts.). L. C. M.

Production of sulphates of barium and calcium. TITAN Co., INC. (B.P. 442,360, 23.9.35. U.S., 27.9.34).—Crude baryte or calcined gypsum is heated with an equal wt. of NaCl and a small quantity of petroleum coke and fluxes for the impurities; the mixture fuses at about 1050 – 1150° , producing a viscous slag containing the impurities, some BaO or CaO , and a fluid solution of BaSO_4 or CaSO_4 in molten NaCl , which is poured directly into H_2O to dissolve the NaCl and ppt. the sulphate in a finely-divided, pure white form suitable for use in pigments. A. R. P.

Preparation of beryllium oxyfluoride and metallic beryllium therefrom. G. N. KIRSEBOM, and CALLOY, LTD. (B.P. 442,601, 15.8.34).—Small pieces of beryl are introduced below the surface of molten Al to produce an Al-Si alloy and a dross containing BeO , Al_2O_3 , and Al-Si alloy; this dross is electrolysed in a bath of molten cryolite until the Al_2O_3 has been reduced to Al and the Be converted into $\text{BeOF}_2 \cdot \text{NaF}$, which is separated and electrolysed for the recovery of Be . A. R. P.

Tablets containing magnesium hydroxide. C. H. PHILLIPS CHEM. Co., Asses. of B. WALTON (B.P. 441,663, 1.3.35. U.S., 26.10.34).—Claim is made for tablets of a compressed mixture of powdered milk 75–25 and $\text{Mg}(\text{OH})_2$ (I) 25–75%, or of powdered skim milk 13,

sugar 33, and (I) 53%. The (I) and sugar may be added to liquid full cream or skim milk, and the mixture evaporated at $< 90^\circ$ to obtain a powder for pressing into tablets. A. R. P.

Production of anhydrous magnesium carbonate (magnesite). I. G. FARBENIND. A.-G. (B.P. 442,764, 27.3.35. Ger., 19.5.34).—Calcined dolomite suspended in aq. $MgCl_2$ is treated with CO_2 at $> 150^\circ$ in an autoclave, or powdered dolomite or limestone is autoclaved with aq. $MgCl_2$ at $280-330^\circ$. A. R. P.

Production of basic aluminium sulphate. BRIT. ALUMINIUM CO., LTD., and S. F. DERBYSHIRE (B.P. 442,144, 1.8.34).—Aq. $Al_2(SO_4)_3$ (3) is treated with CaO (7 mols.) and the resulting ppt. is extracted with aq. SO_2 ; on boiling the filtered solution pure $3Al_2O_3 \cdot 2SO_3$ is pptd. and the SO_2 regenerated for re-use. A. R. P.

Manufacture of polyphosphates. W. J. TENNANT. From HENKEL & Co. G.M.B.H. (B.P. 441,474, 19.6.34).—Mixtures of RH_2PO_4 and R_2HPO_4 in the desired proportions are heated at $> 300^\circ$, but at $<$ the m.p. of the desired salt, until the product dissolves readily in H_2O . A. R. P.

Treatment of glauconite. UNITED WATER SOFTENERS, LTD. (B.P. 443,010, 5.11.35. U.S., 22.1.35).—Glauconite (20–50-mesh) is treated with hot dil. H_2SO_4 in such a way as to remove the bases from the surface layers only, and, after washing free from acid, the granules are impregnated with aq. NaOH containing $NaAlO_2$ to convert the surface SiO_2 into Na aluminosilicate; the product is stabilised by digestion with cold dil. water-glass and then with aq. alum. A. R. P.

Removal of waste materials from mica and vermiculite. J. T. STROCHLKE (U.S.P. 1,989,830, 5.2.35. Appl., 15.3.34).— Fe_2O_3 , MgO , CaO , etc. are removed by leaching with aq. 0.1% KCN, with or without 2.5% AcOH. L. C. M.

Manufacture of basic copper chlorides. I. G. FARBENIND. A.-G. (B.P. 439,188, 31.5.34. Ger., 31.5.33).—A solution or suspension of Cu_2Cl_2 in aq. NaCl or $CaCl_2$ is allowed to flow down a tower packed with clean Cu scrap while a current of O_2 is passed upwards; a ppt. of $3CuO \cdot CuCl_2 \cdot xH_2O$ is obtained, x varying with the temp. [Stat. ref.] A. R. P.

(A) Treatment, (B–D) chloridising, of ore materials. (A–C) T. A. MITCHELL, (D) R. L. SESSIONS, Assrs. to HUGHES-MITCHELL PROCESSES, INC. (U.S.P. 1,979,279–81 and 1,979,287, 6.11.34. Appl., [A] 18.2.32, [B] 2.12.32, [C] 1.9.33, [D] 14.6.33. Can., [c] 8.4.32).—(A) ZnS ore is roasted to obtain ZnO containing a small proportion of ZnS, and the product is treated with dry HCl at $> 100^\circ$ but $<$ the m.p. of $ZnCl_2$, then mixed with CaO \equiv the S content, and treated with Cl_2 to convert all the S into $CaSO_4$ and the Zn into $ZnCl_2$. (B) Fe_2O_3 or roasted pyritic material is treated at $> 100^\circ$ with dry HCl in absence of air to produce dry $FeCl_3$. (C) Roasted ZnS is treated in two stages with HCl gas: in the first, at just above 100° , the ZnO is converted into $ZnCl_2$; in the second, at about 200° , the Fe_2O_3 is converted into $FeCl_3$. The charge is then heated at $300-350^\circ$ to cause the $FeCl_3$ to chlorinate the residual sulphides. (D) Sulphide ores containing readily decom-

posable silicates are roasted and heated with HCl at a temp. at which the liberated SiO_2 is dehydrated; the Zn, Pb, and Cu are then recovered by leaching. A. R. P.

Production of a fluorescent [zinc-cadmium sulphide] substance. J. D. RIEDEL-E. DE HAËN A.-G. (B.P. 440,350, 26.6.34. Ger., 22.7.33).—An intimate mixture of very pure ZnS and CdS with NaCl containing small quantities of Ag and Cu nitrates is heated at 1000° for 1.5 hr. to produce a cryst. Zn-Cd sulphide having the desired fluorescent properties. A. R. P.

Manufacture of ferric sulphate chloride containing water of crystallisation. RÖHM & HAAS A.-G. (B.P. 444,721, 8.5.35. Ger., 31.5.34).—An intimate 6:1 mol. mixture of $FeSO_4 \cdot 7H_2O$ and anhyd. $FeSO_4$ is treated with Cl_2 at $20-25^\circ/1-2$ atm. to convert it into $FeSO_4Cl \cdot 6H_2O$. A. R. P.

Production of catalysts particularly suitable for hydrogenation treatments. H. E. POTTS. From INTERNAT. HYDROGENATION PATENTS Co., LTD. (B.P. 442,573, 27.12.34).— WO_3 or MoO_3 is treated with NH_3 and H_2S at $350-370^\circ/12-15$ atm. for 20–40 hr. and the product heated to 420° and cooled in H_2 or CO_2 . Alternatively, the oxide is treated with liquid NH_3 and H_2S at 100° in a pressure vessel and the resulting $(NH_4)_2WS_4$ or $(NH_4)_2MoS_4$ is decomposed in an inert or reducing gas at 420° . The resulting sulphide is an active hydrogenation catalyst for coal or oil. A. R. P.

Production and use of new water-soluble rhodium compounds [for rhodium plating]. W. W. TRIGGS. From BAKER & Co., INC. (B.P. 438,365, 12.5.34).—Aq. $Na_3Rh(NO_2)_6$ is treated with a sol. NH_4 salt and the ppt. of $Na(NH_4)_2Rh(NO_2)_6$ (I) is collected, washed, and boiled with H_2O until red fumes cease to be evolved and the (I) has been completely converted into sol. $NH_4NaRh(OH)(NO_2)_4$. The latter is used, preferably in aq. NH_3 , as a plating bath; for solutions containing 2 g. per litre (of Rh) current at 6 volts is required to obtain a bright white deposit. A. R. P.

Purification of hydrogen peroxide solutions. E. I. DU PONT DE NEMOURS & Co., and A. T. HAWKINSON (B.P. 438,886, 14.5.34).—Colloidal aq. SnO_2 is added after adjusting the pH to 2.2–3.4, and the pptd. $Sn(OH)_4$ is filtered off. [Stat. ref.] A. R. P.

Manufacture of hydrogen peroxide. E. I. DU PONT DE NEMOURS & Co. (B.P. 442,029, 30.7.34. U.S., 29.7.33).—Solutions of $H_2S_2O_8$ or its salts are distilled at $< 120^\circ/120-200$ mm. in ≤ 2 stages, steam or H_2O being added to the residual solution between each distillation so that the distillate contains $< 6\%$ of H_2O_2 . A. R. P.

Production of a mixture of nitrogen and hydrogen by gasification of carbon under pressure. G. FAUSER (B.P. 442,574, 2.2.35. Italy, 2.2.34).—A mixture of steam and air in the desired proportions is passed over C at $650-800^\circ/10-20$ atm., sufficient O_2 being added to the mixture to supply the heat necessary to maintain the reaction and convert most of the CO first formed into CO_2 . A. R. P.

Production of sulphur by reduction of sulphur dioxide. A. R. LINDBLAD (B.P. 443,008, 3.10.35).—

Roaster gases are introduced, preferably after preheating, into the upper part of a gas producer, and the resultant gas mixture is mixed with more $\text{SO}_2 \equiv$ the H_2S present and passed over a heated Fe_2O_3 catalyst. A. R. P.

Recovery of sulphur dioxide from gases. METALLGES. A.-G. (B.P. 443,314, 8.3.35. Ger., 20.7.34. Addn. to B.P. 435,116; B., 1936, 146).—In the process in which roaster gases are scrubbed with a cold mixture of org. base (xylydine) and H_2O , and the absorbed SO_2 is recovered by heating the solution at $> 70^\circ$, pptn. of org. sulphates is prevented by addition of alkaline-earth compounds, e.g., $\text{Ca}(\text{OH})_2$, CaCO_3 , CaSO_3 , or $\text{Ca}(\text{HSO}_3)_2$. L. C. M.

Production of krypton and xenon. GES. F. LINDE'S EISMACHINEN A.-G. (B.P. 438,196, 7.5.34. Ger., 13.5.33. Addn. to B.P. 413,518; B., 1934, 834).—The separation of Kr and Xe from O_2 is carried out in a rectifying column at > 1.2 (1.7) atm. A. R. P.

NH_3 from coal gas. H_2S and other S compounds from gases.—See II. Converting CO into HCO_2H and salts.—See III. Laundry sour.—See VI. Roasting sulphide ores. Extraction of noble metals. Flux for Mg. Welding flux.—See X. Adhesive.—See XV. Fertilisers. Preps. for pest control.—See XVI. Colloidal Ca malate.—See XX. Pb staphnate.—See XXII.

VIII.—GLASS; CERAMICS.

Cast iron for the manufacture of glass-bottle moulds. N. L. EVANS, W. GOACHER, and J. E. HURST (J. Soc. Glass Tech., 1936, 20, 45—53 T).—From a consideration of the mechanism of the growth of cast Fe on prolonged heating, and of the influence of the composition of the metal on this change, the following specification for refined pig Fe suitable for glass-bottle moulds is proposed: total C $\gtrsim 3.1$, S $\gtrsim 0.07$, P $\gtrsim 0.45$, Mn 0.8—1.5%, the Si content being dependent on the thickness of the casting. It is suggested that two such refined pig irons of different Si content (e.g., 1.59 and 2.68%) should be stocked, which, by appropriate mixing, would cover all casting thicknesses from $\frac{3}{8}$ to $1\frac{1}{4}$ in. Scrap metal ($\gtrsim 25\%$ of the charge) may be used, and refining of the Fe by treatment in the ladle with 1% of granular Na_2CO_3 is recommended.

A. L. R.

Certain phenomena produced by the Corhart block on glassware. K. FUWA (J. Japan. Ceram. Assoc., 1935, 43, 63—75).— Al_2O_3 dissolves from the Corhart block and mixes only gradually into the glass. Fine transparent cords were produced in the glass. Al silicate dissolves from clay blocks and mixes readily with the glass. CH. ABS. (e)

Dimensions of aggregates in siliceous glasses at high temperatures. P. GILARD and L. DUBRUL (Bull. Acad. roy. Belg., 1936, [v], 22, 219—230).—Sheppard's formula (A., 1930, 534, 679, 1244) is used to find the mol. wt. of aggregates in various glasses at different temp. The mol. wt. (M) varies with temp.: $M = qe^{r/T}$, where q and r are const. M for Lillie No. 1 glass varies from 4410 at 1300° to 74,600 at 500° , corresponding to radii of 9×10^{-8} and 23×10^{-8} cm., respectively, the particles being supposed spherical. In the neighbourhood of

the softening point the increase of M is most rapid. There are, in the case of some glasses, anomalies at higher temp., which may be due to a change in the velocity of polymerisation, or to chemical reaction.

A. J. M.

Plastics used in the manufacture of laminated safety glass. J. WILSON (J. Soc. Glass Tech., 1936, 20, 35—44 T).—The composition and properties of celluloid (I), and a method of measuring the brittleness of laminated glass are described. Measurements showed that a laminated glass with a (I) interlayer became more brittle on exposure to light, the deterioration being due to embrittlement of the (I). The properties of cellulose acetate plastic are described. Although in the brittleness tests on glass laminated with this material, in most cases the adhesion to the glass deteriorated on exposure to light, it is believed that, with the satisfactory methods of lamination now available, this material will soon entirely replace (I) as a safety-glass interlayer. The application of synthetic resins as interlayers is discussed; urea- CH_2O resins, and Me methacrylate and vinyl resins when used alone, are too brittle. The acrylic acid ester resins are unique for this purpose, but their application to the glass is troublesome and expensive. The requirements of a safety-glass interlayer are summarised.

A. L. R.

Colour oxides and methods employed in colour matching. T. H. MCKEOWN and G. A. LEE (J. Can. Ceram. Soc., 1934, 3, 34—37).—A discussion.

CH. ABS. (e)

Minerals for colouring glass and enamels. H. LAITHWAITE (Sands, Clays, & Min., 1936, 2, No. 4, 109—114).—A review.

Spitting of glazes in the enamel kiln. J. W. MELOR (Trans. Ceram. Soc., 1936, 35, 1—42).—A discussion of the available facts leads to the assumption that spitting is either a body fault (due to the presence in the body of unburnt C, adsorbed moisture, or hydrocarbons), or a glaze fault (due to the absorption of carbonaceous or hydrocarbon gases, or of H_2O , by the glaze itself). The C theory of spitting is described; it is based on the assumptions that (1) C is not always removed from the body in the biscuit firing, (2) aerial O_2 can diffuse through the hot glaze, and thus (3) burn the C explosively. The gas pressure developed during the burning of the C at red heat in the enamel kiln is due to the local rise in temp. caused by the heat of combustion of the C. The bubble of gas expands in the soft glaze and usually bursts. Various factors influencing the tendency to glaze spitting are discussed, with examples; e.g., a glaze of a lower softening temp., or with an easily fusible frit, is more liable to spitting than one of higher softening temp., or with a less fusible frit. Conditions favouring the retention of C in the body in the biscuit firing will increase the chances of spitting in the later stages; e.g., the brown discoloration of earthenware, and the blue of bone-china, both connected with delayed burning of C in the biscuit firing, favour spitting in the discoloured parts. C spitting has been alleviated by increasing the time of the oxidation period in the biscuit firing, for which a considerable excess of air is required, and by using ball clays of low C content. H_2O may enter the biscuit body as liquid (e.g., during the washing

off of prints etc.) or as vapour (absorbed from the atm. during storage). In the enamel-kiln firing the H_2O forces a way out, causing spitting. The surface H_2O film may also soak into the glaze, and in the enamel-kiln firing may cause splintering, spitting, or the development of a rough surface. A. L. R.

Simultaneous measurement of viscosity and electrical conductivity of some fused silicates at temperatures up to 1400°. M. P. VOLAROVICH and D. M. TOLSTOI (J. Soc. Glass Tech., 1936, 20, 54—60 T).—Parallel measurements were made (at 700—1400°) of the viscosity (η) and the electrical conductivity (κ) of a mixed alkali-CaO-SiO₂ glass, two slags, two enamels, and a lava from Mount Vesuvius. Smooth η and κ curves were obtained with the glass; with the slags the curves showed discontinuities due to crystallisation, and with the lava were of an intermediate type. The following relation held for the glass, within the temp. range 700—1000°: $\eta\kappa^{1.4} = 1.65$, and similar equations were found for the slags and the lava. A. L. R.

China clay. R. J. DAVIES (Proc. Tech. Sect. Paper Makers' Assoc., 1936, 16, 399—412).—A discussion of various tests, with special reference to papermaking requirements. H. A. H.

Clay diaphragm. K. SEKI (J. Japan. Ceram. Assoc., 1935, 43, 197—200).—The H_2O -permeability (P) of the clay diaphragm generally increases gradually with rise in the firing temp. up to 1000°, and more rapidly at 1100—1200°. It decreases suddenly at higher temp. P increases with decreasing amount of clay and with increasing size of grog. It is greatly increased by addition of C powder. High P of the diaphragm is usually accompanied by low electrical resistance. CH. ABS. (e)

Viscosity of the sol of Yamagata water-imbibing clay, a species of bentonite. M. UCHIDA (J. Japan. Ceram. Assoc., 1935, 43, 121—132).—Measurements of η by the capillary and falling-body methods are described. Anomalous vals. found for dense sols of the clay are discussed. CH. ABS. (e)

Use of volcanic ash in ceramics. W. G. WORCESTER (J. Can. Ceram. Soc., 1934, 3, 48—59).—Volcanic ash may replace feldspar in some glazes. The ash was not useful as a body flux. The Fe content did not alter the finished product. CH. ABS. (e)

Acid-resistance of porcelain body. S. KONDO and S. OTOMO (J. Japan. Ceram. Assoc., 1935, 43, 337—342).—Kaolin (I), feldspar (II), quartz (III), and a porcelain body were heated separately at 600—1300° for 2 hr. Mixtures of the raw materials were melted, vitrified, and examined for solubility in 20% HCl at 100°. The acid-resistance of heated (I) changed distinctly at temp. where changes occurred in its thermal reaction, microstructure, and thermal expansion. The resistance of (II) and (III) was unchanged by previous heating. Simultaneous dissolution of (III) and (I) in (II) gave increased resistance as the (I) content was increased. CH. ABS. (e)

Whiteware materials discovered in Korea. S. OGAWA and K. TERAZAKI (J. Japan. Ceram. Assoc., 1935, 43, 2—5).—Analytical data are given. CH. ABS. (e)

Architectural terra-cotta and faience. G. N. HODSON (Trans. Ceram. Soc., 1936, 35, 43—51).—The history of the products and their modern methods of manufacture are outlined. A. L. R.

Refractories: their composition, properties, and applications. D. DIXON (Proc. Tech. Sect. Paper Makers' Assoc., 1936, 16, 375—393).—Mainly a survey. H. A. H.

Refractoriness and its determination. F. H. CLEWS and A. T. GREEN (Trans. Ceram. Soc., 1935, 34, 467—499; cf. B., 1934, 1099).—Factors causing the extended temp. range of transition from rigidity to fluidity of clay materials are reviewed, and different methods (including the British, American, and German) of determining refractoriness and refractoriness-under-load are compared. It is concluded that the most unsatisfactory feature of present refractoriness tests lies in the determination of the time at which to conclude the test. The tip-to-base deformation of the cone (specified as the fail point in the "squatting" test) is not obtained with all types of product, and indicates a much softer state of the material than that in which it would cease to be of service in practice. The "safety test" (determination of the temp. of initial softening) is more satisfactory as it defines the limiting temp. at which the material can be used, but the point of initial softening is difficult to ascertain. The possibilities of a test similar to the under-load test, but using a light load (e.g., 1 lb. per sq. in.), are discussed. The influence of the experimental conditions (e.g., size and shape of test-piece, load applied, rate of rise of temp., nature of furnace atm.) on the results of, and difficulties inherent in, the refractoriness-under-load test are discussed. It is concluded that in selecting refractories for use the complete temp.-deformation curve should be considered, but for specification purposes some characteristic points require definition. Greater discrimination between refractories might be attained by employing two such tests, i.e., the normal, and a "safety," test (the loaded test-piece in the latter being maintained at a specified temp.), or by using two different loads (e.g., 50 and 5—10 lb. per sq. in.) in the former. A. L. R.

Refractory materials. IX. Conditions of using pyrometric cones (2). M. NAKAMOTO and T. SAKATA (J. Japan. Ceram. Assoc., 1935, 43, 201—208).—Tests were made on the influence of the method of setting the cone on the plaque, and of its depth in the plaque, on the temp. at which cone 10 starts to bend and falls flat in a porcelain kiln. CH. ABS. (e)

Novaculite as a refractory material. C. W. PARMELEE (Brick and Clay Rec., 1935, 86, 205—210).—The mineral has essentially the same properties as SiO₂ and is equally satisfactory when made into brick. CH. ABS. (e)

Magnesium silicates: steatite. V, VI. S. NAGAI and G. INOUE (J. Inst. Silicate Ind. Japan, 1935, 43, 265—272; J. Japan. Ceram. Assoc., 1935, 43, 343—352).—V. The products obtained by pressure-moulding of mixtures of MgO and SiO₂ are inferior to those produced with natural talc. Addition of Al(OH)₃ improved the quality of talc preps.

VI. Heating talc to 1400° produces $3\text{MgSiO}_3 \cdot \text{SiO}_2$, a eutectic of enstatite and cristobalite, and the product rehydrates in steam to form talc. (Cf. B., 1936, 370.)

CH. ABS. (p)

Effect of water content of silica-brick batches on porosity of the fired brick. T. R. LYNAM and W. J. REES (Trans. Ceram. Soc., 1935, 34, 500–506).—Measurements of the porosity of works-fired blocks, made from five commercial SiO_2 -brick batches of different H_2O content (7.8–11.3%), illustrated the importance of controlling the H_2O content within fairly close limits; the porosity (and permeability, as indicated by other experiments not described) being lowered, and the bulk d increased, by reducing the H_2O content of the batch (e.g., 22.5% porosity for 7.8% H_2O content). The refractoriness-under-load of bricks made from "wet" (11.3% of H_2O) and "dry" (7.8%) batches was the same (failure at 1660°).

A. L. R.

Grading, porosity, and permeability to air of silica bricks. F. H. CLEWS and A. T. GREEN (Trans. Ceram. Soc., 1935, 34, 457–466).—A reprint of work already noted (cf. B., 1934, 19).

A. L. R.

Utilising cement dust.—See IX. **Org. glasses.**—See XIII.

PATENTS.

Removal of ferrous impurities from sands. J. A. CREW (U.S.P. 1,989,789, 5.2.35. Appl., 19.2.34).—Sand (200 pts.) containing 1–2% of H_2O is treated, during agitation, at 90° with H_2SO_4 (1 pt.), and, after cooling, is washed free from acid and dried.

L. C. M.

Manufacture of ultra-violet-light-transparent glass. C. DREYFUS (U.S.P. 2,002,082, 21.5.35. Appl., 18.2.28).—Sheets of high- SiO_2 glass are laminated with a plastic composition (e.g., cellulose derivative) transparent to ultra-violet light. Powdered plastic may be compressed between the heated glass plates.

J. A. S.

Manufacture of ceramic bodies. JENAER GLASWERK SCHOTT & GEN (B.P. 444,532, 22.7.35. Ger., 1.8.34).—A highly siliceous material (> 90% SiO_2) containing small amounts of flux (mica, feldspar, etc.) is heated to a temp. sufficient to frit the SiO_2 (e.g., 1500–1600°) and suddenly cooled. The product may have a thermal expansion as low as 0.12% up to 800°. The material can be shaped directly from the raw materials or from the crushed prepared product, in which latter case the heat-treatment is repeated.

J. A. S.

Dental porcelains and cements. BAKER & Co., Inc. (B.P. 440,302, 15.3.35. U.S., 5.12.34).—The usual ingredients of a dental cement and a small quantity of colouring matter, e.g., Co-blue, are fused together at 1300°, and the melt is cooled slowly and ground to a powder, which is mixed with H_3PO_4 for use in filling tooth cavities etc.

A. R. P.

Refractory clay articles and patching cements, and processes of forming ceramic refractories of the argillaceous type and of bonding green argillaceous refractory ware. NAT. ALUMINATE CORP., Assees. of J. M. MCKINLEY and W. K. CARTER (B.P. 444,323, 18.9.34. U.S., 25.9.33).—90–99% of an argillaceous body, especially (partly-preburned) fireclay,

is mixed with > 2% of a glass-like bond derived from Na aluminate, and the mixture is fired. B. M. V.

(A) [Linings for] rotary [cylindrical] furnaces.

(B) Furnace linings. A. F. and E. A. MEYERHOFER (MEYERHOFER & Co.), Assees. of (B) DYNAMIDON-WERK ENGELHORN & Co. G.M.B.H. (B.P. 444,862 and 444,878, 22.6.34. Ger., 2.12.33).—The refractory bricks for lining

(A) a rotary furnace, or (B) any type of furnace, are composed, e.g., of chamotte, Al_2O_3 , MgO , or Cr_2O_3 , and are manufactured to have a porosity < 35%, even up to 80% provided they retain sufficient strength, so that they may acquire a thin protecting coat of the material under treatment. [Stat. ref.] B. M. V.

Toughening of [plate] glass. W. J. TENNANT. From ASSUREX LE "ROI DES VERRES DE SECURITÉ" MAGNIEN, MONNIER, & Co. (B.P. 444,317, 11.9.34).

[Apparatus for] glazing of bricks, tiles, and the like. F. G. GATENSBERY and J. H. BOYCOTT (B.P. 445,170, 10.10.35).

Lead-in wire [for glass].—See X.

IX.—BUILDING MATERIALS.

Heat transmission in [cement] rotary kilns.

