BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

APRIL, 1937.

I.—GENERAL; PLANT; MACHINERY.

Application of practical thermodynamics in relation to design of furnaces. J. S. CLARKE (J. Inst. Fuel, 1937, **10**, 157—165).—On the basis of the Rankine and Carnot cycles, it is shown that the thermodynamic efficiency of a furnace is given by $(H_1 - H_0)/H_1$, where H_1 is the heat input and H_0 the sensible and latent heat in the waste combustion products per unit of fuel burned. The various principles governing the design of industrial furnaces are discussed in detail, and illustrated by calculations of the heat balances for three types of furnaces. H. C. M.

Reflexion of heat rays from surfaces. E. ECKERT (Forsch. Geb. Ing.-Wes., 1936, **7**, 265—270).—The manner in which heat radiation is reflected from surfaces, *e.g.*, those of polished metals, blackened Al, cast Fe, clay, wood, etc., was investigated. A considerable degree of direct reflexion occurs in the case of metals appearing matt to the eye. The assumption of completely diffuse reflexion in the calculation of radiant-heat interchange is rarely valid in practice. R. B. C.

Measurement of the heat and electrical conductivity [of metals]. F. FÖRSTER (Z. Metallk., 1936, **28**, 337—340).—An apparatus is described for determining the heat conductivity of small metal specimens by comparison with a standard of known conductivity; the temp. fall between the ends of the specimens is $\ngtr 6^\circ$ and a result correct to $\pm 1\%$ can be obtained in 15 min. With slight modifications the apparatus can be used also for measuring κ at room temp. and at higher temp. A. R. P.

Thermal exchange in nitrogen and hydrogen at ultra-pressures up to 6000 kg. per sq. cm. J. BASSET (Compt. rend., 1936, **203**, 1338—1340).—Data are recorded for the energy needed to maintain a SiO_2 rod heated by a Pt spiral at 600° when surrounded by H_2 and N_2 at 1—6000 kg. per sq. cm. H. J. E.

Recent advances in crushing and grinding. R. S. DEAN (Bull. Amer. Ceram. Soc., 1937, **16**, 9—11).—The electrical "coercive force" of magnetite powder has been shown to be a reliable function of the surface of the powder, and Rittinger's law of grinding has been verified for this mineral. Crushing by air-blast impact and by the sudden expansion of steam condensed in the pores of the material (explosion shattering) is briefly described. J. A. S.

Production of dense aggregates. N. W. TAYLOR (Bull. Amer. Ceram. Soc., 1937, **16**, 7—8).—The effects of particle size and shape and interparticle friction on packing density are discussed. J. A. S.

Gradings for high density. F. O. ANDEREGG (Bull. Amer. Ceram. Soc., 1937, **16**, 11—13).—The theory and practice of particle packing is outlined. J. A. S.

Numerical definitions of particle size and shape. H. HEYWOOD (Chem. & Ind., 1937, 149—154).—A photographic method is described whereby the projected area of a particle can be determined. The mean projected diameter, d, can also be determined by a photoelectric-cell method, where d is the diameter of the circle having an area = that of the projected image of the particle when placed in the most stable position. The results show that d does not differ greatly from the statistical diameter defined by Martin (B., 1926, 903, etc.). Particles are classified into four shape groups, viz., rounded, sub-angular, angular prismoidal, and angular tetrahedral. The relations between the shape consts. are considered, and vals. tabulated for the different shape groups. For routine testing of samples of crushed stone, adequate information is frequently derivable from sieving tests with round and elongated slotted apertures. J. G. A. G.

Calculation of the rate of fall of dust particles. T. WIDELL (Z. Ver. deut. Ing., 1936, **80**, 1497—1498).—Experimental data on the rate of fall of spherical particles are compared with vals. calc. by Stokes' and Oseen's equations; it is shown that the latter are not applicable for Reynolds nos. >1. A new expression is given for calculating the rate of fall of particles of size $>50\ \mu$. R. B. C.

Checking and regulation of the Brinell microscope. G. P. ZAITZEV (Zavod. Lab., 1936, **5**, 95—96).—Methods are described. R. T.

(A) **Slide-rule calculations for testing flat specimens.** (B) **Slide-rule calculation of transient resistance, σ_B, directly from the impression diameter.** G. P. ZAITZEV (Zavod. Lab., 1936, **5**, 96, 97).—Mathematical. R. T.

Fluorescence analysis in chemical industry. J. GRANT (Chem. & Ind., 1937, 237—238).—A brief review.

Adiabatic adsorption by silica gel. E. LEDOUX (Chim. et Ind., 1937, **37**, 31—36).—An apparatus for the study of adiabatic adsorption, with special reference to "fatigue," is described. "Fatigue" is defined as the point at which the efficiency of the adsorbent begins to diminish, and is indicated by falls in temp., as registered by thermometers placed at intervals in the interior of the adsorbent, the falls being due to reductions in the heat of adsorption. "Fatigue" spreads through the adsorbent at a uniform rate in the direction of flow. C. R. H.

Leaching in theory and practice. M. B. Donald (Inst. Chem. Eng., Feb., 1937, 30 pp.).—Leaching is defined as extraction with H_2O. In multistage tank extraction the ratio, A, of the vol. of solvent removed as liquid to the vol. removed adhering to the solid varies with the process, especially if it is proposed to pump the slurry. Vals. of A are given. Percolation leaching is suitable if A is low or if the proportion of extractable matter in the substance treated is low. Theory of percolation is discussed on the analogy of heat exchange. Variables in industrial leaching are : size of material, time, and temp. Apparatus and procedure are described as used in the extraction of (1) tannin, (2) beet sugar, (3) Cu ores with aq. NH_3 and with dil. H_2SO_4, (4) $NaNO_3$, (5) carnallite (continuous), (6) Au (batch extraction). Instances of heap leaching and place leaching for Cu are described. In many cases of batch extraction the gain in throughput by using fewer tanks more than compensates for reduced efficiency. The chief difficulty in the application of theory to design is the absence of accurate vals. for diffusion coeffs. C. I.

Calculation of the maximum results obtainable by extraction with immiscible solvents. T. W. Evans (J. Chem. Educ., 1936, **13**, 536—538). L. S. T.

Vapour–liquid mixtures. Conditions in evaporators with transverse heating tubes. H. Claassen (Chem. Fabr., 1937, **10**, 81—83).—In an evaporator tube concentrating sugar solution four zones are distinguished according to the continually increasing velocity and ratio of space occupied by vapour to that occupied by liquid. The distribution of the zones depends on the tube diameter, and on σ and η for the liquid. With high η or low σ dry patches tend to form in the upper zone. This can be minimised by shortening the tubes or by controlled recirculation. For this latter a curved collecting tube connected to the upper ends of the heating tubes is suggested. From this tube end-vapour escapes upwards, and the liquid divides itself between two outfalls suitably spaced. C. I.

Internal energy–pressure chart for wet and superheated steam vapour. C. L. Yin (Sci. Rep. Nat. Tsing Hua Univ., 1936, **3**, 545—548).—A chart is reproduced. O. D. S.

Measurement of the temperature of flowing gases. P. A. Schischkin (Zavod. Lab., 1936, **5**, 97).—Apparatus is described. R. T.

Grogged-ware dryer.—See VIII. **Ni alloys in H_2O- and steam-power plants and in generators.**—See X. **Ultra-violet rays in industry.**—See XI. **Rubbermeter.**—See XIV. **Bagasse dust as filter-aid. Testing [sugar-]evaporation plant.**—See XVII. **Heat transfer in plate heaters.**—See XIX. **Determining hardness of H_2O.**—See XXIII.

See also A., I, 131, **Collodion ultrafilters.**

Patents.

[Ignition] furnaces. J. E. Greenawalt (B.P. 457,768, 28.5.35).—In a down-draught furnace suitable for ignition in sintering machines and other purposes, the liquid fuel and primary air are sprayed by a centrifugal rotor and diffused into the secondary air descending around the rotor into the combustion chamber, the flame outlets from which are near the bottom. B. M. V.

Incinerating [sintering] furnaces. J. E. Greenawalt (B.P. 460,494, 29.6.36).—A seal between the stationary and moving parts of a sintering machine is formed by jets of air or other innocuous gas. B. M. V.

Crematory furnaces. Birmingham Electric Furnaces, Ltd., and A. G. Lobley (B.P. 460,766, 2.7.35).—The air entering the primary combustion chamber is heated by electrical resisters and the products of combustion are passed through an independently electrically heated, smoke-consuming chamber containing fireclay lumps or other catalytic matter. Pressure and suction fans are provided for the initial air and final gases, and the use of heat exchangers is contemplated. B. M. V.

Furnaces for treatment of pulverulent materials. E. C. St.-Jacques (B.P. 457,957, 9.3.36. Fr., 11.3.35).—The material in suspension in a gas is injected tangentially into an upward extension (E) of a cylindrical furnace (F) of larger diameter, the whirling of the mixture being increased by inclined blades at the junction of E and F. The central part of E is occupied by an outlet for exhaust gases which are drawn out by a fan. Air for combustion is admitted through the wall part way down F, and oil or other fuel lower down, the treated solid being collected on the hearth, which may be in the form of a truck for easy removal. B. M. V.

Gas-fired ovens or furnaces. D. Gunston, and Baker Perkins, Ltd. (B.P. 459,168, 3.7.35).—In an oven of the type in which products of combustion of fluid fuel are constantly circulated by fans in a closed circuit, a master gas cock and air-supply dampers are interconnected with the electric supply that drives the fans. B. M. V.

Furnaces. A. de Jong and J. H. J. Leeming (B.P. 459,089, 28.2.36).—Firebars formed with teeth dipping into a bath of H_2O, and means for providing forced draught, are described. B. M. V.

Rotary [cylindrical] kiln. C. S. Glenn, Assr. to Mathieson Alkali Works, Inc. (U.S.P., 2,034,180, 17.3.36. Appl., 27.5.35).—The hood at the lower end is divided by a bridge wall into a space for exit of burnt material and a space for entry of combustion air; the latter is provided with means to collect and withdraw dust. B. M. V.

Dryer. D. Dalin (U.S.P. 2,034,860, 24.3.36. Appl., 10.12.34).—Steam and vac. connexions for a drum dryer containing steam-heated tubes are described in detail. B. M. V.

Drying machines of the heated-roller type. W. G. and F. R. Simon (B.P. 459,048, 21.6.35).—Means for making a fluid-tight joint between the hopper and the twin rolls, permitting adjustment and allowing for wear, is claimed. An automatic valve for replenishing the hopper is also described. B. M. V.

Drying of plastic or semi-plastic material. Proctor & Schwartz, Inc. (B.P. 460,472, 17.1.36. U.S., 14.5.35).—The material is pressed by a roller into grooves on a heated drum and held therein by a pervious or absorbent band which embraces an arc of such length that the material dries to a non-sticky stage; it is then removed by the combined action of doctor knives and the band leaving the drum, and is finished in any form of dryer suitable for granular materials. B. M. V.

Heating, cooling, kneading, and grinding, as well as emulsifying liquid or semi-solid substances. L. K. V. Helstrup, and Dansk Sojakagefabrik A./S. (B.P. 460,814, 22.1.36).—A pair of rolls is provided with right- and left-hand screw threads on their surface; the threads are mated with slight clearance, and the rolls are rotated at equal and opposite speeds by gearing. A slight reciprocatory motion may be given to one roll, so that the sides of the threads alternately touch. The nett travel of the material is parallel to the axes. B. M. V.

Spray-drying apparatus. K. Schultz, Assr. to Armour & Co. (U.S.P. 2,035,673, 31.3.36. Appl., 7.5.34).—The conditioned drying gas is supplied to an annular space between an outer imperforate shell and a louvred wall which surrounds the drying chamber, the space being tapered to give uniform distribution. The material, *e.g.*, milk or liquid egg, is sprayed at the upper part of the chamber, and the dried solid preferably continues in suspension out at the bottom of the chamber into a cyclone or other separator. B. M. V.

Production of powder from liquids. A. R. Jahn (B.P. 457,731, 5.5.36).—For spray-drying purposes, heated air is impelled by a steam jet and the liquid introduced into the combined stream in such a way as to be broken up and subjected to prolonged contact. A method described embodies two air currents meeting at an angle and passing along a horizontal conduit for contact and into a vertical one for separation. B. M. V.

Apparatus for heating bulk material, such as coal. F. Krupp A.-G. (B.P. 458,298, 27.1.36. Ger., 28.1. and 8.2.35).—Apparatus comprising alternate heating elements (*H*) and retort spaces (*R*) is provided with means (several are described) temporarily to move *H* to increase the size of *R*, to facilitate discharge of coke or the like. *H* are preferably constructed of steel plates containing Si, Cr, and/or Al. B. M. V.

Carrying out chemical reactions and extraction processes. W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 457,552, 25.2.35).—Flotation, condensation, or reaction between different phases, *e.g.*, hydrogenation, is carried out in a vessel oscillated at hundreds or thousands of cycles per min. in a circular or elliptical path of amplitude 5 mm. (*e.g.*); loose grinding bodies may be present. B. M. V.

Pressure vessels such as pressure cookers. Ball Bros. Co., Assees. of L. L. Ludington (B.P. 458,200, 27.9.35. U.S., 23.5.35).—A closure is described. B. M. V.

Lids for pressure-resisting vessels. (a, b) H. P. Dean, (a, b) Imperial Chem. Industries, Ltd., and (b) Refrigeration Patents, Ltd. (B.P. 409,746 and Addn. B.P. 460,587, [a] 4.11.32, [b] 30.7.35).—The joint is of the type in which an outer ring is secured in the neck of a vessel by a bayonet joint and the lid proper is within the ring, being pulled out against an intermediate packing ring by a screw in addition to the pressure in the vessel. The claims in both patents refer to means for preventing rotation of the outer ring when turning the nut on the screw. B. M. V.

Blowpipes. Linde Air Products Co., Assees. of (a) H. W. Cowin, (b) W. J. Jacobsson (B.P. 459,856—7, 15.7.35. U.S., [a] 1.8.34, [b] 8.8.34).—Blowpipes for three gases, the two combustibles and a diluent, are described. B. M. V.

Heat exchangers for fluids. E. C. St.-Jacques (B.P. 459,978, 13.1.36. Fr., 14.1. and 19.11.35).—The heat-exchange elements comprise a solid core and two or more co-axial tubes, not necessarily cylindrical. The annular spaces may be provided with baffles (*e.g.*, the outer tubes may be corrugated), and the inlets and outlets are tangential. B. M. V.

Heat exchangers. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 459,170, 3.7.35).—Heating/cooling fluid is supplied through a hollow shaft and radial tubes to spiral tubes buried in the shell of a rotating drum of diameter 2—10 times its axial length, the external surface being the exchanging zone. B. M. V.

Distribution of liquids over surfaces for heat exchange and other purposes. Mond Nickel Co., Ltd., and F. H. Allman-Ward (B.P. 459,315, 14.8.35).—The liquid is supplied to a trough or apertured pipe which is long enough to cover the whole horizontal length of the surface to be irrigated, but is allowed to discharge only from one localised portion at a time, which point is continually moved, *e.g.*, by forming the trough with a curve in the vertical plane and rocking it. B. M. V.

Tubular heat-exchange apparatus. O. A. Bossart and E. G. Eberhardt (B.P. 457,782, 4.6.35).—A tube is flattened until the walls are parallel and is then indented from each side alternately to form, on the interior, sloping baffles which produce turbulent, partly zigzag flow of the inner fluid. B. M. V.

Heat-insulating sheets, blocks, or the like. C. McEwan, and J. & C. McEwan, Ltd. (B.P. 459,574, 14.3.36).—A no. of layers of corrugated metal foil are separated by strips or layers of asbestos paper, the whole being enclosed in an asbestos paper case. B. M. V.

Heat-insulating coverings made of spun glass. Spun Glass, Ltd., and T. Jackson (B.P. 459,193, 31.7.35).—To form a pipe covering, a thin sheet is sprayed with adhesive and wound on a mandrel. When set the tube is cut longitudinally. Outer rigid coverings of, *e.g.*, cement and wire may be provided. B. M. V.

Heat and/or sound insulators. J. Yuille (B.P. 458,182, 27.5.36).—The walls of the chamber are double and to each face of the hollow space are applied mattresses of metal wool. B. M. V.

Thermostat of the kind wherein an expansible liquid is employed as the temperature element. Landis & Gyr A.-G. (B.P. 460,411, 18.6.36. Switz., 27.6.35).—Change in vol. of the liquid moves a rod against a spring, to move a metal strip carrying a switch contact; a snap action and means of adjustment are provided by a magnet having an Fe armature in its air gap. B. M. V.

Thermostats. L. Satchwell (B.P. 459,962, 16.10.35).—A differentially expanding tube and rod operate a switch through a magnet and spring mechanism, giving a flick action both ways. B. M. V.

Thermostat. R. P. Jameson (B.P. 460,312, 2.10.35. Austral., 10.10.34).—A device for operating electrical contacts comprises (*inter alia*) a pair of rods within a casing of expansible metal. If the rods are of substantially non-expanding metal the device operates at predetermined temp. irrespective of rate of temp. rise, but if the rods have merely a different rate of expansion the device will operate at higher temp. if slowly heated than if heated quickly, thus compensating for the time lag between heat supply and heating effect. B. M. V.

Thermostatic-control devices. C. H. Armstrong and N. H. Brown (B.P. 460,309, 11.9.35).—A device which may be used to regulate boiler-H_2O level comprises an inclined, high-expansion tube (filled, *e.g.*, with H_2O to a desired level and above that with steam) surrounded by a low-expansion tube, the space between having moderate ventilation to atm. at the lower end only. B. M. V.

Apparatus for automatically controlling a variable characteristic, such as temperature. Fabr. elektr. Apparate F. Sauter A.-G. (B.P. 460,419, 13.7.36. Switz., 13.7.35).—The apparatus comprises a cam driven by a synchronous motor or other source of regular motion. This cam rocks a lever, the motion of which is transmitted to the axle of the middle wheel of a differential train, one side of which is connected to the thermostat or the like and the other side normally rocks a cam symmetrically about its central position so that it just fails to operate both of two Hg switches. Any movement of the thermostat causes lack of symmetry in the motion of the second cam, and it will operate one of the Hg switches to start a reversible motor. B. M. V.

Thermometer. H. Y. Norwood, Assr. to Taylor Instrument Cos. (U.S.P. 2,035,663, 31.3.36. Appl., 20.7.32).—An easy-reading stem comprising a tube of elliptical section with a triangular bore and an embedded coloured strip is exactly specified. B. M. V.

Chilling apparatus, particularly for liquids. Worthington–Simpson, Ltd. From Carbondale Machine Corp. (B.P. 460,668, 30.8.35).—The liquid to be chilled flows in series through the inner tubes of a no. of concentric pipe exchangers, while the outer liquid which evaporates to effect chilling is flowed in series at each level, but the different levels are in parallel. Scrapers rotated by hand are provided in the inner tubes. B. M. V.

Absorbent working fluids [for refrigeration]. J. Fleischer, Assr. to Gen. Motors Corp. (U.S.P. 2,035,541, 31.3.36. Appl., 20.5.31).—The absorbent comprises a di-ester, *e.g.*, Bu_2 phthalate, and the refrigerant a halogeno-fluoro-compound having the structure of $CHCl_3$, *e.g.*, $CHCl_2F$. B. M. V.

Defrosting brick. G. A. Booth (U.S.P. 2,035,219, 24.3.36. Appl., 26.10.34).—An antifreeze composition suitable for pressing into block form comprises NaCl, EtOH, glycerin, creosote, and ginger, hemlock, or cedar oil, in stated proportions, with sawdust as binder. B. M. V.

Device for cleaning rotating cylinders. Brit. Celanese, Ltd., R. W. Moncrieff, and P. H. Miller (B.P. 459,456, 8.7.35).—Brushes attached to a conveyor band are moved parallel to the axis and the cylinder is simultaneously rotated. B. M. V.

Crushing devices. Nordberg Manufg. Co. (B.P. 459,011, 22.4.36. U.S., 13.7.35).—In a gyratory cone crusher the spherical bearing is permitted to slide horizontally to reduce the bending moment on the shaft. B. M. V.

Crusher. E. Kraemer (U.S.P. 2,034,401, 17.3.36. Appl., 25.3.35).—A double crusher operated by one eccentric shaft is described. B. M. V.

[Hydraulic cartridge for] breaking [down] coal and similar materials. J. I. Graham and A. E. Lance (B.P. 459,815, 11.1.36).—A rubber cartridge is prevented from expanding axially by end caps and a through bolt in the form of a thick-walled tube which is also the supply conduit for bursting fluid. Circumferentially it is strengthened but not prevented from expanding by a metallic or fabric sleeve with overlapping but unfastened joint. B. M. V.

Mullers. A. C. Christensen (B.P. 459,752, 20.2.36. U.S., 25.1.36).—An edge-runner mill of the stationary pan type is described. B. M. V.

Edge-runner mills. H. E. Cox (B.P. 457,864, 7.6.35).—The pan is stationary and mechanical power is applied to rotate the axis of the roll about the vertical and to rotate the roll positively on its own axis, the gearing being such that the main drive underneath the pan comprises two equal bevels driven by a single-bevel pinion. B. M. V.

Mills and breast bars for grinding, refining, cleansing, finishing, and other processes. H. E. Cox (B.P. 457,671, 25.7.35).—Means for removing the breast bar, its housing, etc. for cleansing are described. B. M. V.

[Roller] mills for mixing, grinding, refining, and other processes. H. E. Cox (B.P. 458,261, 15.5.35).—Manual adjustment (through springs) of the pressure of a breast bar (or another roll) is described. B. M. V.

Grinding bar for single- and multiple-roller mills. W. H. A. Thiemann. From E. A. Itterlein (B.P. 459,025, 26.5.36).—The bar is formed with two or more grinding surfaces separated by a cavity or cavities containing a spring-mounted scraper and serving as feed inlet or outlet to another zone. B. M. V.

Method of and mill for pulverising. Internat. Combustion, Ltd., Assess. of J. Crites (B.P. 460,867, 9.6.36. U.S., 10.6.35).—A ring-roll mill with rotating ring and pendulous but otherwise stationary roll axes is described. Air currents pass up the annular space surrounding the bowl-like support for the ring and into a deflexion-type separator above the mill. B. M. V.

Apparatus for dispensing and consolidating pulverulent materials. Deuts. Waffen- u. Munitionsfabriken A.-G., and Berlin–Karlsruher Industrie-Werke A.-G. (B.P. 458,590, 10.5.35. Ger., 28.5.34).—For the manufacture of pastilles and the like a hollow plunger is reciprocated to a const. but adjustable height in a container of the comminuted material, and after its descent an inner plunger descends and forms the tablet by compression. The container is rapped to keep the material settled down. B. M. V.

Apparatus for casting materials which contract during solidification, especially polymerisable organic liquids. E. I. Du Pont de Nemours & Co. (B.P. 460,240, 24.7.35. U.S., 24.7.34).—An elongated mould is provided with an upstanding reservoir extending substantially the whole length, the cross-section of the latter being inverted triangular and slightly truncated, the top (base) being closed except for a small vent or filling opening. B. M. V.

Treatment of finely-granulated colloidal or plastic materials. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 458,071, 12.6.35).—Reaction with other materials is prompted by passage through a trough vibrating at 33—87 ~, amplitude 0·2—5·0 mm. B. M. V.