XI. W. GILBERT (Cement, 1935, 8, 89–107; cf. B., 1934, 991).—A method for estimating the charge in the kiln is developed. The loss in heat transmission due to the rise of the lump surface temp. when receiving heat on the kiln lining occurs throughout the kiln where the material is dry on the surface.

T. W. P.

Volumes and weights of gases from [cement] rotary kilns. ANON. (Cement, 1936, 9, 55–64).—Tabular data are given for the vols. and wts. of exit gas when various % of excess air are present.

T. W. P.

Heat balance of clinker coolers. T. YOSHII (J. Japan. Ceram. Assoc., 1935, 43, 280–286).—Heat balances were calc. for a drum cooler attached to a rotary kiln, and for a wet Unax kiln. The integral cooler of the Unax type is better than the under-cooler.

CH. ABS. (e)

High-lime Portland cements. III. Chrome cement. S. KONDO and H. YOSHIDA (J. Japan. Ceram. Assoc., 1935, 43, 5–10; cf. B., 1933, 466).—Part of the Al_2O_3 , Fe_2O_3 , and SiO_2 was replaced by Cr_2O_3 . Cr_2O_3 promoted 1- to 28-day strength as well as combined 4-week strength. White and green, high early-strength cements were obtained with limestone, pyrophyllite, and Cr_2O_3 .

CH. ABS. (e)

Magnesia content of Portland cement. II. Y. SANADA and G. NISHI (J. Japan. Ceram. Assoc., 1935, 43, 75–79).—Expansion (E) and tensile (T) and compressive strength (C) tests were made with bars made of the neat cements and 1:3 mortars, and cured in fresh and sea- H_2O for 3 days to 1 year. In fresh H_2O E increased with age, the effect of the MgO being slight. In sea- H_2O E was greater. T was not decreased up to 1 year, whereas C attained its max. in 1–6 months. The reduction in C was greatest in sea- H_2O .

CH. ABS. (c)

Lime saturation in Portland cements. H. KÜHL (Tonind.-Ztg., 1935, 59, 1221–1224; Cement, 1936, 9,

49—54).—Various proportioning formulæ for determining the max. CaO for cement clinkers are discussed. It is concluded that the Lea and Parker CaO-combination factor should be regarded as the "CaO standard" for normal cement mixes. T. W. P.

Corrosion of cement. II. Effect of carbonic acid. Aluminous cement. E. B. R. PRIDEAUX and B. G. LIMMER (J.S.C.I., 1936, 55, 117—119 T).—Earlier work (B., 1935, 1045) has been extended to study the effect of H₂O containing H₂CO₃. This gives rather variable conductivities and p_H vals. By the use of the known ionic equilibria and mobilities, results can be interpreted to show the relative amounts of HCO₃' and CO₃" formed, and also indicate that the rapid diffusion of CaO through the surface skin is still the dominant factor at first, while, later, the protective effect of the CaCO₃ becomes evident. From this point, there is a great difference between the corrosion of carbonated and untreated cement, but a steady increase in the CaO content of pure H₂O is found even when a thick skin of CaCO₃ is present. Experiments with aluminous cement, under the same conditions, show a rate of corrosion in the first 6 hr. rather > of carbonated Portland cement. After 50 hr. the amounts removed from aluminous cement (referred to the same surface and vol.) are intermediate between those removed from the wet and dry carbonated samples and those removed from untreated Portland cement.

Utilisation of cement dust. III, IV. S. KONDO and C. KAWASHIMA (J. Japan. Ceram. Assoc., 1935, 43, 142—153, 208—214; cf. B., 1933, 749).—III. The changes in Cottrell cement dust stored indoors and outdoors, and their effect on its utilisation in glass manufacture, are described.

IV. Satisfactory glasses can be made from the dust with soda ash and sand. The dust contains 2.5% of Fe₂O₃ and the product is never colourless. The constituents of the system SiO₂-felspar-dust were too refractory for effective utilisation of the dust.

CH. ABS. (e)

Analysis of concrete. R. H. H. STANGER, and WOODCOCK & MELLERSH (Cement, 1935, 8, 108—113).—A method for concretes having aggregates free from CaCO₃ is described. The coarse aggregate, after hand-separation, is retained on a $\frac{1}{8}$ -in. sieve. The sand in the fine grade is obtained as a residue after extraction with HCl. Cement oxides in the acid solution are determined by the usual methods. Details are given of refinements to correct for cement adhering to coarse aggregate, SiO₂ originating from the cement but rendered insol. by CO₂ action, etc. T. W. P.

Quality, design, and economy of concrete. I. LYSE (J. Franklin Inst., 1936, 221, 495—508; cf. B., 1935, 547).—The compressive strength of concrete is independent of variations in the grading of the aggregate, except that lower strengths are produced when the grading yields a very harsh mix. The strength of placeable mixes \propto the H₂O : cement ratio of the cement paste. The quantity required of the latter depends on the grading of the fine aggregate. T. W. P.

Effects of composition on the strength of concretes. L. N. JAMIESON (J. Inst. Eng. Australia, 1935,

7, 168—173).—A discussion of reasons for the strength variation of concrete. CH. ABS. (e)

Binding power of road tar. H. MALLISON (Asphalt u. Teer, 1935, 35, 884—886; Road Abs., 1936, 3, No. 93).—The factors involved in the binding power of a tar are discussed. T. W. P.

Adhesion of stone and bitumen binders, such as bitumen and tar, and its significance in practice. P. HERRMANN (Asphalt u. Teer, 1935, 35, 905—908; Road Abs., 1936, 3, No. 94).—The main factors affecting the binding of tar or bitumen to stone are the surface roughness and porosity of the stone, the surface moisture, the insulating layer of dust, and the presence of substances liable to swell. The adhesive force between clean stone and clean binder is of secondary importance. T. W. P.

Determination of the adhesion of road tar to stones. GERTH and SIEBRAT (Stein-Ind., 1935, 30, 388—392; Road Abs., 1936, 3, No. 95).—The method proposed consists in immersing tarred chippings in CHCl₃ and measuring the amount of tar removed after given times. T. W. P.

Wood preservation. E. S. GREIGOV (Peint. Fig. Ver., 1936, 13, 52—53).—Experience has demonstrated the val. of coal tar, HgCl₂, CuSO₄, ZnCl₂ (in decreasing order of efficiency) in the preservation of wood against fungal attack. F. C. B. M.

Preservation of timber against attacks of the powder post borer (*Lyctus brunneus*, Stephens) by impregnation with various chemicals. J. E. CUMMINS and H. B. WILSON (J. Counc. Sci. Ind. Res., Australia, 1936, 9, 37—56).—Comparative tests with numerous substances are recorded. Best results were obtained with Na₂SiF₆, NaBO₂, ZnCl₂, and NaF. Chlorinated C₁₀H₈ products and org. Hg preps. were promising. A. G. P.

Influence of certain calcium compounds on rate of decay of wood by fungi. W. P. K. FINDLAY (J.S.C.I., 1936, 55, 103—105 T).—Blocks of wood treated with aq. CaO or a solution of a Ca salt were exposed to decay under controlled conditions. No decomp. as a result of the treatment with CaO was observed. The growth of the dry-rot fungus, *Merulius lachrymans*, on pine sapwood was greatly checked by the presence of CaO; this is explained by the effect of the CaO in rendering the wood alkaline. The growth of other fungi on pine and beech wood was either unaffected or else reduced according to the effect of the CaO in changing the p_H of the wood. Treatment of oak heartwood with aq. CaO rendered it more liable to attack by certain fungi which normally only grow in the sapwood. This may be explained by the action of the CaO on the tannin, which is converted into a salt innocuous to the fungi.

Mildew prevention and repainting mildewed surfaces. A. P. MILLS *et al.* (Off. Digest, 1936, No. 154, 81—82).—A discussion. D. R. D.

Analysis of preservative-treated timbers. I. Determination of arsenic. W. E. COHEN (J. Counc. Sci. Ind. Res., Australia, 1936, 9, 1—10).—Adaptations

of the methods prescribed by the Society of Public Analysts (B., 1930, 638) are described. A. G. P.

Press board.—See V. Dyeing wood.—See VI. Wollastonite wool.—See IX. Primers for pine.—See XIII. Differentiating glues.—See XV.

PATENTS.

Manufacture of light building slabs and of filling material or aggregates adapted for use in their production. B. E. GROSSMANN (B.P. 444,692, 25.9.34).—Wood wool, sawdust, reeds, straw, or the like are impregnated with a mixture of Na silicate, glycerin, and HCl, preferably at room temp. This silicified material may be combined with cement exactly as sand and gravel. B. M. V.

Surface covering of walls and buildings. R. D. STEWART (B.P. 444,089, 4.2.35).—A plate or sheet of cementitious material impermeable to H_2O is applied to the wall and on that is applied porous CaO plaster. B. M. V.

Composite covering material for walls and the like. ORLIGNA-HOLZBEARBEITUNGS-FABR. G.M.B.H. (B.P. 443,993, 23.5.35. Ger., 20.4.35).—For the prep. of wooden wall "paper," the sap is washed out of a tree trunk by introduction of H_2O at ordinary main pressure through suitably drilled holes and a fireproofing agent may be introduced by similar means. The wood is then peeled into a continuous thin veneer and backed with paper or fabric. It is then rolled, trimmed, and embossed. B. M. V.

Preparation of non-skid road surfaces. A. G. TERREY (B.P. 444,641, 27.9.34).—The surface coat is composed of a thin layer of asphalt and chippings of diam. $>$ the thickness of the asphalt. The chippings may be precoated with bituminous binder, molten, dispersed, or in solution, as may also the surface of the foundation. B. M. V.

Manufacture of bituminous macadam. BERRY, WIGGINS & Co., LTD., and H. H. HOLMES (B.P. 443,471, 23.5.35).—A stone aggregate is mixed with 5–15% of a bituminous binder and a filler, e.g., kieselguhr, in amount $<$ 60% of the binder. Addition of the filler permits the use of a thicker coating of the binder on the aggregate than would otherwise be possible. A. B. M.

Cold mix and cold-laid bituminous paving mixture. C. M. BASKIN, ASSR. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,999,178, 30.4.35. Appl., 27.6.33).—Half of the primary oil of low η is used to wet the mineral aggregate, the oiled aggregate is mixed with powdered hard asphalt, and the whole wetted with the remainder of the oil. Alternative methods of mixing are claimed. D. K. M.

Wood preservatives. GRUBENHOLZIMPRÄGNIERUNG GES.M.B.H. (B.P. 443,995, 5.7.35. Ger., 3.8.34).—Claim is made for powdered mixtures of KHF_2 , $K_2Cr_2O_7$, and K_2CO_3 sufficient to give a p_H of 7 when the mixture is dissolved in H_2O . Insecticides containing As, and/or phenolic substances, e.g., $C_6H_5(NO_2)_2 \cdot OH$, may also be added. A. R. P.

Preservation of timber. R. LURIE (B.P. 443,988, 8.3.35. S. Afr., 31.3.34).—Interaction is effected in the

cold of a sol. fluoride (I) and slight excess of $ZnSO_4$ (II), in presence of an org. substance (III) to prevent pptn. of ZnF_2 . (III) may comprise AcOH or dinitrophenol; a solution of (III) and (I) may be prepared by heating, and then cooled and mixed with a solution of (II). B. M. V.

Manufacture of materials simulating wood. M. HIMMELHEBER (B.P. 443,890, 2.6.34).—Org. felted fibres (wood, cellulose, opened-up straw, sugar cane) are coated with films of non-ceramic binder, e.g., artificial resins, by saturating the wet or dry fibres with a solution or dispersion of the binder and drying or re-drying, the heating being continued to the hardening point without destroying the porosity of the product. A non-solvent of the binder is added to the binder solution to cause pptn. B. M. V.

Preparing concrete coverings for roadways. J. A. H. FEDI (B.P. 444,579, 20.9.34. Fr., 21.9.33).

Composite wood or like materials. F. TIBBENHAM (B.P. 444,069, 12.9.34).

Foam slag.—See I. Patching cements. Dental cement.—See VIII. Blast-furnace slag.—See X.

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

Embrittlement of steel on prolonged heating. H. A. DICKIE (Engineering, 1936, 141, 301–302).—The deposition of carbides at the grain boundaries during prolonged heating of steels below the lower crit. temp. serves to explain the embrittlement which usually accompanies such treatment. W. P. R.

Ferrite banding in forged and rolled steel. A. V. PROHOROV (Metallurgia, 1936, 13, 179–181).—Composite test-pieces made by welding together bars of different types of Ni, Mn, and Si steels were heated to 850° and cooled at different rates. Microscopical examination of sections through the welds indicates that diffusion of C is greatly influenced by the segregation of the alloying elements. It is suggested that ferrite banding can be prevented by balancing the composition of the steel so that the elements which segregate in interdendritic spaces would oppose each other in their influence on the direction of C diffusion. W. P. R.

Effect of solutions on endurance of low-carbon steel under repeated torsion at 250°. W. C. SCHROEDER and E. P. PARTRIDGE (Trans. Amer. Soc. Mech. Eng., 1936, 58, 223–231).—Tests were conducted at 250° on a boiler steel subjected to repeated stress in torsion while in contact with air, H_2O , and solutions of NaOH and various salts. Failure was more rapid in H_2O than in air, and still more so in aq. NaOH, Na_2CO_3 , or Na_3PO_4 , each of which had approx. equal effect. Aq. NaCl or Na_2SO_4 behaved similarly to H_2O . Addition of K_2CrO_4 , Na_2CrO_4 , or $NaNO_3$ to aq. NaOH markedly increased the endurance of the specimens. R. B. C.

Hydrogen-permeability and decarburisation of steels, Armco iron, copper, nickel, and aluminium. W. BAUKLOH and H. GUTHMANN (Z. Metallk., 1936, 28, 34–40).—Cu and Al are quite impervious to H_2 at high temp. and pressures, but Ni and most steels are permeable. The amount of H_2 which diffuses through unit

area in unit time increases with increasing grain size of steels and decreases with increasing C content and with the transformation from α to γ . The permeability increases with increasing pressures up to about 120 atm., after which it remains const. The depth of decarburisation is closely related to the permeability of the steel to H_2 and is decreased with increasing Cr content.

A. R. P.

Welding hard-facings on drilling tools. J. CUTHILL. **Welding of pressure vessels.** S. F. DOREY. **Use of welding in transportation and storage of oil.** A. C. HARTLEY and A. C. VIVIAN. **Training of electric welders.** W. G. POOLE and R. T. ROLFE (J. Inst. Petroleum Tech., 1936, 22, 205—210, 211—223, 224—232, 233—246).—Descriptive reviews.

[Steel] investigations with X-ray intensifying screens. R. BERTHOLD and M. ZACHAROW (Z. Metallk., 1936, 28, 40—42).—For the detection of flaws in steel up to 10 mm. in thickness it is better to work without a screen, but for steel 10—35 mm. thick a screen of low intensifying power and for thicker steel a screen of high intensifying power gives the sharpest definition in the X-ray photograph.

A. R. P.

Water-line corrosion. U. R. EVANS (Chem. & Ind., 1936, 210—213).—The experimental facts relating to H_2O -line corrosion are reviewed; it is shown that they can be explained by the differential aëration theory. The corrosion of Zn, however, is capable of alternative explanation.

W. P. R.

Water-line corrosion. K. G. LEWIS (Chem. & Ind., 1936, 313).—A reply to criticisms (cf. preceding abstract).

Is corrosion research ripe for standardisation? O. BAUER (Z. Metallk., 1936, 28, 25—29).—Corrosion tests on steels show that reproducible results are obtained only when the tests are made in neutral, unstirred solutions; the results obtained in tests made under other conditions depend on numerous external and difficultly controllable variables.

A. R. P.

Corrosion-resisting materials for gas appliances. A. L. WARD and W. H. FULWEILER (Proc. Amer. Gas Assoc., 1935, 660—686).—A study has been made of the resistance to corrosion of a no. of Cu-base alloys when exposed over long periods to town's gas at temp. ranging from 15° to 135°. Alloys in sheet or rod form containing 60% of Cu, 38% of Zn, and 1—2% of either Pb or Al are almost entirely resistant to the action of org. S compounds in town's gas. The composition of the most resistant alloy was: Cu 59.5, Zn 38.4, Sn 0.3, Pb 1.5, Fe 0.3%. In general, tubes are less resistant than sheets of the same composition.

R. B. C.

Hot-tinning of copper; attack on the basis metal and its effects. E. J. DANIELS (J. Inst. Metals, 1936, 58, Advance copy, 117—125).—When Cu is immersed in molten Sn or solder at 250—450° the surface becomes coated with two layers (inner, Cu_3Sn ; outer, Cu_6Sn_5). The outer layer rapidly decomposes and both the bath and the coating become contaminated with Cu to an extent which increases rapidly with rise in temp.; the presence of Pb in the bath tends to reduce the rate of attack, which is only 1/3—1/4 that of pure

Sn with the eutectic Sn-Pb alloy. The presence of Cu in the tinning bath tends to improve the smoothness of the coatings, the best results being obtained when the Cu content is somewhat > the eutectic composition; these effects are most marked when the Cu contains Cu_2O inclusions.

A. R. P.

Influence of surface cuprous oxide inclusions on the porosity of hot-tinned coatings on copper. W. D. JONES (J. Inst. Metals, 1936, 58, Advance copy, 109—116).—The production of irregular porous Sn coatings on Cu by hot-dipping is shown to be due primarily to the effect of Cu_2O inclusions, the presence of which may be detected by amalgamation of the Cu surface in cold aq. $HgCl_2$. Reduction of the surface Cu_2O to Cu by immersion in cold 2—50% H_3PO_3 or by cathodic treatment in dil. aq. NaOH gives satisfactory coatings on subsequent immersion in molten Sn; O-free Cu invariably yields good coatings without pretreatment.

A. R. P.

Micrographic study of the deterioration of brass surfaces by mechanical polishing. P. JACQUET (J. Chim. phys., 1936, 33, 226—231).—By micrographic comparison of brass surfaces polished electrolytically (B., 1935, 730) with mechanically polished surfaces the presence of a distorted layer in the latter is demonstrated; this is shown to be $4—6 \times 10^{-3}$ mm. thick. It appears to have no crystal structure, but moderate heating produces a cryst. appearance. The existence of this layer may account for difficulties experienced in obtaining adherent electrolytic deposits of Ni on polished brass (cf. Hothersall, B., 1932, 606). Unless precautions are taken, erroneous conclusions concerning crystal structures may be reached when polished surfaces are studied.

J. W. S.

Systematic consideration of the bronzes. F. WEIBKE (Metallwirts., 1936, 15, 299—307, 321—325).—A review of the constitution and lattice structure of the Cu alloys gives strong support to the Hume-Rothery rule.

C. E. H.

Beryllium-copper used in electrical switch spring. A. L. RICHE (Trans. Electrochem. Soc., 1936, 69, Preprint, 197—198).—Springs of 2.25% Be-Cu alloy heat-treated at 260° are mechanically superior to those made of phosphor-bronze, are resistant to corrosion, and have good electrical properties.

J. W. C.

Equilibrium in lead smelting. S. F. RAVITZ and K. E. FISHER (Amer. Inst. Min. Met. Eng., 1936, Tech. Publ. No. 681, 7 pp.).—Laboratory tests made on the distribution of Au and Ag between slag, matte, speiss, and Pb bullion in smelting operations show that irrespective of the Au and Ag content of the charge there is a const. ratio between the contents of the various layers in the smelting operation. In the case of the mixture tested the Ag was distributed between bullion, speiss, and matte in the ratio 1:1.2:0.562, and the Au in the ratio 1:1.65:0.073. The matte contained Pb 15.8, Zn 2.9, Cu 61.3, Fe 1.0, S 15.8, Sb 0.4, and As 2.9%, and the speiss Pb 17.4, Zn 3.2, Cu 58.3, Fe 0.6, S 2.1, Sb 2.1, and As 16.1%.

A. R. P.

Production and uses of lead-base bearing metals. R. SCHMIDT (Stahl u. Eisen, 1936, 56, 228—231).—

In general, addition of a heavy metal, *e.g.*, Ni or Cu, to Pb does not produce bearing metals of good properties. The use of Na, K, Ca, Li, Si, and Al for alloying with Pb has given better results. The production, properties, and uses of a bearing alloy called "Union Lagermetalle" containing Pb 98, Mg 1.5, and Ca 0.2% are described.

W. P. R.

Fluxes for use in soft-soldering. J. W. WILLSTROP, A. J. SIDERY, and H. SUTTON (*J. Inst. Metals*, 1936, 59, Advance copy, 175—180).—Corrosion-resistant steels may be satisfactorily soft-soldered with aq. H_2PO_4 or, preferably, mixtures of this with NH_2Ph and $C_2H_4(OH)_2$ or a mineral oil, which are much less corrosive than $ZnCl_2$ fluxes.

A. R. P.

Creep of tin and tin alloys. I. D. HANSON and E. J. SANDFORD (*J. Inst. Metals*, 1936, 59, Advance copy, 181—202).—The creep-resistance of Sn in long-time tests is improved considerably by addition of 3.5% Ag. Addition of Bi improves the resistance to flow at stresses of > 300 lb. per sq. in., but has the opposite effect at lower stresses. Addition of 8.5% Sb trebles the creep-resistance of Sn. Cd-Sn alloys after annealing at 168° for 24 hr. and quenching have a high resistance to creep. The eutectic Pb-Sn and Cd-Sn alloys are very weak in the cold-rolled and annealed conditions, flowing under stresses as low as 130—150 lb. per sq. in.

A. R. P.

Investigations in ore dressing and metallurgy. W. B. TIMM (Canada Dept. Mines, July—Dec., 1934, No. 748, 202 pp.).—Details are given of the results of extraction tests made on 25 different simple and complex Canadian Au ores.

A. R. P.

Physical characteristics of gold lost in tailings. R. E. HEAD (*Amer. Inst. Min. Met. Eng.*, 1936, Tech. Publ. No. 674, 9 pp.).—All the Au particles left in tailings from amalgamation, cyaniding, or flotation treatment of Au ores are coated with some type of impermeable film. This film may be a natural tarnish, *e.g.*, oxidised Fe compounds, or it may consist of non-metallic, generally clayey, minerals or colloids forced into the original rough surface of the particles during grinding. In any case removal of the film renders the Au readily amenable to flotation or to attack by Hg or aq. NaCN. In many types of ore, however, it is impossible economically to remove the film, and the only hope of obtaining better Au recoveries from these ores is the discovery of reagents that will render the filming substances amenable to flotation; until such reagents are discovered the introduction of refined gravity methods should improve recoveries.

A. R. P.

The "permalloy problem." J. L. SNOEK (*Nature*, 1936, 137, 493).

L. S. T.

Workable rare metals, vanadium, thorium, and uranium. W. KROLL (*Z. Metallk.*, 1936, 28, 30—33).—Reduction of V_2O_5 with Ca in a mixture of fused $CaCl_2$ and $BaCl_2$ yields a semi-colloidal powder which cannot be converted into a workable form by pressure and heat. If the powder is mixed with more Ca and the mixture heated with $CaCl_2$ and $BaCl_2$ the resulting metallic powder can readily be pressed into slugs which, after sintering in vac. in an induction furnace, can be cold-forged and rolled. Workable

Th can be prepared in a similar way. Both V and Th sheet are embrittled by heating in $BaCl_2$, but can be annealed in borax. Reduction of U_3O_8 with Ca under fused chlorides gives a powder of which part is colloidal and pyrophoric, but the heavier particles can be pressed and sintered into a workable form; on cold-working, this metal tends to crack and oxidise in the cracks.

A. R. P.

Niobium and its uses. L. SANDERSON (*Sands, Clays, and Min.*, 1936, 2, No. 4, 99—101).

Manipulation of Canadian radium and its application to British science and industry. G. W. BODEN (*Sands, Clays, and Min.*, 1936, 2, No. 4, 33—45).—A descriptive review.

Upper and lower yield points and breaking strain [of metals]. G. WELTER (*Metallurgia*, 1936, 13, 183—187).—The yield point obtained by the usual type of tensile-testing machine is not contingent on the material tested, but is a function of the manner of action of the testing machine.

W. P. R.

Technique of powder metallurgy. C. HARDY (*Min. & Met.*, 1936, 17, 145—146).—Methods of producing, mixing, and pressing metal powders and of sintering the products are briefly outlined and some uses of the process are indicated.

A. R. P.

Electrolytic protection from corrosion of cast iron of various compositions. M. DEK. THOMPSON (*Trans. Electrochem. Soc.*, 1936, 69, Preprint, 199—208).—The respective rates of unprotected corrosion of five samples of cast Fe and one sample of steel in 0.01N- H_2SO_4 , 0.1N- Na_2SO_4 , and 0.1N- $NaCl$ are similar. The degree of surface protection afforded by cathodic treatment in the salt solutions varies directly with the cathodic c.d. but no such relation holds for the acid. A c.d. = that associated with the corrosion e.m.f. gives only 34—78% complete protection.

J. W. C.

Use of inhibitors (with special reference to antimony) in the selective removal of metallic coatings and rust. S. G. CLARKE (*Trans. Electrochem. Soc.*, 1936, 69, Preprint, 209—220).—By addition of $SbCl_3$ to HCl deposits of Zn, Cd, Sn, and Cr can be removed quantitatively from Fe, Ni, and Co, the Sb accelerating dissolution of the former metals and restraining attack on the latter. The inhibiting action of $SbCl_3$ in HCl extends to low- and high-C steels, Cr steel, and to a lesser extent to wrought Fe and grey cast Fe, and is attributed to the deposition of a film of Sb cathodic to the metal and of high H overvoltage. Stimulated attack on Zn, Cd, Sn, and Cr is associated with the high e.m.f. of the basis metal-Sb couple and relatively lower H overvoltage. Rust removal by HCl without metal attack requires the presence of an inhibitor and a reducing agent. A suitable solution contains conc. HCl 100, Sb_2O_3 2, and $SnCl_2$ 5 pts. and is vigorously agitated to facilitate reduction of $FeCl_3$ to $FeCl_2$, the latter being innocuous.

J. W. C.

Hardness of electrolytic nickel deposits. J. CAHOUR (*Compt. rend.*, 1936, 202, 659—660).—The hardness (*H*) depends on the nature of the supporting metal, c.d., and temp. of the plating bath. The presence of small amounts of gelatin increases *H*.

L. J. J.

Electrolytic solder. R. P. E. HERMSDORF and M. HEBERLEIN (Amer. Inst. Min. Met. Eng., 1936, Tech. Publ. No. 680, 9 pp.).—A high grade of solder may be produced from crude Sn- and Pb-bearing residues by smelting them to a crude Sn-Pb alloy in a blast, reverberatory, or electric furnace, purifying the alloy by liquation to remove speiss, sulphurisation to remove Cu, and electrolysis in a SiF_6 bath to remove other impurities. The electrolyte contains Pb^{++} 25–35, Sn^{++} 30–45, and free H_2SiF_6 60–70 g. per litre and is prepared by dissolving PbO in H_2SiF_6 at $< 25^\circ$ and electrolysis with Sn anodes until the desired Sn^{++} content is obtained. The bath is operated at 40° with a voltage drop of 0.34 volt between the electrodes, and the electrolyte is circulated through a tank containing electrolytic solder-shot to remove accumulated Ni, Fe, and Zn. The average anode contains Sb 2, As 0.25, Cu 0.05 %, Au 0.05, Ag 30 oz. per ton, and the cathode Cu < 0.001 , Bi < 0.003 , Fe < 0.001 , and Ni, Mg, Si, and Ca $< 0.0001\%$. A. R. P.

Electrocapillary amalgamation [of gold ores]. O. C. SHEPARD (Amer. Inst. Min. Met. Eng., 1936, Tech. Publ. No. 676, 10 pp.).—The improved extraction of Au by amalgamation produced by cathodic polarisation of the Hg is shown to be due to electrocapillary phenomena, the max. effect being obtained when the polarisation is 0.2–0.5 volt $>$ the max. of the electrocapillary curve. Higher voltages cause the amalgamated plate to become tarnished and dull due to electrochemical action on other constituents of the ore. The actual voltage required must be determined in each case since it varies with the nature of the anodes and with the composition of the mill H_2O . The beneficial effect of Na-Hg on Au extraction is probably due to the electrical potential generated by oxidation of the Na. A. R. P.

Cast-Fe moulds.—See VIII. Oxy-acetylene welding.—See XXIII.

PATENTS.

Metallurgical furnace [for continuous distillation of zinc ores]. E. H. BUNCE and A. O. ASHMAN, Assrs. to NEW JERSEY ZINC Co. (U.S.P. 1,981,028, 20.11.34. Appl., 16.8.30).—The furnace consists of a vertical brick retort with a central dividing wall extending part of the way up from the bottom, the briquettes of ZnO and coke being heated by electrical resistance. A. R. P.

Metallurgical furnace gas and method of controlling composition. F. P. WILSON, JUN., Assr. to GEN. ELECTRIC Co. (U.S.P. 1,988,929, 22.1.35. Appl., 6.3.30).—Fe or steel is brazed at 1100° in an atm. obtained by reaction of a hydrocarbon gas with H_2O at 1050° and removing the H_2O from the mixture. A. R. P.

Influencing the chemical and physical character of blast-furnace slags. J. ROLL (B.P. 444,004, 20.9.35).—Sand is blown into the blast furnace below the tuyères by means of a current of blast-furnace gas, to render basic slags more suitable for use as road ballast. A. R. P.

Furnaces for treating ores. C. P. BRATASIANU (B.P. 444,011, 5.6.34. Rumania, 13.6.33).—The ore passes through a vertical feed chamber past a throat and through a vertical, acid-lined reaction chamber in

which reducing conditions are maintained in the upper part and oxidising in the lower; the charge then passes down a slope to a vertical chamber having a basic lining which takes part in the oxidising or alloying reactions. [Stat. ref.] B. M. V.

Roasting of ferruginous sulphide ores. D. TYRER, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 438,451, 18.5.34).—The ore is preheated by countercurrent treatment with hot SO_2 -rich gases from the main roasting operation and then passed through a rotary roaster in direct-current flow with gases containing N_2 $>$ 70, SO_2 $<$ 10%, and O_2 the remainder. The gases from the preheater are cooled to condense S and then scrubbed to recover SO_2 , part of which is returned to the roaster. The roasted ore contains practically all the Cu and Zn in the form of sol. sulphate. A. R. P.

Apparatus for heat-treatment of metals. BIRMINGHAM ELECTRIC FURNACES, LTD., and F. THOMLINSON (B.P. 443,969, 8.9.34).—Apparatus for feeding and expelling rods or like articles to and from a no. of individual muffle tubes abreast in one furnace is described. B. M. V.

Apparatus for heat-treating sheet metal. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 444,741, 29.8.35. U.S., 30.8.34).—Normalising is effected in a protective gaseous atm. by means of individually adjustable jets of gas above and below, the gas after use being collected, cooled, and rebrown. B. M. V.

Heat-treatment of alloys. M. G. CORSON, Assr. to ELECTRO METALLURG. Co. (U.S.P. 1,990,168, 5.2.35. Appl., 13.8.32).—Cu alloys containing Ni (0.1–40%) and Be (0.1–2%) are softened by quenching from 900° , and hardened by heating at 350° (48 hr.) to 700° (2 hr.). Tensile strength and hardness show no diminution at $< 700^\circ$. L. C. M.

Production of bimetallic strip. C. ARNOLD, FROM CLEVELAND GRAPHITE BRONZE Co. (B.P. 438,789 and 440,258, 23.4.24).—(A) Fe strip is coated with babbitt metal and, after coiling, run through flexing rolls and cutters. (B) Steel strip is passed continuously through a long narrow chamber filled to const. level with molten bearing metal, the strip forming the bottom of the chamber so that only one side is coated and guides being provided to prevent the bearing metal flowing over the sides of the strip. A. R. P.

Bimetallic article [lead-coated steel]. H. W. GRAHAM and S. L. CASE, Assrs. to JONES & LAUGHLIN STEEL CORP. (U.S.P. 1,990,070, 5.2.35. Appl., 16.3.33).—Steel articles are coated by immersion in molten Pb containing 3–7 (5)% of Na at 380 – 440° . L. C. M.

Non-corrodible metallic wool. H. G. STILES, Assr. to STANDARD OIL Co. (U.S.P. 1,990,009, 5.2.35. Appl., 2.7.32).—Steel-wool scouring pads are coated with an emulsion containing mahogany soap (50), mineral lubricating oil (40), oleic acid (4), H_2O (3), and EtOH (3 pts.). L. C. M.

Corrosion-resistant alloy steels and articles made therefrom. U. S. RUSTLESS STEEL & IRON CORP., Asses. of J. STRAUSS (B.P. 440,194, 16.6.34. U.S., 8.12.33).—The steels contain C 0.01–2 (0.015–0.05),

P 0.07—1 (0.09—0.16), Cu 0.15—5 (0.15—0.5), Si 0.35—6, Cr 0.3—8 (1—6), Mn \geq 0.5, and S \geq 0.1%.

A. R. P.

Production of iron alloys of non-ferrous metals.

F. KRUPP GRUSONWERK A.-G. (B.P. 438,633, 7.12.34. Ger., 14.12.33).—Oxidised ores containing Fe and Ni or Cu are heated under reducing conditions to produce a metal sponge, the temp. is then raised to fuse the slag and nodulise the alloy, and the mixture is ground and treated by mechanical means to recover the metal.

A. R. P.

Manufacture of permanent magnets.

H. T. FAUS, ASSR. TO GEN. ELECTRIC CO. (U.S.P. 1,989,551, 29.1.35. Appl., 10.10.33).—An alloy of Fe with Ni 20—30 and Al 6—15% is melted and, when crystallisation has commenced, is poured into (a) a sand mould and cooled quickly by sprinkling with H₂O, or (b) a chill mould and removed when the temp. reaches 600° and quenched in an air-blast.

A. R. P.

Manufacture of magnetic dust cores.

STANDARD TELEPHONES & CABLES, LTD., ASSEES. OF W. C. ELLIS (B.P. 438,803, 24.5.34. U.S., 24.5.33).—Powdered 2:17:81 Mo-Fe-Ni alloy is made into a thin paste with H₂O, colloidal clay 0.1—1.1 (0.77), Mg(OH)₂ 0.25—6.3 (2.11), and 50% aq. Na silicate 0.1—1.3 (0.64) g. per 100 g. of alloy, the paste is dried, and the resulting coated metal powder pressed into cores at 80—90 tons per sq. in. Finally the cores are heated in an inert atm. for 1 hr. at 650°.

A. R. P.

[Copper-nickel-iron] ferromagnetic alloys.

SIEMENS & HALSKE A.-G. (B.P. 439,216, 23.10.34. Ger., 24.10.33).—Claim is made for 13—14:17—14:70—72 Fe-Cu-Ni alloys containing 1—8 (3)% of Mo. The alloys are annealed at 800—1000° for several hr., then cooled slowly to develop the best magnetic characteristics.

A. R. P.

[Nickel-chromium] electric-resistance alloys.

(A, B) BRIT. DRIVER-HARRIS CO., LTD. (A) From J. M. LOHR, (B) and W. M. KAY (B.P. 438,140 and 438,759, [A] 12.5.34, [B] 21.1.35).—(A) Wire resistance elements with a life of 10—12 times that of nichrome elements are made of an alloy containing Ni:Cr = 80:20 or Ni:Cr:Fe = 60:12—15:28—25 with additions of Mo 1—20 (5), Zr 0.1—1 (0—2), and Ca 0.01—0.2 (0.02)%. (B) The alloys consist of Ni 50—90, Cr 9—30, Ca 0.1—0.25 (0.2), and Zr 0.1—1 (1)%. A. R. P.

Electric insulation of [nickel-chromium-iron alloy] wire.

BRIT. DRIVER-HARRIS CO., LTD. (B.P. 438,444, 18.5.34. U.S., 23.3.33).—Ni-Cr alloy wire is dipped in conc. (40—50%) aq. NaOH, heated in air at 400—600°, and washed free from alkali.

A. R. P.

Composite [nickel-iron lead-in] wire.

C. A. LAISE, ASSR. TO EISLER ELECTRIC CORP. (U.S.P. 1,989,236, 29.1.35. Appl., 1.6.28).—The wire, for sealing into glass, consists of an alloy of Fe with Ni 40—42 and Cr 0.1—5% and is coated with a Ni sheath saturated with H.

A. R. P.

Iron-chromium alloys.

B. VERVOORT (B.P. 438,179, 21.2.35. Ger., 9.3.34).—Non-rusting castings with a high breaking strength and impact-resistance are made of cast Fe containing C 0.5—3, Cr 5—40%, and Si \geq 0.5 × % C; the castings are annealed at 1000°,

quenched from 800—1000°, and hardened by reheating at 300—500°.

A. R. P.

Chromium-manganese steel alloy.

W. W. TRIGGS. From DEUTS. EDELSTAHLWERKE A.-G. (B.P. 439,045, 28.5.34).—The alloys contain Cr 8—18 (12), Mn 15—25 (18—20), Si 3.5—8 (5—6); and C 0.01—1.5 (0.2—0.3)%, together with (\geq 3% in all) W, Mo, V, Ti, or Ta.

A. R. P.

Prevention of wear during the running-in of ferrous-metal parts of engines and machinery.

H. C. HALL (B.P. 440,197, 18.6.34).—The parts are heated at 170—350°, according to the composition of the metal, for a sufficient time to produce a purple to brown or grey oxide film \geq 0.0001 in. thick.

A. R. P.

Treatment for producing a modified [rust-resisting] surface on ferrous articles.

F. D. WATERFALL (B.P. 440,215, 27.6.34).—The articles are immersed in a hot bath containing an alkaline-earth acid phosphate, or in such a bath which has been treated with a sulphate of Zn, Cd, Mn, or Fe sufficient to ppt. the whole of the alkaline earth as sulphate. *E.g.*, the bath is made by adding to H₂O a mixture of ZnSO₄·7H₂O 274, CaHPO₄ 300, and NaNO₃ 275 pts.

A. R. P.

Production of plated iron or steel goods, particularly thick iron or steel sheets and sheets of medium thickness.

DEUTS. RÖHRENWERKE A.-G. (B.P. 444,728, 3.7.35. Ger., 3.7.34).—In the hot-rolling of Cu or Cu alloys on to Fe or steel the edges of the two plates are clamped together with a steel band which overlaps the upper and lower surfaces and is prevented from welding to the composite metal by a film of water-glass.

A. R. P.

Treatment of galvanised sheets.

G. R. HOOVER and W. E. MARSHALL, ASSRS. TO AMER. ROLLING MILL CO. (U.S.P. 1,989,925, 5.2.35. Appl., 24.8.31).—Prior to painting, galvanised Fe sheets are immersed in aq. 1—2% NaCl or CaCl₂ containing 5% of Ca(OH)₂; adhesion of the paint is improved by the film of Zn(OH)₂ + Ca(OH)₂.

L. C. M.

Protective treatment of [ferrous] metal and alloys.

H. T. DAVIES (B.P. 438,816, 13.8. and 6.11.34).—The article is given a flash plate of Cu or Ni and then immersed in a hot bath containing acid phosphates of Fe and/or Zn.

A. R. P.

Casting of deoxidised copper.

AMER. METAL CO., LTD. (B.P. 439,002, 18.1.35. U.S., 1.2.34).—Completely deoxidised Cu is cast into a damp chill mould and H₂O sprayed on the surface so that a pool remains there in the spheroidal state while the mould is being filled.

A. R. P.

Copper alloy [bronze].

M. G. CORSON, ASSR. TO G. H. COREY (U.S.P. 1,988,938, 22.1.35. Appl., 2.3.29. Renewed 9.5.33).—The alloy consists of Cu with Sn 4—18, Zn 10—35, and Ni 10%; it is annealed at 650—800° to produce a homogeneous acicular structure, quenched, and reheated at 550—625° to cause separation of finely-dispersed, hard β -particles.

A. R. P.

Copper-zinc alloy containing silicon and iron.

H. A. STAPLES, ASSR. TO PHELPS DODGE COPPER PRODUCTS CORP. (U.S.P. 2,007,008, 2.7.35. Appl., 19.2.34).—Brass of superior drawing quality and suitable for welding

and brazing comprises (approx.) Cu 61, Si 0.4—0.8, Fe 0.2—0.4%. B. M. V.

[Phosphor-copper] brazing alloy. W. B. MILLER, Assr. to OXWELD ACETYLENE Co. (U.S.P. 1,988,422, 15.1.35. Appl., 2.4.32).—The alloy consists of Cu with P 4—7 (7) and Sn 1—7 (2)%. A. R. P.

Zinc smelting. W. A. OGG (U.S.P. 1,988,608, 22.1.35. Appl., 18.4.34).—A mixture of roasted Zn ore and coke is fed in thin layers on to a bath of molten Fe in a closed chamber, whereby Zn distils and the impurities collect as a slag which continuously overflows from a weir at the end of the chamber remote from the feed door. A. R. P.

Zinc[base die-casting] alloy. W. W. BROUGHTON and G. L. WERLEY, Assrs. to NEW JERSEY ZINC Co. (U.S.P. 1,989,308, 29.1.35. Appl., 18.4.34).—The alloy contains Cu 0.85—1.35, Al 5.1—6.5, and Pb > 0.05%. A. R. P.

Production of powdered metals [of low m.p.]. GEN. ELECTRIC Co., LTD., R. W. REES, and C. J. SMITHELLS (B.P. 438,552, 12.10.34).—Alloys of Pb 45—50 (50), Sn 16—30 (20), Cd 20—30 (30), and Bi 0—5 (0)% are shaken in a tray, pounded in a mortar, or treated in an impeller-type disintegrator at a temp. between that of the solidus and liquidus point. A. R. P.

Soldering flux. H. B. DYKSTRA, Assr. to GRASSELLI CHEM. Co. (U.S.P. 1,990,273, 5.2.35. Appl., 16.11.33).—Fluxes for tinplate consisting of glucamine, anhyd., or in 10% aq. solution, or mixed with rosin, are claimed. L. C. M.

Production of bismuth. J. O. BETTERTON and Y. E. LEBEDEFF, Assrs. to AMER. SMELTING & REFINING Co. (U.S.P. 1,989,734, 5.2.35. Appl., 8.10.32).—Bi—Pb alloy containing 1.5—40% Bi is treated at 340—400° with Mg; the Mg—Bi—Pb dross is pressed to remove as much Pb as possible, mixed with CaCl₂, CaF₂, MgCl₂, or NaCl, and heated at > 350° to remove more Pb, leached with dil. H₂SO₄ to dissolve Mg and sol. salts, and the dried residue smelted to crude Bi, which is later refined. L. C. M.

Production of reflecting surfaces. M. MELTSNER (U.S.P. 1,989,764, 5.2.35. Appl., 3.1.34).—Aq. 0.02—0.03N-AgNO₃ or -Ag₂SO₄ (30 pts.) is treated at 80° with an aminoalcohol [N(C₂H₄·OH)₃ (3—4 pts.), or β-NH₂·C₂H₄·OH (2—4 pts.)] in contact with the object to be silvered. L. C. M.

Cadmium-base bearing metal. W. E. McCULLOUGH, Assr. to BOHN ALUMINUM & BRASS CORP. (U.S.P. 1,988,504, 22.1.35. Appl., 16.5.34).—The alloy contains Cd with Cu 0.2—1.5 (0.5) and Mg 0.1—0.75 (0.25)%. A. R. P.

Machine for concentrating ores and amalgamating gold ores. S. W. LACK (U.S.P. 1,988,500, 22.1.35. Appl., 13.1.34. Austral., 27.4.33).—A centrifugal amalgamator with horizontal circular channels for retaining the Hg is described. A. R. P.

Recovery of gold [from ore]. C. R. ARNOLD (U.S.P. 1,988,932, 22.1.35. Appl., 24.11.31).—The ore pulp is passed through a trough with a corrugated bottom, the corrugations being half-filled with Hg and an amalgamated Cu anode being disposed above each

corrugation. Passage of a current between the anodes and the Hg results in the collection of the Au in the latter. A. R. P.

Recovery of gold or other metal particles from sand and the like. J. B. GIRAND (B.P. 438,859, 26.6.35).—A type of rotary-drum centrifugal separator is claimed. A. R. P.

Amalgamation [of gold ores]. C. BUTTERS (U.S.P. 1,979,365, 6.11.34. Appl., 23.9.32).—The ore is passed over a shaking table provided with pockets containing Hg and a movable, amalgamated Cu rod floating thereon. A. R. P.

Extraction of noble metals by leaching out with cyanide. G. SIEGLE & Co. GES.M.B.H., and W. KÖNIG (B.P. 438,358, 10.5.34).—The NH₄CN obtained by the process of B.P. 438,402 (B., 1936, 494) is used for making leaching solutions for extracting Au and Ag from their ores. A. R. P.

Separation of platinum metals from mattes. MOND NICKEL Co., LTD. (B.P. 438,996, 19.11.34. U.S., 17.11.33).—Molten Ni—Cu matte is treated with a silicide or phosphide to cause it to separate into two layers, the lower (smaller) layer containing the greater part of the Pt metals. A. R. P.

Manufacture of sintered hard alloys. WOLFRAM & MOLYBDÄN A.-G. (B.P. 438,414, 14.5.35. Switz., 23.5.34).—The alloys consist of mixtures of WC and Co or Ni with 0.5—5% of free C and/or the oxide of one of the metals. A. R. P.

Hard metallic composition and contacts thereof. G. N. SIEGER, Assr. to P. R. MALLORY & Co., INC. (U.S.P. 1,984,203, 11.12.34. Appl., 12.12.31).—A porous, sintered mass of MoC or WC is impregnated with molten Ag (60%). A. R. P.

Hard-metal alloy. J. HOLZBERGER, Assr. to GEBR. BOHLER & Co. A.-G. (U.S.P. 1,992,372, 26.2.35. Appl., 4.5.31. Ger., 7.5.30).—Sintered alloys containing Ti (as TiC) 35—40, Cr 5—25, W 10—25, C 6—10, and Co 15—25 or Ni 20—30% are claimed. L. C. M.

Flux for smelting and refining magnesium and its alloys. A. LUSCHENOWSKY (U.S.P. 1,989,456, 29.1.35. Appl., 21.7.33. Ger., 29.7.32).—Mixtures of MgCl₂ 21—38, KCl 6—9, NaF 0.5—3, CaF₂ 0.5—3, and MnO₂ or Mn₂O₃ 0.2—10 pts. are claimed. A. R. P.

Working of aluminium. H. D. MONSCH, Assr. to ALUMINUM Co. OF AMERICA (U.S.P. 1,989,242, 29.1.35. Appl., 6.4.33).—In the manufacture of rivets of a heat-treatable Al alloy the wire or rod is annealed at > 480°, quenched, and cold-worked to a reduction of 20—50% prior to passing it to the up-setting process. A. R. P.

Improving the resistance to corroding agents of aluminium-base alloys. I. G. FARBENIND. A.-G. (B.P. 438,512, 11.4.34. Ger., 9.6.33).—Al alloys containing Mg 3—12 and Zn 2—6% are heat-treated to obtain a homogeneous solid solution, which is quenched and reheated at 100—200° to cause all the MgZn₂ and part of the Al₃Mg₂ to be in a finely-dispersed form. A. R. P.

Phosphoric acid metal-cleaning and rust-preventing solution. W. K. SCHWEITZER, Assr. to

GRASSELLI CHEM. CO. (U.S.P. 1,992,045, 19.2.35. Appl., 1.7.32).—A 2 : 2 : 3 mixture of 85% H_3PO_4 , EtOH, and 1—5% aq. sulphonated oil (castor, maize, cottonseed, or fish) or a Na or NH_4 salt thereof is claimed. L. C. M.

Rust remover. C. WINNING and J. TUTTLE, ASSRS. to STANCO, INC. (U.S.P. 1,988,823, 22.1.35. Appl., 26.1.32).—Claim is made for a solution of NH_4Cl or $(NH_4)_2SO_4$ 100, NH_4OAc or NH_4 citrate 50, sugar 18, glue or Na alginate 18, and pyrogallol or quinol 1 lb. in 100 (U.S.) gals. of H_2O . A. R. P.

Composite metallic articles. [Oxide-coated aluminium mirrors.] ALUMINUM CO. OF AMERICA, ASSEES. OF J. D. EDWARDS (B.P. 440,287, 25.9.34. U.S., 11.10.33).—The mirrors are made of Al or an Al alloy coated with Al of purity $> 99.5\%$ which has been rolled to $< 85\%$ reduction and subsequently treated to produce on the Al surface a hard, protective, transparent oxide film. A. R. P.

Electric welding composition [flux]. UNION CARBIDE & CARBON RES. LABS. INC., ASSEES. OF L. T. JONES, H. E. KENNEDY, and M. A. ROTERMUND (B.P. 438,855, 20.2.34. U.S., 21.2.33 and 9.1.34).—Claim is made for mixtures containing 75—99% of a fusible silicate ($CaSiO_3$ or $MgSiO_3$) with CaF_2 and Al_2O_3 . A. R. P.

Electrodeposition of nickel. HARSHAW CHEM. CO. (B.P. 438,412, 13.5.35. U.S., 14.2.35).—A sol. gluconate or a sulphonated alcohol ($> C_3$) is added to Ni-plating baths to reduce the surface tension to < 50 dynes per cm. A. R. P.

Nickelling process applicable to all metals and particularly to those which are more electro-negative than nickel. H. TICHAUER and J. FRASCH (B.P. 438,293, 26.11.34).—The articles are cleaned anodically in a solution of a Zn salt, and then plated in an alkaline bath containing $NiCl_2$ 18—20, $NaOH$ 6—8, malonic acid 1—2, and $NaCl$ 1—3%. A. R. P.

Production of printing plates. E. SHIPPIN (B.P. 439,115, 29.5.34).—The matrix for casting printing plates in type metal is prepared by electrodeposition of Cu directly on to the face of the type or original plate. A. R. P.

Deposition of [precious] metal [on textile threads] by electrode dispersion. CATHODE CORP., LTD., H. W. WHISTON, G. A. B. McIVOR, and F. W. N. THEIN (B.P. 440,183, 21.4.34).—Mechanical devices for running the thread through the vac. chamber are claimed. A. R. P.

Obtaining alkaline-earth metals [magnesium] by electrolysis. G. N. KIRSEBOM, and CALLOY, LTD. (B.P. 439,204, 2.6.34).—A fused chloride bath is electrolysed, using an anode of an alloy of Pb or Cd with the Mg or other alkaline-earth metal. The Mg content of the anode is replenished by periodic treatment with a Mg—Al alloy, the Al being withdrawn from the surface before returning the alloy to the bath. A. R. P.

Plating of aluminium. LONDON ALUMINIUM CO., LTD., and W. A. BURFORD (B.P. 438,228, 25.8.34).—The oxide film is removed by immersion in conc. aq. $NiCl_2$, $Ni(BF_4)_2$, or $FeCl_3$ and the resulting metal (Ni or Fe) film removed by immersion in an acid prior to plating with Cr or Ni. A. R. P.

Zinc coating of a ferrous article. A. H. STEVENS. From INDIANA STEEL & WIRE CO. (B.P. 438,896, 25.5.34).—See U.S.P. 1,984,335; B., 1936, 331.

Be. Rh-plating.—See VII. Metal-refining furnace.—See XI. Protective finish for metals.—See XIII.

XI.—ELECTROTECHNICS.

Linear rise in temperature of resistance furnaces and the recording, as a function of time, of the mass and the temperature of a substance subjected to progressive heating. P. VALLET (Bull. Soc. chim., 1936, [v], 3, 103—121).—A crit. review of devices previously used is made and improvements in method are given. Three types of balance, viz., an electrical heating device using a $CuSO_4$ rheostat together with a Hg-regulated auxiliary furnace, and two optical methods for registering simultaneously, on a photographic plate, a curve showing change of mass of the heated material with time together with one representing change of temp. with time, are described. $ZnSO_4 \cdot 7H_2O$ has been re-examined, using the new apparatus, and the results obtained agree with those reported previously (cf. A., 1934, ii, 859). E. E. A.