Ore concentrator. C. E. Bye (U.S.P. 2,034,225, 17.3.36. Appl., 9.8.34).—Dry separation is effected on a horizontal, slightly conical table with spiral riffles which is given an arcuate differential shake; air blasts are provided to direct concentrate (small in quantity, but very heavy, *e.g.*, Au) into outlet pipes. B. M. V.

Screening or sifting apparatus. C. Arnold. From W. S. Tyler Co. (B.P. 457,924, 9.3.35).—A composite screen comprising a finer upper mesh supported by, but spaced from, a coarser and stronger lower mesh is vibrated as a whole. B. M. V.

Sifting or screening apparatus. T. Summerson & Sons, Ltd., and A. G. Ticehurst (B.P. 459,817, 23.1.36).—A conical or sloping-cylindrical trommel is divided into sections by imperforate portions, and each perforated section is surrounded by an imperforate sleeve to collect the undersize product. B. M. V.

Vibratory sieves. Westfalia–Dinnendahl–Gröppel A.-G. (B.P. 459,642, 28.5.36. Ger., 29.6.35).—In apparatus in which a screen is vibrated by an eccentric, to facilitate starting, the eccentric shaft is allowed freedom on the plane of reciprocation, and when running at full speed the bearings are gradually restrained, thus starting the screen. B. M. V.

Pneumatic separators or classifiers. E. Newell & Co., Ltd., A. H. Moss, and N. A. Kellington (B.P. 460,081, 25.7.36).—In a double-conical, deflexion-type separator, means for adjusting the louvres at the top (base) of the cones is described. B. M. V.

Pneumatic separation of materials of different specific gravities and sizes. F. F. Ridley, and Colliery Eng., Ltd. (B.P. 457,801, 5.6.35).—The apparatus, especially for size 0—⅛ in., comprises a vibrating deck with a flat pervious surface situated over an air box; the bed of material is of even thickness, and forwardly is a grid in the deck large enough to pass the largest particles of heavy material, which are in turn dropped into the air box. If desired, there may be several decks in series separated by imperforate slopes. B. M. V.

Apparatus for pneumatic separation of materials of different sizes and density. P. Soulary, and Comp. Mines de Bruay (B.P. 460,742, 28.2.36. Fr., 26.4.35).—Each jigging box except the last is divided into two portions with sieve bottoms at different levels, the earlier being the lower; each heavy fraction stratified on both the screens is discharged to a forward side box and the upper layer sent forward over an imperforate slope upon which it is caused to converge in a deeper stream before entering the next jigging box. B. M. V.

Flotation-separation apparatus. Minerals Separation, Ltd. (B.P. 459,406, 14.12.35. U.S., 15.12.34).—In a series of cells, the outlet of one cell is connected to the suction inlet of the next in the usual way; in addition, the cells are directly connected below froth level and in a comparatively quiet zone, and the agitators are adjusted so that the greater suction is at the feed end of the series, to cause a return flow from cell to cell through the direct connexions. B. M. V.

Apparatus for use in the separation of dirt from coal, and for other like purposes. W. H. Barker (B.P. 459,401, 11.11.35).—The dirt is discharged from a jigging trough or the like over a plate of which the outer edge is stationary but the inner edge jigs with the trough. B. M. V.

Settling tanks and apparatus for removing settled solids therefrom. C. J. Hartley (B.P. 458,318, 23.7.35).—An elongated tank is divided by intermediate walls into a no. of parallel channels which have common outlet and common inlet screen, but the entry of screened material, *e.g.*, sewage, is individually controlled. Elevating and scraping mechanism is provided which can operate in one channel at a time. B. M. V.

Settling apparatus. H. E. Partridge (B.P. 458,547, 25.3.36).—An elongated tank is provided with transverse baffles not extending to the bottom, and a conveyor belt runs lengthways on the bottom and up a ramp at one end. The liquid is passed transversely through all compartments in parallel, or, if desired, transversely through a few compartments and then longitudinally in the same direction as the belt, so that coarser material is deposited on the belt first. B. M. V.

Prevention of clogging of conduits for liquids containing suspended sludge. Sharples Specialty Co., Assees. of L. D. Jones (B.P. 459,503, 8.5.35. U.S., 16.5.34).—A no. of receivers, *e.g.*, centrifuges or filters, of the mixture are connected to a ring main and the sludge is delivered from an agitator into the ring alternately in either direction by means of a rotary valve. B. M. V.

Devices for removing accumulated solid matter from strainer gratings. Nyeboe & Nissen A./S. (B.P. 459,756, 13.3.36. Denm., 19.3.35).—A rake ascends and descends the grating in the same approx. vertical plane in each direction, and a scraper removes the débris sideways from the rake when near its upper limit of travel. B. M. V.

Clarification or sedimentation treatment of liquids. H. J. Talbot, R. G. A. Weiss, and Dorr-Oliver Co., Ltd. (B.P. 459,120, 26.3.35).—In a thickener the rakes are reasonably rigid in operation and are slidably mounted in frames so as to be capable of being lifted above the liquid level. B. M. V.

Thickening, stirring, or agitating apparatus. W. W. Triggs. From Dorr-Oliver N. V. (B.P. 460,021, 16.7.35).—The driving mechanism is arranged so that when the resistance to the rakes increases they are raised and the driving torque is increased; the actual discharge scraper in the central pit is not so affected, but may be independently adjusted by hand. B. M. V.

(A) **Aëration of cream, cake mixtures, and the like.** (B) **Means for aërating fluids.** E. Christiansen and C. O. Ericsson (B.P. 460,217 and 460,273, 23.7.35).—(A) An air-admission device forming the bottom of a mixer comprises a plate with narrow slits covered with wire gauze on the underside. (B) An assemblage comprising motor, agitator, bowl, pump, and an aëration device, as in (A), is described. B. M. V.

Centrifuges. N. V. Machinefabriek Reineveld (B.P. 460,433, 7.10.36. Ger., 12.11.35).—The horizontal shaft of a centrifugal drum has a bearing at the centre of gravity of the drum and goods even though the goods-containing part has a flat bottom; this is effected by extending the drum wall backwards and providing a heavy rim. B. M. V.

[Centrifuge for] nitration processes [for cellulose and aromatic compounds]. W. W. Groves. From Deuts. Celluloid-Fabr. (B.P. 459,445, 4.7.35).—A centrifuge for receiving the nitrated product in a continuous process comprises a basket and a pusher member mounted on a horizontal shaft so as to rotate at the same speed. The basket carries a piston operating in a cylinder on the pusher, so that the basket can be caused to reciprocate in an axial direction, while the pusher remains stationary. The material fed into the machine and subsequently collected on the inner wall of the basket can thereby be intermittently directed to a discharge pipe. There is absence of friction and no danger from deposits of unstable material. W. J. W.

Centrifugal separating machines. Amer. Centrifugal Corp. (B.P. 459,332, 29.1.36. U.S., 30.1.35).—The apparatus is of the bowl type with seepage means at the upper part. The claims relate mainly to a scraper for discharge of solids. B. M. V.

Removable containers for centrifugal extractors. O. W. Johnson (B.P. 460,263, 2.6.36).—A detachable basket is divisible into semicircles or sectors; the diametral walls when assembled form a central conical space which slips on a driving member. B. M. V.

Centrifugal cream separators. H. W. Fawcett (B.P. 460,362, 23.5., 1.8., and 17.10.35).—The separator is provided with peripheral slime outlets which are closed by valves and can be whizzed clean through them because all internal surfaces are sloped thereto. B. M. V.

Centrifugal [cream-type] separators. Ecrémeuses Mélotte Soc. Anon. (B.P. 458,216, 20.1.36. Belg., 19.1.35).—Frusto-conical driving elements are described in detail. B. M. V.

Sediment-detecting device. F. B. Carkuff (U.S.P. 2,034,795, 24.3.36. Appl., 23.11.34).—A hand pump for withdrawing liquor, *e.g.*, milk, from the lower part of a vessel and returning it through a filter disc is described. B. M. V.

Apparatus for treating mixtures of finely-divided solids and liquids in thickening and countercurrent washing operations. N. C. Christensen (U.S.P. 2,035,592, 31.3.36. Appl., 2.3.33).—A thickening filter operating by pressure on the prefilt is provided with a backwash operated by compressed air, the filters being in the form of vertical tubes with the lower ends closed and the upper ones opening through a tube plate. A no. of units in series for countercurrent washing are provided with electrically-timed valves. B. M. V.

Filters. Royles, Ltd., and B. M. Hills (B.P. 459,657, 2.4.36).—The filter comprises an outer wall, next to which is a layer of coarse granite chippings secured by an inner wall which is very coarsely perforated and within which is granular filter material much finer than the perforations but not capable of passing through the chippings. B. M. V.

Filter. A. O. Walker, Assr. to W. B. Hargraves (U.S.P. 2,035,851, 31.3.36. Appl., 13.8.34).—Filter frames are supported on two tubes for filtrate, and these in turn are supported on one end of a pressure casing, the other end being detachable. B. M. V.

Filters. J. Yuille (B.P. 460,657, 2.6.36).—A no. of mattresses are supported in a tower with deflectors above each, the mattresses comprising metal wool in a foraminous envelope. B. M. V.

Filter. R. C. Pierce, Assr. to Nat. Standard Co. (U.S.P. 2,035,758, 31.3.36. Appl., 6.5.35).—A strong supporting body or perforated tube or the like is covered with a single layer of braided metallic tape without lap. B. M. V.

Filters. A. Knecht (B.P. 459,409, 23.12.35. Ger., 22.21.34).—Brushing devices for cleaning a helical wire filter are described. B. M. V.

Filter. T. C. Ewell (U.S.P. 2,034,611, 17.3.36. Appl., 6.9.34).—In a conduit (*e.g.*, for circulating H_2O) is placed an oblique screen, and immediately before the screen is a gap in the wall of the conduit communicating with a sediment chamber. B. M. V.

Apparatus for filtering water and other liquids. Bell Bros. (Manchester, 1927), Ltd., and C. G. Benson (B.P. 457,880, 29.4.35).—Distributor heads for forcing a mixture of air and H_2O under a sand filter are described. They are supplied by a single pipe for both air and H_2O. B. M. V.

Rotary filters. Internat. Combustion, Ltd., W. F. Harlow, and F. G. Goodwin (B.P. 457,832, 11.6.35).—Construction of the peripheral compartments in a rotary drum filter is described. The filter medium is supported on helical ribs. B. M. V.

Liquid-screening apparatus. J. Peebles, and Glenfield & Kennedy, Ltd. (B.P. 459,623, 29.2.36).—A rotating cylindrical screen to which the inlet is through one end and the outlet peripheral is provided with a downstream end-wall of truncated conical form to prevent building-up of débris. B. M. V.

Filtration of solid-bearing liquids. A. Wright (B.P. 459,560, 28.9.35. U.S., 6.10.34).—In a continuous rotary-drum filter the filter medium is composed of filaments, all of which are situated in planes perpendicular to the axis while some remain permanently circular on the drum and the remainder are led away from the drum at the point of cake discharge and return to it after passing over jockey rollers. B. M. V.

Columns containing filler bodies and adapted for distributing liquids passing therethrough. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 459,542, 11.7.35).—At intervals in a filled column are distributing basins having overflows symmetrically arranged around the common axis of the tower, filling, and basins. The basins are not rigidly connected to the wall of the tower, but may be adjusted by levelling screws. B. M. V.

Separation of solids from liquids. Dickson & Mann, Ltd., and C. R. Thornton (B.P. 459,385, 14.9.35).—In, *e.g.*, the dewatering of fine coal the pulp is carried quietly in dredger or conveyor buckets for such a period that settling takes place; the liquid is then decanted by slowly tilting. Sludge spilt with the last of the liquid is caught in a scraper conveyor, and the buckets are finally emptied of solids into another conveyor or bin. B. M. V.

Mixing apparatus. A. A. Henkel (B.P. 459,237, 4.6.35. Ger., 4.6.34).—A form of agitator for use in a bowl is described. B. M. V.

Mixing and granulating pulverulent and plastic materials. J., G., and L. Eirich (Gebr. Eirich) (B.P. 460,981, 12.8.35. Ger., 11.8.34, 3.9.34, and 31.7.35).—The form of the agitator bars in a planetary mixer is described. B. M. V.

Mixing machines for (A) powdered or granular, (B) powdered, granular, and like materials. H. Simon, Ltd., and J. C. Brian (B.P. 460,341—2, 14.2.36).—(A) In a worm conveyor, small buckets are attached to the helical blade so that the material is lifted and showered; the blade is preferably discontinuous. (B) Material is delivered on to an upper grid and worked through by rotating arms. It falls to an imperforate bottom, is raked to outlets by other rotating arms, and then lifted from one outlet by a worm or other elevator back to the grid; alternatively it is discharged from the other outlet. B. M. V.

Mixing device. V. Gephart (U.S.P. 2,033,518, 10.3.36. Appl., 21.11.33. Can., 18.7.33).—A tank contains excess of a sol. substance (*e.g.*, washing powder), and, after filling with H_2O (or solvent), a const. trickle of H_2O is admitted through a spiral pipe with jets at various angles in the lower part, and saturated solution is allowed to overflow at an equal rate from the upper part. B. M. V.

Apparatus for disintegrating, dissolving, and mixing solids in liquids. W. W. Groves. From Cowles Eng. Corp. (B.P. 459,618, 16.1.36).—A pump discharges a jet across its own inlet, which has also a spinning screen to effect further agitation. B. M. V.

Emulsifying (A) apparatus, (B) method. C. F. Chapman, Assr. to Kraft–Phenix Cheese Corp. (U.S.P. 2,033,412—3, 10.3.36. Appl., [A] 23.4.32, [B] 21.2.33).—In the prep. of mayonnaise (*e.g.*) the main constituents are inserted by measuring pumps into the lower part of a container vessel containing beaters, and additional constituents are added by similar means higher up, the finished emulsion being overflowed at the highest level. B. M. V.

Treatment of liquids. Submarine Signal Co. (London), Ltd. From Submarine Signal Co. (B.P. 458,872, 7.9.35).—For the denaturing of albumin or forming emulsions of materials the liquid is caused to flow between two parallel and slightly separated (0·1 in.) surfaces, one of them being in vibration at a frequency, $\ngtr 4000 \sim$, which is adjustable to resonance. The vibrating surface may be an electromagnetically oscillated diaphragm, and cavitation may be induced at the centre by negative pressure. The fixed surface is preferably provided with a spiral groove, the outlet being at the centre. B. M. V.

Extraction of two or more liquid mixtures. N. V. de Bataafsche Petroleum Maats. (B.P. 459,442, 2.7.35. Holl., 14.7.34).—A single selective solvent is used to extract a no. of different liquid mixtures in cyclic order without any substantial proportion of the solvent being purified, only that small proportion stripped from the raffinates being obtained pure. B. M. V.

Purification of liquids. Dorr Co., Inc. (B.P. 459,126 and 459,288, 29.3.35. U.S., 29.3.34).—(A) A floc-laden liquid is caused to flow upwardly and downwardly a no. of times and is put into rotation about the vertical axes of the cells; finally it is caused to spread horizontally in a sedimentation zone, the transfer being effected through slot-like apertures in the dividing wall, claimed in (B). B. M. V.

Purification of liquids. N. V. Octrooien Maats. Activit (B.P. 458,748, 18.5.35. Holl., 29.5. and 12.9.34).—Uncarbonised but carbonisable material (*e.g.*, sawdust) is mixed with a H_2O-absorbing reagent, (*e.g.*, H_2SO_4 or H_3PO_4), and the mixture used to decolorise liquids other than H_2O but including aq. solutions of (*e.g.*) sugar. The acid must not be washed out before use, but may be neutralised or bound (*e.g.*, with $BaCO_3$); alternatively or in addition, $BaCl_2$ may be added to the filtrate to cause a ppt. to form. B. M. V.

(A) Treatment of substances and forming films. (B) Irradiation of substances. B. O'Brien (B.P. 459,043 and 459,118, 26.4.35. U.S., 27.4.34).—(A) To form a film free of solid support for irradiation, the liquid is caused to flow from an annular slot the outlet edge of which is formed so as to give to the liquid a component of motion (horizontal rotary, the general flow being vertical) sufficient to overcome the contracting effect of surface tension, but not so great as to cause any substantial thinning of the film in the area near the slot. (B) The material is irradiated while unsupported, the distance of such flow being $\nless 50$ times the thickness of the film. B. M. V.

Desiccation or drying of liquid films. J. Brabäk (B.P. 459,459, 16.7.35).—The films are supported on a surface and dried by impact of rapid currents of gas which are deflected so that both arriving and leaving currents have a component of motion parallel to the surface. B. M. V.

Drying of liquids, in particular in determining the solid content thereof. Ges. f. Linde's Eismachinen A.-G. (B.P. 459,771, 22.6.36. Ger., 27.12.35).—Liquids which thicken on drying are absorbed in a porous body which is placed in a tube (open at both ends) which is hung in a substantially gastight manner through a partition in the oven so that any of the atm. leaving the oven does so through the tube. A gentle supply of air or inert gas is forced to the oven, which is preferably externally heated, the gas-supply pipe and the heating means (electric or steam-coil) being wound adjacently inside the heat insulation of the wall of the oven. B. M. V.

Apparatus for mixing of liquids. F. Hejduk and J. Neumann (B.P. 460,161, 27.12.35. Czechoslov., 8.6.35).—The liquids are passed through separate flow-meters, each recording total and trip. The drive of the trip counter is effected through change wheels which are adjusted so that when the desired proportion of mixture is correctly attained all the trip counters read the same figure. To maintain the proportion between two liquids, a differential gear may be incorporated in the transmission which closes one side and opens the other of a double valve should any discrepancy arise. B. M. V.

Manufacture of solid materials in liquids [chlorinated rubber products]. A. P. Lowes, and Imperial Chem. Industries, Ltd. (B.P. 460,144, 15.7. and 3.10.35).—For forming a solution of a solid (*S*), an initial solvent (I) is replaced by another (II) without the intermediate step of separation of *S*. The mixture of *S* and (I) is brought in contact with vapour of (II), effecting condensation of (II) and evaporation of (I), preferably in countercurrent, *S* descending by gravity through a tower the external temp. of which is controlled to give a gradient similar to that inside. *E.g.*, *S* is chlorinated rubber, (I) is CCl_4, and (II) is PhMe. B. M. V.

Spargers or sprinklers. R. Morton & Co., Ltd., and G. A. Rawlins (B.P. 460,635, 1.8.35).—Bearings for a rotating sprinkler are described. B. M. V.

[Base-exchange] water softeners. O. C. Kerrison (B.P. 458,628, 21.1.36).—A protruding, wire-wound inlet for H_2O is combined with the salt stopper. The device distributes the H_2O into the middle of the salt charge at the commencement of regeneration and afterwards over the surface of the zeolite. B. M. V.

Production of artificial fogs. N. Wesström and G. Lundin (B.P. 458,202, 8.10.35. Swed., 10.10.34).—Oleum or other liquid capable of producing a durable fog is pumped through a nozzle by which it is atomised by its own pressure only. B. M. V.

Hydrometer. E. N. Hurlburt, Assr. to Taylor Instrument Cos. (U.S.P. 2,035,603, 31.3.36. Appl., 23.3.35).—A hydrometer of the float type is claimed in which the graduated strip, preferably of Al or other light metal, extends down into the bulb and is securely anchored by fusion of the fusible metal used as ballast. This precludes any subsequent slipping of the graduations. D. M. M.

Distillation apparatus. R. N. Graham and W. S. Brackett, Assrs. to Union Carbide & Carbon Corp. (U.S.P. 2,035,428, 24.3.36. Appl., 31.8.32).—A tower is composed of sections comprising imperforate trays which are connected by external ⊐-pipes for upflow and downflow, everything, including the baffles, being of simple form so that it can be clad with non-corrodible metal. B. M. V.

Distilling systems. Distillers Co., Ltd., and A. J. V. Underwood (B.P. 458,152, 18.4.36).—During the distillation of volatile org. liquids the heat in the effluent is utilised by partial evaporation at reduced pressure, the vapour being sent elsewhere, after recompression if desired. B. M. V.

(A) Degassers. (B) High-vacuum distillation apparatus. B. E. A. Vigers, and Imperial Chem. Industries, Ltd. (B.P. 457,777—8, 4.6.35).—(A) A liquid is subjected to a high vac. at an elevated temp., *e.g.*, as a preliminary to short-path distillation. The liquid is passed as a film down the interior surface of a vessel heated externally so that the bottom is hotter than the top; this effect of subjecting to the highest temp. only liquid which has been partly degasified may be intensified by treatment in stages. (B) Both the evaporating and condensing surfaces in a short-path apparatus are formed of massive good-conducting metal (*e.g.*, Al alloy) which is cast around tubes of, *e.g.*, steel or Cu carrying the heating/cooling medium. B. M. V.

Continuous vacuum distillation of high-boiling-point products. J. Grosjean and P. R. E. Lewkowitsch (B.P. 460,532, 3.8.35).—In an apparatus for fractional distillation, the partial or total pressure is decreased in stages, and also the temp., if desired, but the depth of liquid above the heating surface is small in each boiling tray and the vapours are removed from any stage at the pressure prevailing therein. The outer walls and top of the tower may be heated; the use of carrier steam or other vapour is optional. B. M. V.

Continuous distillation retort. E. G. M. R. Legé (B.P. 457,960, 30.3.36. Fr., 19.3.35 and

2.3.36).—The material is fed to the centre of a rotating spiral, precautions being taken to ensure uniform feeding over the whole width (axial length). The distilled vapours leave at the centre, and the residue drops from the outer end and forms a liquid seal. Heating is by combustion gases in or out of contact with the material. B. M. V.

Non-bumping heater for distillations and evaporations. A. F. Camp (U.S.P. 2,033,323, 10.3.36. Appl., 23.1.35).—A flask of Kjeldahl shape is supported on refractory rings of stepped diameter, and in the angle between them the heating means, *e.g.*, an electric-resistance coil, is placed. B. M. V.

Vacuum concentrating vessels. Hansella Ges. m.b.H. (B.P. 458,788, 27.6.35. U.S., 29.12.34). —In a vac. kettle with dome, the inlet pipe for material terminates in an inverted bowl which serves as a preliminary flash chamber. B. M. V.

Fractionation of liquids. C. C. Benz (U.S.P. 2,034,891, 24.3.36. Appl., 9.7.34).—Lubricating oil (*e.g.*) flows in film form over heated tubes in a vac. vessel. The vapours flow off in the same direction as the liquid (downwards), are then reversed to separate entrainment, and are condensed, preferably in an upper compartment of the same vessel. B. M. V.

Apparatus for effecting growth of crystals *in vacuo*. H. C. A. Behrens, Assr. to R. O. Meyer (U.S.P. 2,034,969, 24.3.36. Appl., 28.9.33. Ger., 29.10.32).—A shell is divided into a no. of compartments for series flow, each being provided with agitators; entrance to each compartment is at a lower point and overflow from an upper point, and vac. is applied which increases in the later compartments, the difference in head being taken up by the liquid in the transfer passages. B. M. V.

Apparatus for accelerated crystallisation. P. de Lattre (B.P. 460,834, 11.9.36).—In a cylindro-conical vessel a screw impeller maintains a circulation up a central well and down the outer parts. The lower part of the vessel in which the liquor is stationary and crystals collect is not cooled, but cooling jackets are provided for the outer wall and the well partition. Additional concentric hollow walls may be provided within the well to extend the cooling surface. B. M. V.