Application of the "Photronic" photocell to chemical processes. M. E. FOGLE (Trans. Electrochem. Soc., 1936, 69, Preprint, 183—196).—Technical data on the solid photovoltaic type of light-sensitive cell are given. Application to the control of processes, checking of outputs, and other uses are discussed. J. W. C.

Polar characteristics of electrical insulation-dielectric dispersion. C. F. HILL (Trans. Amer. Inst. Chem. Eng., 1935, 31, 249—255).—Relationships between dielectric loss and the presence of dipoles in a no. of materials are discussed. CH. ABS. (p)

Effect of certain impurities in the forming acid on plate-forming time. J. E. HATFIELD and H. R. HARNER (Trans. Electrochem. Soc., 1936, 69, Preprint, 161—169).—Fe (as $FeSO_4$) promotes self-discharge and increases the formation time of both positive and negative plates. Cl (as HCl) if $> 0.05\%$ prevents clearing of SO_4^{--} from both plates. 9% Na (as Na_2SO_4) reduces the formation time by 9 amp.-hr. V (as V_2O_4) exceeding 0.01% greatly increases the formation time of the negative plate and prevents clearing of the positive plate. 3% HCO_2H increases the formation time of the positive plate from 210 to 314 amp.-hr., and to a lesser extent that of the negative plate, tending to cause blistering of the latter. 2% $H_2C_2O_4$ increases the rate of rise of formation voltage, prolongs the clearing time, and causes negative-plate blistering. Small amounts of Sb and Mg (as sulphates) have no effect. J. W. C.

Welding. X-Ray screens for steel. Be—Cu switch spring. Protecting cast Fe from corrosion. Removal of metallic coatings and rust. Hardness of Ni deposits. Electrolytic solder. Amalgamation of Au ores.—See X. Determining soil reaction, and redox capacity of soils.—See XVI.

PATENTS.

Induction furnaces [for refining metals]. SIEMENS & HALSKE A.-G. (B.P. 444,000, 7.8.35. Ger., 9.8.34).—

A furnace having two energising inductive systems arranged normal to one another, the inner serving to heat the charge, and the outer producing movement of the metal bath, is claimed. J. S. G. T.

Manufacture of [electrical] heating elements. C. H. BOYLES, Assr. to HEATING UNIT CORP. (U.S.P. 1,989,736, 5.2.35. Appl., 13.6.32).—Moulded rods of a mixture of SiC with aq. Na silicate (d 1.26) are dried at 150°, heated to 1100°, cooled, packed in a mixture of bentonite (10), graphite (40), and SiO₂ flour (50%), and heated by the passage of a current to sinter the SiC. L. C. M.

Apparatus for [electrically] heating glue or other solids or liquids, such as, e.g., waxes, tallows, or oils. C. L. WHITNEY, and BARLOW-WHITNEY, LTD. (B.P. 444,124, 15.11.34).—A detachable, electrically heated glue pot (P) is provided with a thermostat (T) in a pocket of the side wall of the casing of the apparatus, T being pressed against P by springs. B. M. V.

Electric primary cells. C. J. GORDON (B.P. 423,301 and Addn. B.P. 443,983, [A] 24.5. and 23.8.33, [B] 27.11.34).—In a cell including a Mg electrode and fibrous material accessible to air, the latter is impregnated with a solution of (A) KI, KBr, and/or CaCl₂, (B) NaBr, NaI, CaBr₂, CaI₂, and/or KCl. B. M. V.

Polarising electrolyte. P. E. EDELMAN, Assr. to R. T. MACK (U.S.P. 1,990,274, 5.2.35. Appl., 3.9.29).—A mixture of glycerin (10) and gum arabic (3–4 pts.) is heated, and Al₂O₃, ZnO, powdered charcoal, MgO, or BaO added to form a cement, which is applied to electrolytic condenser surfaces. L. C. M.

Electric-discharge lamps. GEN. ELECTRIC CO. LTD. FROM PATENT-TREUHAND GES. F. ELEKTR. GLÜHLAMPEN M.B.H. (B.P. 438,910, 28.8.34).—The inner wall of a Hg-vapour lamp is provided with a fluorescent mixture of ZnSiO₃ (93) and CaWO₄ (7%), to obtain substantially white light. A. R. P.

Electric-discharge (A) lamps, (B) devices. GEN. ELECTRIC CO., LTD. FROM PATENT-TREUHAND GES. F. ELEKTR. GLÜHLAMPEN M.B.H. (B.P. 444,119 and 444,132, [A] 5.10.34, [B] 19.12.34).—(A) The anode comprises a no. of fine wires directed towards the cathode or of small helices with their axes likewise directed. The cathode is of uncoated metal, but the anode wires are preferably coated with insulating material except at their tips. Cs is present in the atm. (B) For ultra-violet radiation the bulb is of glass (A) selected to be highly transparent to that radiation and is thinly coated on the inside with glass (B) less transparent but more resistant to the discharge, i.e., of higher softening point (S). A comprises SiO₂ 74–75.5, B₂O₃ 15–13.5, Na₂O 7–9, Al₂O₃ 4–2%; S is 550–600°. B comprises SiO₂ 58–50, B₂O₃ 1, Al₂O₃ 28–25, MgO 8, CaO 5–6, BaO 0–5, P₂O₅ 0–5%; S is 720–740°. Luminescent material, e.g., ZnSiO₃ or CaWO₄, may be applied to the bulb. B. M. V.

Electric-discharge devices. M.-O. VALVE Co., LTD., R. W. REES, and C. J. SMITHELLS (B.P. 443,796, 12.10.34).—The bulb is coated externally with a Pb alloy (cf. B.P. 438,552; B., 1936, 505), which is ductile when cold but brittle near the m.p., by feeding powdered

alloy into a flame and projecting it on to the bulb by a blast, the temp. of the bulb not rising above 50°.

B. M. V.

Electric-discharge devices. M.-O. VALVE Co., LTD., and G. R. JESSOP (B.P. 443,954, 7.8.34).—Emission from the cathode is improved by coating (by electroplating) the anode with Cu or Ag, the anode core being of Ni or other metal having sufficient resistance to heat up by eddy currents only. B. M. V.

Electric-discharge devices [lamps]. GEN. ELECTRIC Co., LTD., H. G. JENKINS, and J. W. RYDE (B.P. 438,727, 22.5.34).—Cu or Ni-Fe alloy electrodes coated internally with sublimed Ba form each end of the glass tube. A. R. P.

Production of multiple electron-discharge devices. S. LOEWE (U.S.P. 1,990,041, 5.2.35. Appl., 12.6.30. Ger., 7.6.29).—In a thermionic valve containing ≤ 2 electrode systems, the cathodes are coated with a highly-emissive film containing Ba, liberated by heat from pockets attached to one of the anodes. L. C. M.

Flash-light lamp. J. A. M. VAN LIEMPT and P. LEYDENS, Assrs. to N. V. PHILIPS' GLOEILAMPENFABR. (U.S.P. 1,989,572, 29.1.35. Appl., 20.4.30. Holl., 2.7.31).—The bulb is filled with a 1:1.5–3.5-vol. mixture of CS₂ and NO which is flashed by passing a current through a thin resistance wire in the centre. A small quantity of a Sr compound may be added to increase the actinic effect. A. R. P.

Getter for incandescence lamps. E. DIETZ, Assr. to WESTINGHOUSE LAMP Co. (U.S.P. 1,989,790, 5.2.35. Appl., 27.11.29).—A mixture of Cu₃P₂ (1 pt.) with Na₃AlF₆ (1–100 pts.) is claimed. L. C. M.

Carrying out chemical reactions by means of electric discharges. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 444,526, 27.6.35. Ger., 28.6.34).—During the electrical treatment the gases are also put into acoustical oscillation by means of sirens or whistles; the reaction space should have a fundamental resonant note corresponding to the frequency of the a.c. used for the electrical discharges. B. M. V.

Electron-emitting cathodes. MARCONI'S WIRELESS TELEGRAPH Co., LTD., and A. J. YOUNG (B.P. 439,048, 28.5.34).—Cathodes for cathode-ray tubes comprise a long Ni tube almost closed at one end and containing a bonded mixture of BaCO₃ and SrCO₃ with a heating element embedded therein. A. R. P.

Thermionic electrodes. GEN. ELECTRIC Co., LTD. FROM PATENT-TREUHAND GES. F. ELEKTR. GLÜHLAMPEN M.B.H. (B.P. 438,683, 6.11.34).—The cathodes comprise a rod of Ba and Sr and/or their oxides surrounded by a W spiral and enclosed in a metal cylinder coated internally with a thick layer of BaO. A. R. P.

[Supporting assembly for electrodes of] electron-discharge devices. STANDARD TELEPHONES & CABLES, LTD., and V. L. RONCI (B.P. 439,000, 4.1.35. U.S., 3.5.34).—An Invar-Ni bimetallic strip is employed. A. R. P.

Electrostatic precipitation of suspended matter from gas. STURTEVANT ENG. Co., LTD., and H. W. WAGNER (B.P. 444,333, 1.11.34).—The live electrodes

comprising wires or rods are transverse to the flow of gas, each one having a strip-like receiving electrode immediately after it in the direction of flow of gas; the "strip" may have various cross-sections. B. M. V.

Apparatus for electrical precipitation of suspended particles from gaseous fluids. LODGE-COTTRELL, LTD. FROM RESEARCH CORP. OF NEW YORK (B.P. 444,660, 28.11.34).—Methods of supporting the discharge electrodes are described. B. M. V.

Electrical treatment of gaseous fluids. LODGE-COTTRELL, LTD. FROM RESEARCH CORP. OF NEW YORK (B.P. 444,459, 27.8.35).—In an electrostatic precipitator, the inlet and outlet are in the same direction (preferably vertical) and the flow during the actual treatment is at right-angles (horizontal annular flow). B. M. V.

Apparatus for measuring the thickness, moisture content, or other characteristics of materials. L. MELLERSH-JACKSON. FROM FOXBORO Co. (B.P. 444,056, 28.10.35).—The material to be tested forms part of a condenser in an oscillatory circuit which is energised from another oscillatory circuit through an aperiodic, loosely coupled circuit. The claims are mainly electrical. B. M. V.

Dielectric materials. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 443,257, 26.10.34. U.S., 27.10.33).—A pentahalogenated Ph_2 is nitrated (at 100–110°) with conc. HNO_3 - H_2SO_4 until viscous, semi-resinous compounds are formed. These are washed (H_2O and alkali), and dried to yield non-sludging dielectrics that are non-inflammable under arcing. [Stat. ref.]

E. J. B.

Electric insulating material [asbestos board]. BRIT. THOMSON HOUSTON Co., LTD. (B.P. 438,337, 28.6.35. U.S., 30.6.34).—Board made of asbestos bonded with Portland cement is soaked at 150° in a molten 1:2 mixture of paraffin and carnauba waxes. A. R. P.

Electric-current rectifiers. S. RUBEN, ASSR. TO RUBEN RECTIFIER CORP. (U.S.P. 1,989,463—4, 29.1.35. Appl., [A] 9.11.33, [B] 18.6.32).—Dry rectifiers consist of plates of (A) Mg and CuS arranged around a central core of S or Se to supply S or Se to the CuS during use, or (B) Si or a silicide and Be, Mg, Al, or Zn. A. R. P.

Cores for high-frequency coils. H. VOGT (B.P. 438,612, 1.6.34. Ger., 1.6.33).—A mixture of magnetic powder and a thermoplastic insulating binder, e.g., a resin or a solid Cl-derivative of C_{10}H_8 , is extruded into shape and hardened by heat-treatment. A. R. P.

Electrolytic condensers [with folded or pleated electrodes]. DUBILIER CONDENSER Co. (1925), LTD., ASSEES. OF W. DUBILIER and J. OPPENHEIMER (B.P. 438,934, 8.4.35. Ger., 9.6.34).

Electrolytic condensers. DUBILIER CONDENSER Co. (1925), LTD. (B.P. 444,542, 27.8.35. Ger., 1.10.34).

[Sealing arrangement for] electrolytic condensers. DUBILIER CONDENSER Co. (1925), LTD. (B.P. 445,328, 15.8.35. Ger., 21.12.34).

[Sealing-in of electrodes of] electron-discharge devices. TELEFUNKEN GES. F. DRAHTL. TELEGRAPHIE M.B.H. (B.P. 445,285—7, 4.10.34. Ger., 7.10.33).

Sealing of electric conductors into glass or like material. A. WEST & Co., LTD., and E. BABLER (B.P. 444,138, 19.2.35).

[Insulated] rapping mechanism used in electrostatic precipitation of particles from gas. STURTEVANT ENG. Co., LTD. FROM SOC. DE PURIFICATION INDUSTRI. DES GAZ (B.P. 444,426, 15.1.35).

Dielectric F compounds.—See III. Fluorescent substance. Be. Rh-plating.—See VII. Ultra-violet-light-transparent glass.—See VIII. Magnets. Magnetic dust cores. Ferromagnetic alloys. Resistance alloys. Insulation of wire. Lead-in wire. Recovering Au. Welding flux. Ni-plating. Printing plates. Depositing metals on threads. Mg by electrolysis. Plating Al.—See X. Heat-stable polystyrol.—See XIII. Spreading etc. rubber dispersions.—See XIV.

XII.—FATS; OILS; WAXES.

Component glycerides of cacao butter. T. P. HILDITCH and W. J. STAINSBY (J.S.C.I., 1936, 55, 95—101 τ).—Cacao-butter glycerides are shown to be made up approx. as follows (wt.-%): oleopalmitostearins (I) 52, oleodistearins (II) 19, steardioleins (III) 12, palmitodioleins (IV) 9, oleodipalmitins (V) 6, palmitostearins 2%. Much of the trebly-mixed glyceride must be β -palmito-oleostearin; β -oleodipalmitin and β -oleodistearins are probably the isomerides of these types mainly present, while both α - and β -steardiolein may occur. The molar proportions of (I), oleostearins (30), and oleopalmitins (15) are in the order characteristic of even distribution of the total fatty acids [oleic (VI) 40, stearic (VII) 34, palmitic (VIII) 26] among the triglyceride mols.; the amount of (II) is $>$ that of (III), but that of (V) is $<$ that of (IV). Further, nearly half of the fat is made up of binary combinations in which (VII) and (VI), or (VIII) and (VI), are concerned; similar combinations with (VIII) and (VII) occur in insignificant quantities. The proportions of (III) and (IV) observed are almost exactly those which would result if the unsaturated acids of the fat were divided in the relative proportions of the (VIII) and (VII), and united separately with the latter to form mono- and di-oleoglycerides. The (V) and (II) occur in much smaller quantities than those corresponding with this calculation: of the total mono-oleoglycerides, $\frac{2}{3}$ are (I), the remaining third alone consisting of either (II) or (V). An optically inactive *dibromostearopalmitostearin*, m.p. 27–28°, is described.

Detection of adulteration of butter fat (ghee). N. N. GODBOLE (Current Sci., 1936, 4, 578–581).—A review of current Indian standards for the purity of butter fat, together with suggested improvements for the detection of adulteration. F. N. W.

Wetting and spreading properties of aqueous solutions. Mixtures of oleic acid with potassium hydroxide, potassium carbonate, and ammonia. H. L. CUPPLES (Ind. Eng. Chem., 1936, 28, 434–436).—Determinations of the surface and interfacial tensions and of the spreading coeff. of the different mixtures on refined paraffin oil indicate that K and Na compounds behave similarly (B., 1935, 1129). The wetting properties of

mixtures containing KOH or NaOH are adversely affected by even a slight excess of alkali above a concn. equiv. to the oleic acid present. As this is not the case for carbonates or aq. NH_3 , the action is apparently due to OH^- . This probably explains why it appears advantageous to add to washing compounds substances such as silicates or phosphates which will buffer the OH^- .

M. S. B.

Perilla oil. R. PRIESTER (Verfkroniek, 1936, 9, 100—101).—Erroneous figures given by van Loon (B., 1936, 419) are corr.

D. R. D.

Perilla oil. J. VAN LOON (Verfkroniek, 1936, 9, 101; cf. preceding abstract).—The errors are admitted.

D. R. D.

Manufacture of oils for the paint and varnish industry. R. PRIESTER (Verfkroniek, 1936, 9, 99—100).—A review.

D. R. D.

Significance of individual constants of oils in comparative analyses. E. V. DODONOVA and Z. P. PRIZEMINA (Bull. Appl. Bot. U.S.S.R., 1934, [iii], No. 5, 223—253).—The acid and I vals. suffice to characterise common plant oils. The Ac val. differentiates oils of the ricinoleic series.

CH. ABS. (p)

Chemical and physical constants of cod-liver oil and their alteration under varied conditions of storage. H. R. V. LINDHOLM (Dansk Tidsskr. Farm., 1936, 10, 25—59).—Manufacturing processes are reviewed and criticised. Attempts to bleach or deodorise cod-liver oil (I) lead to complete loss of vitamin-A. Analyses of 15 representative pharmaceutical oils show remarkable constancy of composition. Samples were stored under varying conditions and investigated at intervals of two months for two years. -A is quickly reduced to zero by air and light, but the effect of temp. is slight. (I) is best stored in completely filled dark bottles, well stoppered, and kept cool. Under these conditions -A remains const. for long periods. The Carr-Price test is reliable for rough investigations; the H_2SO_4 test and other measurements remain within the specified pharmacological limits even when the -A content is nil; vals. outside these limits always denote absence of -A owing to oxidation. Further oxidation leads to increase of η and acidity, and to a decrease in I val. The colour of (I) bears no relation to -A, being due to Fe^{II} oleate, derived partly from natural Fe in the fish and partly from the extraction vessels. Oxidation yields the darker Fe^{III} oleate. The high acidity of veterinary (I) is due to fermentation processes occurring during extraction and does not necessarily denote low -A. Highly oxidised (I) gives a characteristic black coloration on saponification. The prep. of extracts for spectrography and the quant. Carr-Price test is discussed. Determinations are best made on the unsaponifiable portion of the (I). Sterols are removed by freezing out from MeOH, or by pptn. with digitonin, and the -A loss is determined by comparison with halibut-liver oil of high -A content. The measurements have been checked biochemically. -D is less affected by air, and 50% of the -A in (I) may be oxidised without detectable change in -D.

M. H. M. A.

Lubricants.—See II. **Tung oil in varnishes.**—See XIII. **Aleurites.**—See XVI. **Milk fat. Cottonseed cake.**—See XIX.

PATENTS.

Cleansing of rigid materials. W. W. GROVES. From DR. A. WACKER GES. F. ELEKTROCHEM. IND. G.M.B.H. (B.P. 444,818, 27.9.34).—Degreasing is effected at elevated temp. by an emulsion of H_2O and a volatile solvent for fat (prepared with the aid of an agent comprising an alkaline salt of a fatty or resin acid, an insol. metal soap, or a textile wetting agent) in conjunction with (before or after) a cold, hot, or vaporised solvent (e.g., chlorinated hydrocarbon) for the fat.

B. M. V.

Lubricants.—See II. **Condensation products. Emulsifiers. Thickening agents.**—See III. **Silicate detergents.**—See VII. **Oils from rubber.**—See XIV. **Rendering fish etc.**—See XIX.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Paint-plant equipment. J. M. SANDERSON (Drugs, Oils, and Paints, 1936, 51, 100—101).—The different types of plant used in the manufacture of varnishes, paints, and lacquers are briefly described.

D. R. D.

European paint and varnish equipment. ANON. (Paint, Oil, and Chem. Rev., 1936, 98, No. 6, 9—11).—A descriptive article, dealing particularly with the differences between European and American practice.

D. R. D.

Manufacture of paints and varnishes. F. KOLKE (Farben-Chem., 1934, 5, 370—373, 451—454; 1935, 6, 49—52, 89—92, 173—176, 252—254, 297—298, 325—330, 372—374, 449—452; 1936, 7, 91—93, 125—126).—Recent developments in the industry are discussed. Particular reference is made to nitrocellulose and cellulose acetate lacquers, chlorinated rubber, glyptal resins, Al and Al-bronze products, tinplate stoving finishes, production of matt effects, rust-preventive paints and protection of Al alloys, removal of old paint films and rust, and methods for clearing varnishes.

S. M.

Copper paint. ANON. (Ind. Finishing, 1936, 12, No. 5, 24—26).—The use of Cu powder as a pigment for priming paints for Fe is described.

D. R. D.

Oil, nitrocellulose, and artificial resin as binding media for paints etc. S. BAKONYI (Farbe u. Lack, 1936, 185—186, 197—198).—A discussion.

Paint in the petroleum industry. H. B. FOOTNER (Petroleum Times, 1936, 35, 399—408).—The painting of steel storage tanks is discussed.

R. B. C.

House primers for southern [United States] climates, especially for yellow pine. E. M. FAIRBROTHER *et al.* (Off. Digest, 1936, No. 154, 82—83).—A paint made from Al powder and spar varnish forms the most suitable primer.

D. R. D.

Aluminium powder in southern [United States] paint formulation. R. I. WRAY (Off. Digest, 1936, No. 154, 102—105).—Al primers led to the greatest durability on southern pine.

D. R. D.

Rubber in paints. S. C. STOKES (Bull. Rubber Growers' Assoc., 1936, 18, 107—117).—Rubber solutions, the η of which has been reduced by oxidation in presence of Co linoleate, impart free-flowing and non-settling properties to paint, and their addition is of particular

advantage with flat paints and undercoatings. Such dissolved rubber is also of advantage in the prep. of H_2O -paints, for which purpose, however, latex may alternatively be adapted. Formulæ are given for various typical rubber-containing paints. D. F. T.

Determination of turpentine and volatile thinner in paints and pastes. S. CHIERT (Chem. Analyst, 1935, 24, No. 2, 10).—The sample is distilled with H_2O and the vol. of immiscible liquid collected in a trap is measured. CH. ABS. (p)

Weather-resistance of casein paints. H. WULF (Farbe u. Lack, 1936, 171—172).—The prep. of various kinds of casein is outlined. For weather-resistant films Ca caseinate must be used; the Na compound is H_2O -sol. S. M.

Manufacture of lithopone. J. P. RUTH (Off. Digest, 1936, No. 154, 112—117).—The process is described. D. R. D.

Formulating varnishes with American tung oil. E. CORDON *et al.* (Off. Digest, 1936, No. 154, 79—81).—A discussion of experiences in the use of the oil in varnishes. It has lower acid val. and paler colour, and polymerises more rapidly, than the Chinese oil. D. R. D.

Modern trends in the lacquer industry. D. TRAIL (Oil and Col. Trades J., 1936, 89, 1109—1112).—The manufacture, properties, and uses of cellulose nitrate and acetate, methyl-, ethyl-, and benzyl-cellulose, polymerised vinyl acetate and chloride, polymerised divinylacetylene, chlorinated rubber, and rubber hydrochloride are described. D. R. D.

[Cellulose nitrate] lacquers versus synthetics. J. R. STEWART (Ind. Finishing, 1936, 12, No. 5, 5—8, 59).—A discussion of their relative merits. D. R. D.

Lacquer testing. H. E. EASTLACK (Paint, Oil, Chem. Rev., 1935, 97, No. 9, 22, 24, 26—27).—Methods are discussed. CH. ABS. (p)

Coating photographs [and labels] with protective transparent finishes. E. PERRY (Ind. Finishing, 1936, 12, No. 5, 46—51, 61).—Instructions for making suitable varnishes and lacquers are given. D. R. D.

Synthetic stoving finishes. E. ASHETON (Paint Manuf., 1935, 5, 161—163).—A $PhOH-CH_2O$ resin prep. is described. CH. ABS. (p)

Naphthenate driers. S. N. GREENFIELD (Paint Manuf., 1935, 5, 154—155).—Description and application of the driers are given. CH. ABS. (p)

Accelerated weathering. E. H. HARVEY (Paint, Oil, and Chem. Rev., 1936, 98, No. 6, 12—13).—The use of the "Weather-Ometer" is described. D. R. D.

Shellolic acid. R. BHATTACHARYA (Chem. & Ind., 1936, 309).—Nagel's shellolic acid (m.p. 200—201°) has been isolated from the mixed acids in lac (cf. B., 1935, 465). Its Me_2 ester has m.p. 149°. S. M.

Organic glasses [resins]. G. T. MORGAN, N. J. L. MEGSON, and E. L. HOLMES (Chem. & Ind., 1936, 319—324, and J. Soc. Glass Tech., 1936, 20, 35—44 r).—A discussion of the prep., properties, and structure of synthetic resins available as glass substitutes.

Varnish driers from C_6H_6 "overhead."—See II. **Safety glass.**—See VIII. **Repainting mildewed surfaces.**—See IX. **Oils for paints etc.**—See XII.

PATENTS.

Removal of coating materials, e.g., paint, from metal and the like fireproof surfaces. I. H. MASSEY and J. J. WILLIAMS (B.P. 438,382, 29.6.34).—A tubular furnace with mechanical scrapers is claimed. A. R. P.

Colour lake. W. S. CALCOTT, P. W. CARLETON, and H. I. STRYKER, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,999,395, 30.4.35. Appl., 27.5.30).—A basic dye, e.g., Victoria Blue B, Ethyl Violet, is mixed, in aq. solution, with an alkylamine, e.g., NH_2Bu_2 , NPr_3 , or a salt thereof, and a complex inorg. acid, e.g., phosphotungstic, silicotungstic, or phosphomolybdotungstic acids, phosphomolybdic acid, or the reduced complex acids (cf. B.P. 292,253; B., 1928, 603). Lakes of exceptional light-fastness are claimed. A. W. B.

Protective finish [for metals]. M. J. CALLAHAN, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,003,068, 28.5.35. Appl., 5.8.31).—An oil-modified alkyd resin is applied on a nitrocellulose coating. S. M.