[Test-paper] aid for rapidly determining the degree of acidity or the p_H value of liquids. G. Kloz (B.P. 460,108, 9.4.36).—A reagent paper for testing milk (*e.g.*) is impregnated with indicator and with $\nless 1$ colour for comparison; the colour may be developed in use from another indicator or other indicators, all the indicators being chosen to develop the same final colour but at different p_H vals. B. M. V.

Device for separating gas from liquid. A. Lanser, Assr. to S. F. Bowser & Co., Inc. (U.S.P. 2,034,914, 24.3.36. Appl., 19.12.32. Fr., 4.2.32).—Flowing petrol or the like is given a swirling motion, and the inner core of gas is collected under a bell which, when it rises, opens a gas-discharge valve. B. M. V.

Fine dispersion of gases in liquids. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 458,583, 30.1.36).—Liquid is withdrawn from a tank and pumped back into the lower part of the same tank through an annular outer vertical jet, the gas being supplied to an inner jet. The mixture strikes a baffle and emerges horizontally through slits into the bulk of the liquid. B. M. V.

Valves for use in pumping liquids containing solid substances under pressure. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 459,662, 11.7.35).—The valve comprises a ball upon a seating of hard material formed with an obtuse-angled actual seat giving line contact, *e.g.*, that formed by the intersection of two cones or a cone and plane. B. M. V.

Rubber-lined pumps. G. A. H. Grierson (B.P. 459,468, 24.3.36. Can., 10.4.35).—The metal body of a centrifugal pump is cylindrical, the volute being formed in the rubber lining, which is "inflexible resilient" and manufactured in two parts which are pressed together on bolting up the body. A stuffing box is described. B. M. V.

Apparatus for measuring viscosity. E. S. L. Beale (B.P. 459,565, 4.11.35).—A falling-ball viscosimeter is inverted, the sphere being fixed and conveniently having the bulb of a thermometer buried in it, whilst the sample vessel is allowed to fall vertically, the fall being electrically timed. B. M. V.

Viscosimeter. E. A. Rockwell, Assr. to Patent Eng. Corp. (U.S.P. 2,033,302, 10.3.36. Appl., 3.10.32).—Oil is withdrawn from a crankcase (*e.g.*) by a hand-operated pump, the piston of which is pressed back by a spring and returns the oil through a capillary obstruction adjusted for temp. by a bellows thermostat. B. M. V.

Viscosity-indicating device. G. R. Eckstein, Assr. to Visco Meter Corp. (U.S.P. 2,035,951, 31.3.36. Appl., 29.10.31).—The same flow of lubricating oil (*e.g.*) is passed through short and long orifices and the differential pressure is indicated. B. M. V.

Viscosimeter. B. A. Jones and N. Johnston, Assrs. to Firestone Tire & Rubber Co. (U.S.P. 2,034,658, 17.3.36. Appl., 22.11.33).—The rate of fall of a ball is determined by electric contacts which start and stop a clock, preferably by means of a brake, the clock being of the electric-mains type. B. M. V.

Filters for gaseous media. A. A. Knecht (B.P. 459,372, 13.7.35).—The filter medium is fabric woven of flat wires, those in one direction only being twisted. B. M. V.

Filters for gaseous fluids. J. Yuille (B.P. 458,629, 29.1. and 10.3.36).—Screens composed of coarser (at inlet) and finer metallic wool and methods of securing and vibrating them are claimed. Irrigation is contemplated. B. M. V.

Removal of oil from air or other gaseous fluids. Aktieb. Separator (B.P. 458,913, 24.7.36. Swed., 5.11.35).—A cylindrical or conical coil spring is wound with the turns closed, and one end is closed by a lid; the other end forms the inlet for gas–oil mixture and the coils open under the gas pressure, the oil-free gas passing through the narrow slits between the turns. B. M. V.

Centrifugal apparatus for separating dust or other solid particles from air and gases. C. H. W. and C. H. Cheltnam, and Gen. Electric Co., Ltd. (B.P. 458,792, 27.6.35).—In a stationary separator embodying scroll-shaped tangential flow the inlet is rectangular and extends substantially the full axial length of the cylindrical casing; a minor outermost portion of the air is shunted to a comparatively small precipitator through annular spaces left between the cylindrical shell and its ends, the clean air leaving axially. If the same fan draws both clean and dirty air, valve means are provided to adjust the proportion. B. M. V.

Apparatus for separating solids from suspension in gases. H. Waring, and Goodlass Wall & Lead Industries, Ltd. (B.P. 457,784, 4.6. and 26.7.35).—A cylindro-inverted conical shell contains a large no. of upright and inverted conical baffles, the final outlet for the cleaned gas being upward at the centre. B. M. V.

Separation of suspended particles. O. Brandt and H. Freund (B.P. 460,795, 8.10.35. Ger., 9.3.35. Addn. to B.P. 454,050; B., 1936, 1185).—A continuous stream of liquid is led through part of the sound chamber, this liquid being thrown up and coarsely dispersed at the antinodes and producing an additional "foreign" cloud which entrains the coagulated particles of the original aërosols. B. M. V.

Apparatus for removing solid or liquid particles from gases or vapours. E. Haber (U.S.P. 2,034,467, 17.3.36. Appl., 6.6.32. Ger., 12.6.31).—The dirty gas is impelled by suction or pressure downwards through a conduit composed of a no. of nested, inverted, truncated cones of decreasing size; the gas having to double-back upwards before it can escape sideways, the solid or liquid particles flow straight on by their inertia and are collected in conc. form. B. M. V.

Apparatus for wet treatment of gases. J. M. Reve and M. J. Conchon (B.P. 457,974, 4.6.35. Fr., 24.5.35).—Means for irrigation of sinuous walls are described. B. M. V.

Separation of gaseous mixtures by washing. Ges. f. Linde's Eismaschinen A.-G. (B.P. 458,393, 16.3.36. Ger., 4.4.35).—(1) Compressed feed gas, G_1, is passed countercurrent to washing liquid, L_1, which becomes L_2. (2) Gas, G_3, compressed to the washing pressure is passed countercurrent to L_2, which becomes L_3. (3) L_3 becomes L_4 by evolution of G_3 on release of pressure. (4) The more sol. gases, G_4, remaining in L_4 are reasonably pure; extra refinement may be attained by evolution in several stages. *E.g.*, G_1 is a mixture of 85% of CH_4 and 15% of C_2H_2 at 15 atm., L_1 is H_2O, and the residual gas from the compressed G_3 is pure CH_4; G_3 is a mixture of 41% of CH_4 and 59% of C_2H_2 at 2·9 atm.; and G_4 is C_2H_2, 98% pure, evolved under vac. B. M. V.

[Entrainment] separator. J. A. Stuard (U.S.P. 2,036,106, 31.3.36. Appl., 8.11.34).—H_2O is removed from a flowing stream of compressed air by deflexion followed by a granular mass of pebbles or the like. B. M. V.

Hygrometer. J. Sharp, Assr. to Brown Instrument Co. (U.S.P. 2,034,884, 24.3.36. Appl., 28.11.31).—The extension of parallel strands of hygroscopic material (unspecified), which is not directly $\propto$ humidity, is converted into an even scale of humidity by linkwork. B. M. V.

Valves for vessels containing gas under pressure. N. V. Philips' Gloeilampenfabr. (B.P. 460,399, 16.4.36. Ger., 27.4.35).—The movable valve member is non-rotary and is secured in a diaphragm which prevents access of the gas to the ball-race and screw thread of the operating spindle. An annular piece, of peculiar cross-section and divided into sectors by saw-cuts, is provided to protect the diaphragm from undue deflexion. B. M. V.

Automatic control of absolute pressures. Brit. Arca Regulators, Ltd., and T. Lindsay (B.P. 460,098, 23.7.35).—The vessel, the pressure in which is to be controlled, communicates with a sealed chamber from which rises a barometric tube, and in the chamber is a float controlling a hydraulic regulator of the leak-port type. B. M. V.

Valves for controlling high pressures. C. N. Webby (B.P. 460,059, 16.10.35).—A piston type of release valve for air under high pressure is described. B. M. V.

Measurement of low pressures. Callender's Cable & Construction Co., Ltd., and R. S. Vincent (B.P. 460,977, 9.8.35).—Gas from the evacuated vessel in which the pressure is to be determined is passed in series through two compressors, the displacement of the first being $\gg$ that of the second and in fixed ratio thereto. A pressure gauge is connected to a receiver between the two compressors, and the second compressor may discharge to atm. or back to the inlet of the first. The whole may be submerged in a thermostatic bath. B. M. V.

Apparatus for determining fluid density. O. P. Adams, C. D. Phillips, and J. E. Vorce, Assrs. to Nat. Tube Co. (U.S.P. 2,035,039, 24.3.36. Appl., 19.2.35).—Gas at const. pressure is admitted through a centrifugal rotor to a chamber at the circumference of which the pressure is greater in proportion to the *d* of the gas, the speed being const. (synchronous motor). The pressure rise is measured in a differential gauge, a small leak being provided to prevent stagnation; the rotor comprises simply a tube forming a **T** with the hollow shaft. B. M. V.

Incorporating to a stream of fluid under pressure other fluid or powdered bodies. Protection et Extinction (B.P. 459,674 and 459,692, [A] 19.8.35, [B] 27.4.36. Fr., [A] 18.8.34, [B] 31.7.35).—The pressure fluid is caused to pass at high speed around a curve of small radius, and the other material is supplied by gravity to the inside of the curve, the method being applicable to formation of foam for fire-fighting. In (B) a device is more particularly described. B. M. V.

Apparatus for catalytic treatment, more particularly the purification of gases. Ruhrchemie A.-G. (B.P. 460,017, 10.9.36. Ger., 9.10.35).—The solid packing material is supported in trays in a tower, the trays being arranged in pairs and the flow upwards through one and downwards through the other of any pair. Joints are sealed with finely-powdered catalyst. B. M. V.

Automatic control of variable physical characteristics. A. Callender, A. B. Stevenson, and Imperial Chem. Industries, Ltd. (B.P. 458,176, 8.3.35).—In a system comprising a relay, a servomotor, and compensating effect (steam or the like), the relay is affected by the difference between impulses from (1) the property under control and (2) the pressure difference between fluids on opposite sides of a piston (P_2). One side of P_1 is connected to one side of another piston P_2 by a hydraulic fluid; the other side of P_2 is affected by the compensating effect, the effect being that the time lag to obtain the final accurate compensation for any change is reduced. B. M. V.

(B) Materials for (A, B) self-lubricating bearings. E. Kramer (B.P. 458,829 and Addn. B.P. 458,832, [A] 28.6.35, [B] 21.10.35. Ger., [A] 28.6.34, [B] 19.10.34).—(A) Metallic powders (−10 to +60 mesh) are pressed and sintered (or welded) to such an extent that the pores remain visible, and, if several metals are mixed, so that the most fusible metal melts and alloys with the less fusible only on the outer parts, leaving an unchanged core. (B) Suitable mixtures are (wrought) Fe 65 and Cu 35%, or Fe 65, Cu 25, Sn, Pb, Zn, or other metal of low m.p. 10%. B. M. V.

Coating of pipes and the like. L. Mellersh-Jackson. From Standard Oil Co. of California (B.P. 459,985, 29.2.36).—The pipe is rotated helically against a forced stream of mastic, and then passed through a heated, tapering die to press the coating on. B. M. V.

Tuyère blocks for [underfeed stoker] furnaces. Amer. Eng. Co. (B.P. 460,104, 25.2.36. U.S., 27.2.35).

[Surface-]grinding machines for hard materials. Speed Surfacers, Ltd. (B.P. 458,425, 19.6.35. Fr., 25.3.35. Addn. to B.P. 413,555).

Production of composition friction elements and [asbestos-covered wire] backings therefor. J. E. Pollak. From Amer. Brakeblok Corp. (B.P. 457,722, 4.3.36).

Lubrication of bearings. W. Peyinghaus (Eisen u. Stahlwerk W. Peyinghaus) (B.P. 459,871, 16.7.35. Ger., 19.7.34).

Plant for concn. of salt H_2O. Base-exchange material [for H_2O softening]. Vac. distilling H_2O_2 etc.—See VII. **Cooling glass.**—See VIII. **Artificial lumber.**—See IX. **Centrifugal mineral recovery.**—See X. **Pptg. particles from gases.**—See XI. **Vac. boiling pans. Syrup concn. Centrifuging sugar etc.**—See XVII. **Comminuting apparatus.**—See XIX. **Clarifying and treating liquids etc.**—See XXIII.

II.—FUEL; GAS; TAR; MINERAL OILS.

Northumberland and Durham coalfield. Beaumont seam. I. Northumberland area. Anon. (Dept. Sci. Ind. Res., Fuel Res. Survey Paper 36, 1936, 68 pp.).—The seam was examined by taking 19 samples distributed over the area. The coal changes from a gas coal in the South to a steam and general-purposes coal in the North. The seam varies in thickness from 19 to 44 in. in the North, 26 to 52 in. in the South East, and 35 to 57 in. in the South West. In properties the coal varies over the following ranges: ash 2·6—7·1, H_2O content (air-dried) 1·2—6·4, volatile matter 30—40, fixed C 51·9—64·8%; C (dry, ash-free basis) 83·2—87·0, H 4·9—5·5, N 1·5—1·8, S (combustible) 0·6—1·6%; P in ash (as % of coal) 0·0015—0·0086%; calorific val. (dry, ash-free) 14,510—15,500 B.Th.U./lb. Only a relatively small amount of the Beaumont seam has yet been worked. A. B. M.

Alabama coals—their classification and analyses. P. B. Place (Combustion, 1937, **8**, No. 7, 40—43).—Ultimate analyses of typical coals are tabulated. R. B. C.

Analyses of New Mexico coals. R. W. Ellis *et al.* (U.S. Bur. Mines, 1936, Tech. Paper 569, 112 pp.).—Detailed data on the occurrence, reserves, quality, characteristics, production, and uses of New Mexico coals are presented. The coals are mainly of bituminous or sub-bituminous rank. H. C. M.

Oxidation of pyritic sulphur in coal mines. S. P. Burke and R. Downs (Amer. Inst. Min. Met. Eng., Tech. Publ., 1937, No. 769, 20 pp.).—Experiments on " S balls " containing 90% of FeS_2 indicate that the primary rate-controlling reaction with either gaseous or dissolved O_2 is $FeS_2 + 3O_2 = FeSO_4 + SO_2$. Under conditions where the $FeSO_4$ can accumulate in the material, its subsequent hydration and swelling may be responsible for disintegration of stored coal and of roofs and floors of mine galleries. A. R. Pe.

Angle of polarisation as an index of coal rank. L. C. McCabe and T. T. Quirke (Amer. Inst. Min. Met. Eng., Tech. Publ., 1937, No. 791, 11 pp.).—The n vals. of a no. of vitrains have been determined from measurements of the angle of max. polarisation from the polished surface of the vitrain. An approx. straight-line relationship obtains between the calorific val. (moist, mineral-matter-free basis) and the n for a no. of widely different coals. H. C. M.

Prevention of coal-dust explosions. M. Blanke (Arch. Wärmewirts., 1936, **17**, 293—294).—The causes of spontaneous ignition and explosions of coal dust are discussed, and the text is given of German regulations relating to their prevention in coal-crushing and -drying plants. R. B. C.

Freezing together of coal, and its prevention. Z. I. Badanova (Koks i Chim., 1936, **6**, No. 11, 16—30).—Washed coal freezes in transport, to yield a coherent mass, when the H_2O content exceeds a certain crit. val., depending on the type of coal and its degree of comminution. R. T.

Behaviour of flame safety lamps in mine atmospheres deficient in oxygen. A. B. HOOKER, E. J. COGGESHALL, and G. W. JONES (U. S. Bur. Mines, Jan., 1937, Rept. Invest. 3327, 6 pp.).—The behaviour of the lamps in O_2-deficient atm. and the effects of CH_4 on the detection of O_2 deficiency have been investigated. Where CH_4 is present in an O_2-deficient atm. the flame height of the normal safety lamp is not a reliable guide as to the % CH_4 or the O_2 deficiency; observations of both the height and colour of the flame will, however, indicate quite reliably the presence of $>1{\cdot}5\%$ of CH_4 or of $<16\%$ of O_2. The first evidence of O_2 deficiency is an initial increase in flame height followed by a decrease, unless CH_4 is present; a sustained increase in flame height accompanied by dimming of the flame shows both CH_4 and O_2 deficiency. The flame is extinguished when the O_2 content falls below 13%, no matter how high is the % of CH_4 present. H. C. M.

Operation of a Rheolaveur coal-washing plant. R. G. EVANS (J. Inst. Fuel, 1937, **10**, 189—198).—The operation and performance of a Rheolaveur washer treating coal graded 0—$\frac{1}{4}$ in., $\frac{1}{4}$—$\frac{5}{8}$ in., and $>\frac{5}{8}$ in. are discussed. The improvements effected by dedusting the coal prior to washing are also discussed. H. C. M.

Treatment of coal with oil. Some considerations of the dust-proofing process. E. T. WILKINS (J. Inst. Fuel, 1937, **10**, 213—219).—The spraying of coal with oils to reduce dustiness is discussed, reference being made to recent attempts to improve both the efficiency and permanence of the effect. A method for assessing the degree of dustproofing of an oiled coal is described, the dustproofing index (I) being defined as the max. ratio of unoiled to oiled coal in the mixture which on being gently blown with air does not give rise to drifts of dust. The amenability of six British coals to dust-proofing has been examined. For each coal an approx. linear relationship obtains between the oil consumption and I. The oil consumption for a given val. of I can be correlated with the C content of the coal, coals containing 79—83% C (dry, ash-free basis) requiring considerably higher oil consumptions than coals containing >84% C. The dust-proofing properties of both petroleum oils and home-produced oils have been determined. Low-temp. tar is unsuitable, whilst, in general, petroleum oils are more satisfactory than tar oils. H. C. M.

Dust-prevention treatment of solid fuels. L. D. SCHMIDT (U. S. Bur. Mines, Jan., 1937, Inf. Circ. 6932, 10 pp.; cf. preceding abstract).—Methods of measuring dustiness and the general principles involved in attempts to decrease the dustiness of a fuel are discussed. The characteristics desirable in dust-proofing reagents are enumerated, and the various reagents that may be employed are described in detail; they include H_2O, solutions of hygroscopic salts, and oils. H. C. M.

Coal storage. A. C. DUNNINGHAM and E. S. GRUMELL (J. Inst. Fuel, 1937, **10**, 170—177).—Coal when stored in heaps (300—500 tons) provided with an adequate system of ventilating ducts and shafts showed but little deterioration in calorific val. or size, even after $3\frac{1}{2}$ years. Corresponding unventilated heaps, which had been firmly consolidated by rolling during the laying-down period, also remained cool until the height was increased from 8 to 16 ft.; heating up then gradually occurred, resulting ultimately in considerable oxidation and destruction of the coking properties of the coal. Further larger-scale experiments with both rolled and unrolled heaps indicated that considerable oxidation again took place in unventilated heaps, particularly at points exposed to prevailing winds. Coal stored in large heaps (1000—1500 tons) provided with peripheral ventilation ducts has shown but little oxidation, even after 2 years. It is considered that peripheral ventilation is, short of complete exclusion of air by immersion, the best protection against loss of coking properties, provided that the laying down of the coal is not performed too hurriedly. H. C. M.

Polymeric character of bituminous coal. H. C. HOWARD (J. Physical Chem., 1936, **40**, 1103—1112; cf. B., 1935, 534).—Recent work by the author and others on the primary degradation products of bituminous coal is summarised. Pyrolysis in the mol. still, the action of solvents at high temp., hydrogenation, and mild oxidation all yield products of mol. wt. 250—350, which are considered to correspond closely with the fundamental building unit of coal, which is itself a polymeride. The chemical nature of the degradation products and the type of inter-unit linking are discussed. F. L. U.

Colloidal structure of bituminous coals. G. AGDE and R. HUBERTUS (Braunkohlenarch., 1936, No. 46, 3—30).—Lyophilic colloidal properties were recognised in German coking coals by testing for imbibition, extraction, and peptisation. Liquids of medium dipole moment (about 2·5) and ε (13—20) produced the most marked solvation and demonstrated differences in the micelle structures of fat, gas-flame, and lean coals, which were confirmed by ultramicroscopical examination. Solvation, the first stage of peptisation, loosens and renders extractable the absorbed or chemi-sorbed coal constituents, which then become truly lyophilic. Strong peptising agents were quinoline, NH_2Ph, and bituminous coal-tar fractions when heated at 300—400° in sealed tubes. PhOH, brown coal-tar phenols, and tetralin were not so effective. A considerable excess of peptising agent and a diluent for the solution of the reaction products are necessary. The colloid particles of all the coals investigated showed micelles of 300—900 mμ which were subdivided by solvation and peptisation into units of 220 and 150 mμ, sizes attainable by fine grinding. A kind of aged gel structure is ascribed to fat coal. The micelles of gas-flame coals appear to be more reactive and coagulative, more strongly lyophilic, and more easily peptisable. R. B. C.

Colloid-chemical researches on the water properties of peat. A. DUMANSKI and M. TSCHAPEK (Kolloid. Shurn., 1936, **2**, 95—111).—The H_2O content of peat is classified and measurements are recorded of the amount of H_2O absorbed by peat sol and gel from sugar and EtOH solutions, of the electro-osmosis of aq. $CaCl_2$ solutions through peat,

and of the heat of wetting of peat by H_2O, C_6H_6, C_6H_6 + BzOH, $C_6H_6 + C_{15}H_{31}{\cdot}CO_2H$, and $C_6H_6 + C_{17}H_{33}{\cdot}CO_2H$. The dewatering of peat by pressure is difficult owing to the rigidity of the pore walls; deformation of these is facilitated by steaming before pressing. A simultaneous electro-osmosis treatment markedly increases the effect of pressure.
J. J. B.

Physico-chemical characterisation of thermoanthracite. M. P. Lonskaja (Koks i Chim., 1936, 6, No. 12, 15—21).—The composition and calorific val. of thermoanthracite (I) approaches that of metallurgical coke. Its mechanical strength and *d* are > those of anthracite. The porosity is $\ngtr 4\%$, and its permeability to CO_2 is > to air. The high inflammability of (I) is a consequence of its highly developed surface. R. T.

Determination of apparent density of coal. D. V. Ermuzevitsch and M. F. Klimovskaja (Zavod. Lab., 1936, 5, 1227—1228).—Apparatus and methods are described. R. T.

Rapid determination of the carbon content of solid and liquid fuels. G. Lambris and H. Boll (Brennstoff-Chem., 1937, 18, 61—66; cf. B., 1936, 82).—An amount of the fuel equiv. to about 0·35 g. of C is burned with O_2 under pressure in a calorimeter bomb and the CO_2 formed is absorbed in aq., carbonate-free KOH. The solution is removed from the bomb and the carbonate pptd. by addition of excess of $BaCl_2$. The free alkali is exactly neutralised by addition of 0·5*N*-HCl (to phenolphthalein), the solution being heated to 50—60° in order to convert any basic carbonate into $BaCO_3$. A measured quantity of 1·3—1·5*N*-HCl is added, the solution boiled for 10 min., and excess of acid titrated with 0·5*N*-KOH (to Me-orange). The method is accurate to 0·1—0·2%; a determination occupies 2—2½ hr. The technique is described in detail. A. B. M.

Determination of ash in raw materials for gasification. A. Jäppelt (Braunkohle, 1936, 35, 783—786).—A method for determining ash in fuels for water-gas or producer gas production, which gives results similar to those obtained in practice, is described. Superheated steam, or air saturated with H_2O, is passed for 2 hr. over a sample of fuel contained in a SiO_2 tube inside a furnace heated electrically at >720°. In accord with theory the wt. of ash so determined is always < that obtained by incinerating the same wt. of fuel in a muffle. In general, the difference in wt. is greatest in the case of coals containing a high % of S. The new method enables a satisfactory ash balance to be set up for a gas producer. R. B. C.

Apparatus for determining m.p. [of coal ash]. E. R. Bramslev (Gas- u. Wasserfach, 1936, 79, 943—946).—An enlarged image of a moulded test-piece is reflected on to photographic paper by the mirror of a galvanometer connected to the thermocouple which registers the temp. of the test-piece, so that the height of the latter is recorded as ordinate against its temp. as abscissa. A. R. Pe.

Determination of phosphorus in coal and coke: laboratory instructions of the [German] Coke Oven Committee. Anon. (Glückauf, 1937, 73, 43—44).—The material is incinerated under standard conditions, the ash treated with HF and then twice with HNO_3–HF, and the residue dissolved in HNO_3. P is determined in the extract in the usual way by the volumetric determination of phosphomolybdate. R. B. C.

Determining the pitch content of [fuel] briquettes. K. Scheeben (Tech. Mitt. Krupp, 1936, 4, 153—154).—A rapid process, and apparatus therefor, in which the material is continuously extracted with CS_2, are described. Results of tests when using synthetic coal–pitch mixtures are discussed. R. B. C.

Developments in coke-oven design. I. H. Jordan (Brennstoff-Chem., 1937, 18, 48—53).—Improvements in coke-oven construction to effect more uniform heating (*e.g.*, for medium-temp. carbonisation) and to avoid cracking of the volatile products, improvements in regenerator design, new charging devices, and various other suggested modifications in method or apparatus are summarised from the German patent literature for 1935—6.
A. B. M.

Heat evolved on heating wood with calcium hydroxide and water under pressure. H. Bergström, K. N. Cederquist, and K. G. Trobeck (Iva, 1936, 4, 118—125; J. Inst. Petroleum Tech., 1937, 23, 24a).—Heating at 325°/170 atm. of beechwood sawdust with the above material yielded 13·5% of alcohols, 7·5% of oils, a gas containing H_2 66·8, N_2 17·4, and CH_4 8·0%, H_2O-sol. Ca salts, and an insol. residue. The heat balance of the process was investigated. R. B. C.

Preparation of active coke from tar. B. G. Šimek and F. Coufalík (Chem. Listy, 1937, 31, 20—25).—The activity of coke obtained from tar carbonised with Fe stearate is enhanced by adding Mn stearate, which prevents inactivation by S. Ca stearate alone has little effect, but very active C is obtained when CaO is also present, in particular when very acid tars are taken. R. T.

Production of ferro-coke in Factory No. 17. M. G. Kashdan (Koks i Chim., 1936, 6, No. 10, 74—76).—A 7 : 3 coal–ore mixture is coked in the usual manner, to yield a product suitable for admixture with Fe ores, in Fe smelting. The coking gas has the same composition as ordinary coal gas. The yield of NH_3 is 29% lower, and of C_6H_6 28% higher, than from ordinary coking. R. T.

Comparison of methods of technical analysis of coke, for standardisation purposes. M. E. Neimark, S. N. Abramov, and R. J. Fischman (Koks i Chim., 1936, 6, No. 10, 54—61).—Standard methods for determination of the content of H_2O, ash, S, P, volatile constituents, of the fusibility of the ash, and of the porosity of the coke are discussed.
R. T.

Determination of reactivity of coke. I. G. Petrenko (Koks i Chim., 1936, 6, No. 10, 61—65).—Pure CO_2 is passed through a layer of powdered coke at 950°, and the CO content of the resulting gas determined; the reactivity is given by $200a/(2b$—

a), where *a* is vol.-% CO in the issuing gas, and *b* its CO_2 content. R. T.

Reactivity of coke. B. G. Šimek (Chem. Listy, 1937, **31**, 10—15).—Mathematical. R. T.

Cracking tendency of coke and its determination. A. S. Bruk (Zavod. Lab., 1936, **5**, 89—91).—A graphical method for determining the no. and extent of cracks per unit area of projections of fragments of coke is described. R. T.

Rapid calculations concerning the combustion of coal. VIII. R. L. Rees (Ind. Chem., 1937, **13**, 63—64; cf. B., 1937, 105).—The application of the nomograms given previously (B., 1936, 482) to the determination of (*a*) the wt. of flue gases per lb. of coal, and (*b*) the *d* of air and flue gases, is discussed. H. C. M.

Factors affecting combustion in fuel beds. M. A. Mayers (Amer. Inst. Min. Met. Eng., Tech. Publ., 1937, No. 771, 18 pp.).—Mathematical analysis of the distribution of heat in a fuel bed leads to expressions involving the ignition temp. of the fuel, the apparent thermal conductivity of the fuel bed, and the coeff. of heat transfer between fuel and air or gas stream. The evaluation of these coeffs. is discussed. A. R. Pe.

Firing of coals sprayed with oils. A. Donald and H. E. Stölzing (Power, 1936, **80**, 383).—At present this process is practised at 14 mines in the United States. A straight-run, $C_{10}H_8$-base oil (*d* 0·9071, flash point 160°, η 100 sec.) is employed. 1 gal. of oil per ton of coal is claimed to lay 75—85% of the dust. The cost is about 7·5 cents/ton. R. B. C.

Carbonising properties and petrographic composition of Clintwood bed coal from Buchanan mines Nos. 1 and 2, Buchanan County, Va. A. C. Fieldner, J. D. Davis, R. Thiessen, W. A. Selvig, D. A. Reynolds, F. W. Jung, and G. C. Sprunk (U.S. Bur. Mines, 1936, Tech. Paper 570, 34 pp.).—Petrographic analyses (proportions and characteristics of the anthraxylon, translucent attritus, opaque attritus, fusain, etc.), chemical analyses, and agglutinating vals. are recorded. The yields and quality of the products obtained by carbonisation at 500—1000°, using the B.M.–A.G.A. test-procedure, have been determined. Results obtained with the Fischer low-temp. assay are also given. The coal [66·4% of fixed C (dry, mineral matter-free basis), calorific val. 15,310 B.Th.U. per lb. (moist, mineral matter-free basis)] can be classified as a high-volatile *A* coal. H. C. M.

Carbonising properties and petrographic composition of Pittsburgh bed coal from Pittsburgh Terminal No. 9 mine, Washington County, Pa. A. C. Fieldner, J. D. Davis, R. Thiessen, W. A. Selvig, D. A. Reynolds, G. C. Sprunk, and F. W. Jung (U.S. Bur. Mines, 1936, Tech. Paper 571, 33 pp.; cf. preceding abstract).—Results of the chemical, physical, and petrographic examination of the coal are recorded. The carbonising properties of the coal have been determined, using the B.M.–A.G.A. test-procedure and the Fischer low-temp. assay. The coal is more anthraxylous than is normal for a Pittsburgh bed coal and contains a high % of finely-divided pyrites. The coal [54·1% of fixed C (dry, mineral matter-free), calorific val. 14,810 B.Th.U. per lb. (moist, mineral matter-free)] is classified as a high-volatile *A* coal. H. C. M.

Properties of carbonised products from brown-coal briquettes in comparison with those of coke from bituminous coal. H. Hock and O. Schrader (Braunkohle, 1936, **35**, 645—650).—Apart from structural peculiarities, such as the pronounced capillary structure of brown coals, the difference in properties between brown coal and bituminous cokes is due mainly to lack of softening properties in brown coals. Satisfactory lump coke can be produced from brown coal briquettes if attention be paid to particle size, dryness, degree of compression, etc. in the manufacture of the latter. The properties of cokes so obtained and photomicrographs showing their structure are given. R. B. C.

Chemical aspects of the combustion of carbon. H. L. Riley (J. Inst. Fuel, 1937, **10**, 149—156).—A comprehensive and crit. survey is made of the literature dealing with the nature of the primary reaction in the combustion of C. Attention is drawn to the close parallelism between the chemistry of graphite and that of the triarylmethyls, the mechanism of the combustion of C being discussed in the light of this parallelism. It is considered that intermediate oxide formation plays an important rôle in C combustion, that the O atoms penetrate between the planes of the graphite lattice, forming a compound of the graphitic oxide type, and that CO and CO_2 are simultaneously produced by the breakdown of this intermediate solid O complex, the factors governing the breakdown being statistical in character. The influence of metallic catalysts and of chemically combined H and hydrocarbons on the velocity and mechanism of C combustion are also discussed. H. C. M.

Application of Traube's adsorption rule to briquetting of active charcoal. N. Ermolenko and K. Schestakov (Kolloid. Shurn., 1936, **2**, 51—54).—The adsorption capacity of peat C for a series of org. acids falls with increasing briquetting pressure. The effect is greater for feebly than for strongly adsorbed acids. R. T.

Oxidisability and structure of industrial carbon black. A. Baroni (Atti R. Accad. Lincei, 1936, [vi], **23**, 940—942).—Various types of C black are differentiated by *X*-rays and, more readily, by the oxidation method (Levi and Baroni, A., 1936, 1217). F. O. H.

Electrophoretic concentration of graphite suspensions. E. Hoffmann (Kolloid-Z., 1937, **78**, 105—106).—The graphite suspension, stabilised with sulphite liquor, is contained in a brass tank in which the lower part of a clay cylinder rotates about a horizontal axis. The Pb anode is within the cylinder, on the outside of which the C is pptd. and continuously removed. Electrolyte flows continuously through the cylinder, in order to remove sol. Pb compounds which would coagulate the suspension. The collected material contains 30—40% of C. F. L. U.

The gas industry and the consumer. F. S. Sinnatt (Chem. & Ind., 1937, 232—237).—A lecture.

Gasification of low-grade fuels from the viewpoint of synthetic production of motor spirit or methyl alcohol. J. Estival (Génie Civil, 1936, **109**, 405—407).—The Philipon slagging gas producer is used to melt a mixture of low-grade fuel, CaO, and scrap Fe by the action of a blast heated to 500—600°. Temp. of 1800—2000° are developed in the tuyères which ensure fusion of slag and conversion of C into CO. In a large-scale plant at St. Etienne a typical charge is: shale 42·1, high-ash coke containing 15% of H_2O 25·9, CaO 24·0, and scrap Fe 8%. The slag obtained is suitable for cement and the gas contains 30—40% of CO and only 1—4% of CO_2. Tests carried out in an expermental plant using preheated O_2 and steam with a charge consisting of lignite, metallurgical coke slag, and scrap Fe are described. The gas obtained contains 66% of CO and 24% of H_2 and would be suitable for the production of synthetic MeOH. R. B. C.

Industrial experiments with some petroleum oils for carburetting water-gas. G. Nérot and D. S. de Sacy (J. Usines Gaz, 1936, **60**, 478—479).—Large-scale tests with (*a*) three standard gas oils, (*b*) a heavy Iraq gas oil, and (*c*) a light fuel oil in a Humphreys–Glasgow carburetted water-gas plant, run under standard operating conditions, are described. Data correlating the rate of oil injection with the calorific val. and yield of the oil gas show that (*b*) required a slower rate of injection than (*a*). (*c*) was unsatisfactory, only the lighter fractions being converted into oil gas. Attempts to correlate laboratory- and plant-test results were only partly successful. Large-scale tests afford the best criterion of the carburetting val. of an oil. R. B. C.

Economics of detoxification of town's gas, with special regard to carbonisation with coal-gas firing. F. Stief (Gas- u. Wasserfach, 1937, **80**, 114—121).—Capital and running costs are estimated for a plant to carry out the process $CO + H_2O \rightarrow CO_2 + H_2$, and its economic reaction on works practice as a whole is considered. The effect of the diluent CO_2 on the calorific val. entails (especially when the gas contains water-gas) increased throughput of coal and output of coke and by-products, which may under favourable works and market conditions set off the cost of the process. Such increase may also be gained by using coal gas for firing (cf. B., 1935, 131), and the effects of both procedures, alone or in combination, on production costs are calc. for conditions prevailing in Hamburg. A. R. Pe.

Effect of changes in composition on combustion of town gas. F. O. Hawes (Gas J., 1937, **217**, 530—533).—Tendency to back-fire in an aërated burner depends on the composition of the gas and its *d*. The greater is the stability as measured by the Ott no., the greater is the tolerance to change in composition. High Ott nos. may be obtained by any procedure which keeps up the ratio $(CH_4 + C_nH_m) : (H_2 + CO)$. For a given type of gas, calorific val. follows Ott no. fairly closely. A. R. Pe.

Manufacture and economics of concentrated gas liquor as applied to coke-oven by-product recovery plant. J. Bishop (Gas World, 1937, **106**, Coking Sect., 13—17).—The method and the economics of the manufacture of conc. gas liquor by the indirect NH_3-recovery system are critically discussed. H. C. M.

Treatment of crude calcium acetate from generator gas liquor. N. J. Samorodnitzki, P. V. Dibina, and E. J. Eliagina (J. Chem. Ind. Russ., 1936, **13**, 1477—1479).—Crude $Ca(OAc)_2$ (I) obtained from the condensation liquor of generator gas plants using wood fuel is of inferior quality to the ordinary commercial product, but no great difficulties are encountered in preparing pure AcOH from it. It is concluded that (I) should be recovered as a by-product of even quite small generator gas plants. R. T.

Apparatus for complete analysis of gases. A. F. Radulov (Koks i Chim., 1936, **6**, No. 12, 65—69).—Apparatus is described for the analysis of gases for O_2, CO_2, NH_3, H_2, and heavy hydrocarbons. The complete analysis requires 80—90 min. R. T.

Automatic calorimeter for determining the calorific value of gases. G. A. Gertzikov and A. M. Bilenkin (Koks i Chim., 1936, **6**, No. 10, 66).—Apparatus is described. R. T.

Teplopribor Works calorimeter. N. D. Michailov (Zavod. Lab., 1936, **5**, 1132—1134).—A calorimeter for determining the calorific val. of gaseous fuels is described. R. T.

Developments in coal-tar distillation. H. G. Shatwell (Chem. & Ind., 1937, 155—159).—Future possibilities in utilising the chemical entities obtainable from tar are sketched. The advantages of pipe stills over shell stills are indicated. Results obtained from a pipe still without using fractionation are given. A. R. Pe.

Coal-tar distillation. G. A. Phillipson (Chem. & Ind., 1937, 193; cf. preceding abstract).—The advantages of using pipe stills are confirmed. Details are given of the fractionation obtained and of working conditions. A. R. Pe.

[Coal-tar distillation.] W. G. Adam and F. M. Potter (Chem. & Ind., 1937, 193—194).—The advantages of using the pipe still are confirmed. Its historical development, leading up to the plant referred to by Phillipson (cf. *supra*), is briefly traced. A. R. Pe.

Desulphurisation of benzene by means of aluminium chloride. N. Kozlov and G. Duberschtein (J. Appl. Chem. Russ., 1936, **9**, 1994—1996).—The vapour is passed repeatedly through a column filled with $AlCl_3$, when 70% of thiophen- or MeSH-S is eliminated as H_2S during the first hr. No advantage is gained by prolonging the process for >1 hr. R. T.

Prevention of resin formation in benzol recovered by active carbon. D. Witt (Gas- u. Wasserfach, 1937, **80**, 85—88).—Benzol recovered by oil-washing contains traces of inhibitors derived from the oil, so that it gives a low resin test. That recovered by active C lacks such inhibitors, but these can be introduced by distilling it rapidly in presence of a small amount of wash-oil. A. R. Pe.

Colloidal nature of asphalt as shown by its flow properties. R. N. Traxler and C. E. Coombs (J. Physical Chem., 1936, **40**, 1133—1147).—Data showing the effect of temp. and of rate of shear on the η of different kinds of asphalt are recorded. Many of the samples studied exhibited thixotropy, elasticity, and age-hardening. Asphalts are colloidal systems as judged by their flow properties, the variation in which is determined by the influence of temp., processing, and age on the nature and amount of dispersed material. F. L. U.

Chemistry of rock asphalt. G. Hradil (Petroleum, 1937, **33**, No. 8, 1—4).—The S and other compounds found in rock asphalts and shale distillates are described. These afford evidence of the vegetable and animal origin of the deposits. H. C. R.

Stability of [bituminous] emulsions in presence of metals. A. G. Nasini, C. Rossi, and A. Balian (Atti V Congr. Naz. Chim., 1936, **14**, 809—818).—On metallic surfaces of Al, Fe, Zn, Pb, and Ni in contact with bituminous emulsions approx. equal quantities of bitumen are deposited per unit area of surface. No bitumen is deposited on Sn, Ag, or Cu surfaces. Measurements have also been made of the coagulating power of the ions of the afore-mentioned metals on the same emulsion, and of the potentials of the various metals in contact with the emulsion.
O. J. W.

German crude oils and their treatment. J. Weller (Petroleum, 1937, **33**, No. 5, 5—8).—These oils are mainly of the mixed-base type, with up to 1·3% of S. Since 1927 waxy crudes have been worked in dewaxing plant. Dubbs cracking plants are now widely used and lubricants produced, using vac. distillation and solvent extraction. Dewaxing is also carried out with modern solvent processes, to yield high-grade lubricants. Volatile solvents and C_3H_8–C_4H_{10} mixtures are obtained from the gaseous products. H. C. R.

Isolation of *iso*nonane from petroleum—its fractionation from naphthenes by distillation with acetic acid. J. D. White and F. W. Rose, jun. (J. Res. Nat. Bur. Stand., 1936, **17**, 943—954).—*iso*-C_9H_{20} has been isolated from petroleum by distillation of the 135—136° fraction with AcOH and crystallising from CCl_2F_2. It has b.p. 135·21$\pm$0·02°, f.p. $-103·25\pm0·05°$, d_4^{20} 0·70963$\pm$0·00002, $\Delta d/\Delta t$ $-0·00079$ at 20—25°, n_D^{20} 1·40115$\pm$0·00005, dn/dt $-0·00049$ at 20—25°, crit. solution temp. in NH_2Ph 81·2$\pm$0·5°, mols. of H_2O/mols. of CO_2 1·1082$\pm$0·0004, % in petroleum 0·1, optical activity 0. The properties are near those of the dimethylheptane of Konovalov, but not of Escourrou, and it may be one of the 19 unknown nonanes, of which there are 35 possible isomerides. R. S. B.

Relationships between physical properties and chemical constitution of lubricating oil fractions. B. J. Mair and C. B. Willingham (J. Res. Nat. Bur. Stand., 1936, **17**, 923—942; cf. preceding abstract).—Fractions obtained by $COMe_2$ extraction of const.-boiling fractions of lubricating oil have been compared with synthetic fractions with respect to d, n, optical activity, sp. dispersion, η, $d\eta/dt$, NH_2Ph point, and b.p. The least sol. or most refined fraction of the oil contains 1—3-ring naphthenes with alkyl groups as substituents. The more sol. portion consists of naphthenes of >3 rings, unsaturated hydrocarbons, and some aromatic hydrocarbons. There are no *iso*- or branched-chain paraffins. One-ring aromatic hydrocarbons may be wasted in the extraction of undesirable naphthenes. R. S. B.

Preparation of petroleum residues in powder form. C. Fostiropol and R. Verona (Bul. Soc. Chim. România, 1936, **18**, 117—120).—Mixture of water-in-oil emulsions of mazout (20—120) and H_2O (100) with CaO (passing a sieve with 1600 meshes per sq. cm.) (90—150 pts.) at 25° gives exothermally solid products containing 36—44% of mazout.
R. S. C.

Refining of petroleum products by solvents. R. Verona and C. Fostiropol (Bul. Soc. Chim. România, 1936, **18**, 121—130).—Extraction of the solid products from mazout and CaO with MeOAc or, less well, $COMe_2$ removes first ($-20°$) the volatile, unsaturated compounds and then (40°) the heavy, saturated oils. The process is most conveniently effected in good yield at 20—30°. R. S. C.

Ammonia in petroleum refining. Anon. (Petroleum Times, 1936, **36**, 393—396, 429—430).—A comprehensive review of the use of anhyd. NH_3 in preventing corrosion by acids in petroleum-refinery equipment. R. B. C.

Production of benzine and lubricating oils from wood, tar, and shale oil by hydrogenation. H. Bergström, K. N. Cederquist, and K. G. Trobeck (Iva, 1936, **4**, 125—132; J. Inst. Petroleum Tech., 1937, **23**, 27a).—A study of a no. of catalysts employed for the pressure-hydrogenation of liquid rosin showed that $(NH_4)_2MoS_4$ (I) gave the best results. 46·5% of spirit boiling up to 220°, 22·9% of heavy oil boiling up to 320°/2 mm., 1·5% of CO_2, 10·8% of H_2O, and 7·7% of gases were obtained when working at 450°/80 atm. Addition of small amounts of $Cr(OH)_3$ or $Zn(OH)_2$ to (I) did not materially affect the results. R. B. C.

Copper sweetening process [for petrol]. W. A. Schulze and L. S. Gregory (Nat. Pet. News, 1936, **28**, No. 41, 34—40, 75).—By treating petrols with $CuCl_2$ in presence of NaCl the thiols therein are oxidised to disulphides. The reagent is regenerated by oxidation with air, and the process may be made continuous by controlled dissolution of air in the charge. The process is claimed to be superior to, and more economical than, the plumbite process.
R. B. C.

Activated charcoal in the mineral oil industry. E. Reisemann (Oel u. Kohle, 1937, **13**, 107—112).—An account is given of the development of the recovery of light hydrocarbons from natural and other hydrocarbon gases by absorption with activated charcoal, with special reference to German conditions. H. C. R.

Polymerisation of gases to produce gasoline. C. R. Wagner (Refiner, 1936, **15**, 243—244).—

·Details are given of a commercial plant in which natural gas is converted into high-C_8H_{18} no. petrol by means of the Universal Oil Products Co.'s process. Pelleted P_2O_5 is used as catalyst (cf. B., 1935, 887). R. B. C.

Analysis of light petroleum fractions. S. S. Kurtz, jun., and C. E. Headington (Ind. Eng. Chem. [Anal.], 1937, **9**, 21—25).—Given the refractivity intercept (*R*) (cf. Kurtz and Ward, A., 1937, I, 13), *n*, and *d* of the pure components, mixtures of $\not>3$ types of hydrocarbon can be analysed by means of a triangular diagram; such data for non-cyclic olefines (I), cyclic olefines (II), aromatics (III), paraffins (IV), and naphthenes (V), in each case over a b.-p. range of 40—200°, are listed. For the systematic quant. analysis of petroleum fractions of b.p. 40—200°, conjugated diolefines are stripped by means of maleic anhydride and measured by difference. The material is fractionated by distillation into 30° cuts; treatment of each of these by H_2SO_4 removes a ternary mixture of (I), (II), and (III), which may be analysed by the above graphical method, the requisite vals. of *R*, *d*, and *n* being computed from the properties of the cut before and after acid treatment. (III) and (IV) remaining in each cut are similarly determined graphically. Non-conjugated diolefines which have been neglected in the above scheme would be included in (I) and (III), but are normally present in negligible amount. Analyses by the above method can be reproduced to within 1—2%. E. L.