Liquid coating composition. H. HECKEL, Assr. to EMERY INDUSTRIES, INC. (U.S.P. 2,001,422, 14.5.35. Appl., 1.3.30. Cf. B.P. 360,948; B., 1932, 234).—Casein, glue, or other H_2O -sol. colloid is emulsified with H_2O , a mineral oil, and "mahogany sulphonates." Pigments and fillers may be incorporated. S. M.

Preparation of emulsions of thermoplastic materials. A. W. HIXSON and J. M. FAIN (U.S.P. 2,002,505, 28.5.35. Appl., 23.2.32).—Liquid asphalt, or tar, pitch, etc. is agitated in a hot aq. solution of an emulsifying agent, e.g., soap; tannin (I) and a protective colloid, e.g., casein (II), are added. (II) is then pptd. by a heavy-metal salt, e.g., $FeSO_4$, which also converts (I) into a tannate sol which is stable to electrolytes and irreversible when dried. A dry film of the product is H_2O -resistant. S. M.

Vulcanised asphalt oil and product containing it. H. S. HOLT, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,002,634, 28.5.35. Appl., 7.3.30).—"Asphalt oil" (cf. U.S.P. 1,931,110; B., 1934, 670) obtained by distilling asphalt in presence of S until the wt. loss is 22—25%, is used as the basis of coating compositions. S. M.

Plastic composition. M. OMANSKY, Assr. to E. W. COLLEDGE, GEN. SALES AGENT, INC. (U.S.P. 2,001,311, 14.5.35. Appl., 31.3.32).—To produce a true black colour and promote flow during moulding, 5% of ground charcoal is incorporated with a phenol-aldehyde or other synthetic resin (I). Fillers are added so that the quantity of (I) is ≥ 43 vol.-% of the mass. S. M.

Production of [resinous] vinyl derivatives. KODAK, LTD. (B.P. 443,324, 20.5.35. Fr., 23.5.34. Addn. to B.P. 437,368; B., 1936, 110).—The process of the prior patent is extended to the use of other acid-reacting catalysts (I), e.g., H_2SO_4 , using a slight excess of (I) over the quantity found necessary in preliminary experiments to give the desired η of the solution of the product in org. solvents. A. W. B.

Manufacture of artificial masses. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 444,697, 25.9.34).—Polymerides of halogenated butadienes, e.g., β -chloro- Δ -butadiene, are chlorinated in a suitable solvent. The product may be stabilised by heating in presence of an alkali, e.g., Na_2CO_3 . S. M.

Manufacture of heat-stable polystyrol. DYNAMIT A.-G. VORM. A. NOBEL & Co. (B.P. 443,405, 25.5.35. Ger., 23.7.34).—The Martens softening point is raised to $> 80^\circ$ on heating polystyrene at $> 160^\circ$ for long periods, e.g., at 90° for 72 hr. The period may be shortened by raising the temp. or reducing the pressure. A. W. B.

Production of [modified alkyd] synthetic resins and coating compositions therewith. I. ROSENBLUM (B.P. 444,021, 7.9.34).—A polyhydric alcohol (glycerol), $o\text{-C}_6\text{H}_4(\text{CO}_2\text{H})_2$ (I), and drying-oil acids (II) in sufficient quantity to render the product sol. in drying oils are heated with a polybasic aliphatic acid, e.g., maleic [$> 15\%$ of (I)]. Condensation is aided by addition of H_3BO_3 , and (II) may be replaced by phenol-aldehyde and acidic natural resins. The products yield pale films when baked. 11 examples are given. S. M.

Production of synthetic resin. J. M. WEISS, Assr. to WEISS & DOWNS, INC. (U.S.P. 1,999,380, 30.4.35. Appl., 17.11.33).—A monosaccharide, e.g., glucose, is treated with an org. dibasic acid or the anhydride thereof, e.g., maleic or phthalic anhydride, at $> 170^\circ$. The type of resin obtained depends on the nature of the reactants and the conditions of reaction. A. W. B.

(A) Emulsions of synthetic resins. (B) Synthetic resin. (C) Plasticised synthetic resin. H. P. BILLINGS and D. A. HURST, Assrs. to RADIO CORP. OF AMERICA (U.S.P. 1,999,715—7, 30.4.35. Appl., 30.6.32).—(A) A condensation product of $\text{PhOH-CH}_2\text{O}$ type, e.g., resorcinol- CH_2O , is emulsified in H_2O by means of a saponifiable wax (beeswax) in presence of an alkaline salt (borax). (B) Resorcinol (4 pts.) and cresol (1—6 pts.) are caused to react with CH_2O in presence of $p\text{-NO}_2\text{-C}_6\text{H}_4\text{-NH}_2$. (C) A raw fatty oil, a blown drying oil, and oil fatty acids are incorporated as plasticisers in synthetic resins (in the early stages of formation). The products in (A—C) are surface coatings for phonograph records. S. S. W.

C black.—See II. BaSO_4 and CaSO_4 .—See VII. Ultra-violet-light-transparent glass.—See VIII. [Painting of] galvanised sheets.—See X.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Blending of rubber and other materials. Master-batches. Treatment of scorched compound. R. P. LAWSON (Trans. Inst. Rubber Ind., 1936, 11, 449—457).—Blending of rubber at various stages of manufacture is the most effective method for reducing variation. Of common compounding ingredients, C black appears to be the only one in need of blending. The incorporation of ingredients, either powders or liquids, as conc. stocks or master-batches in rubber, for subsequent mixing into the remainder of the rubber leads to improved dispersion, greater accuracy and uniformity, and cleaner working. Lightly scorched or prematurely vulcanised rubber mixtures can be restored to a plastic

condition by low-temp. working; for badly scorched material the best procedure is to complete the vulcanisation and then to grind to crumb, which can be used as such or reclaimed. D. F. T.

Russian artificial rubber. ANON. (Chem.-Ztg., 1936, 60, 313—317).—A review, mainly of the SKB process by which butadiene, obtained by heating EtOH vapour with a catalyst, is polymerised in presence of Na. Reference is made also to the products from $\text{CH}_2\text{:CCl:CH:CH}_2$, chloroisoprene, and isoprene, and to the possibility of solvent regeneration of synthetic rubber. D. F. T.

Mixing of sodium-butadiene rubbers of different plasticities. P. I. FEDEROV, L. E. SMOLENSKAJA, and I. A. LEVITIN (Sintet. Kautschuk, 1934, No. 2, 32—37).—Calculation of mixing proportions to produce a given plasticity is described. CH. ABS. (p)

Rubber derivatives. P. SCHIDROWITZ (Trans. Inst. Rubber Ind., 1936, 11, 458—476).—A review of the chemistry and character of certain derivatives of rubber, particularly the *cyclorubbers* obtained by the action of sulphonic acids or SnCl_4 , and the products obtained by addition of Cl_2 , HCl , or O_2 . D. F. T.

Some practical consequences of the chemical character of rubber. D. F. TWISS (Trans. Inst. Rubber Ind., 1936, 11, 491—504).—The technically important properties of rubber are grouped according to their dependence on (a) the composition, (b) the chemical unsaturation, and (c) the mol. magnitude of the caoutchouc hydrocarbon. D. F. T.

Determination of mineral matter in soft rubber goods with active turpentine oil as solvent. T. EBE (J. Soc. Rubber Ind. Japan, 1935, 8, 1—14).—Turpentine oil after oxidation in daylight dissolves soft rubber on boiling. Undissolved residues are collected and washed with Et_2O , CHCl_3 , and EtOH. CH. ABS. (p)

Commercial protective agents against ageing of rubber. Preparation of sponge rubber for filtration. T. UTSUNOMIYA (Rept. Imp. Ind. Res. Inst., 1931, 12, No. 13, 42 pp.).—Comparative tests are described. The prep. of acid- and base-resistant filter sponges is given. CH. ABS. (p)

Rubber in paints.—See XIII. **Rubber in the dairy industry.**—See XIX.

PATENTS.

Natural and artificial rubber latex. I. WILLIAMS and B. DALES, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 2,002,622, 28.5.35. Appl., 20.5.33).—Stabilisation of rubber latices is effected by addition of a sulphonated product (approx. 0.5% on total solids) of abietene, abietane, or abietine. D. F. T.

Production of rubber thread [from latex]. INTERNAT. LATEX PROCESSES, LTD. (B.P. 444,726, 21.6.35. Hung., 20.7.34).—Rubber thread (diam. < 3 mm.) is obtained by leading simultaneously a fibre core and an aq. dispersion of rubber through the same orifice into a coagulant. The core, which is thinner than the thread, has sufficient strength to facilitate weaving etc., but can easily be broken subsequently, the elasticity

of the rubber being thereby liberated without injury to the thread in the finished article. D. F. T.

Manufacture of rubber thread. N. G. MADGE, ASSR. to UNITED STATES RUBBER CO. (U.S.P. 2,002,640, 28.5.35. Appl., 4.5.32).—An aq. dispersion of rubber is passed first through a nozzle (*N*) cooled sufficiently to freeze the dispersion and then, possibly, into a coagulant. The thread thereby takes more accurately the shape of *N*. D. F. T.

Spreading, coating, extruding, or like operations of aqueous dispersions of or containing rubber or the like. INTERNAT. LATEX PROCESSES, LTD. (B.P. 444,582, 21.9.34. U.S., 10.10.33).—An electrical p.d. is maintained between the confining or shaping member and the dispersion, the electric charge on the member being of similar sign to that on the disperse phase of the dispersion, so that H₂O accumulating against the surface of the member acts as lubricant. Apparatus is claimed. D. F. T.

Stabilisation of chlorinated rubber. J. G. MOORE, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 444,636, 24.9.34).—The solution in a volatile org. solvent (CCl₄) is treated with an aq. solution of an antichlor, e.g., NaHSO₃, Na₂SO₃, or Na₂S₂O₃. D. F. T.

Manufacture of hard rubber [ebonite] powder. F. N. PICKETT (B.P. 444,571, 23.8.34).—A mixture of latex and S (< 30% on the rubber) is spray-dried to form a spongy mass, vulcanised without mechanical pressure, and disintegrated. D. F. T.

Purification of oils and spirits obtained by distilling indiarubber. F. N. PICKETT (B.P. 444,654, 6.11.34).—A rubber distillate (particularly the fraction b.p. < approx. 200°) is deodorised and decolorised by heating with a metallic (not Al) chloride, e.g., ZnCl₂ or FeCl₃. D. F. T.

Rubber fabric.—See VI.

XV.—LEATHER; GLUE.

Solubility of vegetable tanning extracts in organic solvents and aqueous mixtures thereof and the tanning properties of the solutions. F. STATHER, R. LAUFFMANN, and T. B. MIAU (Collegium, 1936, 66—74).—Only solvents containing alcoholic OH groups possessed good solvent power for the tanning extracts, and it diminished with the higher members of homologous series. Only quebracho, gambier, and sumac extracts were sol. in esters, and selective solvent power was shown by COMe₂. There was a connexion between solvent power for tanning extracts and the presence of polar groups in the solvent. The solvent power of aq. mixtures of MeOH, EtOH, and COMe₂, respectively, was > that of these solvents or of H₂O alone. Less tannin was fixed by hide powder from solutions in org. solvents than from solutions in H₂O—org. solvent and less from the latter than from aq. solutions of the tannin extracts. Chambard and Mezey's (B., 1925, 370) and Meunier and Rey's (B., 1924, 370) conclusions, that H₂O is necessary for tannage, are confirmed. D. W.

Detailed report of the 1934—35 I.S.L.T.C. Commission on quantitative tannin analysis. J. G.

PARKER (J. Soc. Leather Trades Chem., 1936, 20, 180—188).—The results obtained by different methods of analysis are detailed (cf. B., 1935, 862, 1007).

D. W.

Determining tannins by precipitation with gelatin. P. A. JAKIMOV and G. V. KURSCHAKOVA (Bull. Appl. Bot. U.S.S.R., 1934, [iii], No. 5, 283—289).—Gelatin is added to tannin (I) solutions until no turbidity is noted. Vals. are standardised against known (I) solutions. CH. ABS. (p)

Determination of insolubles in mimosa extracts, with a note on colour measurement. W. J. SEYMOUR and A. W. GREENSTEIN (J. Soc. Leather Trades Chem., 1936, 20, 166—170).—The figures given by the modified Riess method for insol. matter in mimosa extracts are higher than those yielded by the filter-candle method on optically clear solutions, and the difference in the results increases as the solutions become more turbid. The increased time required for their filtration by the Riess method affects the colour of the solutions. All solutions should be filtered in the dark to avoid such discoloration. D. W.

Pickling of sheepskins. III. Pickling in presence of certain disinfectants. W. B. PLEASS (J. Soc. Leather Trades Chem., 1936, 20, 171—180; cf. B., 1935, 280).—The presence of disinfectants, e.g., *p*-NO₂·C₆H₄·OH (0.01%), cresols, C₆H₂Cl₃·OH, β-C₁₀H₇·OH, in pickle liquors deficient in acid content prevented mould growth and preserved the microstructure of pelts treated therewith. D. W.

Sampling of sole-leather bends. M. C. LAMB (J. Soc. Leather Trades Chem., 1936, 20, 165—166; cf. B., 1935, 601).—It is claimed that there is little disparity between analytical results obtained on leathers sampled by the official method and those obtained on strip samples. D. W.

Possible uses of the microscope in qualitative leather analysis. N. JÁMBOR and Z. DEMÉNY (Collegium, 1936, 74—76).—Methods are given for the microscopical detection of Pb and Ba compounds in Cr-tanned leather and of sugar and glycerin in vegetable-tanned leather. D. W.

Viscosity measurement as a method of testing glue. E. SAUER and E. WILLACH (Kolloid-Z., 1936, 75, 95—100).—Standard procedure is discussed. On the basis of experiments with glues of known properties, the American procedure is preferred to the German, with a recommendation for the use of the Vogel-Ossag or Hoespler viscosimeter. E. S. H.

Differentiation of casein and blood-albumin glues in plywood by means of the microscope. B. J. RENDE and G. L. FRANKLIN (J.S.C.I., 1936, 55, 105—106 T).—Microscopical examination shows that casein glue is nearly colourless and has a fine granular structure. Blood-albumin appears distinctly green with an opaque glassy structure. In thin sections of plywood treated with a mixture of eosin and Me-blue in glycerin jelly, casein glue stains purplish pink and blood-albumin wine-red. The wood itself stains pale mauve in contrast to the deep colour of the glue layer.

Determining N in leather.—See XIX.

PATENTS.

Adhesive compositions. DISTILLERS CO., LTD., and P. D. COPPOCK (B.P. 443,223, 22.8. and 27.9.34).—To a commercial protein glue (gelatin) in H_2O is added $\leq 5\%$ of a phenol or its salt with an inorg. base (cresol or NaOPh), sufficient H_2O -sol. solvent (EtOH) to render the mixture fluid in the cold, and smaller amounts of solvents that dissolve or soften the material to be treated; e.g., PhMe and C_2HCl_3 with Lorol (as emulsifier) are used for waxed surfaces. E. J. B.

[Plastic fireproof] adhesive. W. C. WARE, Assr. to E. B. SICKLE (U.S.P. 1,989,833, 5.2.35. Appl., 16.7.31).—A chemically-inert, fireproof adhesive contains Na silicate solution ($d 1.71$) 36 (U.S.) gals., asbestos fibre 160 lb., asbestine 128 lb., and sulphonated castor oil 0.36 (U.S.) gal. L. C. M.

Devices for applying thin layers of liquids [glue]. J. M. WILSON (B.P. 444,546, 3.10.35).

$FeSO_4Cl$.—See VII.

XVI.—AGRICULTURE.

"Terra rossa" and red loams and their relation to other zonal soil types. J. S. JOFFE (Amer. Soil Survey Assoc. Rept. 15th Ann. Meet. Bull., 1935, No. 16, 60—65).—Analyses indicate that "terra rossa" are products of lateritic processes of formation. Red loams examined (south-east United States) show evidence of podsolisation and are transitional between true podsols and true laterites. SiO_2 accumulates in the A_2 horizon, whereas $[R_2O_3]$ and $[PO_4^{''}]$ are low in A and high in B . CH. ABS. (p)

Genesis and morphology of red soils in south-eastern United States. O. C. BRYAN (Amer. Soil Survey Assoc. Rept. 15th Ann. Meet. Bull., 1935, No. 16, 66—69).—Red soils develop from a variety of parent rocks under a mixed forest cover with rainfall 50—60 in. and mean annual temp. of 15.5° . The soils are intermediate between grey forest soils and laterites, podsollic influences being apparent. The colour results from oxidation of Fe without sufficient hydration to produce yellow types. CH. ABS. (p)

Genesis of soil microstructure. L. D. BAVER (Amer. Soil Survey Assoc., Rept. 15th Ann. Meet. Bull., 1935, No. 16, 55—56).—Relations between the size-distribution of aggregates and the clay fraction and org. matter contents are examined in non-lateritic soils. The aggregating effect of org. matter is more marked in soils containing low proportions of clay. No correlation was found between the exchangeable Ca content and the granulation of soil particles. CH. ABS. (p)

Sorption in an ideal soil. W. O. SMITH (Soil Sci., 1936, 41, 209—230).—Mathematical discussion. (Cf. A., 1935, 1316.) A. G. P.

Transmission coefficient of water in natural silts. V. I. VAIDHIANATHAN and H. L. LUTHRA (Punjab Irrig. Res. Inst., Res. Publ., 1934, 5, No. 2, 12 pp.).—In a no. of silts examined, vals. for transmission coeffs. varied much more widely than did those for pore space. CH. ABS. (p)

Azotobacter in Malayan soils. R. A. ALTON (J. Agric. Sci., 1936, 26, 268—280).—Strains of *Azotobacter*

examined do not grow readily on the customary culture media. Development is retarded by $CaCO_3$, but proceeds well in presence of $CaCl_2$ or in absence of $>$ traces of Ca. The organisms have a wide range of acid-tolerance (to pH 3.6). A. G. P.

An optical lever siltometer. V. I. VAIDHIANATHAN (Punjab Irrig. Res. Inst., Res. Publ., 1933, 5, No. 1, 17 pp.).—The method is based on changes in pressure at a cross-section of a column of soil suspension as the particles settle. CH. ABS. (p)

Action of frost on soils. E. A. MITSCHERLICH (Ernähr. Pflanze, 1935, 31, 141—142).—Frost penetration and its influence on soil texture are discussed. A. G. P.

Biological effect of available phosphorus in Hawaiian soils. A. F. HECK (J. Amer. Soc. Agron., 1935, 27, 847—851).—In presence of adequate energy sources available P in laterite soils stimulates bacterial activity, as shown by assimilation of NO_3^- by the organisms. The val. of P in minimising the leaching of N under these conditions is emphasised. A. G. P.

Total base-exchange capacity of soil and its relation to humus and clay content. P. BRUIN (Rec. trav. chim., 1936, 55, 192—204).—The humus and clay content, pH , total base-exchange capacity, and degree of saturation by exchangeable bases have been determined for a no. of soils. F. L. U.

Relation between exchangeable sodium and crop yield in Punjab soils, and a new method of characterising alkali soils. A. N. PURI (Punjab Irrig. Res. Inst., Res. Publ., 1933, 4, No. 5, 4 pp.).—A method is described for determining the "degree of alkalisation" of soils, i.e., the ratio of the amount of exchangeable univalent ions present to that which the soil is capable of binding by exhaustive treatment with neutral salt. Vals. obtained are correlated with wheat yields on soils in which exchangeable Na is the limiting factor. CH. ABS. (p)

Nitrification process [in soils] and plant nutrition. R. E. STEPHENSON (Soil Sci., 1936, 41, 187—196).—The action of the nitrification process in effecting the dissolution of nutrient cations in soils, the part played by NO_3^- in facilitating the entry of cations into plants, and the conditions obtaining in acid NH_3 -accumulating soils are discussed. A. G. P.

Report of [Sudan] Government chemist, 1934. B. W. WHITFIELD (Sudan Govt. Wellcome Trop. Res. Lab. Chem. Sect. Publ., 1934, No. 68, 13 pp.).—Nitrification of $(NH_4)_2SO_4$ in soil proceeded as readily in darkness as in diffuse daylight. Dil. acid or alkali did not extract any N fraction of the soil completely in a single (2-day) extraction. Approx. 20% of the protein- and residual N was thus removed. (Cf. B., 1935, 421.) CH. ABS. (p)

Available nitrogen in tropical soils. I. N. R. DEAR and S. K. MUKHERJI (J. Indian Chem. Soc., 1936, 13, 23—24).—Total N in tropical soils is $<$, but available N is $>$, that in soils of temperate climates. E. E. A.

Micro-determination of nitrogen in soil. S. K. SAHA (J. Indian Chem. Soc., 1936, 13, 72).—The results of micro- and macro-determinations are concordant. E. E. A.

Determination of assimilable nitrogen in soil. G. GASSNER and G. GOEZE (*Z. Pflanz. Düng.*, 1936, **42**, A, 263—276).—The method is based on the parallelism between the chlorophyll (I) content of plants and the level of N supply. Standard vals. for (I) in young rye or barley plants are obtained by growth in synthetic solutions. A. G. P.

Rapid determination of P_2O_5 and K_2O in the Neubauer process [for testing soil]. B. PANTOLA (*Ann. R. Staz. Sperim. Agrar.*, 1932—4, **3**, 211—214; *Chem. Zentr.*, 1935, ii, 270).—The dried seedlings are decomposed by HNO_3 — H_2SO_4 . In the clear solution P is determined by pptn. with molybdate reagent, dissolution of the ppt. in aq. NH_3 , treatment with 0.1N- $AgNO_3$, neutralisation with AcOH, filtration, and determination of excess of Ag by means of KCNS. In the original solution K is pptd. as cobaltinitrite and subsequently titrated with $KMnO_4$. A. G. P.

Use of the quinhydrone with the glass electrode in determining the redox capacity of soils. J. A. NAFTEL (44th Ann. Rept. Alabama Agric. Exp. Sta., 1933, 17).—The p_H of soil suspensions is determined by the glass electrode before and after saturating the suspension with a known amount of quinhydrone (I). Considerable amounts of (I) are oxidised by Mn in the soil. High oxidation-reduction capacity in soils is associated with high Mn contents. CH. ABS. (p)

Determination of the lime requirement of soils by "casorption" studies. J. A. NAFTEL and R. E. YODER (44th Ann. Rept. Alabama Agric. Exp. Sta., 1933, 15—17).—The "casorption" val. of a soil is the no. of milliequivs. of Ca sorbed per 100 g. of soil at the air—Ca—soil equilibrium. Saturation points are determined from p_H vals. (glass electrode) and by sp.-conductivity measurements. The optimum Ca saturation for certain crops is obtained by pot experiments. No evidence of injury from excessive liming was apparent. "Casorption" vals. together with growth curves of crops are fundamentally satisfactory for determining CaO requirements of soils. CH. ABS. (p)

Conductometric method of analysis applied to soil-survey work. R. C. HOON (*Mem. Punjab Irrig. Res. Inst.*, 1931, 4, No. 3, 10 pp.).—An adaptation of Callan and Horrobin's method (B., 1929, 154) is described, together with its application to the examination of H_2O extracts of soils. Determinations of SO_4^{2-} are more rapid than by gravimetric methods. CH. ABS. (p)

Humic acids. III. Determination in [soil] extracts by conductometric titration. W. SCHEELE [with W. ROWE] (*Kolloid-Z.*, 1936, **75**, 73—79; cf. A., 1935, 1320).—Procedure for titrating humus acid with NaOH in presence of excess of $BaCl_2$ is described. The error is about 3%. E. S. H.

Selenium as a catalyst in the Kjeldahl method as applied to soil and grass analysis. F. L. ASHTON (*J. Agric. Sci.*, 1936, **26**, 239—248).—Use of Se leads to the same vals. for total N in grass as does that of $CuSO_4$, but in much less time. The clearing of the digest is not indicative of complete conversion of N into $(NH_4)_2SO_4$, max. vals. not being reached until 2—3 hr. further digestion has been allowed. The salicylic acid method for treatment of NO_3 -containing

soils by the Kjeldahl process may be combined with Bal's modification (B., 1925, 1002). The reduced-Fe method gives satisfactory results if the Fe is sufficiently finely ground. A. G. P.

Humic composts and inorganic fertilisers. Y. D. WAD and F. K. JACKSON (*Nature*, 1936, **137**, 582).—These should be regarded as complementary and not necessarily competitive. For the most efficient use of inorg. nutrients soil org. matter must reach a certain level, which can best be maintained by the use of humic composts. L. S. T.

Use of Hoffman's method for determining magnesium in mixed fertilisers. J. B. SMITH and W. L. ADAMS (*Rhode Is. Agric. Exp. Sta. 47th Ann. Rept. Contrib.*, 1935, No. 467, 85—86).—Ca is separated by pptn. as $CaSO_4$ in EtOH solution and removed, together with dehydrated SiO_2 , by filtration. Mg is pptd. as $MgNH_4PO_4$ in citric acid solution (to prevent pptn. of Al and Fe), repptd., and weighed. Mn occurring in the final ppt. is determined colorimetrically and a correction is made accordingly. CH. ABS. (p)

Use of seedling plants to determine soil-nutrient deficiencies. B. E. GILBERT and F. R. PEMBER (*Rhode Is. Agric. Exp. Sta. 47th Ann. Rept. Contrib.*, 1935, No. 467, 80—83).—A pot-culture technique is described. In the seedling stage of all crops N was the primary requirement. The relative response to K and P varied with the crop. CH. ABS. (p)

Effect of fertilisers and liming on the electro-dialysable manganese of sassafras silt loam. G. M. GILLIGAN (*Soil Sci.*, 1936, **41**, 203—208).—Limed soils yielded the larger amounts of electro-dialysable Mn, but hay from limed soils contained less Mn than that from untreated controls. No consistent influence of fertilisers on the electro-dialysable Mn was observed in these soils. A. G. P.