Complete analysis of technical hydrocarbon gases by aid of the desorption method. K. Peters and W. Lohmar (Brennstoff-Chem., 1937, **18**, 41—48; cf. B., 1930, 744).—The scheme of analysis is as follows. The H_2S, CO_2, and C_2H_2 are successively removed by means of suitable reagents; the fractions volatile (I) and non-volatile (II), respectively, in vac. at $-185°$ (liquid air) are separated. Fraction (I) (O_2, H_2, CO, CH_4, C_2H_4, N_2, and rare gases) is analysed by the usual methods; (II) is warmed to $-80°$ (solid CO_2) and the fractions volatile (III) and non-volatile (IV) in vac. at this temp. are separated. Fraction (IV) contains H_2O, C_6H_6, liquid hydrocarbons, and org. S compounds; (III), which consists of hydrocarbon gases, is divided into two parts (*a*, *b*): from (*a*) the unsaturated hydrocarbons are removed, the saturated hydrocarbons being then adsorbed on active C at a low temp. and fractionally desorbed therefrom in vac. at successively higher temp.; (*b*) is catalytically hydrogenated and the resultant mixture of saturated hydrocarbons is similarly separated by fractional desorption from active C. Sufficient of the original gas is taken to give 40—50 c.c. of condensable hydrocarbon gases (less with simpler mixtures). The method is capable of considerable accuracy. Analyses are tabulated of coke-oven gases obtained by Still's process, in which the gases are withdrawn by suction from the interior of the charge; the gases contain 5—10% of C_2H_6 and 2·5—8·4% (varying as carbonisation proceeds) of hydrocarbons containing 3—4 C. Comparison of the results with those of analyses carried out by the usual technical methods shows the latter to be in error, giving low vals. for the H_2 content and high vals. for the hydrocarbon content. The method is readily applicable to the determination of small quantities of CH_4 in H_2, or of H_2 in admixture with other gases. A. B. M.

Application of physical constants to the analysis of mixtures of hydrocarbons. I. Fundamentals and experimental proof. II. Study of petrols from petroleum and from cracking and hydrogenation processes. M. Marder and V. Gómez Aranda (Anal. Fís. Quím., 1936, **34**, 694—721, 721—735).—I. A preliminary study is made of a method for analysing olefine–aromatic–naphthene–paraffin mixtures, based on the determination of a physical constant of the mixture before and after complete removal of one series of components. Olefines and aromatics are separated by the method of Dănăilă *et al.* (B., 1934, 438). Aromatics may be determined in olefine-free mixtures by means of the *d*, and napthenes and paraffins from the *n* vals. In addition, *d* and the parachor serve to indicate the nature of the chemical species in the various groups of hydrocarbons.

II. Although olefines and aromatics may be completely removed by Hg acetate (I) followed by H_2SO_4, cyclic olefines are not completely separated from aromatics by means of (I) and hence determinations break down. The general nature of the three types of petrol has been ascertained. L. A. O'N.

Separation of hydrocarbon mixtures by means of phenol. R. Vondraček and J. Dostál (Chem. Listy, 1937, **31**, 15—20).—Benzine fractions (2° cuts) are arranged in a series of increasing *d*, and the series is extracted successively with the same portion of 95% PhOH. The extraction is repeated with fresh portions of PhOH until the vol. of the first fraction is reduced to half, when the procedure is continued similarly, beginning with the 2nd, 3rd, etc. members of the series. The residues and extracted hydrocarbons are then examined separately. The method gives good separation of cyclic from paraffinic hydrocarbons. *n*- and *iso*-C_6H_{14} and -C_7H_{16}, γ-methylpentane, *cyclo*hexane, methyl*cyclo*hexane, C_6H_6, and PhMe were identified in the fractions. R. T.

Carburetting index of petroleum oils. A. Alleaume (J. Usines Gaz, 1936, **60**, 476—478).—A laboratory apparatus for studying the thermal decomp. of gas oils, used for carburetting water-gas, comprises an electrically-heated, metal retort through which oil is passed at the rate of 1 g./min. A method for assessing the carburetting indices of gas oils from results obtained in carburetted water-gas plant is described. R. B. C.

Engineering properties of paraffin hydrocarbons. W. L. Nelson (Oil Gas J., 1936, **35**, No. 28, 46).—Physical data, *e.g.*, *d*, v.p., b.p., C_8H_{18} no., etc., are tabulated for 60 hydrocarbons ranging from CH_4 to $C_{35}H_{72}$. R. B. C.

Relations between the octane numbers, cracking, and oxidation of hydrocarbons, and their thermal effects. (Mlle.) S. Estradère (Compt. rend., 1937, **204**, 46—48).—Data for the cracking and oxidation of C_7H_{16}, *iso*-C_8H_{18}, and *cyclo*hexane are given and discussed. No simple relation to the C_8H_{18} no. was found. A. J. E. W.

Safety rules for the storage, transportation, and handling of hydrocarbons. J. Rimbaut (Ann. Off. nat. Comb. liq., 1936, **11**, 801—862).—The properties of hydrocarbons, *e.g.*, v.p., upper and lower limits of inflammability, etc., which control their safe handling are discussed. R. B. C.

Alcohol–ether [motor] fuel. Anon. (Tech. Ind. u. Schweiz. Chem.-Ztg., 1936, **19**, 310—311).—Crima fuel, developed in Italy, is a catalytically treated mixture of EtOH 74, esters (mainly Et_2O) 23, and H_2O 3%. It has calorific val. 6450 kg.-cal./kg., C_8H_{18} no. 92, and gives easier starting of an engine (from cold) than does pure EtOH. R. B. C.

Relationship between analytical data and ignitability of Diesel fuel. M. Marder [with F. Sommer] (Angew. Chem., 1937, **50**, 147—151).—Curves are given showing the close relationship for Diesel fuels of the same mean mol. wt. between cetene no. and *d*, H content, C content, lower and higher calorific vals., and C/H ratio. In some cases these relationships are so well defined that the cetene no. can be calc. from the other variable. *d* is the most easily and accurately determined of the above vals., and is useful as a guide to new methods of making good Diesel fuels from petroleum and tars. H. C. R.

Extraction with acetone of substantially constant-boiling fractions of a "water-white" lubricating oil. B. J. Mair and S. T. Schicktanz (J. Res. Nat. Bur. Stand., 1936, **17**, 909—922).—Const.-boiling fractions of lubricating oil have been separated by extraction with $COMe_2$ into 25—35 fractions, and the kinematic η, *n*, C/H, mol. wt., *d*, dispersion, optical activity, b.p., and NH_2Ph point have been determined for the fractions. For lower mol. wts. an excellent separation with respect to type of mol. was effected, wide variations in physical properties occurring with approx. const. no. of C atoms, but with higher mol. wt. separation occurs also with respect to mol. wt. owing to a slight range in composition in the const.-boiling mixture. R. S. B.

Recent developments in selective solvent extraction [of lubricating oils]. R. Fussteig (Petroleum Eng., 1936, 7, No. 13, 36—39).—A comprehensive review. R. B. C.

Hydrocarbons and sulphur compounds of lubricating oil. II. Separation of sulphur compounds from Tschusovo oils as complexes with mercuric chloride. A. V. Kirsanov and A. F. Novikova (J. Appl. Chem. Russ., 1936, **9**, 2021—2025).—Part of the S compounds are pptd. as complexes when the oil (b.p. 340—345°) is heated at 100° with $HgCl_2$ in Et_2O. The products obtained by treating the ppt. with aq. HCl contains 10—11% of S. R. T.

Natural and artificial ageing of automobile motor oils. E. H. Kadmer (Oel u. Kohle, 1937, **13**, 101—106, 127—133).—Numerous graphs and tables are given showing the effect of use, in different types of engine with different fuels, on the analytical characteristics of lubricating oils. Grinding C_6H_6-insol. matter separated from used oils into fresh oil caused little increase in η. The ε of fatty oils, higher alcohols, and esters are given. Resinous and asphaltic matter in used motor oils consists rather of polymerisation products of aromatic nature than of oxidation products, though their formation is started by the action of O_2 from the air. Crankcase sludges are H_2O-in-oil emulsions with only 1—2% of H_2O. It is not possible to correlate change in η with the diluent content of oils because of the varying properties of the heavy ends of fuels. Loss of fluorescence could not be correlated with asphalt or free-C content. The results of 86 road tests with different vehicles and fuels on the properties of the oils are tabulated, and proportional changes in η with distance, using vaporised heavy oil and Diesel fuel, graphed. Development of acidity is ascribed rather to the fuel than to the oil, especially when EtOH and wood gas are used. Combustible sludge is related to fuel/oil consumption ratio, and ash to area of cylinder wall swept by the piston over the period of running, the results being calc. to a 100/1 fuel/oil consumption ratio. The free C and asphalt in the used oil are both related to the C/H ratio of the fuel, being low with a high C/H ratio. Hence it appears that the fuel is responsible for their formation. Even the dirtiest used oil can be restored to its original properties by treatment with H_2SO_4 and fuller's earth. This is not so with oil after a laboratory oxidation test. The completeness with which used motor oils can be renovated by fuller's earth treatment alone is illustrated by a table of analytical data on oils before and after treatment. H. C. R.

Ageing of lubricating oils in internal-combustion engines. A. Maillard, A. Acker, and F. Rengade (Ann. Off. nat. Comb. liq., 1936, **11**, 945—966).—A study of lubricating oils taken at regular intervals from marine Diesel engines showed that ageing, *i.e.*, the formation in the oil of asphaltic deposits insol. in $CHCl_3$, was caused by oxidation of the oil on the hot cylinder walls. Oxidation did not appear to take place in the crank case. Oil from a spark-ignition engine showed relatively little change. R. B. C.

Simple apparatus for determination of dirt in used motor [lubricating] oils. E. Graefe (Brennstoff-Chem., 1937, **18**, 67—69; cf. B., 1935, 1081).—The used oils can be regenerated by filtering or centrifuging to remove the dirt. Further refining with conc. H_2SO_4 or fuller's earth is often disadvantageous. The dirt is determined by placing a drop of the oil, diluted with an equal vol. of motor spirit, on filter-paper and comparing the colour of the deposit with a set of standards. A suitable testing set is described. A. B. M.

Determination of kinematic viscosity [of oils] with technical viscosimeters. H. Vogel (Oel u. Kohle, 1937, **13**, 153—155; cf. B., 1936, 1188).—The author's general formula $\nu = \tau a^{1-(1/\tau^3)}$, where τ is the ratio of the time of flow of the oil to that of H_2O at 20·2° and *a* is an apparatus const., holds for the conversion of Redwood, Engler, and Saybolt vals. into kinematic viscosity (ν). For the Saybolt viscosimeter used by McCluer and Fenske (B., 1935, 613),

$\tau = S/29\cdot3$ (where S = Saybolt sec.) and $a = 6\cdot32$. It is not possible to express the results from all instruments of one type in the form of a conversion table, but τ and a must be separately determined for each instrument. Tables are given showing that results obtained by Garner at 37·8° and 99° and by McCluer and Vogel on the Saybolt instrument can all be expressed by the above formula to $\pm1\%$, but the viscosimeters used by the various observers had slightly different consts. The above consts. may be ascertained for any technical viscosimeter by the use of two standard liquids. H. C. R.

Effects of oxidation and moisture on the electrical characteristics of transformer oil. J. F. Gillies and J. V. Black (World Power, 1936, **26**, 163—167).—Air purified by passage through $AgNO_3$, KOH, and conc. H_2SO_4 was passed (4 litres/hr.) through a standard, dehydrated, transformer oil heated at 100—140° in contact with a Cu-foil catalyst. The progress of oxidation was followed by measuring acid formation in the oil by a colorimetric method. The breakdown val. and the power factor (P) of the oil are affected only in the later stages of oxidation, owing to the probable formation of asphaltene products. The P of the pure dehydrated oil is of the order of 0·0005 up to a stress of 150 volts/mil (10^{-3} in.). The presence of $<0\cdot01\%$ of H_2O in the oil does not affect P at stresses up to 120 volts/mil. Higher % of H_2O affect P at high stress, but if the oil is undisturbed for a prolonged period it gradually approximates in behaviour to that of pure oil. It would therefore appear that transformer oil cannot hold $>0\cdot01\%$ of H_2O permanently in suspension. R. B. C.

Chlorinated hydrocarbons from vaseline oil.—See III. **Bituminous emulsions for paper. Creosoting paper.**—See V. **NH_3 from coke-oven gas. H_2. N_2–H_2 mixture for syntheses and from coke-oven gas. Absorption of H_2S.**—See VII. **SiO_2 bricks for coke ovens.**—See VIII. **Bituminous cement and mortars, and road construction.**—See IX. **Corrosion in oil refineries.**—See X. **Resistance of Thiokol to oil.**—See XIV. **Fertilisers.**—See XVI. **Wood saccharification.**—See XVII.

See also A., II, 81, **I val. of olefines.** 102, **Mellitic acid from coal etc.**

Patents.

Electric separation of coal from associated impurities. K. C. Appleyard, S. D. Pollitt, and Birtley Co., Ltd. (B.P. 460,966, 2.8.35).—For marshalling the material into files preparatory to passing through a discriminating device (cf. B.P. 421,401; B., 1935, 259), the material is passed through a longitudinally corrugated shoot which is subjected to curvilinear vibration at the inlet end and linear, longitudinal vibration at the discharge end. B. M. V.

Production of air-dried granulated peat for manufacture of briquettes. M. K. Sörensen (B.P. 459,822, 6.3.36).—Peat is cut to a depth of 10 mm. by fine-toothed cutting rings mounted on a sleigh provided with a blower and trail shoe. The shoe smooths the cut surface on which the blower deposits the grains of peat for drying by sun and wind, after which they are collected by suction. D. M. M.

Manufacture of briquetted fuel. F. Holz, Assr. to C. Vacca (U.S.P. 2,040,609, 12.5.36. Appl., 13.3.30).—Comminuted carbonaceous material, *e.g.*, coal, is briquetted by first mixing with a 5% aq. solution of molasses to a slushy mass, then cooking until white steam ceases to be evolved, and carbonising in moulds at 340—370°. D. M. M.

Making solid fuel briquette. F. M. Pukli (U.S.P. 2,036,642, 7.4.36. Appl., 8.5.33).—A mixture of petroleum-coke fines 88·5, crude crushed rosin 4·42, fuel oil (d 1·07—1·16) 5·31, and $Ca(OH)_2$ 1·77% is passed into a heated space wherein further mixing takes place, partly cooled, H_2O-sprayed, and then moulded wet. D. M. M.

Manufacture of agglomerates from carbonaceous material without addition of a binder. H. A. Hardy (B.P. 460,394, 24.6.35. Cf. B.P. 445,208; B., 1936, 582).—Agglomerates with a brilliant cryst.-looking internal structure, similar to that of native coal, are obtained from globulated carbonaceous material without the use of a binder by subjecting it to a higher pressure than the min. agglomerating pressure at the given temp. and for a shorter time. Temp. should be 380—415° and pressure 300—1000 kg./sq. cm. Cooling may be necessary before its introduction into the press moulds. D. M. M.

[Vertical] carbonising retorts or furnaces. Woodall-Duckham (1920), Ltd., and A. T. Kent (B.P. 459,950, 17.6.35. Cf. B.P. 357,146; B., 1931, 1129).—A retort in which the lower part consists of a metallic portion lined with refractory material and fixed at its upper end adjacent to and a continuation of the refractory upper part, is provided at its lower end, which is free to expand and contract, with a coke outlet and coke extractor supported from girders and provided with a gastight joint between the free end of the metallic portion and the fixed coke outlet, the free end being able to expand within a rim on the coke outlet without breaking the gastight joint. The refractory lining is made in sections to correspond with the sections of the metallic portion and is supported on shelves arranged to permit unequal expansion of the metal and the refractory. D. M. M.

Charging of vertical carbonising retorts. Woodall-Duckham (1920), Ltd., and A. T. Kent (B.P. 459,716, 13.6.35. Addn. to B.P. 357,146; B., 1931, 1129).—The retorts are provided with a travelling charging car suspended above them and having separate coal and coke hoppers, preferably arranged with interconnected discharge valves to ensure that the coke is charged first into the retorts. D. M. M.

Discontinuous operation of horizontal coke ovens. Dr. C. Otto & Co. G.m.b.H. (B.P. 460,509, 31.8.36. Ger., 13.9.35).—In a battery of coke ovens provided with two gas-collecting mains, one at each end of the ovens, running longitudinally along the battery, only one main serves as gas-collecting main, the other being used as an equalising main. Means are provided for periodically reversing the rôles of the mains. D. M. M.

Manufacture of non-structural activated carbon. J. C. Morrell (U.S.P. 2,037,257, 14.4.36. Appl., 8.1.34).—Finely-divided (8—100-mesh) hard wood is carbonised at $>$538° and then treated with steam at $>$815° for 20 min.—4 hr. The product is treated with dil. acid, *e.g.*, 1—2% HCl, at 65—94° either before or after further powdering, washed with H_2O, and dried; a further alkaline wash may be required. D. M. M.

Carrying out catalytic reactions [with carbonaceous materials]. M. Pier, P. Jacob, and W. Simon, Assrs. to Standard–I.G. Co. (U.S.P. 2,039,259, 28.4.36. Appl., 29.5.34. Ger., 30.1.31).—Sulphides of heavy metals other than Fe are prepared by decomposing a thio-salt of the metal at elevated temp. or by treatment of other salts with H_2S at high temp. in absence of any substance having oxidising action. The sulphides so prepared are stated to be extremely active catalysts. D. M. M.

Treatment with hydrogenating gases of carbonaceous materials. W. H. Beeston. From Internat. Hydrogenation Patents Co., Ltd. (B.P. 459,232, 1.6.35).—Congestions likely to occur in the paste-transmission lines of a hydrogenating circuit are mitigated by injecting a suitable liquid, *e.g.*, oil, at or before the point of congestion as soon as a pressure fluctuation occurs. The liquid may amount to 6—10 wt.-% of the total carbonaceous material. D. M. M.

Production of hydrocarbon products by destructive hydrogenation of solid carbonaceous materials. H. E. Potts. From Internat. Hydrogenation Patents Co., Ltd. (B.P. 459,268, 5.4.35).—Carbonaceous materials, *e.g.*, coal, brown coal, etc., are treated prior to hydrogenation with S either in vapour form or as volatile org. S compounds, *e.g.*, CS_2, until the material has absorbed 0·2—2% of S. In addition, the coal etc. may, if desired, be impregnated with solutions of catalytic materials, *e.g.*, NH_4 molybdate. D. M. M.

Gas producers. K. Koller (B.P. 460,554, 8.5.36).—In a gas producer having a rotary cover, itself provided with an agitating device, the latter is mounted excentrically on the cover and consists of a tube or rod passing through the cover and provided with one or more agitating arms each carrying agitating teeth. This tube or rod rotates with the cover about the axis of the producer, rotating at the same time about its own axis and adapted to be raised or lowered according as it meets with resistance or as the level of the charge drops. D. M. M.

Gas generator equipped with ash-removal means. W. Lindhorst, Assr. to Semet–Solvay Eng. Corp. (U.S.P. 2,039,175, 28.4.36. Appl., 9.4.29).—A gas generator is fitted with a conical member below the grate with its vertex close to the grate and its base provided with a trough connected to an outlet. H_2O or other liquor sprays wash ash etc. dropping on to the conical member into the trough and out through the outlet into an ash-disposal tank. D. M. M.

Manufacture of gas. C. B. Hillhouse, Assr. to S. R. Hillhouse (U.S.P. 2,038,657, 28.4.36. Appl., 4.10.30).—Fuel is fed in one direction throughout a zone concentric with the axis of a chamber, then directed inwardly, and burned in a combustion zone extending in an opposite direction to the feed while the gas-making materials are fed in by a helical path surrounding the fuel-feeding zone and in contact with it and gasified by transfer of heat from the combustion zone. D. M. M.

Manufacture of coal gas. Gas Light & Coke Co., and E. L. Randall (B.P. 459,314, 1.8.35).—Intermittent vertical retorts provided with bottom as well as top off-takes are fitted with shut-off valves instead of a liquor seal to the bottom off-takes, and these are adapted to by-pass the bottom rich gas from newly charged retorts through the free space of another retort which is being steamed, thereby causing cracking of the rich bottom gas in presence of the water-gas in the other retort. D. M. M.

Production of a mixture of coal gas and water-gas. Woodall–Duckham (1920), Ltd., A. T. Kent, and H. H. Carey (B.P. 459,611, 27.11.35. Addn. to B.P. 445,638; B., 1936, 679).—A water-gas chamber serving only for the production of water-gas is connected with a group of two or more intermittent vertical retorts and the water-gas is passed, while hot, into the top of the latter, mixing with the coal gas generated there and preserving the rich hydrocarbons formed. Additional water-gas may be generated by passing steam through the carbonising retorts after completion of carbonisation. D. M. M.

Production of acetylene gas. R. G. Wulff, Assr. to Wulff Process Co. (U.S.P. 2,037,056, 14.4.36. Appl., 9.5.31).—C_2H_2 is produced from natural gas by passing the latter through a heated contact mass of refractory particles, *e.g.*, carborundum, at 980—1650°. The flow of gas is decreased as C_2H_2 is formed and the resulting gas is suddenly cooled. The process is cyclic, the refractory particles requiring to be periodically heated by burning a part of the natural gas in a burner at intervals as the temp. falls below 98°. D. M. M.

Purification of [coal] gas from nitrogen oxides. W. H. Fulweiler, Assr. to United Gas Improvement Co. (U.S.P. 2,031,410, 18.2.36. Appl., 16.9.33).—The gas is passed over Cu turnings at 200° to remove O_2, and then over FeS mixed with an alkali to remove H_2S and N oxides. A. R. P.

Purification of gases. V. Ipatieff, Assr. to Universal Oil Products Co. (U.S.P. 2,035,889, 31.3.36. Appl., 31.8.32).—Gum-forming olefines are removed from fuel gases by washing the gas with a mixture of H_2SO_4 and an aromatic hydrocarbon, *e.g.*, C_6H_6, whereby condensation is produced. D. M. M.

Purifier for wood-gas generating plant used on vehicles. H. Linneborn (B.P. 459,415, 13.2.36.

Ger., 13.2. and 17.8.35).—Wood-gas is passed through a H_2O-seal in a settling-container and then through cooling tubes above the latter to which condensate from the cooling tubes drains back. D. M. M.

Coke-oven gas by-product recovery. L. Mellersh-Jackson. From Koppers Co. of Delaware (B.P. 459,311, 17.7.35).—Coke-oven gas is sprayed with NH_3 liquor immediately on leaving the oven, and while hot passed through a hot tar precipitator while still at or above the dew point of the contained H_2O. It is subsequently cooled by direct contact with NH_3 liquor, *e.g.*, to 24—38°, and scrubbed with hot $C_{10}H_8$-free tar previously pptd., to remove $C_{10}H_8$, after which it can be cooled for benzol recovery by indirect H_2O-cooling without danger of clogging with $C_{10}H_8$. D. M. M.

Recovery of hydrocarbons from gases containing the same. I. G. Farbenind. A.-G. (B.P. 459,471, 20.4.36. Ger., 20.4.35).—Hydrocarbons, *e.g.*, C_6H_6, are removed from gas by wash oil or active-C processes after first treating the gas together with O_2 or gases containing it, by passing it at 250—600° over a catalyst capable of promoting the oxidation of H_2S and/or CN compounds and then washing out the substances formed during the catalysis, *e.g.*, SO_2 and NH_3. An improved resinification test of the C_6H_6 and less thickening of wash oil are claimed, and a longer life for the active C. D. M. M.

Regenerating washing oil which has been used in the production of benzene from coal-distillation gases. C. Still Ges.m.b.H. (B.P. 460,478, 17.2.36. Ger., 16.2.35).—Oil used in extraction of C_6H_6 etc. from gas is washed and separated simultaneously from H_2O and tarry constituents by passing a mixed stream of oil at 70° and hot H_2O, *e.g.*, condensate from the oil heater, into a separator $\nless$ 10 m. high containing a submerged bell and of such diameter that the passage of the oil occupies ½ hr. H_2O and oil separate therein by gravity and are discharged over separate weirs, while the tarry impurities collect at the bottom, from which they also are discharged. D. M. M.

Purification of crude hydrocarbons. W. W. Triggs. From Gutehoffnungshütte Oberhausen A.-G. (B.P. 459,599, 9.4.35).—Low-boiling hydrocarbons, *e.g.*, benzol, are purified by scrubbing in the vapour phase with liquid tar acids etc., especially cresol, the temp. of the liquid being held at 10—20° above the b.p. of the hydrocarbon. A subsequent treatment with fuller's earth may be required as well as a light pre-wash with dil. H_2SO_4, *e.g.*, 30%, followed by an alkaline wash. D. M. M.

Treatment of tars. R. F. Davis, Assr. to Universal Oil Products Co. (U.S.P. 2,035,868, 31.3.36. Appl., 29.1.34).—Tar acids are removed from coal tar or fractions by treatment with aq. NaOH (18—20% solution) at 60—71°, pressure being used if required to prevent ebullition. D. M. M.

Apparatus for dehydration of tar emulsions. T. H. Jackson (U.S.P. 2,039,003, 28.4.36. Appl., 29.11.33).—Tar emulsions are dehydrated to 0·2% of H_2O by heating in a tank provided with a vapour dome and steam coils. The tar is first heated at 97° for 2 hr., and then kept at 93° for 10—20 hr. while gravity separation takes place. D. M. M.

Bituminous dispersions. R. R. Thurston, Assr. to Texas Co. (U.S.P. 2,037,669, 14.4.36. Appl., 14.10.32).—Thermoplastic hydrocarbon material, *e.g.*, asphalt, is stabilised for emulsifying by adding 1—12% of the saponified products of materials adsorbed on fuller's earth or other adsorbent used in filtering cracked petroleum vapours and removed from the adsorbent by the action of a solvent, *e.g.*, $COMe_2$ or benzol. D. M. M.

Bituminous compositions incorporating india-rubber. T. W. Ward, Ltd., and A. P. Booth (B.P. [a] 460,854 and [b] 460,962, 1.8.35).—(a) Rubber in liquid form, *e.g.*, as latex or dissolved in naphtha, is incorporated while hot with a large proportion of bituminous material, in presence of a small proportion of NaCl, and, if desired, of an alkali, *e.g.*, NH_3, and a protective colloid, *e.g.*, soap. A vulcanising agent, *e.g.*, S, an accelerator, *e.g.*, ZnO, and an activator, *e.g.*, mercaptobenzthiazole, are then added. (b) The S may be added at a temp. $<$ that at which vulcanisation would proceed in absence of an accelerator and activator, and the latter are not added until it is desired that vulcanisation should commence. A. B. M.

Manufacture of articles fabricated with asphaltenes. S. C. Fulton and V. Kalichevsky, Assrs. to Standard Oil Development Co. (U.S.P. 2,035,122, 24.3.36. Appl., 12.12.31).—Wall-boards or briquettes are obtained by mixing asphaltenes with a binder (inorg. or org.), placing the mixture in layers between layers of cloth or with fibrous matter in a mould, and pressing to shape. C. C.

Conversion of carbonaceous substances, tars, mineral oils, and the like into more valuable products. C. Krauch and M. Pier, Assrs. to Standard–I.-G. Co. (U.S.P. 2,035,133, 24.3.36. Appl., 31.5.37. Ger., 1.6.36).—Carbonaceous liquids, *e.g.*, pastes with coal, tars, mineral oils, etc., are converted into lower-boiling hydrocarbons by heat-treatment in liquid phase at 300—500° (420°)/$>$20 ($>$100) atm. in presence of H_2 and a sulph-active catalyst. Intermediate fractions are separated from the product and treated in vapour phase at 50—100° above the temp. used in the first stage (350—600°) in presence of a catalyst (a metal from groups III—VIII). C. C.

Production of benzines from middle oils or crude benzines rich in phenols and olefines by hydrogenation. H. E. Potts. From Internat. Hydrogenation Patents Co., Ltd. (B.P. 460,151, 23.7.35).—Middle oils, having an end b.p. of about 350°, preferably 325°, and rich in phenols and olefines, are hydrogenated in two stages. In the first stage 30—50% are hydrogenated in presence of catalysts having only a slight splitting action, *e.g.*, sulphides of Ni, Co, Fe, Zn, Mn, etc., or oxides or sulphides of Mo or W which have had their activity diminished by long use. The product from the first stage is separated from any benzine, and then, after mixing with the remainder of the initial material and any residue from previous operations, is hydrogenated in presence of catalysts with a strong splitting action, *e.g.*, oxides or sulphides of Mo or W. D. M. M.

Treatment of mineral oils. L. P. Chebotar, Assr. to Texas Co. (U.S.P. 2,036,396, 7.4.36. Appl., 27.2.32).—Petroleum distillates of high S content are agitated with air at about 60—100° with 0·05—0·3% of oxidation promoter, *e.g.*, C_5H_5N, and about 0·02—0·2% of an oil-sol. soap of Mn, Cu, Co, Ni, or Pb, *e.g.*, Cu naphthenate. A preliminary alkaline wash is desirable and subsequently the distillate is given a small H_2SO_4 wash and finished in the usual manner. D. M. M.

Partial oxidation of hydrocarbons. J. H. James, Assr. to C. P. Byrnes (U.S.P. 2,036,215, 7.4.36. Appl., 12.4.29).—Petroleum hydrocarbons are oxidised catalytically by passage in the vapour phase, mixed with air, over a catalyst maintained at just $<$ red heat. The reaction may be controlled by mixing the vapours with a diluent, *e.g.*, steam or fume gas, by decreasing the proportion of air, by employing several layers of catalyst with limited air admixture before each, or by artificial cooling of the catalytic layer. D. M. M.

Olefine concentration and polymerisation. R. F. Ruthruff, J. K. Roberts, and M. T. Carpenter, Assrs. to Standard Oil Co. (U.S.P. 2,035,409, 24.3.36. Appl., 17.7.33).—Olefinic gases (I) are conc. by scrubbing with liquid C_4H_{10} (II), whereby fixed gases are eliminated. (I) are recovered from the (II) by stripping distillation at 350—500 lb. per sq. in. and then polymerised at 425—565°/500—3000 lb. per sq. in. Unconverted gases are separated, cracked at 705—955°/0—200 lb. per sq. in., and then conc. and polymerised by the above process. C. C.

Manufacture of condensation products and substantially olefine-free oils from olefine-containing oils. W. J. Tennant. From Henkel & Co. G.m.b.H. (B.P. 460,435, 20.5.35).—Olefinic constituents are removed by condensation with aromatic OH- or OAlk-compounds (*e.g.*, phenols, naphthols, anisole) in presence of $HClO_4$. C. C.

Obtaining distillates from hydrocarbon oils by action of water under high pressure and temperature. H. O. Forrest, L. F. Marek, and A. White, Assrs. to Standard Oil Development Co. (U.S.P. 2,035,120, 24.3.36. Appl., 7.7.30).—Mineral hydrocarbons, *e.g.*, gas oil, are mixed with H_2O in the mol. ratio 80 : 1 and the mixture is heated at 538°/3000 lb. per sq. in. for ≯2 min. (10—100 sec.). ≮75% of the oil is converted into gasoline. C. C.

Composition obtained from hydrocarbon acid sludge. J. C. Bird, Assr. to Standard Oil Development Co. (U.S.P. 2,035,112, 24.3.36. Appl., 6.1.32).—A resinous plastic material is obtained from the aq. alcoholic extract of the org. matter separated from acid sludge, *e.g.*, by dilution with H_2O. It is practically free from sulphonates and sol. in C_6H_6, CCl_4, CS_2, and in "hydro-formed" solvents (*i.e.*, derived from the hydrogenation of petroleum oil) with kauri–BuOH val. $>$40 (but insol. in aq. EtOH). The solution is used as a stain for wood, particularly the fraction more sol. in liquefied hydrocarbons (C_3, C_4) or in light petroleum. C. C.

Stabilisation and refining of cracked hydrocarbon distillates. A. L. Mond. From Universal Oil Products Co. (B.P. 459,923, 18.7.35).—Cracked gasolines are separated by fractionation from the light ends which normally evaporate under atm. storage conditions and adversely affect the inhibitors. Inhibitors are added to the fractionated product, which then required less inhibitor than before fractionation. D. M. M.

Combined stabilising and gas-conversion process. M. P. Youker, Assr. to Phillips Petroleum Co. (U.S.P. 2,040,455, 12.5.36. Appl., 10.5.32).—A mixture of very volatile hydrocarbon liquids and gases is introduced into a rectifying column (*C*) and part of the heavier portion from the bottom of *C* is passed through a furnace for cracking and back to *C* while the gases are separately condensed and separated, the liquid being also passed back to the furnace and polymerised at 400—510°/500 lb. per sq. in. Stabilised motor fuel is drawn off from an intermediate point in *C* and fuel oil from the bottom. A pressure of 400—500 lb./sq. in. is maintained in *C*, condenser, and accumulator. D. M. M.

Treatment of naphtha. A. A. Wells, Assr. to Standard Oil Development Co. (U.S.P. 2,036,166, 31.3.36. Appl., 12.11.31).—Cracked naphtha is treated with 5—20% of a slurry consisting of gas oil containing 1—4% of clay, by passing under high pressure through a coil at 177—316° and thence to a vaporising zone where it is fractionated and the naphtha vapour may be scrubbed countercurrently by a further oil–clay mixture. D. M. M.

Inhibiting gum formation in naphthas and products obtained thereby. C. Winning, L. E. Sargent, and J. F. Dudley, Assrs. to Standard Oil Development Co. (U.S.P. 2,031,917, 25.2.36. Appl., 24.4.31).—Claim is made for the use of aromatic NH_2- and phenolic compounds, *e.g.*, α-$C_{10}H_7$·OH or *sec.*-amyl-*p*-aminophenol, and a small quantity (≯0·001%) of a dye having an indophenol, oxazine, indamine, eurhodine, safranine, or *apo*safranine base as inhibitors for gum formation in petrol made by cracking heavy hydrocarbons. A. R. P.

Purification of naphthenic acids. R. F. Nelson and L. Zapf, Assrs. to Texas Co. (U.S.P. 2,039,106, 28.4.36. Appl., 13.6.35).—Naphthenic acids (I) are recovered from petroleum hydrocarbons by distilling off the oils in presence of an alkali. The residue containing alkali naphthenate is emulsified with H_2O in presence of a diluent light oil, the emulsion acidified, and the diluent, containing the (I), drawn off after settling. The diluent is distilled off and the (I) are separated by vac. distillation as desired. D. M. M.

Refining of petroleum distillates. C. E. Dolbear, Assr. to P. Wiseman, P. K. Wiseman, and C. E. Dolbear (U.S.P. 2,034,712, 24.3.36. Appl., 28.11.33).—In order to remove in a single step a no. of impurities, especially S compounds and colour-forming constituents, so that when the colour is removed by a subsequent simple treatment with clay it will not return, the vapours of, *e.g.*, petrol are passed through a fragmentary mass of reactive material comprising partly dehydrated alkaline-earth oxide surface-activated by alkali-metal hydroxide which is heated at $>$ the b.p. of the least volatile constituent but $<427°$. B. M. V.

[Oil-]sweetening process. F. R. Moser, Assr. to Shell Development Co. (U.S.P. 2,031,972, 25.2.36. Appl., 20.6.32).—Low-boiling petroleum distillates are sweetened by treatment with an alkali hydroxide and S ≡ 50—200% of the mercaptan-S present, and the product is treated with a small quantity of tetrahydronaphthalene, pinene, or *cyclo*hexene to inhibit the corrosive action of the S. A. R. P.

Emulsions. E. I. Du Pont de Nemours & Co. (B.P. 458,817, 21.6.35. U.S., 15.3.35).—Deacetylated chitin salts (B.P. 458,839; B., 1937, 370) are used to produce (preferably oil-in-H_2O) emulsions of liquids, *e.g.*, paraffin, tung oil, in H_2O, the ratio of chitin salt to oil varying widely, but the ratio 2—10 : 1 being generally preferred. R. S. C.

Breaking petroleum emulsions. (A) M. De Groote, B. Keiser, and A. F. Wirtel, (B) C. N. Stehr, Assrs. to Tretolite Co. (U.S.P. 2,034,941 and 2,034,963, 24.3.36. Appl., [A] 12.11.34, [B] 15.7.35).—(A) Ricinoleic acid blown with an O_2-containing gas (air), *e.g.*, at 135—140° for 8—12 hr., is added to the emulsion, which is then diluted with an equal vol. of kerosene and neutralised with $N(CH_2{\cdot}CH_2{\cdot}OH)_3$. (B) The demulsifying agent consists of a mixture of (*a*) a blown oil, glycerides or fatty acids, 15—50; (*b*) the acid salts of dibasic sulphonic acids, and/or sulphonated fatty or aryl-fatty acids, 2—15; (*c*) S-free higher fatty acids or their esters, anhydrides, etc., but not salts, derived by fission of H_2SO_4 from sulphated material (castor oil), 20—60; (*d*) a monohydric aliphatic alcohol $\nless C_3$, 5—25%, and (*e*) hydrophobic solvent (petroleum hydrocarbon distillate). (Cf. U.S.P. 2,026,195; B., 1936, 868.) E. J. B.

Breaking of petroleum emulsions. M. De Groote, B. Keiser, and A. F. Wirtel, Assrs. to Tretolite Co. (U.S.P. 2,037,885—6, 21.4.36. Appl., [A, B] 6.12.35).—Petroleum emulsions of the H_2O-in-oil type are broken by treatment with (A) an acid-free keto-fatty acid compound, *e.g.*, the Na salt of ketohydroxystearic acid, diluted with 50 wt.-% of a 1 : 1 mixture of MeOH and solvent naphtha, or (B) a salt-free polyketo-fatty acid compound, *e.g.*, the oxidation product of castor oil, with 10% of linseed oil and 1% of Petroff reagent dissolved in the same solvent as in (A). D. M. M.

Treatment of petroleum sludges and sludge acids. J. Robinson, Assr. to Standard Oil Co. (U.S.P. 2,036,299, 7.4.36. Appl., 30.6.32).—The acid sludge obtained by washing petroleum oil with H_2SO_4 is hydrolysed with limited amounts of H_2O and steam to maintain the dil. acid at d 1·26—1·32. The three layers are then separated in the usual way, and the dil. acid layer is agitated cold with *iso*-$C_5H_{11}{\cdot}OH$ (I), whereby a sharp separation of the acid from the (I) and impurities occurs and the acid is reconc., any (I) coming off with the H_2O being recovered. The alcoholic layer containing the impurities is distilled and the (I) recovered. D. M. M.

Treatment of hydrocarbons. J. C. Morrell, Assr. to Universal Oil Products Co. (U.S.P. 2,035,910, 31.3.36. Appl., 29.11.33).—Finely-divided coal–oil mixture is passed through a heating zone at 390—538°/50—1500 lb./sq. in. Sufficient O_2 or gases containing O_2 are introduced into the heating zone to form condensible partial oxidation products, *e.g.*, alcohols, aldehydes, ketones, etc. D. M. M.

Treatment of hydrocarbon oils. (A) A. V. Grosse, (B—E) V. Ipatieff, Assrs. to Universal Oil Products Co. (U.S.P. 2,037,781 and 2,037,789—92, 21.4.36. Appl., [A] 14.3.33; [B] 30.4.32, [C] 16.1.33, [D] 30.6.33, [E] 4.12.33).—The S content of cracked hydrocarbon distillates is reduced by treatment with H_2 in presence of catalysts consisting of (A) a thiomolybdate, (B—E) metallic oxides or thiomolybdates and aluminates, at high temp. and pressure. Catalysts cited are: (A) $CoMoS_4$ 85—95 and $NaAlO_2$ 15—5% at 260—370°/100—300 lb. per sq. in.; (B) NiO 80, Al_2O_3 20%; (C) NiO 70—75, Al_2O_3 25—20, and $NaAlO_2$ 5%; (D) Fe^{III} (Ni or Co) thiomolybdate 65, $NaAlO_2$ 10, NiO 10, and infursorial earth 15%; (E) MoO_3 33·1, NiO 51·7, $NaAlO_2$ 9·2, inerts 6%, mostly NH_4 salts. D. M. M.

Treatment of hydrocarbon oils. J. D. Seguy, Assr. to Universal Oil Products Co. (U.S.P. 2,037,933, 21.4.36. Appl., 22.11.30. Renewed 23.10.34).—After cracking, the oil is separated into vapour and liquid oil and the former dephlegmated, the reflux passing back to the cracking zone. The unvaporised oil is hydrogenated over metal or metallic oxide catalysts and the product is again dephlegmated and the reflux passed to a secondary cracking zone at lower temp. and higher pressure than that in the original cracking zone. The residue from the second cracking zone is passed back to the hydrogenating zone. D. M. M.

Treatment of hydrocarbon oils. (A) G. Egloff and J. C. Morrell, (B, C) J. C. Morrell and G. Egloff, Assrs. to Universal Oil Products Co. (U.S.P. 2,040,366 and 2,040,395—6, 12.5.36. Appl., [A] 12.1.34, [B] 19.12.31, [C] 26.12.31. Renewed [B, C] 5.4.34).—(A) Cracked hydrocarbons are refined by interaction in the vapour phase with SO_3 and steam at 120—315° in presence of sulphates, phosphates, or chlorides of a heavy metal, *e.g.*, Zn. (B) The anti-knock val. of cracked spirit is improved by causing part of the vapours to interact in presence of a metallic catalyst, *e.g.*, Cu or its salts, with a halogen and NH_3 at 150—315° to form NH_2-derivatives, which are collected with the gasoline vapours. (C) Cracked gasoline vapours are treated with NH_3 and a mono- or poly-chloro-substitution product, *e.g.*, PhCl, in presence of a heavy-metal catalyst at 150—315°/100—400 lb. per sq. in. Cu, Fe, Ni, etc., or their oxides or salts, may be used as catalyst. D. M. M.

Treatment of hydrocarbon oils. C. W. Watson, Assr. to Texas Co. (U.S.P. 2,039,239, 28.4.36. Appl., 22.6.32).—Hydrocarbon oils are cracked and the cracked vapours fractionated at once to produce a vapour fraction of a definite boiling range. This is immediately treated, while still in the nascent condition, with countercurrent flow of a suspension of a suitable catalytic adsorbent in a treated liquid hydrocarbon. The treated vapour is then withdrawn and condensed to a stable motor fuel. D. M. M.

Refining of hydrocarbon liquids. Burmah Oil Co., Ltd., and B. C. Allibone. From H. L. Allan (in part) (B.P. 459,595, 9.4.35).—The aromatic content of an aromatic hydrocarbon extract, produced in the refining of petroleum distillates, *e.g.*, by SO_2 extraction, is conc. by separation of the non-aromatic part by extraction in presence of liquid SO_2 with a paraffinic or non-aromatic hydrocarbon that is not itself sol. in liquid SO_2 at the temp. used, but is miscible with the non-aromatic hydrocarbons contained in the extract. A suitable hydrocarbon is a refined spindle or transformer oil. D. M. M.

Refining hydrocarbon oil. R. E. Manley and H. H. Gross, Assrs. to Texas Co. (U.S.P. 2,037,385, 14.4.36. Appl., 9.12.32).—S-bearing substances, aromatic unsaturated compounds, etc. are separated from mineral oils by washing with a solvent consisting of furfuraldehyde mixed with an ester (acetate) of a cyclic hydrocarbon, *e.g.*, Ph or furfuryl ester. D. M. M.

Solvent refining of hydrocarbon oil. R. E. Manley, Assr. to Texas Co. (U.S.P. 2,038,798, 28.4.36. Appl., 7.3.32).—Hydrocarbon oils are continuously extracted in countercurrent system with a selective solvent, *e.g.*, furfuraldehyde (I), the solvent being continuously recovered. There are a no. of mixing and separating zones and the oil and (I) are kept at 93°. H_2O is used to displace the last traces of (I) from the oil at 135° and later removed by cooling to 27°. Subsequent treatment with small quantities of acid may be required. D. M. M.

Purification and refining of hydrocarbon oils. A. Lachman, Assr. to Vapor Treating Processes, Inc. (U.S.P. 2,035,607—10, 31.3.36. Appl., [A] 26.7.29, [B] 5.2.32, [C, D] 12.10.32. Argentina, [C, D] 30.4.32).—The amount of H_2SO_4 required to purify gasoline stock or other hydrocarbon oils is substantially reduced by treatment under pressure and at 150—300° with an aq. solution of an org. or inorg. salt of one of the more common metals, *e.g.*, (A, B) a Zn salt ($ZnSO_4$), (C) a Cu salt ($CuCl_2$), or (D) an Al salt ($AlCl_3$). It may alternatively be either pre- or after-treated with smaller amounts of H_2SO_4 and NaOH. D. M. M.

Removal of wax from hydrocarbon oil. B. Y. McCarty and W. E. Skelton, Assrs. to Texas Co. (U.S.P. 2,035,490—1, 31.3.36. Appl., 8.6.34. Cf. U.S.P. 1,995,153; B., 1936, 260).—Wax is pptd. from solution in oil by use of a selective solvent consisting of o-$C_6H_4Cl_2$ (I) and a monoalkyl ether of mono- or di-ethylene glycol or an aliphatic alcohol and subsequent chilling and filtering with or without the use of filter-aids. Preferred solvents are 20% of (I) and 80% of commercial $C_5H_{11}\cdot OH$, or 65% of (I) and about 35% of either $C_2H_4Cl_2$ or $C_3H_6Cl_2$. D. M. M.

[Paraffin] wax composition. H. J. Rose, Assr. to Atlantic Refining Co. (U.S.P. 2,036,301, 7.4.36. Appl., 12.4.33).—The brittleness of ordinary paraffin wax is decreased by incorporating in it 0·25—2% of rubber. Similarly, higher-melting waxes may be prepared by completely removing the oil from petrolatum and incorporating 0·25—2% of rubber in the remaining wax. D. M. M.

Motor fuel. E. J. Houdry, Assr. to Houdry Process Corp. (U.S.P. 2,035,478, 31.3.36. Appl., 20.7.32).—Hydrocarbon oils of low b.p., produced by cracking, are separated from the incondensible gases, the latter are desulphurised by means of a material capable of regeneration, and the former are stabilised to remove entrained gases. The purified gases and liquid products are then passed over a refining catalyst, *e.g.*, activated clay with 2% of metallic, *e.g.*, Ni, oxide, which also has the effect of polymerising the gases. D. M. M.

Treatment of motor fuel. J. C. Morrell, Assr. to Universal Oil Products Co. (U.S.P. 2,033,145, 10.3.36. Appl., 27.2.33).—Cracked gasoline is separated into light and heavy cuts. An oxidation and polymerisation inhibitor (several mentioned) is added to the former, whilst the heavy cut is refined with H_2SO_4, adsorbent earth, or heavy-metal salts ($ZnCl_2$, $AlCl_3$, etc.). The refined cut is blended with the inhibited light oil. C. C.