Effect of green manuring on the water-holding capacity of soils. E. S. WEST and A. HOWARD (*J. Counc. Sci. Ind. Res.*, Australia, 1936, **9**, 65—66).—Nine years' continuous green manuring with tick beans increased the sticky point of soil by 1.25%. The corresponding increase in H_2O -holding capacity was of little practical significance. A. G. P.

Why do liberal applications of potash increase the resistance of plants to cold? W. H. FUCHS (*Ernähr. Pflanze*, 1935, **31**, 233—234).—K increases the frost-resistance of plants by restricting the low-temp. coagulation of nitrogenous colloids in the tissues as a result of increased hydration. A. G. P.

Potassium and plant metabolism, with special reference to deficiency phenomena in potatoes. G. ROHDE (*Ernähr. Pflanze*, 1935, **31**, 237—243).—A review and discussion. A. G. P.

Influence of excessive applications of potash on yield and starch content of potatoes, and the subsequent effect on the quality of the seed. A. KUHNKE (*Ernähr. Pflanze*, 1935, **31**, 234—235).—The depressive effect on potato yields of very heavy dressings of K fertilisers was much more marked with KCl than with K_2SO_4 . The latter also produced a relatively

smaller decline in the starch content of the tubers. In no case was the quality of the seed adversely affected.

A. G. P.

Crop husbandry. III. Effect of time of application of ammonium sulphate to wheat. F. H. GARNER and H. G. SANDERS (J. Agric. Sci., 1936, 26, 316—327; cf. B., 1932, 855).—Early dressings of $(\text{NH}_4)_2\text{SO}_4$ do not affect germination or the establishment of the crop, but tend to increase tiller formation by the end of February, and the no. of ears at harvest. Late dressings (May) increase the size of the ears. Application of half the dressing with seed and the remainder in May is recommended.

A. G. P.

Toxic wheat grown on soils containing selenium. M. J. HORN, E. M. NELSON, and D. B. JONES (Cereal Chem., 1936, 13, 126—139).—Chemical and biological tests indicate that the toxicity of wheat grown in certain sections of S. Dakota is due to the presence of Se intimately associated with the gluten. Most of the Se could be conc. in the leucine fraction of the hydrolysed gluten. Certain conclusions have been drawn as to the properties of the Se compound.

E. A. F.

Symptoms of boron deficiency in Zea mais. J. VAN OVERBEEK (Med. Phytopath. Lab. Willie Commelin Scholten' Baarn [Holland], 1934, 13, 29—33).—Without B plants show white transparent stripes in leaves, after 1 month. Addition of B restores normal growth. B requirements at various growth stages are determined.

CH. ABS. (p)

Comparative value of calcium cyanamide and ammonium sulphate in the yield of Irish potatoes on Bladen fine sand. H. SHERARD (Amer. Potato J., 1935, 12, 86—90).—Heavy dressings of CaCN_2 (I) caused no injury to potatoes when applied 2—6 weeks prior to planting, and produced better yields than did equiv. dressings of $(\text{NH}_4)_2\text{SO}_4$ (II). Mixtures of (I) and NH_4 phosphate were superior to mixtures of (I), (II), and superphosphate. (I) increased the p_{H} and exchangeable Ca contents of soils.

CH. ABS. (p)

The Bechold copper test in diagnosing the vitality of potato tubers. M. KLINKOWSKI (Phytopath. Z., 1935, 8, 421—455).—Factors influencing the result of the Cu test are examined and improvements in technique are suggested. The test serves to examine tubers of a particular species, but is not generally applicable on the same basis.

A. G. P.

Physiology of the potato. II. Diagnosis of "breakdown." H. KAMO (Phytopath. Z., 1935, 8, 324—335).—Reduction of guaiacum resin in EtOH by potato juice serves to distinguish between healthy and "breakdown" tubers of any individual variety. The abs. vals. show no relation to those obtained by the Cu test, although the latter also differentiates normal from diseased potatoes. The mechanism of the resin test is discussed.

A. G. P.

Root-nodule organisms of certain wild legumes. M. E. CONKLIN (Soil Sci., 1936, 41, 167—185).—Organisms are classified on the basis of cross-inoculation tests and cultural characteristics.

A. G. P.

Reduction of nodule numbers and growth, produced by addition of sodium nitrate to lucerne in

sand culture. H. G. THORNTON and H. NICOL (J. Agric. Sci., 1936, 26, 173—188; cf. B., 1934, 550).—The yield and N content of lucerne were unrelated to the amount of NaNO_3 (I) supplied in sand cultures. (I), above certain limiting concns., reduced the no. and length of nodules and the vol. of bacterial tissue per nodule and per g. of root. The effect of (I) was not due to reduced root growth.

A. G. P.

Supposed fixation of atmospheric nitrogen by root nodules of leguminous plants. N. A. BARBIERI (Bull. Mem. Soc. nat. hort. France, 1935, 6, 139—143).—Leguminous plants grown in soil-free org. composts form no nodules. The latter appear in proportion to the resistance offered by the soil to root development. Nodules are not an integral part of the root structure.

CH. ABS. (p)

Relation of root system to minimum phosphate concentration necessary for good [plant] growth. A. L. SOMMER (Alabama Agric. Exp. Sta. 44th Ann. Rept., 1933, 17—19).—The min. $[\text{PO}_4''']$ for normal growth is smaller for plants producing the greater root surface. The amount of P necessary per unit dry-matter production was the same for cotton and buckwheat, the min. $[\text{PO}_4''']$ for which were very different. With a low P supply growth is limited by the rate of supply of available PO_4''' .

CH. ABS. (p)

Growth of clover in presence of ammonium sulphate. J. CALDWELL and H. L. RICHARDSON (J. Agric. Sci., 1936, 26, 263—267).— $(\text{NH}_4)_2\text{SO}_4$ has no sp. toxic action on alsike or red clovers, even when applied in relatively heavy dressings. In the early stages of growth a definite stimulative effect is recorded.

A. G. P.

Effects of ammonium- and nitrate-nitrogen on growth of perennial rye grass. A. H. LEWIS (J. Agric. Sci., 1936, 26, 249—257).—In sand-bentonite media of $p_{\text{H}} 7.6$ the intake of $\text{NH}_3\text{-N}$ by the grass was $>$ that of $\text{NO}_3'\text{-N}$. The growth response of the plant to the greater intake from NH_3 varied with age. The % N in plants receiving NO_3' was $>$ in those receiving NH_4' , as a result of inferior growth response to the former. The % P was higher in NH_4 -fed plants and was probably related to the better growth produced in this case.

A. G. P.

[Acclimatisation] trials with Aleurites [species] in Morocco. E. MIÈGE (Bull. Mat. Grasses, 1936, 20, 57—63).—*A. Fordii* reared at Rabat yields fruits comparable with those grown in Florida, the seeds containing as much as 34% ($\equiv 55.2\%$ on the kernel) of oil ($d_{4}^{16} 0.9445$, $n 1.520$), which conforms to all the ordinary specifications for tung oil; the cultivation trials are promising. It may be possible to cultivate *A. montana* in some districts. Plants of *A. moluccana* flourished, but the climate (1933) was not hot enough to ensure fruiting.

E. L.

Form of potassium and calcium in the leaves of Helianthus annuus, L. A. VOLOCHOV (Bul. Internac. Sci. Assoc. Esperantista, 1936, No. 42, 1—7).—The variation during growth in the % of total and H_2O -sol. K and Ca in the leaves of sunflowers grown in plain soil and in soil containing a $\text{K}_2\text{SO}_4\text{-NaNO}_3\text{-Na}_2\text{HPO}_4$ fertiliser has been studied. The results for leaves from

different parts of the plant are compared. In absence of fertiliser the % of total K falls steadily during July—Sept., and that of Ca increases considerably. The sol. K (as % of total K) decreases steadily and the % of sol. Ca passes through a max. in August. The fertiliser produces an increase in the total K and inhibits the normal rise in the Ca content. D. R. D.

Relation of fertiliser and soil reaction to viability and production of strawberries. R. A. LINEBERRY (Com. Fertiliser, 1935, 50, No. 4, 12—16).—In soils examined (average p_H 5.0—5.5) NaNO_3 increased and $(\text{NH}_4)_2\text{SO}_4$ (I) decreased the p_H . Loss of strawberry plants is correlated with the increase in p_H and was highest when (I) was the sole source of N in fertilisers.

CH. ABS. (p)

Coffee. W. T. POPE (Ann. Rept. Hawaii Agric. Exp. Sta., 1934, 18—23).—Cultural and manurial practice is discussed. Trees receiving only N fertiliser tend to die back and to produce beans of inferior quality. Analysis of coffee pulp may serve as an indication of nutrient requirements.

CH. ABS. (p)

Waialua irrigation investigations. H. R. SHAW and J. A. SWEZEY (Hawaiian Planters Rec., 1935, 39, 68—78).—In soils from irrigation plantations a close relation is established between the moisture equiv., max. field capacity, and wilting %. The rate of growth of sugar cane is approx. const. from the time of irrigation until the H_2O content of the soil reaches wilting point.

CH. ABS. (p)

Sugar cane in the Punjab. I. P. E. LANDER and R. NARAIN (Indian J. Agric. Sci., Reprint, 1935, 5, [ii], 1—133).—Numerous field observations are recorded. Best yields were obtained by manuring with KNO_3 (I) and $(\text{NH}_4)_2\text{SO}_4$ (II). Ripening was delayed somewhat by NH_4 phosphate and by (II), but was unaffected by (I) or superphosphate. Artificial fertilisers had no effect on the quality or quantity of juice obtained or on the % fibre in the cane. Canes treated with (I) showed greater resistance to cold and the juice had a lower f.p. and higher ash content. A. G. P.

Salt useless as a grub killer [for sugar canes]. R. W. MUNGOMERY (Cane Growers Quart. Bull., 1935, 2, 126).—Soaking soil around sugar-cane stools with 10% aq. NaCl did not control grubs and injured the cane.

CH. ABS. (p)

Sulphur requirements of *Azotobacter chroococcum*. J. E. GREAVES and A. ANDERSON (Soil Sci., 1936, 41, 197—201).—The organisms require S in the form of SO_4^{4-} . Compounds readily converted by direct oxidation or by bacterial action into SO_4^{4-} were effective S sources, e.g., colloidal S, S_2Cl_2 , SO_2Cl_2 , Na_2S , Na_2SO_3 , Na_2CS_3 , and Et_2SO_4 . Mustard oil and S iodide inhibited growth. NaSPh and CS_2 prevented N fixation because of the unavailability of the S. The combined N of autoclaved mustard oil, NaCNS, and Na sulphaniolate discourages fixation. Cysteine supplied combined N without preventing fixation. A. G. P.

Sulphur minerals for combating *Oidium*. C. MALQUORI (Ric. sci., 1934, 5, I, 423—433).—S-bearing minerals are oxidised in air to yield acid products, notably H_2SO_4 , $\text{H}_2\text{S}_4\text{O}_6$, and $\text{H}_2\text{S}_5\text{O}_6$, to which their

toxic properties are attributable. $\text{S}_5\text{O}_6^{2-}$ is less stable than $\text{S}_4\text{O}_6^{2-}$. CH. ABS. (p)

Safe use of sulphur as a fungicide. P. D. PETERSON (Maryland State Hort. Soc., Proc. 37th Ann. Meet., 1935, 60—67).—A processed form of S ("catalytic S") added to ordinary CaO-S accelerated the breakdown of the polysulphides and reduced the risk of injury to sprayed foliage. Addition to CaO-S-Pb arsenate prevented blackening of the mixture.

CH. ABS. (p)

Major insect pests of hops. S. G. JARY (J. Inst. Brew., 1936, 42, 186—190).—Control of aphides on hops is effected with nicotine dust or a spray of this containing soft soap or sulphonated Lorol as spreader. Of control agents for red spider, CaO-S in suitable dilution offers the most promise, and the incompatibility of this wash with Bordeaux mixture may not necessarily prove detrimental to its use. I. A. P.

Physiological and toxicological studies on insects. I. Respiratory response of adult orthoptera to certain gases. II. Toxicity of petroleum oil mixed with certain chemicals. E. R. MCGOVAN (Iowa State Coll. J. Sci., 1934, 9, 177—178).—I. CO_2 increased the rate of tracheal ventilation. Sublethal doses of CS_2 and nicotine vapour increased the rate, which was also lowered by larger amounts of CS_2 and by HCN.

II. The effect of numerous addenda on the toxicity of the oil is examined. Plant extracts (notably nicotine) were the most effective in this respect. Toxicity of halogens was in the order $\text{F} > \text{Cl} > \text{Br}$, that of C_{10}H_8 was $>$ that of C_6H_6 , and of aromatic was $>$ that of aliphatic compounds. Cetyl arsenite was more toxic than AsH_3 or inorg. forms of As. CH. ABS. (p)

Use of oil sprays in the control of sooty mould of citrus fruits. E. BROADLEY (Hadar, 1935, 8, 84—85).—The mould (*Capnodium citri*) is spread by the wax scale (*Ceroplastes floridensis*). Both are controlled by spraying with 2½% oil preps. CH. ABS. (p)

Control of citrus rust mite with sulphur. R. L. MILLER (Citrus Ind., 1935, 16, No. 6, 8—9, 24—25).—Dusting with S (0.5—1.0 lb. per tree) gives good control. Spraying with CaO-S is also effective, but leaf injury may occur during hot periods. CH. ABS. (p)

Cattle-spray tests. A. E. DOTY (Soap, 1936, 12, 97, 99, 101, 103).—Divergences between results of toxicity tests due to variations in technique are discussed. Effective field and laboratory methods are described. Pine oil increases the repellency of pyrethrum (I) sprays, but not that of org. thiocyanate sprays. The latter are superior to (I) containing pine oil. A. G. P.

Glycerin-boric acid dressings for fly-struck sheep. M. R. FRENEY, I. M. MACKERRAS, and M. J. MACKERRAS (J. Counc. Sci. Ind. Res., Australia, 1936, 9, 11—18).—Dressing prepared by heating glycerol (I) (1 mol.) with H_3BO_3 (2 mols.) gave excellent results and also acted as a preventive. Addition of $\geq 25\%$ of EtOH (denatured with MeOH) improved its effect. Crude (I) was unsatisfactory for the prep.

A. G. P.

German potatoes.—See XIX.

PATENTS.

Manufacture of a hygroscopic material for adsorption and retention of moisture in soil. E. W. S. PRESS and W. RUDDY (B.P. 444,182, 12.9.34).—Waste cellulose pulp from paper manufacture, preferably from esparto grass, is dried, shredded, mixed with a solid hygroscopic substance, *e.g.*, CaCl_2 or NaCl , and with fertiliser or weed killer if desired. B. M. V.

Apparatus for measuring and controlling the moisture of the soil and similar substances. W. S. ROGERS (B.P. 444,330, 26.10.34).—A thick-walled ($\frac{1}{2}$ -in.), close-grained porous pot is filled with H_2O and buried. Pressure variations are transmitted to any desired point by means of a small tube terminating within the pot in a rubber bag so that non-freezing liquid may be used above-ground. B. M. V.

Manufacture of soil improvers. J. HUDIG (B.P. 438,114, 3.4.34. Holl., 1.4.33 and 27.3.34).—A moist mixture of sphagnum moss, readily decomposed aluminosilicate (12) (*e.g.*, "Silicokalk" containing CaO 45, SiO_2 30, and Al_2O_3 18%), MnO_2 (0.5), and Fe_2O_3 (0.5 pt.) is treated at 70° for 10 days with moist air containing NH_3 sufficient to keep the p_{H} at 5–7, then with dry NH_3 until saturated, and finally with dry air to remove excess NH_3 . The product is claimed to contain complex Al_2O_3 - SiO_2 -humic acids in a readily assimilable form. A. R. P.

Production of phosphatic fertilisers. KALI-FORSCHUNGS-ANSTALT G.M.B.H. (B.P. 440,214, 26.6.34. Ger., 25.7.33. Addn. to B.P. 410,774; B., 1934, 672).—Mother-liquors resulting from the treatment of K_2SO_4 with HNO_3 (of $> 40\%$ concn.) are saturated with K_2SO_4 and used for the decomp. of rock phosphate to produce a dry superphosphate containing, *e.g.*, P_2O_5 12–13, K_2O 14–15, and N 7–8%. A. R. P.

Production of (A) dicalcium phosphate or of mixed fertilisers containing it, (B) a neutral mixed fertiliser. KALI-FORSCHUNGS-ANSTALT G.M.B.H. (B.P. 442,395 and 442,623, [A] 23.1.35, [B] 22.1.35. Ger., [A] 14. and 27.2.34, [B] 27.1.34).—(A) Moist $\text{Ca}(\text{H}_2\text{PO}_4)_2$ (I), with or without KCl , is treated with cold, saturated, aq. $(\text{NH}_4)_2\text{HPO}_4$ to produce a mixed fertiliser containing CaHPO_4 and NH_4HPO_4 , with or without KH_2PO_4 . The mother-liquor is treated with NH_3 before re-use. (B) A suspension of (I) in mother-liquor from a preceding operation is treated with NH_3 until the ionic ratio of $\text{PO}_4''' : \text{NH}_4$ in solution is 1:1–2; the ppt. obtained is similar to the product of (A), and the mother-liquor is returned to the first stage. A. R. P.

Production of concentrated fertiliser. B. G. KLUGH, Assr. to SWANN FERTILIZER Co. (U.S.P. 1,989,756, 5.2.35. Appl., 22.8.31).—Fertiliser salt mixtures (ground to < 80 -mesh) containing K^+ , NH_4^+ , and PO_4''' are moistened with H_2O to a dough-like paste, which is kneaded and dried to produce granules of predetermined size. L. C. M.

Manufacture of chemical products which may be used as fertilisers. P. LANTHIER (B.P. 443,670, 2.5.35. Fr., 9.4.35).—An 80:20 mixture of dolomite and KCl is heated at $> 350^\circ$ (500°) in a current of moist air and SO_2 to produce K_2SO_4 , CaSO_4 , and MgSO_4 . A. R. P.

Manufacture of preparations for agricultural or horticultural pest control. H. SPENCE, A. L. HOCK, and P. SPENCE & SONS, LTD. (B.P. 442,664, 28.4.34).—Finely-divided hydrated SiO_2 prepared according to B.P. 357,993 (B., 1931, 1094) is heated with an aq. suspension of $\text{Cu}(\text{OH})_2$, or basic compounds of CuCO_3 or CuSO_4 . [Stat. ref.] A. R. P.

Fertilisers.—See II. Condensation products.—See III. Treating silicate ores.—See VII.

XVII.—SUGARS; STARCHES; GUMS.

Successes and problems of the sugar industry. E. GUNDERMANN (Chem.-Ztg., 1936, 60, 353–356).—A review.

Composition of juice from Louisiana sugar cane injured by the sugar-cane borer and red-rot disease. N. MCKAIG, JUN., and C. A. FORT (J. Agric. Res., 1936, 52, 17–25).—Juice from injured canes showed lowered contents of sugar and total solids, and decreased true and apparent purity. The % of reducing sugar, ash, gum, non-sugars pptd. by EtOH , total org. non-sugar, protein- and non-protein-N is $>$ that in juice from healthy cane. A. G. P.

Formation of xylose from pentosan-containing materials. L. C. BRYNER (Iowa State Coll. J., Sci., 1934, 9, 137–139).—Optimum conditions for the pressure- HCl decomp. of oat hulls are examined. Hydrolysis is facilitated by preliminary extraction of xylan by 7% aq. NaOH . Yields of solvents obtained by fermentation of the products are investigated. CH. ABS. (p)

Varietal and regional variation in durum-wheat starches. C. E. MANGELS (Cereal Chem., 1936, 13, 221–233).—The ash and P contents of durum-wheat starches exhibited varietal and regional variations, and there was a considerable variation in the susceptibility to malt diastase. The η of cold- and heat-gelatinised preps. showed considerable variation. There is some indication that low P content is associated with high susceptibility to diastase, but the data are not consistent. η with 0.10 mol. of NaOH is correlated with susceptibility to diastase, but η with 1.25 mols. of KCNS , with 4.5 mols. of urea, or with heat-gelatinised preps. has no relation to diastatic susceptibility. η with aq. KCNS is correlated with η of urea and of heat-gelatinised preps., but η with aq. NaOH is not significantly correlated with η of other preps. Durum-wheat starches are probably subject to greater regional variation than hard red spring-wheat starches (B., 1935, 169). E. A. F.

Purification of starch milk and manufacture of potato starch. F. SCHMIDT (Z. Spiritusind., 1936, 59, 133).—The process and apparatus described by Kröner and Knoblich (cf. B., 1936, 213) are critically discussed and it is concluded that they are at present unsuitable for technical practice. I. A. P.

[Purification of starch milk and manufacture of potato starch.] W. KRÖNER and G. KNOBLICH (Z. Spiritusind., 1936, 59, 133).—The objections and conclusions of Schmidt (cf. preceding abstract) are countered. I. A. P.

Sumatra [gum] benzoin. P. H. BRANS (Pharm. Weekblad, 1936, 73, 374–400).—The methods of

preparing, marketing, and assaying styrax resins are reviewed. The best sorts of Sumatra benzoin from *Styrax paralleloneurus* contain $> 30\%$ of cinnamic acid and about 10% of BzOH, whilst resin from *S. benzoin* contains about $30\text{--}35\%$ of BzOH only. S. C.

Bagasse.—See V. Sugar cane.—See XVI.

XVIII.—FERMENTATION INDUSTRIES.

Granulation of pressed yeast. R. ILLIES (Z. Spiritusind., 1936, 59, 117—118).—It was impossible to confirm the suggestion that several cultivations of yeast near the neutral point in media rich in CaO cause the yeast crop to become granular, although such repeated cultivation does cause an increase in the ash content of the yeast. Similarly, chemical analysis of the ash of separated granular and powdery (normal) fractions of 2 affected yeast samples showed only insignificant differences. Thus, it cannot be confirmed that "calcification" is responsible for the granular condition. I. A. P.

Ability of yeast to liberate coagulable nitrogen. N. NIELSEN (Compt. Rend. Lab. Carlsberg, Ser. physiol., 1936, 21, No. 10, and Woch. Brau., 1936, 53, 113—116).—By heating wort at 125° for $\frac{1}{2}$ hr. and then filtering, a product is obtained free from coagulable N. Yeast yields no coagulable N to such wort either during growth or during autolysis. Similar results are obtained using synthetic growth media, and the conclusion is further supported by the results of investigation of wort and beer (before and after storage) in the brewery. I. A. P.

Innovations and experiences in the malt house and brewery. H. LEBERLE (Svenska Bryg. Månadsb., 1935, 11, 409; Woch. Brau., 1936, 53, 108—110).—Modern views concerning, and methods for, the following processes are critically discussed: barley storage, pneumatic malting, wort filtration. I. A. P.

Viscosity of malt wort. W. PIRATZKY (Woch. Brau., 1936, 53, 105—108).—The η of malt wort was determined by a method requiring measurement of the time of flow of a fixed vol. from a burette through a capillary outlet. For a given malt and mashing process η remains const. With increasing modification during malting η falls, rapidly at first and then slowly till a limit val. is reached, which for normally modified malts is 1060—1080 ($H_2O = 1000$). The high η of worts from malts in the early stages of growth appears to be due to a wort-sol. substance of fatty nature, which, together with protein and pentosan, is pptd. by $CCl_3 \cdot CO_2H$ and is probably hydrolysed enzymically during germination. I. A. P.

Colorimetric determination of phosphoric acid in brewing materials. L. S. WALTERS (J. Inst. Brew., 1936, 42, 205—209).—For the determination of P_2O_5 in a modified Fiske-Subbarow method (A., 1926, 443), wet oxidation of org. matter with conc. H_2SO_4 - 30% H_2O_2 mixture is employed. The application of the method to barley, malt, yeast, wort, and beer is described. For determining inorg. P_2O_5 in wort or beer, MgO mixture is added to these; the centrifuged ppt. is dissolved in H_2SO_4 and the resultant solution treated with the Fiske-Subbarow reagent. I. A. P.

Measurement of foam [in beer]. E. HELM and O. C. RICHARDT (J. Inst. Brew., 1936, 42, 191—205).—

Measurements of foam formation by the methods of (I) Helm (B., 1933, 808) and of (II) Blom (B., 1936, 214) give results which are essentially similar when the conditions are such that comparison is possible. The foaming properties of machine-drawn beer, measured by (I), vary from bottle to bottle, due to unequal air retention. With, respectively, CO_2 , H_2 , O_2 , air, or N_2 as the foam-gases the head-retention capacity [method (II)] increases in that order, as does also the residual head [method (I)] when bottles have been filled under these gases. It is attempted to explain these facts from a consideration of the rates of diffusion and of the solubilities of these gases. The head-forming capacity of beer is a direct function of the CO_2 content, but there is no relation between this and foam retention within the limits investigated. Storage of beer in bottle up to 10 days improves the foam-retention capacity, but this decreases slightly after prolonged storage, the presence of air being probably responsible for the variations. Pasteurisation has little effect on foam. Methods for the determination of air (O_2 , N_2) in beer, H_2O , and mineral waters are described. I. A. P.

Ozone in breweries. R. R. POWELL (Ice and Refrig., 1935, 88, 99—100).— O_3 had an inhibiting effect on nearly all fungi in breweries; its germicidal action was 12 times that of CH_2O and 60 times that of SO_2 , on a wt. basis.

CH. ABS. (p)

Colloid phenomena in wines. J. RIBEREAU-GAYON (Bull. Soc. chim., 1936, [v], 3, 603—612).—The formation of ppts. in wines is discussed as a colloid-coagulation process, and the importance of the presence of protective colloids emphasised. E. S. H.

Contraction on mixing together alcohol and water. C. LUCKOW (Z. Spiritusind., 1936, 59, 131—132, 134).—The contraction which takes place when H_2O is mixed with spirits of various strengths is discussed, reference being made to the use of the tables of Hayek. I. A. P.

Insect pests on hops.—See XVI. [Solvents from] pentosan-containing materials.—See XVII.

XIX.—FOODS.

Rapid determination of the particle size of wheat flour. R. M. WITTE (Mühlenlab., 1936, 6, 33—36).—The process claimed in G.P. 577,896 [determination of the particle size, i.e., the surface factor (S), of dust, by mixing with a powder of contrasting colour] was applied to wheat flour, using the author's leukometer (B., 1935, 785). By mixing flours of determined S vals., flours of any required S can be obtained. E. A. F.

Measurement of respiration in flour. E. B. WORKING (Cereal Chem., 1936, 13, 234—236).—Apparatus is described for measuring the respiration of flour, based on Spoehr's method for single leaves (A., 1923, i, 988). The CO_2 produced is absorbed in $Ba(OH)_2$, and the strength determined by the change in conductivity. The daily CO_2 production per 100 g. of flour was approx. 0.002 mg. at 25° and 0.006 mg. at 35° . E. A. F.

Physical tests to determine quality in wheat varieties. C. O. SWANSON (Cereal Chem., 1936, 13,

179—201).—The desirable properties for bread, cracker, biscuit, or cake flours are indicated. Recent physical devices for testing desirable characteristics in dough described are: the Chopin Extensimeter, Bühler Comparator, Brabender Farinograph, and the Swanson-Working Recording Dough Mixer. The significance of the dough-curve characteristics in the last-mentioned machine are explained, together with the use of the dough curves for testing wheat varieties. It is claimed that varietal characters in wheat quality are more accurately revealed by these curves than by any other one measure which is available for wheat quality. The dough-curve characteristics of varieties representative of various wheat classes (*e.g.*, hard red spring, hard red winter, and Kansas and other U.S. soft wheats) are indicated. E. A. F.

Principle and construction of a flour-testing device. O. HÜBSCH (Mühlenlab., 1936, 6, 27—30, 38—42).—The principle is the same as that of the fermentation test, but the ball of dough is retained by a trapping device under the surface of the H_2O . The expansion of the dough ball brought about by the fermentation gases causes the dough to press against the fingers of the trap device. In the case of a strong gluten the dough can resist the leavening pressure, otherwise the ball of dough becomes torn by the "fingers" and the pieces of dough sink. The point at which complete disintegration occurs furnishes a measure of the stability of the flour. The gas-retaining capacity is recorded by means of the movement of a float which is transferred on to a recording drum. The significance of the various curve characteristics for different flour types is indicated. E. A. F.

Nature and significance of farinography from a colloid-chemical viewpoint. H. L. B. DE JONG (Mühlenlab., 1936, 6, 23—28).—A positive correlation exists between the changes in the Farinogram and the swelling phenomena as determined by purely colloid-chemical methods. From an energy viewpoint the kneading process in the Farinograph is made up of mixing, swelling [(a) the swelling of coarsely dispersed particles, and (b) the disintegration of coarsely dispersed into primary particles], and sticking phenomena. Corresponding to these 3 phenomena hard wheats possess 3 distinct maxima, whereas in very soft wheats the first two maxima coincide, other wheats being intermediate. By adding a swelling-accelerating electrolyte (KCNS or, to a lesser extent, KNO_3) to the doughing liquid of hard wheat flours, the mixing and swelling maxima can be made to approach each other and, finally, to coincide; similarly by adding a swelling-inhibiting electrolyte (*e.g.*, K_2SO_4) to soft wheat flours, the single mixing-swelling max. can be separated into its components. A colloid-chemical explanation of these phenomena is given. The time taken for the second max. to be attained is also determined by swelling factors. E. A. F.

Effect of addition to [wheat] flour and dough on gluten. E. A. SCHMIDT (Mühlenlab., 1936, 6, 17—24).—As the proteolytic activity of most malt flours and extracts, the existence of which is demonstrated by the baking test and Farinogram, cannot be determined

by the usual chemical methods, the "dough-standing method" (Z. ges. Getreide-, Mühlen- u. Bäckereiw., 1935, 22, 138), in which the proteolytic activity is determined by its effect on gluten quality (as measured by the gluten swelling test, η , gluten evaluation, and by the "Abstehprobe"), has been applied. The amounts of proteolytic preps. sufficient to soften the gluten slightly and the effect of other factors (*e.g.*, yeast, dried milk, and chemicals such as lactic acid) on gluten can also be determined by this method. E. A. F.

Mechanism of gas production in dough fermentation. A. G. SIMPSON (Cereal Chem., 1936, 13, 140—152).—The rate of fermentation in a fermenting flour dough is greatly influenced by the growth of the yeast. The rate of growth of yeast increases inversely with the amount of yeast used. The rate of gas evolution from a dough increases steadily as fermentation proceeds, the increase being the greater, the lower is the original % of yeast used. The rate of gas evolution increases with the growth of the yeast in the dough, in proportion to the actual amount of yeast present. The general phenomena of gas evolution in fermenting doughs are essentially the same as in fermenting sugar solutions containing yeast nutrients. E. A. F.

Peptisation of flour, dough, and bread. O. N. GOLOSsoVA (Kolloid-Z., 1936, 75, 100—106).—The degree of peptisation by H_2O is sp. for each kind of flour, varies according as the corn is a winter or summer crop, and changes during the process of bread-making, reaching a max. in hot bread. E. S. H.

Comparative study of bread leavened with yeast and with hydrogen peroxide. L. H. BAILEY and J. A. LECLERC (Cereal Chem., 1936, 13, 119—126).—Bread made with H_2O_2 as sole leavening agent has a vol., appearance, grain, and texture = that of ordinary yeast bread, but is inferior in flavour and aroma; crust and crumb are extremely tender. The H_2O_2 bread had slightly more crust, and contained less H_2O than the yeast bread. Apart from the higher sol.-starch content of the crust, the composition of the crust and crumb of yeast bread is practically the same. Crust and crumb of H_2O_2 bread are also similar in composition. H_2O_2 bread contained approx. 3 times as much sugar, EtOH-, K_2SO_4 -, NaCl-, and H_2O -sol. N as did yeast bread. The % of fat, ash, and total N in both breads was practically the same. E. A. F.

Bound water in bread-making. A. G. KUHLMANN and O. N. GOLOSsoVA (Cereal Chem., 1936, 13, 202—217).—The principal methods used for determining bound H_2O are outlined, Dumanski's refractometric method (A., 1934, 26) being chosen for the present investigations. The H_2O -binding capacity of the flours tested was in the order: soya > rye > maize > durum > soft wheat > potato flours. There is a direct relation between the H_2O -absorption of flours (the amount of H_2O required to prepare a dough) and their H_2O -binding capacity, and between the latter and the flour yield. The H_2O -binding capacity of the colloids is increased just before transferring into the oven in the case of rye flours, but not with wheat flours. A considerable increase in H_2O -binding capacity occurs during baking, this effect

being more pronounced in the case of wheat than rye bread. Bread colloids made by the straight dough process bind more H₂O than does bread made by the sponge-dough method. The decrease in the H₂O-binding capacity of bread colloids during staling is more gradual for rye than for wheat bread. Methods which have been adopted for determining the staling of bread are outlined. There is a direct relation between the H₂O-binding capacity of dough and hot bread and the baking loss, and between the loss in drying of bread and the H₂O-binding capacity of bread colloids. All the factors which increase the H₂O-binding capacity of colloids (scalding, additions, etc.) decrease the loss in baking, increase the overweight, and reduce the loss in drying of the bread during storage. E. A. F.

Complete analysis of milk with a small sample. R. VLADESCO (Lait, 1935, 15, 363—369; Chem. Zentr., 1935, ii, 297).—Methods for determining *d*, solids, fat, lactose, Cl', PO₄'', Ca, casein, etc. are given. A. G. P.

Nutritive value of skim milk powders, with special reference to sensitivity of milk-proteins to heat. B. W. FAIRBANKS and H. H. MITCHELL (J. Agric. Res., 1935, 51, 1107—1121).—Roller or preheated-spray drying processes lower the biological val. of milk by approx. 8%, probably through destruction of cystine. Spray-drying without preheating involves no significant loss. Scorching in roller-drying causes rapid loss of biological val. (largely due to destruction of lysine) and a still more rapid loss of digestibility. The nett energy val. of the product is but little affected even by extreme scorching. The solubility of total solids and N is greater for spray- than for roller-dried milks. Solubility and colour differences in milk powders are not reliable criteria of changes in the nutrient val. of the proteins. A. G. P.

Nutritive value of artificially dried grass and its effect on the quality of milk produced by cows of the main dairy breeds. S. J. WATSON and W. S. FERGUSON (J. Agric. Sci., 1936, 26, 189—211).—Replacement of part of the concentrates of a normal winter ration by dried grass effected no change in the yield or fat and solids-not-fat contents of the milk. Improved colour in butter reflected the increased intake of carotene, especially in the Guernsey breed. A. G. P.

Effect of homogenisation on some characteristics of milk fat. I. A. GOULD and G. M. TROUT (J. Agric. Res., 1936, 52, 49—57).—Homogenising raw milk increased the acidity of the fat, the change continuing at a decreasing rate during subsequent storage for several days. Treatment (1500 lb.) of pasteurised milk caused no alteration in the Reichert-Meissl or Polenske vals., *n*, or acidity. A. G. P.

Preparing samples of butter for analysis. D. H. NELSON (J. Dairy Sci., 1935, 18, 667—670).—Conditions for use of the spiral type of mixer are examined. A. G. P.

Manufacture of yoghurt. S. PARASCHTSCHUK (Milch. Zentr., 1936, 65, 66—67).—Mixed cultures of *Lactobacillus* and lactic *Streptococci* gave best results. The acidification process is preferably carried out at 50—55°, although optimum growth of the organisms occurs at

40—45°. Preliminary pasteurisation of the milk at 63° for 30 min. yields a soft product. Greater firmness results by pasteurising at 90° (momentary flash or 10-min. heating). A. G. P.

Factors influencing the loss of butter fat in churning. J. LYONS and M. O'SHEA (Econ. Proc. Roy. Dublin Soc., 1936, 3, 1—18).—The losses increase with the proportion of small fat globules in the cream, and decrease with the temp. of chilling after pasteurising. With cream chilled to 0.5° for 16 hr. losses of fat are unaffected by churning temp. up to 10°, but increase at higher temp. Loss of fat in buttermilk is not influenced by the size of grain to which butter is churned. A. G. P.

Fodders injurious to cheese: disgenetic milk. C. GORINI (Milch. Zentr., 1936, 65, 73—81; cf. A., 1928, 85).—The effects of unsuitable feeding of cows on the quality of cheese produced are examined. Milk unsatisfactory for cheese-making, including disgenetic milk, may result from dietary factors. The ill-effects of certain feeding-stuffs may be counteracted by appropriate admixture with more suitable materials. A. G. P.

Control of cheddar cheese production. H. SILMAN (Food, 1936, 5, 277—280).—The advantages of using pasteurised milk are discussed. The tests applied to ensure correct conditions during the various stages of manufacture are described. E. C. S.

Bacteriological methods for analysis of dairy products. P. A. DOWNS, B. W. HAMMER, W. A. CORDES, and H. MACY (J. Dairy Sci., 1935, 18, 647—656).—A Committee report. A. G. P.

Use of rubber in the dairy industry. G. GÉNIN (Lait, 1936, 16, 256—60).—A review. W. L. D.

Determination and importance of the condition of the firm albumin in studies of egg-white quality. A. VAN WAGENEN and H. S. WILGUS, JUN. (J. Agric. Res., 1935, 51, 1129—1137).—A method is described and the interpretation of results discussed in relation to candling observations. A. G. P.

Determination of spray coverage on apples. K. GROVES and J. MARSHALL (J. Agric. Res., 1935, 51, 1139—1142).—A method of calculating the area of the sprayed apple surface is described. Distribution of spray is examined by the disc sampling method. The BrO₃' method for determining As is preferable to the Gutzeit test for this purpose. A. G. P.

Determining pectin substances. M. KUDRJAVZEVA (Bull. Appl. Bot. U.S.S.R., 1934, [iii], No. 5, 203—221).—For examination of fruit and vegetables, extraction of H₂O-sol. pectin (I) and pptn. as the Ca salt is preferable. The pectin content of oranges declines as ripening advances. (I) increases as fruit ripens. CH. ABS. (p)

Preservation of orange juice. L. J. LYNCH (J. Counc. Sci. Ind. Res., Australia, 1936, 9, 29—36).—Current methods are discussed. A. G. P.

Theotannin: chemistry of tea. I. Theotannin in relation to green leaf. W. S. SHAW [with, in part,

K. B. W. JONES]. **II. Theotannin in relation to black tea.** W. S. SHAW and K. B. W. JONES (United Planters' Assoc. S. India Bull., 1935, No. 4a, 1—67, No. 4b, 1—42).—I. Theotannin (I) is prepared by extracting newly-plucked green leaf of tea with boiling H_2O , washing the conc. solution with C_6H_6 , saturating with NaCl, extracting (I) by EtOAc, and pptg. with $CHCl_3$. The properties of (I) are described. In the Loewenthal-Procter method of determination of (I), the indigo-carmin used has a different $KMnO_4$ val. before and after pptn. of (I); a modified method, applying a correction for this, and using a large quantity of kaolin and a slower and more dil. infusion, is described, and a conversion factor given. The CH_2O method of determination is criticised: boiling the reaction mixture ppts. not only (I), but also non-tannins of phenolic nature; there is also co-pptn. of non-phenolic substances containing N. A new method is described: the infusion is treated with 40% CH_2O and HCl at room temp. for 3—4 hr., and the ppt. washed with cold EtOH, dried, and weighed. The conversion factor, using pure (I), is 0.997; (I) may thus give a sol. as well as an insol. product with CH_2O . The factor, using infusions, is 0.98. Results agree with those by the iodometric method, and are not affected by changes in constitution of (I). The iodometric method involves errors if time is not standardised, and if the amount of tea is not regulated to give const. (I). Salt-gelatin does not completely ppt. (I): amount of ppt. \propto the amount in solution. A modified procedure is detailed. The iodometric "totals" and "pptn." equivs. are in the const. ratio 1.418:1. The former, in c.c. of 0.05N- $Na_2S_2O_3$, is converted into mg. of (I) by the factor 0.955; for tip, first and second leaves, and stalk separate factors must be applied. The iodometric "totals" method, without pptn., is recommended as being rapid and simple. (I) in green leaf varies periodically with season of year, and with rainfall. The % (a) of (I) in the leaf is related to the % (b) of dry wt.: $a = 0.378(b - 8)$. The iodometric "totals" equiv. may thus be used to determine dry wt., and hence moisture content. Caffeine combines with (I) to give *caffeine theotannate* (II), sol. in MeOH and in hot, but not in cold, H_2O . 1 mol. of caffeine combines with 2 mols. of (I); the ratio by wt. varies with mol. wt. of (I) from different sources. (II) is extracted from green tea by warm MeOH, and obtained in high purity in yields up to 10%; it is suggested that the aroma of tea is due to this compound. (II) in warm $H_2O + NaHCO_3$ darkens, and on acidification gives a coloured ppt. of *caffeine oxytheotannate*, which is present in black tea, and is responsible for the "creaming down" phenomenon. (I) contributes 90% of the total reducing properties of sol. constituents of green leaf: its function as a substitute for carbohydrate in metabolic processes in the tea plant, and the relation of (I) in the aerial portions to starch in the root, and to the wood cells are discussed. Structures proposed for (I) by Deuss, by Yamamoto, and by Tsujimura (A., 1929, 934) are reviewed; (I) is considered to be a variable mixture of tannins, for which no standard formula can be proposed, and in which the aliphatic side-chain attached to the quercetin skeleton is especially subject to change during

the growth of the plant. (I) treated with 10% or 20% H_2SO_4 yields no gallic acid; the red ppt. obtained is a *theophlobaphen*, a condensation product of (I). 75% H_2SO_4 and (I) yield another *theophlobaphen*, also obtained from a conc. green-tea infusion, in much greater quantity than could be derived from the free (I) in the latter; the excess is ascribed to decomp. of (II). As theophlobaphens are tasteless and odourless, insol. in cold and almost insol. in hot H_2O , their significance in the manufacture of black tea has been over-emphasised.

II. Methods of determining (I) in black tea are reviewed. The iodometric "totals" method is rapid, but rough; owing to variations in the degree of oxidation of (I), the "pptn." method should be employed for accurate results. Existing figures for (I) content of black tea are unreliable. There is no substantial loss of (I) during manufacture. The ratio of iodometric "totals" to "pptn. val." is an index of the reducing power of the "filtrate" portion of the infusion. During withering this rises and falls slightly; during oxidation (rolling) there is a rapid drop, arrested by firing. Iodometric analysis can be used to indicate the extent to which oxidation has proceeded (avoiding over-oxidation), and the efficacy of the firing. Chemical processes in the manufacture of black tea are reviewed. The hypothesis that withering involves cleavage of a sugar from (I) is untenable; it is suggested that the most important change is the formation of (II). Partial de-esterification of pectin may also occur. (I) serves as the colloid basis of the peroxidase which causes subsequent oxidation, and probably contains Mn. The relations between degree of withering, concn. of (I), and % dry wt. are discussed and tabulated. Wither should be standardised, and calc. from (I) or from % dry wt. A balance for rapidly testing the degree of wither is illustrated. In dry weather, control of wither by humidification of factories is desirable.

E. W. W.

Potato genetics. I. Protein content of species and hybrids. P. A. SCHWARZ and S. F. KUZMIN (Compt. rend. Acad. Sci., U.S.S.R., 1936, 1, 187—190).—The protein contents of two S. American species and of hybrids derived from them are recorded. The vals. are 7—16%. Genetic relationships are indicated.

W. McC.

Organic and mineral nutrients in German potatoes. E. MANGOLD (Z. Spiritusind., 1936, 59, 17).—The composition of German-grown potatoes varies between the following limits: dry substance 17.8—28, org. material 12.8—26.8, protein 1.4—2.2, fat 0.02—0.18, fibre 0.49—0.76, N-free extractives (chiefly starch) 14.6—24.6, ash 0.87—1.18, Ca 0.008—0.03, Mg 0.015—0.03, K 0.34—0.52, Na 0.006—0.068, P 0.048—0.111, S 0.028—0.062, Cl 0.027—0.163, and sand 0.012—0.073%. Fertilisation with K and P salts increases the K and P content, but the use of fertilisers containing Ca, Mg, and SO_4 does not result in an increased content of these constituents.

A. R. P.

Kjeldahl method for determination of nitrogen in foods, feeding-stuffs, leather, etc. A. E. BEE and D. G. FURZEY (J.S.C.I., 1936, 55, 108—109 T).—If a mixed Se-Hg SO_4 catalyst is used instead of the

usual CuSO_4 catalyst, the digestion is completed in from $\frac{1}{3}$ to $\frac{1}{2}$ the time without sacrificing accuracy. By using such a wt. of protein-containing material as corresponds to about 30 mg. of N, the NH_3 may be absorbed in 20 c.c. of a cold saturated solution of H_3BO_3 and can then be titrated directly with 0.1N-acid, using an indicator composed of Me-red 0.125% and methylene-blue 0.083%.

Grass silage and silos. A. W. LING and W. R. PEEL (Chem. & Ind., 1936, 45—52).—To prevent losses of nutritive matter and to produce a palatable and nutritious silage, respiration of the grass in the silo must be kept to a min., the formation of lactic acid (I) must be stimulated, and the temp. must not be allowed to rise high enough to cause charring. Spraying with dil. molasses liquor increases the rate of formation of (I) and reduces the loss of nutritive val. to a min. Spraying with a 2N mixture of HCl and H_2SO_4 reduces mould formation and yields a satisfactory silage, which must be neutralised with chalk before use as fodder. The chief disadvantage of silage is that the digestibility of the crude protein is much more seriously reduced than is the case when hay-making; as a fodder 100 lb. of good silage \equiv 40 lb. of hay or 166 lb. of mangels. Methods of constructing silos are briefly discussed.

A. R. P.

Influence of temperature of ashing on the accuracy of the determination of phosphorus in grass. F. L. ASHTON (J.S.C.I., 1936, 55, 106—108 T).—From comparative determination it is concluded that the addition of $\text{Mg}(\text{NO}_3)_2$ (I) is not necessary if the grass is ashed at $> 600^\circ$. At 800° losses of PO_4''' were detected in absence of (I) and at 1000° considerable losses took place whether (I) was added or not. Figures obtained by wet digestion ($\text{H}_2\text{SO}_4\text{—HNO}_3$) were comparable with those obtained by ashing at 400° and 600° , and at 800° after the addition of (I).

Green fodder ensilage in Belgium. E. PIRAUX, A. HACQUART, F. JOASSIN, and F. DESMET (Bull. Inst. Agron. Sta. recherches Gembloux, 1933, 4, 106—145).—Comparison of various methods of ensilage indicates a correlation between the p_{H} and the NH_3 and PrCO_2H contents for a given fodder and a given process of ensilage. Addition of acid to fodder to maintain optimum p_{H} in the silo gave best results. Analysis of products from various crops obtained under varying conditions is recorded and discussed.

CH. ABS. (p)

Variability in composition of different varieties of soya beans. M. I. SMIRNOVA and M. N. LAVROVA (Bull. Appl. Bot. U.S.S.R., 1934, [iii], No. 5, 73—102).—Climatic conditions influence the oil but not the protein content of the beans. Early varieties have less oil of lower I val. than do later varieties. Ash contents and catalase vary but little. Varietal difference in urease and peroxidase contents are considerable.

CH. ABS. (p)

Effect of calcium carbonate and sodium bicarbonate on the toxicity of gossypol [in cottonseed cake]. W. D. GALLUP and R. REDER (J. Agric. Res., 1936, 52, 65—72).—Addition of NaHCO_3 to the diet provides an alkaline medium in which gossypol (I)

is unstable and susceptible to pptn. by Ca^{++} . (I) inhibits lipase activity in acid (p_{H} 4.7) or alkaline (p_{H} 8.9) media. The presence of Ca^{++} does not affect this action in acid, but increases it in alkaline media. A reaction between (I) and the activator-enzyme complex (which includes Ca^{++}) is indicated. (Cf. A., 1935, 396.)

A. G. P.

Composition and nutritive value of marrow-stem and thousand-head kales. H. E. WOODMAN, R. E. EVANS, and A. EDEN (J. Agric. Sci., 1936, 26, 212—238).—Analyses and digestibility trials are recorded. The effects of the spacing of the growing crops are examined. The kales are characterised by a notably high mineral content, especially Ca, K, Cl, and S.

A. G. P.

Graphical aid in practical cattle-feeding. I. Feeding norms for milch cows in the form of nomograms. E. BROUWER and A. M. FRENS (Bied. Zentr. [Tierernähr.], 1935, 7, B, 226—233).

A. G. P.

Influence of silage prepared with hydrochloric or sulphuric acid on the nitrogen, calcium, and phosphorus metabolism of sheep, with special reference to growing animals in long-period trials. E. KAEMPFER (Bied. Zentr. [Tierernähr.], 1935, 7, B, 290—316).—In comparison with silage prepared with sugar, that prepared with acid produced no difference in growth rate of sheep, but decreased urinary p_{H} and increased Ca excretion, without affecting the N or P balances. Similar results were obtained with pigs receiving acid potato silage, except that growth rates were somewhat retarded as a result of digestive disturbances.

A. G. P.

Feeding-trials with skim-milk powder for hens. G. WIEGNER and A. TSCHERNIAK (Bied. Zentr. [Tierernähr.], 1935, 7, B, 344—360).—In comparison with cod meal, skim-milk powder produced inferior egg yields. Use of the mixed concentrates gave better results than either alone.

A. G. P.

Selenium in proteins from toxic foodstuffs. II. Effect of acid hydrolysis. E. P. PAINTER and K. W. FRANKE (Cereal Chem., 1936, 13, 172—179).—When the toxic proteins (B., 1936, 344) are hydrolysed with HCl or H_2SO_4 a part of the Se appears in the insol. humin, and a part in the sol. hydrolysate. By increasing the humin formation by addition of carbohydrates or hydrolysing with more conc. acids, the % of Se in the humin fraction can be greatly increased. Hydrolysis with HI produced a Se-free hydrolysate. Isolated tryptophan and tyrosine contained only small amounts of Se, which was probably a contaminant. The Se possibly replaces the S in the NH_2 -acids cystine and methionine.

E. A. F.

Butter fat.—See XII. **Casein paints.**—See XIII. **Wheat grown on soils containing Se. Se in grass analysis. Coffee.**—See XVI. **Durum-wheat starches.**—See XVII. **Casein in pharmacy.**—See XX.

PATENTS.

Milk and chocolate suspension. [Beverage.] D. E. LINN, ASSR. to INTERNAT. PATENTS DEVELOPMENT Co. (U.S.P. 1,989,758, 5.2.35. Appl., 23.1.33).—

Beverages containing chocolate with or without milk are stabilised against sedimentation by addition of starch (1—3%) and agar-agar, gelatin, gum arabic, gum tragacanth, or pectin (0.01—0.2%) and heating above the gelling temp. of the starch. L. C. M.

Composition and process for treatment of fruit. J. N. SHARMA, Assr. to FOOD MACHINERY CORP. (U.S.P. 2,002,589, 28.5.35. Appl., 12.10.32).—Fruit is treated with a sulphonchloroamide dissolved in a wax, whereby Cl is liberated when in contact with H₂O, this retarding decay from mould spores. A list of suitable compounds is given. The application may be to the wrapping paper or the fruit skin, being dissolved in a wax (e.g., 2% of toluenesulphonchloroamide in paraffin wax).

E. B. H.

Removal of spray residue from fruit. H. C. McLEAN and A. L. WEBER, Assrs. to ENDOWMENT FOUNDATION (U.S.P. 2,003,005, 28.5.35. Appl., 27.10.33).—A highly efficient solution for removal of Pb or As spray residue is prepared from mineral acid (e.g., HCl) 1.0—2.0, H₂O-sol. salt (e.g., NaCl) 0.5—1.0, degumming agent (D) (e.g., sulphonated aromatic hydrocarbon) 0.5—1.0, anti-foaming substance (A) 0.1—0.2%. A list of suitable materials for use as D or A is given.