Polymerisation of gaseous olefines [motor fuel]. Anglo-Iranian Oil Co., Ltd., and A. E. Dunstan (B.P. 460,659, 26.6.35, 21.1. and 13.5.36).—Motor fuel of high C_8H_{18} no. is obtained by polymerising olefines at 180—250°/100—500 lb. in presence of $Cd(H_2PO_4)_2$. The catalyst is prepared by heating at 100° mixtures of CdO and H_3PO_4 giving a ratio $Cd_3(PO_4)_2 : H_3PO_4 = 1 : 3{\cdot}5$, or $1 : 1 : 3$—$1 : 1 : 8$ mixtures of $Cd_3(PO_4)$–$Cu_3(PO_4)_2$–H_3PO_4; its resistance to disintegration is increased by pelleting with a binder (lubricating oil and/or graphite); it can be reactivated by heating in N_2 or flue gas at about 300°. R. S. C.

Operation of internal-combustion engines and production and supply of fuel thereto. Ammonia Casale Soc. Anon. (B.P. 460,498, 15.7.36. It., 30.10.35, 10.12.35, and 22.1.36).—An NH_3–H_2 mixture ($NH_3/H_2 = 3$—19) is used as fuel for the engines, the H_2 being provided by catalytic decomp. of 3·4—18·2% of the NH_3 in an apparatus connected to the engine, and utilising the waste heat of the latter to heat the catalyst. D. M. M.

Stabilisation of motor fuels. A. L. Mond. From Universal Oil Products Co. (B.P. 459,722, 12.7.35).—<2% of tar fractions of boiling range 200—325° or, better, 225—275° are added to the fuels. The tar fractions, preferably from low-temp. distillation of coal, peat, torbanite, or shale, may be acid- and alkali-washed, the acid- and/or alkali-sol. portions being used alone or in admixture with each other or with untreated fractions. D. M. M.

Storage of inflammable or explosive liquids. K. Szilvay (B.P. 459,624, 2.3.36).—Safety devices for petrol storage tanks are described. B. M. V.

Production of lubricating oils. U. B. Bray and C. E. Swift, Assrs. to Union Oil Co. of California (U.S.P. 2,040,239, 12.5.36. Appl., 13.2.34).—Oil from which gasoline, kerosene, and gas oil have been removed is mixed with a solvent (2 : 3 C_2H_6–C_3H_8 mixture at about 93°), then cooled by partial vaporisation of the solvent to about 50°, mixed, and the asphalt separated. Wax is removed by further similar cooling and the residual oil freed from solvent, after acid washing, by distillation. D. M. M.

Lubricating oil. E. F. Pevere, Assr. to Texas Co. (U.S.P. 2,039,111, 28.4.36. Appl., 23.4.34).—The pour point of lubricating oil is depressed by addition to each 100 c.c. of oil 0·1—1·0 g. of a glycol di-ester of a higher saturated fatty acid, *e.g.*, ethylene glycol distearate. D. M. M.

Mineral oil composition. H. A. Curtis, Assr. to Socony–Vacuum Oil Co., Inc. (U.S.P. 2,037,563, 14.4.36. Appl., 7.6.33).—The pour points of lubricating oils are depressed by addition of about 2% of the residue obtained from absorbent earths previously used in the filtration of cylinder stock. The earth is first extracted with light petroleum until free from oil and then with $CHCl_3$–EtOH mixture until all extractable material has been removed. The solvents are subsequently evaporated and the residue is the required pour-point depressant. D. M. M.

Solid [dehydrated] lubricants. G. R. Taylor and R. N. Smith, Assrs. to McColl–Frontenac Oil Co., Ltd. (U.S.P. 2,038,688—9, 28.4.36. Appl., 10.7.33).—The products consist of (A) naphthenic petroleum oil and Na soap from animal fat and stearic acid in approx. equal amounts, $<1\%$ of H_2O, and 1—4% of glycerin; and (B) 30—45% of Na soap, 3—15% of Ca soap, 3—15% of Al soap, $<1\%$ of H_2O, 1—5% of glycerin, and the balance of highly viscous naphthenic oil. D. M. M.

Stabilisation of lubricating oils or the like. L. W. E. Townsend (B.P. 459,789, 11.7.35).—Sludge formation is prevented by addition of approx. 0·2% of finely-divided SnO_2 or Sn hydroxide [$Sn(OH)_2$], the particles of which average $\not> 0{\cdot}0002$ cm. (0·00002 cm.) in diameter. A dispersing agent, *e.g.*, soap, high-boiling ester, etc., is used to ensure the formation of a stable colloidal dispersion. D. M. M.

Treatment of [heavy] hydrocarbons. J. F. Wait (U.S.P. 2,034,068, 17.3.36. Appl., 30.7.32).—Heavy petroleum, *e.g.*, lubricating oil, is first vaporised under vac. (100 mm. abs. pressure) and the vapours are treated successively in two reaction zones through which circulates fused alkali metal at 200—400°. The contact time is short to avoid cracking. The metal is kept active by adding freshly formed metal or by circulating the mass through a zone of electrolysis. C. C.

Machines or apparatus for testing oils and lubricants. T. R. Palmer (B.P. 458,306, 16.3.35).—In an apparatus comprising an adjustable bearing containing a spindle rotated by an electric motor, the power output and/or the speed of the motor and the load on the bearing can be adjusted to predetermined vals., or their variations are recorded and the point at which the film of lubricant fails is indicated electrically. B. M. V.

(A) Coking of liquid hydrocarbons. (B) Coking of hydrocarbons. (C) Apparatus for coking of bituminous or asphaltic liquids. (A) C. W. Andrews and R. S. Petersen, (B) R. S. Petersen and C. W. Andrews, (C) R. S. Petersen, Assrs. (A—C) to Brassert–Tidewater Development Corp. (U.S.P. [A] 2,039,763, [B] 2,039,835, and [C] 2,040,875, [A, B] 5.5.36, [C] 19.5.36. Appl., [A] 5.7.32, [B] 18.12.33, [C] 23.2.34).

Polymerisation of olefinic gases. R. F. Ruthruff, Assr. to Standard Oil Co. (U.S.P. 2,038,086, 21.4.36. Appl., 24.8.32).

Gas cooler. D. Pyzel, Assr. to Shell Development Co. (U.S.P. 2,035,506, 31.3.36. Appl., 19.11.32).

Furnace for heating fluids [hydrocarbons]. H. D. Loeb, Assr. to Texas Co. (U.S.P. 2,035,900, 31.3.36. Appl., 7.12.33).

Heating of [hydrocarbon] fluids. L. de Florez, Assr. to Texas Co. (U.S.P. 2,043,095, 2.6.36. Appl., 10.8.32).

Cracking of oils. A. V. Ritchie, Assr. to Texas Co. (U.S.P. 2,037,537, 14.4.36. Appl., 4.2.30).

Cracking of hydrocarbons. E. C. Herthel, Assr. to Sinclair Refining Co. (U.S.P. 2,037,380, 14.4.36. Appl., 29.6.29).

Apparatus for cracking hydrocarbon oils. E. C. D'Yarmett (U.S.P. 2,040,838, 19.5.36. Appl., 28.3.32).

Cracking of [hydrocarbon] oil. E. C. Herthel, Assr. to Sinclair Refining Co. (U.S.P. 2,037,379, 14.4.36. Appl., 24.9.23).

[Hydrocarbon oil] cracking system. G. C. Hargrove, Assr. to Gasoline Products Co., Inc. (U.S.P. 2,036,965, 7.4.36. Appl., 4.3.31).

Cracking of [petroleum] oil. A. L. Still (U.S.P. 2,039,611, 5.5.36. Appl., 26.3.29).

Treatment of hydrocarbon oil. F. W. Sullivan, jun., and R. F. Ruthruff, Assrs. to Standard Oil Co. (U.S.P. 2,043,269, 9.6.36. Appl., 1.12.34).

Treatment of hydrocarbon oils. W. F. Moore, Assr. to Texas Co. (U.S.P. 2,036,968, 7.4.36. Appl., 1.2.33). E. W. Rembert, Assr. to Tide Water Oil Co. (U.S.P. 2,039,981, 5.5.36. Appl., 22.7.32). A. C. Hampton, Assr. to Gasoline Products Co., Inc. (U.S.P. 2,040,048, 5.5.36. Appl., 10.5.33). A. G. Peterkin, jun., Assr. to Atlantic Refining Co. (U.S.P. 2,040,064, 5.5.36. Appl., 29.8.31).

Petroleum refining system. W. T. Hancock (U.S.P. 2,035,547, 31.3.36. Appl., 3.7.34).

Apparatus for dewaxing oil. H. F. Fisher, Assr. to Union Oil Co. of California (U.S.P. 2,042,775—6, 2.6.36. Appl., 18.9.33).

[Dewaxing of oil by] chilling. M. H. Tuttle (U.S.P. 2,036,374, 7.4.36. Appl., 26.4.30).

Dewaxing of hydrocarbon oil. R. E. Manley, Assr. to Texas Co. (U.S.P. 2,040,056, 5.5.36. Appl., 13.6.32).

Dewaxing of hydrocarbon oils. J. A. Anderson, Assr. to Standard Oil Co. (U.S.P. 2,036,188, 7.4.36. Appl., 27.8.30).

Manufacture of lubricating oil. R. E. Manley and H. H. Gross, Assrs. to Texas Co. (U.S.P. 2,040,057, 5.5.36. Appl., 25.2.33).

Reclaiming used lubricating oil. F. G. Baender (U.S.P. 2,043,691, 9.6.36. Appl., 14.5.31).

Heating coal. Separating dirt from coal. Separating solids from liquids [*e.g.*, coal sludge]. Fractionation of liquids. Separating gas from liquid. Measuring η. Removing oil from fluids. Separating gaseous mixtures. Coating pipes etc.—See I. **Sulphonates. Mercaptans. Lubricants. Ketones.**—See III. **Decomp. of WS_3. Washing out acids from gases.**—See VII. **Road-surfacing material. Asphaltic paving. Bituminous emulsion.**—See IX. **C brushes.**—See XI. **Vegetable oils for lubricants. Machine oils.**—See XII.

III.—ORGANIC INTERMEDIATES.

Transformation of chlorinated hydrocarbons obtained from vaseline oil into acetylated hydrocarbons. E. André and A. Maurel (Ann. Off. nat. Comb. liq., 1936, **11**, 1127—1148).—Chlorinated vaseline oil (8·3% Cl) obtained previously (cf. B., 1936, 728) was treated with AgOAc, whereby of the total Cl 35% was unaffected, 47% removed as HCl with formation of double linkings, and 18% substituted by OAc. The Ac esters obtained were fractionated by means of a mixed solvent (EtOAc and EtOH). The *d*, sap. vals., and Cl content of each fraction are given. R. B. C.

Determination of non-nitrated hydrocarbons in technical nitrobenzene and its derivatives. E. Rostovtzeva (Zavod. Lab., 1936, **5**, 99).—100 ml. of $PhNO_2$ are boiled with 5 g. of P_2O_5 (20 min.) in a Wurtz flask, at a rate such that $PhNO_2$ condenses at a level 2 cm. below that of the side-tube, and the vol. of the distillate of C_6H_6 is measured. R. T.

Separation of naphthalene and anthracene from vapours. I. S. I. Kukuschkin and K. A. Belov (Koks i Chim., 1936, **6**, No. 11, 43—45).—$C_{10}H_8$ (I) and anthracene are deposited at cooled surfaces from the vapour, together with oily and aq. products. The oil–H_2O–(I) mixture rapidly separates on keeping, and 92·7% (I) is obtained by pressing the product so obtained (600 kg./sq. cm.). The expressed oil contains 4—6% of (I). R. T.

New methods of determining naphthalenesulphonic acids. Z. E. Zinkov, J. L. Daniuschevski, V. Reinschtein, and G. M. Chomiakovski (J. Appl. Chem. Russ., 1936, **9**, 1997—2020).—The sulphonic acids are pptd. from aq. solutions of sulphonation products as salts with the appropriate amines, which are collected, washed, dissolved in H_2O, and titrated with 0·1*N*-NaOH. The most suitable amines for the purpose are: $NHPh{\cdot}NH_2$ for β-, *m*-nitro-*o*-anisidine or *m*-nitroaniline for α-$C_{10}H_7{\cdot}SO_3H$, *m*-xylidine for 1 : 5-, benzidine for 2 : 6- and 2 : 7-$C_{10}H_6(SO_3H)_2$, and β-$C_{10}H_7{\cdot}NH_2$ for all mono- and di-sulphonic acids. Detailed instructions for the analysis of different mixtures of sulphonic acids are given. R. T.

Separation of mixed aromatic amines by means of phosgene. G. I. Gerschzon and R. P. Lastovski (J. Appl. Chem. Russ., 1936, **9**, 2058—2064).—$COCl_2$ is passed into a mixture of NH_2Ph, NHPhEt, and $NPhEt_2$ in aq. Na_2CO_3 and the product poured into 10% H_2SO_4 at 7—8°, when NPhEt·COCl,HCl (I) and $CO(NHPh)_2$ (II) separate out, leaving $NPhEt_2$ in solution. The mixture of (I) and (II) is heated with 5% H_2SO_4 (80°; 3—4 hr.), when NHPhEt is regenerated quantitatively from (I). NH_2Ph is regenerated from (II) by the action of H_2O at 250° in presence of NaOH. Mixtures of toluidine and ethyltoluidines are separated similarly. R. T.

[Products from] heating wood. Adsorption [of org. acids] by active C. Synthetic MeOH. $Ca(OAc)_2$ from gas liquor. *iso*-C_9H_{20} from petroleum. Separating mixed hydrocarbons. Motor fuel.—See II. **MeOH synthesis.**—See VII. **Naphthenic acids in soap-making. Glycerol concn.**—See XII. **Na divinyl polymerides.**—See XIV. **Synthetic camphor.**—See XX. **Synthetic ripening agent.**—See XXI. **Mustard-gas reactions.**—See XXII.

See also A., I, 143, **Synthesis of $NaNH_2$, and of esters by dehydrogenation of alcohols.** 144, **Catalytic hydrolysis of Et_2O.** A., II, 92, **Electrochemical oxidation of ψ-cumene.** 95, **Electrolytic introduction of CNS′ into arylamines and phenols.** 99, **Synthesis of anisyl alcohol.** 101, **Synthesis of β-1-phenanthrylpropionic acid. Electrolysis of benzaldehyde-2-carboxylic acid. Prep. of phenylmalonic acid.** 102, **Mellitic acid from coal etc. Prep. of PhCHO.** 116, **Prep. of 2-hydroxy-4-methylquinolines.** 118, **Prep. of *p*-phenanthroline and 3 : 3′-dipyridyl.** 130, **Determination of PhCHO, $COMe_2$, salicylic acid, thymol, β-$C_{10}H_7{\cdot}OH$, and salicylates.**

Patents.

Production of olefines by catalytic dehydrogenation of paraffin hydrocarbons. N. V. de Bataafsche Petroleum Maats. (B.P. 460,758, 2.7.36. U.S., 15.7.35).—O_2- and H_2O-free paraffins $\nless C_2$, alone, in mixtures, or with inert diluents (H_2), are dehydrogenated to olefines (average conversion 20—30%) over activated Al_2O_3 at 500—800°/1 atm. The catalyst is regenerated by oxidation of deposited C *in situ* at 500—800°. Dehydrogenation of C_3H_8, *n*- and *iso*-C_4H_{10} is described and production of *iso*-C_4H_8 is specifically claimed. A. H. C.

Production of alkyl halogen compounds. F. H. Gayer, Assr. to Gen. Motors Corp. (U.S.P. 2,033,374, 10.3.36. Appl., 12.5.33).—An olefine and (excess of) a gaseous H halide are passed at (usually) $\ngtr 250°$ over porous Al_2O_3 dehydrated at 300—500° which contains 1—25 (3—5)% of H_2O. The prep. of $Pr^{\beta}Cl$ from C_3H_6 and HCl is described. E. J. B.

Manufacture of alkyl halides. I. G. Farbenind. A.-G. (B.P. 461,140, 10.8.35. Ger., 10.8.34).—A mixture of a halogenated hydrocarbon containing $\nless 2$ halogen atoms, *e.g.*, $CHCl_3$, CCl_4, and an aliphatic alcohol is passed over a heated catalyst. In four examples active C at 250° is used. MeCl is produced thus: $CHCl_3 + 3MeOH = 3MeCl + CO + 2H_2O$ or $CCl_4 + 4MeOH = MeCl + 2H_2O + CO_2$. Similarly EtCl is obtained from EtOH. K. H. S.

Manufacture of alkyl halides and unsaturated organic compounds. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 460,143, 15.7.35).—Compounds containing at least one halogen and at least one H on adjacent aliphatic (or *cyclo*aliphatic) C atoms are caused to interact with aliphatic alcohols and/or ethers in presence of a dehydrating catalyst at 150—500° (260—320°). *E.g.*, $Pr^{\beta}Cl$ and Me_2O over Al_2O_3 at 290° give $CHMe\colon CH_2$ and MeCl, $(\cdot CHCl_2)_2$ and MeOH over bauxite at 320—350° give C_2HCl_3 and MeCl, *iso*bornyl or bornyl chloride and EtOH or Et_2O over Al_2O_3 at 170—180° give camphene and EtCl, and $CH_2Cl\cdot CH_2\cdot CO_2H$ and MeOH over Al_2O_3 or ThO_2 at 300° give $CH_2\colon CH\cdot CO_2H$ and MeCl. It is claimed in most cases that the yields are almost quant. H. A. P.

Production of 1 : 1 : 2-[ααβ-]trichloroethane. Comp. de Prod. Chim. et Electrométall. Alais, Froges et Camargue (B.P. 461,220, 14.4.36. Ger., 6.5.35).—$(\cdot CH_2Cl)_2$ is irradiated by light rich in chemical rays (Hg vapour, arc, half-watt lamps) and treated with Cl_2 in slightly < theoretical quantity in absence of metallic catalysts at temp. $\not>$50°. By fractionation $CHCl_2\cdot CH_2Cl$ is obtained in 94% yield. K. H. S.

Production of dispersions of halogenobutadienes. E. I. Du Pont de Nemours & Co. (B.P. 460,916, 7.8.35. U.S., 8.8.34).—Up to 60% dispersions of particle size 0·1—4 μ are obtained by heating partly (15—25%) polymerised $CH_2\colon CX\cdot CH\colon CH_2$ ($X = Cl$ or Br) with 1—3% of emulsifying agent in $HCO\cdot NH_2$, glycerol, $(\cdot CH_2\cdot OH)_2$, or other solvent in which the diene is insol. R. S. C.

Effecting hydrogenation and dehydrogenation of organic compounds. N. V. de Bataafsche Petroleum Maats. (B.P. 460,747, 20.4.36. U.S., 29.4.35).—Olefines and primary or *sec.* alcohols in presence of a hydrogenating catalyst (base or noble metal) at $\not>$500°, alone or diluted, give good yields of saturated hydrocarbons and ketone or aldehyde. There is a wide choice of reactants and conditions, but it is preferred to use *tert.* olefines (1 mol.), *sec.* aliphatic alcohols (1 mol.), and pyrophoric Ni at 150—300°/high pressure in an inert atm. R. S. C.

Purification and separation of [hydrocarbon oil] sulphonates. H. G. Vesterdal and E. W. Carlson, Assrs. to Standard Oil Development Co. (U.S.P. 2,035,106, 24.3.36. Appl., 23.5.32).—An aq. solution of (alkali) metal or NH_4 sulphonates from, *e.g.*, the refining of petroleum oils is agitated with 1—5 pts. by vol. of H_2O containing $\not>$15% of a H_2O-sol. org. solvent (EtOH, $COMe_2$) and $\not>$10% ($\not>$20%) of a salt (NaCl, Na_2SO_4). The top layer of oil and the bottom layer of sludge are removed and the sulphonate solution is successively cooled to, *e.g.*, 5°, 0°, and −5° to separate products of decreasing combining wt. (*e.g.*, >500, 300—500, <300). E. J. B.

Separation of *tert*.-butyl alcohol. G. H. Coleman and G. W. Warren, Assrs. to Dow Chem. Co. (U.S.P. 2,033,684, 10.3.36. Appl., 4.12.33).—$Bu^{\beta}Cl$ is added to the mixture obtained by selectively hydrolysing the $Bu^{\gamma}Cl$ in a chlorinated $CHMe_3$ product (containing $Bu^{\gamma}OH$, *iso*-C_4H_7Cl, and $Bu^{\beta}Cl$) so that the wt. ratio of $C_4H_7Cl + BuCl$ to BuOH is $\not<$6·67; distillation yields an azeotrope of these three compounds with H_2O, from which the pure alcohol is extracted with H_2O. Preferably the azeotrope is continuously freed from $Bu^{\gamma}OH$ and returned to the still. E. J. B.

Preservation of organic solvents. H. L. Cox, Assr. to Carbide & Carbon Chemicals Corp. (U.S.P. 2,035,383, 24.3.36. Appl., 18.3.33).—Alkyl ethers of αβ-polyalkylene glycols which deteriorate on storage are preserved by adding 0·1 vol.-% of commercial $N(CH_2\cdot CH_2\cdot OH)_3$ or other hydroxyalkylamine. Aldehydes should first be removed by treatment with acid. E. J. B.

Conversion of mercaptans. P. K. Frolich, Assr. to Standard Oil Development Co. (U.S.P. 2,035,121, 24.3.36. Appl., 16.4.32).—Alkyl or aryl mercaptans are converted into the corresponding thioethers by passage at about 300° over a metallic sulphide catalyst (particularly of elements of group II or VI) supported on Al_2O_3 etc. Mixtures of sulphides of Cd and Zn and of Se and Mn are specially claimed. 12 examples are given. E. J. B.

[Aliphatic] acid synthesis process. W. E. Vail, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,033,161, 10.3.36. Appl., 25.3.33).—The catalytic addition of H_2O and CO to olefines at high temp. and pressure is effected in vessels lined with Ag or an alloy containing $\not<$90% Ag (O_2 is preferably absent). E. J. B.

Purification of acetic anhydride. N. Lamb, Assr. to Dow Chem. Co. (U.S.P. 2,033,720, 10.3.36. Appl., 8.2.34).—Ac_2O is freed from compounds of S and/or halogens by heating it with Cu_2O and distilling. E. J. B.

Production of propionic acid esters [of polyglycols]. H. S. Holt, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,031,603, 25.2.36. Appl., 3.5.32).—The prep. of propionates of polyhydric ether-alcohols, said to be useful as plasticisers for cellulose esters and ethers, is claimed. Examples are: *di*-, b.p. 165—170°/40 mm., and *tri-ethylene glycol dipropionate*, b.p. 195—200°/30 mm., *pentaerythritol tetrapropionate*, and ββ-*bishydroxymethyl*-n-*butyl tripropionate*. H. A. P.

Manufacture of vinyl esters. I. G. Farbenind. A.-G. (B.P. 459,882, 17.7.35. Ger., 17.7.34. Addn. to B.P. 438,728; B., 1935, 138).—Condensation of C_2H_2 is effected by a compound of Hg with H_3BO_3 or B_2O_3 and HF. *E.g.*, HgO (2·5), B_2O_3 (1·5), and HF (3·5) are added to AcOH (500 pts.) and C_2H_2 is introduced at 30—35° for 4 hr.; the yield of $CH_2\colon CH\cdot OAc$ is >80%. K. H. S.

Production of monomeric methacrylic acid esters. Röhm & Haas A.-G. (B.P. 460,009, 20.7.36. Ger., 20.7.35).—Polymeric methacrylic acid esters are heated at about 250—300°, preferably with inert substances (sand, $BaSO_4$). R. G.