E. B. H.

Rendering of fish, fish refuse, or the like. A. SOMMERMEYER (B.P. 444,337, 8.11.34. Ger., 8.11.33).—The material is passed through (1) a sieve-drum disintegrator and (2) a dryer, and the exhaust gases pass from (2) through (1).

B. M. V.

Food-preservative means [wrapping]. CALIFORNIA FRUIT GROWERS EXCHANGE (B.P. 443,911, 7.9.34. Ger., 7.9.33).—Paper-like or woven material for bags or wrappings is coated on both sides, and between the plies if multi-ply, with pectin to which has been added NaOBz or other preserving agent. The treatment is suitable for transparent wrappings.

B. M. V.

H₂O-sol. vitamins.—See XX.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Application of disperse gases. I. Medicinal baths. M. BÖTZKES (Kolloid-Z., 1936, 75, 79—80).—Apparatus and technique for obtaining dispersions of gases, such as CO₂ or O₂, in H₂O containing a stabiliser (e.g., soap) are described.

E. S. H.

Bactericidal and bacteriostatic value of colloidal cadmium proteinate. W. A. LOTT and W. G. CHRISTIANSEN (J. Amer. Pharm. Assoc., 1936, 25, 205—206).—A prep. (5.32% Cd) of Cd(NO₃)₂-hydrolysed gelatin had no bactericidal and very feeble bacteriostatic action.

F. O. H.

Casein for pharmaceutical purposes. J. J. HOFMAN (Pharm. Weekblad, 1936, 73, 420—431).—Samples of casein (I) of Dutch, English, German, and Danish origins have been examined for H₂O, ash, H₂O-sol. and fat contents, solubility in 10% aq. Na₃PO₄, H₂O, and NH₃, and acidity or alkalinity. The results show considerable variations. (I) for pharmaceutical purposes should pass the specification in the British Pharmaceutical Codex.

S. C.

Determination of organically-bound phosphoric acid in phytin and medicaments. G. A. WEISSMANN and R. J. BERMAN (Pharm. Zentr., 1936, 77, 239—242).—Phytin is determined by treatment of its solution in 0.2N-HCl in presence of 0.5% NaOAc with 0.1N-CuSO₄, the filtrate being titrated iodometrically. Modifications necessary owing to admixture with sugar, Fe preps, and Ca glycerophosphate are described.

F. O. H.

1:8-Dihydroxyanthranol as a substitute for chrysarobin. H. BEERMAN, G. V. KULCHAR, D. M. PILLSBURY, and J. H. STOKES (J. Amer. Med. Assoc., 1935, 104, 26—29).—A review. Advantages of its use in dermatology are discussed.

Ch. Abs. (p)

Chemotherapy of malaria. T. A. HENRY (J.S.C.I. 1936, 55, 111—117 T).—A review.

Clinical comparison of various ergot preparations on the post-partum human uterus. J. L. JONES and O. W. BARLOW (Amer. J. Obstet. Gynecol., 1935, 29, 489—502).—Alkaloids in the U.S.P. prep. amount to 3 times those of the B.P. prep. After 1 year both preps. give negative tests for alkaloids, but retain 15—25% potency. Ergotamine tartrate (gynergen) and ergotamine ethanesulphonate are absorbed more slowly and are less effective than is the crude drug.

Ch. Abs. (p)

[Essential] oil of Eucalyptus citriodora of the Seychelles. W. HOLDSWORTH-HAINES (Perf. & Essent. Oil Rec., 1936, 27, 109—110).—Leaves collected at 4-monthly intervals from trees of *E. citriodora* recently introduced to the Seychelles yield 16 litres of oil per ton. The aldehyde content is < 98%.

E. H. S.

Theory of distillation as applied to essential oils. A. L. BLOOMFIELD (Perf. & Essent. Oil Rec., 1936, 27, 131—133).—A preliminary discussion of the fundamental relations between v.p. and latent heat is given.

E. H. S.

Test for aldehydes in Et₂O.—See III. **Gum benzoin.**—See XVII.

PATENTS.

Medicinal preparation [coal-tar ointment]. A. E. OSTERBERG, Assr. to CHEM. FOUNDATION, INC. (U.S.P. 2,002,829, 28.5.35. Appl., 21.4.33).—The extract prepared as in U.S.P. 1,908,176 (B., 1934, 122) is incorporated with ZnO and/or starch for treatment of infantile eczema.

E. H. S.

Production of a therapeutically active compound of hexamethylenetetramine. KALI-CHEMIE A.-G. (B.P. 443,350, 5.9.35. Ger., 15.10.34).—(CH₂)₆N₄ is treated with Ca(CNS)₂ in aq. or alcoholic solution, or Ca(CNS)₂ in presence of CH₂O, is treated with NH₃. (CH₂)₆N₄.Ca(CNS)₂.4H₂O is pptd. from H₂O on concn., the anhyd. substance being pptd. from alcoholic solution. The product is a demulcent.

A. W. B.

Manufacture of therapeutically active derivative of phthalic acid. W. J. TENNANT. From CHEM. FABR. GRÜNAU, LANDSHOFF & MEYER A.-G. (B.P. 443,396, 8.2.35).—Good yields of *o*-C₆H₄(CO·NET₂)₂, by treatment of NHEt₂ with *o*-C₆H₄(COCl)₂ under Schotten-Baumann conditions, are claimed. The product is

salted out of the aq. solution obtained and purified by distillation under reduced pressure. A. W. B.

Manufacture of acridine derivatives [pharmaceuticals]. I. G. FARBENIND. A.-G., F. MIETZSCH, and H. MAUSS (B.P. 441,007 and 441,132, [A, B] 5.7.34. [A] Addn. to B.P. 363,392; B., 1932, 368).—(A) The products are 3-halogeno-10-amino- or 10-amino-3-alkyl-acridines substituted in the 10(*N*)-position by an alkyl group having ≤ 1 additional NH_2 (or substituted NH_2), and are made by standard methods, and in most cases by interaction of a polyamine with an acridine having a replaceable substituent (Cl, aryloxy, alkoxy, SH, SO_3H) in position 10. *E.g.*, 3 : 10-dichloroacridine (I) is heated at 90–100° with $\text{NEt}_2 \cdot [\text{CH}_2]_3 \cdot \text{CHMe} \cdot \text{NH}_2$ in PhOH to give 3-chloro-10- δ -diethylamino- α -methylbutylamino-acridine (*B, 3HCl*, decomp. 160–165°). Other examples are the dihydrochlorides of 3-chloro-10- γ -diethylamino- β -hydroxypropyl-, decomp. 236–237°, 10-diethylaminoethyl-, decomp. 250–252°, 10- γ -dimethylaminopropyl-, 10-diethylaminobutyl-, 10- β -diethylaminoethyl-, 10- γ -diethylaminoethylthiolpropyl- (γ -diethylaminoethylthiolpropylamine has b.p. 135–136° (12 mm.), and 10- β -dimethylaminoethoxyethyl-aminoacridine (β -dimethylaminoethoxyethylamine has b.p. 88–92°/11 mm.); 3-chloro-10- ϵ -diethylaminoamylaminoacridine citrate; 10- δ -diethylamino- α -methylbutylamino-3-methyl- and 3-ethyl-acridine dihydrochlorides; 3-bromo-, decomp. 148–150°, and 3-iodo-10- δ -diethylamino- α -methylbutylaminoacridine dihydrochloride, decomp. > 140°; 3-iodo-10- δ -dimethylaminobutylaminoacridine dihydrochloride, decomp. > 135°; 3-iodo-10- γ - ζ -bisdiethylamino- $\beta\epsilon$ -dihydroxy-*n*-hexylaminoacridine tartrate. Interaction of 3-chloro-10-phenoxyacridine, m.p. 146° [from (I) and PhOH], with *p*- $\text{NHAc} \cdot \text{CH}_2 \cdot \text{C}_6\text{H}_4 \cdot \text{NH}_2$, and hydrolysis (HCl) of the resulting amide, m.p. 239°, gives 3-chloro-10-*p*-(aminomethyl)anilinoacridine (dihydrochloride, decomp. 240°); similarly, using *p*- $\text{NH}_2 \cdot \text{C}_6\text{H}_4 \cdot \text{O} \cdot \text{C}_2\text{H}_4 \cdot \text{OH}$ and treating the resulting condensation product successively with SOCl_2 and NHEt_2 , 3-chloro-10-*p*-diethylaminoethoxyanilinoacridine (dihydrochloride, decomp. 238°) is formed. 10-Chloro-3-nitroacridine, m.p. 209–210° and γ -piperidinopropylamine, b.p. 106–108° (from bromopropylphthalimide), at 90–100° give a NO_2 -compound, m.p. 154°, converted by reduction, diazotisation, etc. into 3-chloro-10- γ -piperidinopropylaminoacridine, m.p. 134°. The amide from 4-chloro-diphenylamine-6-carboxylic chloride, m.p. 80°, and *p*-aminophenyl β -diethylaminoethyl sulphide is cyclised by POCl_3 at 100° to 3-chloro-10-*p*-diethylaminoethylthiolphenylaminoacridine (dihydrochloride, decomp. 223°). (B) Similar products, similarly made, having alkyl, alkoxy, or alkylthiol groups in position 3 or 7, are claimed. The products may also be made by alkylating OH or SH compounds. Examples are the dihydrochlorides of: 10- δ -diethylamino- α -methylbutylamino-3 : 7-dimethoxy-, decomp. 245–250°, and -3 : 7-dimethyl-, m.p. 245–256° (decomp.), 10- γ -diethylaminothiolpropylamino-3 : 7-, 10- β -dimethylaminoethoxyethylamino-3 : 7-dimethoxy-, and -7-methoxy-3-*n*-butoxy-acridine, m.p. 201–202°, and γ -dimethylamino- $\beta\beta$ -dimethylpropylamino-3 : 7-dimethyl-acridine; the citrates of 10- δ -diethylamino- α -methylbutylamino-7-methoxy-3-isopropoxy-, -3-methylthiol-, -3-methyl-, and -3-butoxy-acridine; 10-*p*-aminomethylanilino-7-meth-

oxy-3-methylthiolacridine (*Ac* derivative, m.p. 227–228°; *B, 2HCl*, decomp. 260°); the dihydrochlorides of 10- γ -piperidinopropylamino-, m.p. 270° (decomp.) (free base, m.p. 106–107°), and 10-*p*-diethylaminoethoxyanilino-3 : 7-dimethoxyacridine, m.p. 285° (decomp.) (free base, m.p. 166–167°), and 10- γ -diethylaminobutylamino-7-ethoxy-3-methylacridine citrate, decomp. 100° [ethylation of the 7-OH-compound (hydrochloride, m.p. 250°)]. 10-Chloro-3 : 7-dimethoxy-, m.p. 228–229°, -3 : 7-dimethyl-, m.p. 154–155°, -7-methoxy-3-isopropoxy-, m.p. 129–130°, -7-methoxy-3-methylthiol-, m.p. 181–183°, -7-methoxy-3-methyl-, m.p. 161–162°, 7-methoxy-3-*n*-butoxy-, m.p. 133°, 7-ethoxy-3-butoxy-, m.p. 147°, and -7-methoxy-3-*n*-hexyloxy-, m.p. 74–75°, and 7-methoxy-3-methylthiol-, m.p. 114–115°, and 3 : 7-dimethoxy-10-phenoxy-acridine, m.p. 147–148° (*B, HCl*, decomp. 225°), and 10-*p*- β -hydroxyethoxyanilinoacridine, m.p. 208–209°, are described.

H. A. P.

Therapeutic agent and manufacture of colloidal calcium malate. J. TORIGIAN, Assr. to DRUG PRODUCTS Co., Inc. (U.S.P. 2,002,842, 28.5.35. Appl., 6.12.33).—Malic acid is added to an aq. dispersion of pptd. $\text{Ca}(\text{OH})_2$ dispersed with, *e.g.*, Na gluconate; the p_{H} is adjusted to 8.5 and the Ca content to 1%.

E. H. S.

Isolation of water-soluble vitamins. R. J. BLOCK and G. R. COWGILL, Assrs. to S. J. DANNENBERG (U.S.P. 2,002,519, 28.5.35. Appl., 20.4.32).—Materials containing the antineuritic vitamin (I) are treated with an oxidising agent, *e.g.*, H_2O_2 , in presence of BaCl_2 (appears to prevent the formation of poisonous products) and an org. solvent for (I), *e.g.*, $\text{EtOH} \cdot \text{CCl}_4 \cdot \text{H}_2\text{O}$, and the vitamin solution is separated.

E. H. S.

Production of reduction products of the male sexual hormone and like substances. SCHERING-KAHLBAUM A.-G. (B.P. 443,463, 23.2.35. Ger., 24.2.34).—Saturated and unsaturated cyclopentanophenanthrols, free from C_6H_6 rings and exhibiting the action of the male sexual hormone, are reduced, *e.g.*, with H_2 at 150°/35 atm., in presence of a reduced Ni catalyst or by refluxing with NaOEt in EtOH . The keto-groups are converted into alcohol groups.

A. W. B.

Pure C_2Cl_4 .—See III.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Use of cobaltamines in photography. R. DUVAL (Bull. Soc. chim., 1936, [v], 3, 95–96).—Using certain cobaltamines, Co^{III} has been substituted for Au and Pt for the toning of Ag citrate papers. The tints obtained are usually maroon, but black and white prints may be produced by the suitable use of Co^{III} iodo-pentammine iodide.

E. E. A.

Sensitising dyes and their application to scientific photography. C. E. K. MEES (Proc. Roy. Inst., 1936, 29, 136–149).—A lecture.

Dyes in photography. J. D. KENDALL (J. Soc. Dyers and Col., 1936, 52, 13–19).—A lecture, dealing with recent progress in the prep. and use of sensitising dyes of the cyanine and other types, and indicating the relation between structure and sensitising action.

S. M. N.

X-Ray screens.—See X. Photocell.—See XI.
Coating photographs.—See XIII.

PATENTS.

Photographic sensitive elements. KODAK, LTD. From KODAK A.-G. (B.P. 444,198, 15.9.34).—Three sensitive layers are successively coated on one side of a support. They are sensitive to different colours, the layer farthest from the support being sensitive to blue light only. Below this is incorporated a decolorisable yellow filter layer. A red filter layer may be placed between the lower green- and red-sensitive layers; the latter intermediate layer may alternatively be clear gelatin. Other arrangements of the layers are claimed.

J. L.

Photographically producing colour-printing plates. V. F. FEENY. From MIEHLE PRINTING PRESS & MANUFG. Co. (B.P. 444,229, 25.3.35).—Thin positive transparencies are prepared from the "yellow" and "blue" separation negatives. These are used as overlays in printing positives from the yellow and red separation negatives, respectively, to produce corr. positives. Retouching of such positives is largely unnecessary.

J. L.

Production of fast prints on paper. SOC. CHEM. IND. IN BASLE (B.P. 443,394, 14.1.35. Switz., 15.1.34).—The use as printing inks of H_2O -sol. acid dyes dissolved in diethylene glycol or in org. solvents miscible with it, e.g., EtOH, glycerol, with the aid of a H_2O -sol. amine salt or NH_4 salt having an aliphatic residue of $\leq C_{10}$, is claimed. The prints are said to have outstanding fastness to H_2O . [Stat. ref.]

H. A. P.

Copying colour-record photographs on to lenticular films. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 444,191, 14.9.34).

Machine for production, by chemical means, of explanatory titles for the pictures on kinematograph films. R. HRUSKA (B.P. 438,272, 7.5.34. Addn. to B.P. 411,335).

XXII.—EXPLOSIVES; MATCHES.

Theory of detonation. W. FINKELNBURG (Z. ges. Schiess- u. Sprengstoffw., 1936, 31, 109—114, and Ann. Physik, 1936, [v], 26, 116—120).—A simple theory, based on the kinetic theory of gases, is discussed. It serves to explain the most important observations of Muraour and Michel-Lévy.

W. J. W.

Stability tests of ballistite in presence of calcium oxide. M. TONEGUTTI (Z. ges. Schiess- u. Sprengstoffw., 1936, 31, 2—5, 42—43).—Tests by the Taliani and the silvered-vessel methods showed a considerable increase in stability of ballistite when a tube of CaO was inserted in the apparatus to absorb moisture. Centralite, which can combine only with nitrous gases, is less efficient. The use of CaO would have many disadvantages in practice. Furthermore, although CaO would prolong stability, the ultimate decomp. of the powder, brought about by interaction of moisture and nitrous gases, would take place more rapidly, and liability to spontaneous combustion would not be eliminated.

W. J. W.

Fuses. A. MAJRICH (Chem.-Ztg., 1936, 60, 333—335).—A review.

PATENTS.

Manufacture of explosives. G. ROTTER, F. HOLDEN, W. M. BURDEN, H. H. HAZEL, and L. J. L. HAMMOND (B.P. 443,905, 6.9.34).—In the nitration of phenols, glycols, or glycerol the reacting vessel is cooled by a mixture of dil. HNO_3 and H_2SO_4 (e.g., nitrating acid) or by a current of air or CO_2 circulating around the nitrator and through a cooling medium, e.g., a refrigerator.

A. R. P.

Manufacture of lead styphnate. E. HERZ, Assr. to REMINGTON ARMS Co., Inc. (U.S.P. 1,999,728, 30.4.35. Appl., 27.2.28. Ger., 8.11.27).—Mg styphnate (I), which is sufficiently H_2O -sol. to give 25—30% solutions and is prepared by treating styphnic acid (II) with MgO or $MgCO_3$, is claimed as a starting material, the high solubility effecting economies in plant. (I), in presence of free (II) in conc. aq. solution, is treated with $Pb(NO_3)_2$.

A. W. B.

Production of nitrated polyhydric alcohol emulsion. D. R. WIGGAM, Assr. to HERCULES POWDER Co. (U.S.P. 1,999,828, 30.4.35. Appl., 28.11.32).— H_2O -sol. ethers of carbohydrates (I), e.g., methylcellulose, are claimed as emulsifying agents for nitrated polyhydric alcohols (II), e.g., nitroglycerol. Solutions containing 3—10% of (I) are used, the final emulsion containing 50—95% of (II). Antifreeze agents, e.g., glycerin, may be added. The products, depending on η , are stabilised explosives.

A. W. B.

 NH_4NO_3 .—See VII.

XXIII.—SANITATION; WATER PURIFICATION.

Determination of injurious constituents in industrial atmospheres. II. Determination of solvent vapours in air by means of activated charcoal. W. A. COOK and A. L. COLEMAN (J. Ind. Hyg., 1936, 18, 194—210; cf. B., 1935, 576).—A charcoal adsorption apparatus for the determination of org. solvent vapours in industrial atm. is described.

H. D.

Bactericidal action of disinfectants in presence of oil, fat, paraffin, vaseline, etc. T. SABALITSCHKA and DÜRRMANN (Pharm. Ztg., 1936, 81, 335—337).—The bactericidal action of disinfectants dissolved in fats depends on the partition coeffs. between fat and H_2O , those with high fat- and low H_2O -solubility, e.g., PhOH, being less active when dissolved in fat, and *vice versa* (e.g., resorcinol). In hydrocarbons (paraffin, vaseline) the behaviours differ from those in fat, in accordance with the different solubilities.

W. O. K.

Toxicology of oxy-acetylene welding. Z. T. WIRTSCHAFTER and E. D. SCHWARTZ (J. Ind. Hyg., 1936, 18, 158—162).—Hazards resulting from metal fumes and the incomplete combustion of and impurities in the C_2H_2 are discussed.

W. O. K.

Skin hazards in American industry. L. SCHWARTZ (U.S. Publ. Health Bull., 1934, No. 215, 54 pp.).—Dermatitis occurring in a no. of industries is examined.

CH. ABS. (p)

Modern sewage-treatment practice. E. B. BESSELEVRE (Eng. Contract. Rec., 1935, 49, 86—89, 203—205).—A review.

CH. ABS. (p)

Chemical precipitation of sewage. E. W. STEEL and P. J. A. ZELLER (Amer. City, 1935, 50, No. 6, 48—50).—Best coagulation was obtained with freshly-prepared FeCl_3 , with AlCl_3 next in order. Control of reaction is essential for economic dosage.

CH. ABS. (p)

Sewage purification. II. A zoogloea-forming bacterium isolated from activated sludge. C. T. BUTTERFIELD (Publ. Works, 1935, 66, No. 6, 23—26; cf. B., 1936, 397).—The floc produced by the organism in pure culture removed 41—84% of the oxidisable matter in polluted H_2O during aëration for 3 hr.

CH. ABS. (p)

Biological oxidation of carbohydrates. V. Decomposition of cellulose in the activated-sludge process and in percolating filters. S. H. JENKINS (Biochem. J., 1936, 30, 497—505; cf. A., 1935, 255).—When aq. suspensions of cellulose (I) containing varying amounts of NH_4HCO_3 were treated by the activated-sludge process, approx. the same amount of (I) was oxidised whether the C:N ratio was 80:1 or 8:1. The (I) did not disappear at a steady rate and the oxidation of NH_3 to NO_2' and NO_3' was erratic and bore no apparent relation either to the amount of (I) oxidised or to the period of aëration. (I) and NH_3 were oxidised simultaneously and there was no evidence to show that decomp. of (I) preceded oxidation of NH_3 . When similar experiments were carried out by the glass percolating-filter process, the filter receiving large amounts of N had enough film to decompose 70% of the (I) and allowed liquid to percolate freely, whereas the one receiving less N oxidised 65% of (I) and contained four times as much film as the former and did not allow free passage to the liquid. Tables indicate the N recoveries in the various experiments. P. W. C.

[Disposal of] sewage sludge. A. LEITCH (J. Inst. Civ. Eng., 1935—6, 583—584).—The carbonisation of digested sludge in an experimental retort at a gasworks, at 1250° , proved unsuccessful as the gas (10,000 cu. ft. per ton) was of low calorific val. (350 B.Th.U.) and the tar and NH_3 were of little val. The coke contained a high % of ash. Laboratory experiments, using a Gray-King assay apparatus, show that 12 gals. of oil (of unknown val.) may be extracted from 1 ton of (H_2O -free) Glasgow chemically-pptd. sludge press-cake at 450° , leaving 14 cwt. of "coke" (fuel val. \equiv 4 cwt. of gas coke) which could be burned without nuisance. C. J.

Sewage sludge fuel value related to volatile matter. G. M. FAIR and E. W. MOORE (Eng. News-Rec., 1935, 114, 681—683).—Calculation of the fuel val. of sludge from its volatile matter content is described. Activated sludge has a lower val. than that of plain-sedimentation solids.

CH. ABS. (p)

Filtering materials for rapid sand filters. Vb. The sand-gravel interface. J. R. BAYLISS (Water Works and Sewerage, 1935, 82, 212—215).—Factors affecting the working condition of filters are examined. (Cf. B., 1935, 704.)

CH. ABS. (p)

How activated charcoal is working out in practice in the waterworks field. F. E. STUART (Eng. Contract. Rec., 1935, 49, 265—267).—Current procedure is described.

CH. ABS. (p)

Modern chlorination [of water]. W. M. BINGLEY (Water Works Eng., 1935, 88, 471).—Modern practices are discussed.

CH. ABS. (p)

Method of copper-sulphating reservoirs. R. F. GOUDEY (J. Amer. Water Works Assoc., 1936, 28, 163—178).—Sections of a reservoir surface 50—100 ft. in width can be covered uniformly with fine crystals of CuSO_4 , passing a screen of 16 meshes per in., by means of a mechanical "scatterer." The CuSO_4 dissolves as it sinks through the H_2O , giving a uniform vertical distribution which can be varied according to the concn. and depth of treatment desired. A considerable saving in time, labour, and chemical is achieved.

C. J.

Comparative study of [American] standard methods of water analysis (1933) and 2% bile-brilliant-green-lactose broth confirmation [of the coli-aërogenes group]. W. L. MALLMANN and J. M. HEPLER (J. Amer. Water Works Assoc., 1936, 28, 411—420).—Results from ten H_2O -filtration plants show that the liquid medium is equally as satisfactory for confirmation purposes as the standard eosin-methylene-blue agar. It is simpler and more rapid and is recommended for consideration as a routine method.

C. J.

Report of water analyst (Corporation of Madras), 1933. S. V. GANAPATI (Sep., 1933, 21 pp.).—Procedure for elimination of excessive amounts of org. matter, H_2S , and S bacteria from a town- H_2O supply is described.

CH. ABS. (p)

Residual chlorine determinations [in water]. T. F. DONAHUE, JUN., and E. ZIMBON (Water Works and Sewerage, 1935, 82, 228—229).—A technique for tolidine tests is described.

CH. ABS. (p)

Odour-control methods [in water purification] aided by new test equipment. M. W. COWLES (Eng. News-Rec., 1935, 114, 636—637).—A method is described for assessing odour in H_2O by dilution to a "threshold" concn.

CH. ABS. (p)

Determining atm. CO_2 .—See VII. Insects.—See XVI. O_3 in breweries.—See XVIII.

PATENTS.

Dentifrices. G. BEHR (B.P. 444,180, 10.9.34. Norw., 11.9.33).—A composition free from H_2O and forming an acid emulsion in use contains an alkaline-earth carbonate, a non-hygroscopic phosphate, a mineral, animal, or vegetable oil, and saponin.

B. M. V.

Incense. [Eucalyptus inhalant.] E. FRANTZ (B.P. 442,637, 12.4.35).—Claim is made for moulded sticks prepared by grinding the pods or caps of eucalyptus trees to a moist mass and moulding this into shape under pressure.

A. R. P.

Materials for combating pests. SOC. CHEM. IND. IN BASLE (B.P. 443,135, 8.8.35. Switz., 14.8.34).—Peat impregnated with HCN is claimed.

A. R. P.

[Ejector device for] disposal of sewage and like refuse from ships. J. STONE & Co., LTD., and W. P. WATKINS (B.P. 444,112, 13.9.34).

Air conditioning.—See I. Glaucanite.—See VII. Rendering fish refuse etc.—See XIX.