Manufacture of chlorinated carboxylic acid esters. G. W. Johnson. From I. G. Farbenind. A.-G. (B.P. 460,720, 7.8.35).—Cl_2 and olefines are introduced simultaneously into liquid acids or acid–salt mixtures which may contain catalysts (Mn) at $<100°$. Preps. of $CH_2Cl{\cdot}CH_2{\cdot}OAc$, $CH_2MeCl{\cdot}OAc$, and $CH_2Cl{\cdot}CH_2{\cdot}OBz$ are described. A. H. C.

Manufacture and application [as lubricants] of halogenated stearic esters. Continental Oil Co. (B.P. 459,719, 8.7.35. U.S., 7.7.34).—The products of dichlorination of stearates of C_{1-18} alcohols, preferably Me stearate, are claimed as lubricating agents. R. S. C.

Manufacture of acetaldehyde from gases containing acetylene. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 460,145, 16.7.35).—Mixed gases containing C_2H_2 are circulated with steam and a catalytic liquid (containing Fe^{II}, Fe^{III}, Hg^{I}, and Hg^{II} sulphates) at about 90° in a special apparatus (figured). Practically complete conversion into MeCHO is obtained with gases containing $\not>18\%$ of C_2H_2. R. G.

Manufacture of addition products of acetylene and its hydrocarbon substitution products. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 461,080, 9.8.35).—C_2H_2 and its substitution products, *e.g.*, CPh⫶CH, heptine, $CH_2{:}CH{\cdot}C{:}CH$, are condensed with (aliphatic) carboxylic halides, in presence of condensing agents ($ZnCl_2$, $AlCl_3$, $SnCl_4$, $FeCl_3$, BF_3), using a solvent if necessary. Among examples AcCl is condensed with C_2H_2 ($AlCl_3$ or $FeCl_3$) to form CHAc⫶CHCl or with heptine to form Me chloroheptenyl ketone. The halogenovinyl ketones are unstable, but can be stabilised for storage with derivatives of $(CH_2)_2O$, *e.g.*, phenoxypropene. They are used as intermediates for dyes, as artificial masses, or auxiliaries for the rubber and textile industries. K. H. S.

Manufacture of diacetyl. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 460,862, 4.10.35. Addn. to B.P. 421,676; B., 1935, 218).—Gas containing C_2H_2 and 1·5% of $({\cdot}C{:}CH)_2$ and $CH_2{:}CH{\cdot}C{:}CH$ obtained by treating hydrocarbons in the electric arc is passed into an acid (H_2SO_4, H_3PO_4) solution of a Hg^{II} salt which may also contain Fe at 70—100°; the Ac_2 is separated from MeCHO in the issuing gas by fractional condensation. A. H. C.

Production of carbonyl compounds. N. V. de Bataafsche Petroleum Maats., Assees. of C. T. Cautter (B.P. 458,626, 24.12.35. U.S., 24.12.34).—An olefine of which only one of the olefinic C is *tert.* is heated with Cl_2 and H_2O under high pressure in the liquid phase at $>100°$ (140—250°). Preferably the H_2O is in great excess of the olefine, which itself is in slight excess of the Cl_2, and the H_2O is kept at 0·5—2·5*N*-HCl by dilution or by adding $CaCO_3$ etc. The ketones and/or aldehydes formed are allowed to distil off as soon as they are produced. *E.g.*, *iso*-C_4H_8 (1·1) and Cl_2 (1·0 mol.) passed into H_2O at 155°/75 lb. give 85% yields of $Pr^{\beta}CHO$; $CMe_2{:}CHMe$ similarly gives 65% yields of $COMePr^{\beta}$. E. J. B.

Manufacture of nitrogenous condensation products [wetting etc. agents]. G. W. Johnson. From I. G. Farbenind. A.-G. (B.P. 460,710, 2.8.35).—*tert.*-Amine oxides and alkylene oxides in H_2O or an org. solvent at $>50°$ (90—110°)/>1 atm. give basic wetting etc. agents. The condensation products may be sulphonated. Details are given for reaction of $(CH_2)_2O$ with $C_{12}H_{25}{\cdot}NMe_2O$ and NMe_3O, of αβ-propylene oxide with $NRMe_2O$ (I) (R = radical of palm-kernel oil acids), and of (I) with $(CH_2)_2O$, the last product being sulphonated by conc. H_2SO_4 at 10°. R. S. C.

Manufacture of aminoguanidine. R. McGill, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,033,203, 10.3.36. Appl., 3.5.32).—A substituted or unsubstituted nitroguanidine is heated at 25—125° (70—85°/400—3000 lb. per sq. in.) with H_2 in presence of a hydrogenating catalyst of group VIII (Cu, Fe, Co, Ni) and in substantial absence of acids. Addition of buffers ($MgSO_4$, mixed alkali phosphates, borax–H_3BO_3–NaCl) inhibits decomp. of the product. E. J. B.

Manufacture of amines containing two hydroxyalkylamino-groups. I. G. Farbenind. A.-G. (B.P. 459,746, 29.1.36. Ger., 31.1.35).—Primary or *sec.* hydroxyalkylamines with aliphatic dichlorides, preferably at 100—200° (130—150°) in absence of H_2O, give good yields of di(hydroxyalkyl)diamines. Thus are obtained NN′-*di-*(β-*hydroxyethyl*)-, m.p. 102—103°, b.p. 190—200°/15 mm., and NN′-*dimethyl*-NN′-*di*(*hydroxyethyl*)-*ethylenediamine*, b.p. 160—180°/15 mm., NN′-*dibutyl*-NN′-*di*(*hydroxyethyl*)-ββ′-*diaminodiethyl ether*, b.p. 150—155°/15 mm., and ββ′-*di*-(β-*hydroxy*-n-*propylamino*)iso*propyl alcohol*, b.p. 185—200° (decomp.)/15 mm. The bases are emulsifiers; salts of the bases of middle mol. wt. are good wetting agents and of those of high mol. wt. good washing agents. R. S. C.

Preparation of quaternary ammonium compounds. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 460,146, 16.7.35).—Salts of NH_3 or amines are heated under pressure at $\not>$ about 100° with only slightly more of an alkylene oxide [$(CH_2)_2O$] than is theoretically necessary for the formation of quaternary NH_4 compounds. 16 examples are given. R. G.

Manufacture of aminocarboxylic acid nitriles and aminocarboxylic acids. I. G. Farbenind. A.-G. (B.P. 460,372, 26.7.35. Ger., 26.7.34).—Amines having at least one aliphatic radical of $\not<C_9$ are caused to interact with an aliphatic aldehyde and HCN and the products optionally hydrolysed. *E.g.*, *n*-$C_{12}H_{25}{\cdot}NH_2$ is treated in H_2O with CH_2O, $NaHSO_3$, and NaCN, and the crude aminonitrile is hydrolysed (aq. NaOH) to dodecylglycine. In other examples *n*-$C_{18}H_{37}{\cdot}NH_2$, *n*-$C_{18}H_{35}{\cdot}NH_2$, *n*-$C_{12}H_{25}{\cdot}NHMe$, and MeCHO are used. H. A. P.

Manufacture of solutions of polymerisation products. W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 459,596, 9.4. and 26.9.35).—Polymerisation products of the vinyl series are sol. in saturated or nearly saturated aq. solutions of a salt of a metal of group I, II, or III and a monobasic acid, such salt being capable of giving a $\not<50\%$ wt./wt. aq. solution.

Among examples are polyacrylic acid nitrile (60) in LiBr (1500)–H_2O (750), $ZnCl_2$ (1500)–H_2O (375), NaCNS (1200)–H_2O (360). Finely-divided cellulose may also be added. Films, threads, etc. made from such solutions are also claimed. R. S. C.

Manufacture of cyanohydrins. G. W. Johnson. From I. G. Farbenind. A.-G. (B.P. 460,464, 4.11.35).—Aliphatic cyanohydrins are produced in high yields and purity by interaction in the liquid phase at, *e.g.*, 30—70° of an aliphatic aldehyde or ketone and HCN, in presence of an alkaline-earth cyanide, *e.g.*, $Ca(CN)_2$, as catalyst, and preferably in absence of appreciable quantities of H_2O. Examples are: HCN, $Ca(CN)_2$, and $COMe_2$ or PrCHO at 40° yield the corresponding cyanohydrins in 98% and 95% yields, respectively. N. H. H.

Nitration of diphenyl. J. L. Ballard and R. L. Jenkins, Assrs. to Swann Res., Inc. (U.S.P. 2,033,370, 10.3.36. Appl., 13.10.34).—Molten Ph_2 mixed with 100—115 mol.-% of $NaNO_3$ is treated with an equiv. amount of H_2SO_4 at $\ngtr$130° (95—100°). Better yields are obtained by using at first 75 mol.-% of the $NaNO_3$ and H_2SO_4, and completing the nitration with more $NaNO_3$ and H_2SO_4. $C_6H_4Ph{\cdot}NO_2$ with a *p* : *o* ratio of 1·60—1·78 is obtained in 90% yield. E. J. B.

Emulsions. H. Pirie, and Imperial Chem. Industries, Ltd. (B.P. 460,578, 29.7.35).—Emulsions for use in impregnating textiles, or as insecticides or fungicides, are prepared by mixing compositions consisting of hydrogenated naphthalenes ($C_{10}H_{18}$) and solid or liquid chloronaphthalenes (in proportions giving a liquid mixture) with a limited amount of H_2O, in presence of dispersing agents, *e.g.*, NH_4 caseinate, Turkey-red oil, goulac. N. H. H.

Halogenation of hydrocarbons. O. H. Smith, Assr. to United States Rubber Co. (U.S.P. 2,034,962, 24.3.36. Appl., 29.8.34).—Almost exclusively side-chain halogenation of aralkyl compounds is effected by treatment with a halogen at high temp. in presence of 0·1—0·5% of an org. base ($NHEt_2$, C_5H_5N, etc.). Particular claim is made to the halogenation of PhEt for use in the prep. of styrene. E. J. B.

Manufacture of monobromopyrene. W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 460,439, 24.7.35).—Details are given for the prep. (5 methods) of (? 3-)*bromopyrene*, m.p. 95°, b.p. 255°/7 mm., by adding a dil. solution of Br to a solution or suspension of pyrene or by passing diluted Br vapour at 0° into pyrene in $CHCl_3$. R. S. C.

Manufacture of acylated aromatic amines containing the trichloromethyl group. W. W. Groves. From I. G. Farbenind. I.-G. (B.P. 459,881, 17.7.35).—Passage of Cl_2, preferably in light, into (molten) *N*-tolyl- and substituted -tolyl-phthalimides gives phthalimidobenzotrichlorides without nuclear substitution. Thus are obtained *o*-, m.p. 153—158°, unstable to H_2O, *m*-, and p-*trichloromethylphenylphthalimide*, m.p. 205—210°, b.p. 238—242°/1 mm.; 5′-*chloro*-2′-, cryst., b.p. 235°/3 mm., 4′-*chloro*-2′-, b.p. 230—234°/0·5 mm., 2′-*chloro*-6′-, b.p. 230—235°/1·5 mm., 3′-*chloro*-4′-, m.p. 164—166°, b.p. 255—258°/1·5 mm., 2′ : 5′-*dichloro*-4′-, m.p. 209—211°, b.p. 240—245°/1 mm., and 3′-*chloro*-2′-*trichloromethylphenylphthalimide*, m.p. 175—177°, b.p. 215—225°/1 mm.; 2′ : 6′-, m.p. 235—237°, and 2′ : 4′-*di*(*trichloromethyl*)*phenylphthalimide*, b.p. 254—255°/0·4 mm. R. S. C.

Manufacture of aromatic amines containing the trifluoromethyl group. W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 459,890, 18.7.35).—Compounds, $NH_2{\cdot}Ar{\cdot}CF_3$, are obtained by heating the corresponding $o\text{-}C_6H_4(CO)_2N{\cdot}Ar{\cdot}CCl_3$ with HF (preferably liquid) alone or in a diluent (*e.g.*, CH_2Cl_2) at about 150°, and then hydrolysing by dil. alkali or N_2H_4. The following are thus prepared in good yield, figures in parentheses referring to the *phthaloyl* derivatives: o-, b.p. 68—70°/2·5 mm. (m.p. 129—131°, b.p. 210—220°/1 mm.), and m-*trifluoromethylaniline*, b.p. 70—85°/4·5 mm. (b.p. 230—235°/6 mm., m.p. 148°); 5-*chloro*-2-, b.p. 82—84°/14 mm. (m.p. 197—198°), 2-*chloro*-3-, b.p. 55—60°/0·5 mm. (b.p. 195—200°/1 mm.), 4-*chloro*-2-, b.p. 66—67°/3 mm. (m.p. 143—145°, b.p. 197—203°/1·3 mm.), 2-*chloro*-6-, b.p. 39—40°/0·1 mm. (b.p. 180—185°/0·2 mm.) (*Ac* derivative, m.p. 165—166°), 3-*chloro*-4-, b.p. 112—115°/10 mm. (m.p. 200—202°) (*Ac* derivative, m.p. 104—106°), and 2 : 6-*dichloro*-4-*trifluoromethylaniline*, m.p. about 50°, b.p. 95—100°/0·8 mm. (m.p. 182—183°) (*Ac* derivative, m.p. 157—158°); 2 : 4-, b.p. 50°/0·4 mm. (b.p. 185—190°/2 mm.), and 2 : 6-*di*(*trifluoromethyl*)*aniline*, b.p. 37°/0·2 mm. (b.p. 160—163°/0·2 mm.). R. S. C.

Manufacture of washing, wetting, cleansing, dispersing, and like agents. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 459,791, 11.7.35).—Pure or impure aliphatic acids ($>C_5$) are dichlorinated and converted into amides of $m\text{-}NH_2{\cdot}C_6H_4{\cdot}SO_3H$ (I). The products are wetting agents. *E.g.*, stearic acid (300) is chlorinated at 90° (until 85 pts. of Cl_2 are absorbed) and is then condensed with (I) (173 pts.) in aq. Na_2CO_3. R. S. C.

Manufacture of [aminoaryl]sulphonic acids. Soc. Chem. Ind. in Basle (B.P. 459,992, 1.4.36. Switz., 8.7.35 and 18.2.36).—Baking of the H sulphate of an aminoaryl sulphone having an *o*- or *p*-position to NH_2 unsubstituted (at <1 atm.) is claimed. *E.g.*, *o*-, *m*-, or *p*-aminophenyl Me sulphones are converted into sulphonic acids by heating at 180—200°/vac.; sulphonic acids are similarly prepared from *o*-aminophenyl *p*-tolyl or Et sulphones and *p*-aminophenyl CH_2Ph sulphone. H. A. P.

Formation of *N*-diarylthiocarbamates of metals. B. F. Goodrich Co. (B.P. 460,389, 10.1.36. U.S., 10.8.35).—Interaction of CS_2 with an alkali or alkaline-earth metal derivative (I) of a diarylamine is claimed; prep. of (I) is catalysed by an Fe, Cu, or Co salt or I. *E.g.*, $NHPh_2$ (excess) is heated with Na in an Fe vessel at 280°, and the product treated with CS_2 in C_6H_6 at the b.p. to give *Na diphenyldithiocarbamate*; the *Mg* salt is similarly formed. In the prep. of *Na phenyl*-β-*naphthyldithiocarbamate* $NaNH_2$ is used to produce $NNaPh{\cdot}C_{10}H_7$. H. A. P.

Manufacture of (A) *N*-aminoalkylanthranilic acid alkyl esters, (B) *N*-aminoalkylamides.

[Local anæsthetics.] (A) I. G. Farbenind. A.-G. (B) W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 460,249—50, [A, B] 25.7.35. Ger., [A] 26.7.34).—(A) Alkyl anthranilates are treated with an aminoalkyl halide, or aminoalkylanthranilic acids are esterified. The prep. by the first method of the *Et*, b.p. 175°/5 mm., and by the second of the *Bu* ester, an oil (*hydrochlorides*, m.p. 121° and 113—116°, respectively), of β-*diethylaminoethylanthranilic acid*, m.p. 159—161°, is described. [Stat. ref.] (B) A monoalkylaminobenzoic acid, its halides, or its ester is caused to interact with an *as*-substituted alkylenediamine; *e.g.*, interaction of *p*-$NHBu{\cdot}C_6H_4{\cdot}COCl$ with $NH_2{\cdot}[CH_2]_2{\cdot}NEt_2$ gives β-*diethylaminoethyl* p-*butylaminobenzoate* (*hydrochloride*, m.p. 140—141°). Other examples are β-*diethylaminoethyl* p-*ethylamino*- [*phosphate*, m.p. 209—211° (decomp.)], o-*propylamino*- (*phosphate*, m.p. 190°), o-*hexylamino*-, b.p. 230°/5 mm. (*phosphate*, m.p. 172°), and m-*butylaminobenzoate*, b.p. 250—252°/7 mm. (*phosphate*, m.p. 146°), and β-*piperidinoethyl* p-*butylaminobenzoate* (*phosphate*, m.p. 184—185°). *Hexylanthranilic acid*, m.p. 65—66°, and its *Et* ester, b.p. 170—175°/7 mm., are described. The products are stated to be superior to $NHBz{\cdot}[CH_2]_2{\cdot}NEt_2$ in anæsthetic action.

H. A. P.

Manufacture of diazonium salts. Soc. Chem. Ind. in Basle (B.P. 461,051, 1.4.36. Switz., 2.4. and 16.5.35).—Diazonium salts derived from 2-aminodiphenyl ether (I) or its derivatives are pptd. by salts of $PhSO_3H$. The salts so obtained are more sol. in cold H_2O than those previously known (B.P. 238,704; B., 1925, 840) and are highly stable. In examples, (I) and its 4 : 2′- or 4 : 4′-dichloro- and 4′-chloro-4-carbethoxy-derivative are diazotised and pptd. with $PhSO_3Na$.

K. H. S.

Production of oxygenated organic compounds. Imperial Chem. Industries, Ltd., W. A. Bone, and D. M. Newitt (B.P. 459,920, 15.7.35).—Aromatic hydrocarbons, *e.g.*, C_6H_6 and PhMe, are oxidised in the vapour phase with a limited supply of O_2 at 200—400°/$\nless$10 atm. The gases may be stationary or flow at space velocities 5—50 through void heated chambers. The O_2 may be diluted, *e.g.*, with N_2, and the temp. must be accurately controlled; reaction may take place in > one stage. According to the temp., mixture, and space velocity PhMe affords as main product $CH_2Ph{\cdot}OH$, PhCHO, or BzOH. In an example a mixture of 75—80% of C_6H_6 with 25—20% of air is passed at 50 atm. at space velocity 10 through a zone maintained at 365—375°, affording 620 pts. of PhOH per 100 pts. of C_6H_6. Again, PhCHO is obtained from PhEt–O_2 (10 : 1 mol.) at 300—350°/$\nless$20 atm. (space velocity $\nless$20), $CH_2Ph{\cdot}OH$ from PhMe–air (84 : 16%) at 340—350°/>20 atm. (space velocity >20), and BzOH from PhMe–air (50 : 50%) at 275—300°/>20 atm. (space velocity 4—20).

K. H. S.

Manufacture of *p*-aminophenol. J. A. Bertsch, Assr. to Monsanto Chem. Co. (U.S.P. 2,035,292, 24.3.36. Appl., 11.12.33).—*p*-$NO_2{\cdot}C_6H_4{\cdot}OH$ is reduced (H_2–Ni etc.) in presence of an inert org. solvent for the $NH_2{\cdot}C_6H_4{\cdot}OH$, which is recovered and the mother-liquor returned to the cycle; the solvent is such (MeOH, BuOH) that the H_2O formed may be separated by distillation.

E. J. B.

Preparation of [aromatic] *o*-hydroxycarboxylates and *o*-hydroxycarboxylic acids. E. H. and S. W. Reichenberg (B.P. 460,282, 26.7.35).—CO_2 is passed into a suspension in an indifferent liquid (b.p. >100°) of the dry K or mixed Na and K salts of a phenol, preferably under pressure (2—3 atm.).

R. G.

Mixed (A) phenoxyphenyl, (B) diphenyl[yl], (C, D) furyl, alkyl ketones. A. W. Ralston and C. W. Christensen, Assrs. to Armour & Co. (U.S.P. 2,033,540—2 and 2,033,548, 10.3.36. Appl., [A—C] 23.4.35, [D] 8.11.35).—Ketones ($>C_4$ and $>C_{10}$) are prepared by Friedel–Crafts (good yields) or Grignard reactions from the aliphatic chloride and (A) Ph_2O, (B) Ph_2, and (C, D) compounds containing a furan nucleus, or their substitution products. They are waxy materials, suitable for electrical insulation and incorporation into waxes, polishes, and mineral oils. The following are described: (A) p-*phenoxyphenyl hepta*-, m.p. 68°, *tri*-, m.p. 53·5—54·5°, and *un-decyl ketone*, m.p. 45—46°; p-p′-*nitrophenoxyphenyl*, m.p. 177—179°, and 4-p-*tolyloxyphenyl heptadecyl ketone*, m.p. 77—78°; (B) 4-*diphenylyl hepta*-, m.p. 108—109°, *tri*-, m.p. 102—103°, and *un-decyl ketone*, m.p. 97—98°; 4-4′-*methyl*-, m.p. 105—106°, and 4-4′-*chloro-diphenylyl heptadecyl ketone*, m.p. 96—97°; (C, D) 2-*furyl hepta*-, m.p. 52·5—54°, and *un-decyl ketone*, b.p. 165—167°/5 mm.; 2-5-*methylfuryl heptadecyl ketone*, m.p. 68—69°; 2-*dibenzfuryl hepta*-, m.p. 83—84°, and *un-decyl ketone*, m.p. 74—75°.

R. S. C.

Manufacture of amino-compounds of the anthraquinone series. Brit. Celanese, Ltd., G. Lord, and G. Reeves (B.P. 460,440, 25.7.35).—Anthraquinone compounds having OH, NH_2, or substituted NH_2 at 1 and/or 4 are heated with NH_3 or an aliphatic amine and a metal or metallic compound other than an alkali metal, preferably capable of forming co-ordination compounds with NH_3 and/or amines (Mn, Cu, Cr, Co, Ni, Pt). *E.g.*, quinizarin when heated at 110—120° with NH_3 or NH_2Me in EtOH in presence of $MnCO_3$ and Na_2CO_3 gives 1-amino- or 1-methylamino-4-hydroxyanthraquinone.

H. A. P.

Manufacture of [higher] alkoxyanthraquinones. F. Lodge, C. H. Lumsden, and Imperial Chem. Industries, Ltd. (B.P. 460,255, 25.7.35).—Anthraquinones having as substituents an alkoxy-group of $\ngtr C_5$ or a β-hydroxyethoxy-, OPh-, or tolyloxy-group are heated with an alkali-metal compound of a long-chain alcohol having C_{10-20} (or the alcohol and an alkali hydroxide). *E.g.*, interaction of 1-amino-4-anilino-2-phenoxyanthraquinone (I) with *n*-$C_{12}H_{25}{\cdot}OH$ (II) and KOH at 120° gives 1-amino-4-anilino-2-dodecoxyanthraquinone (cf. B.P. 430,160; B., 1935, 763), which is similarly obtained from the 2-OMe-compound (III), NaOH, and (II) at 150°, or from (III) and $C_{12}H_{25}{\cdot}ONa$ at 120°; 1-*amino*-5-*dodecoxy*-, m.p. 84°, and -5-*cetoxy*-, 1-*hydroxy*-4-*dodecoxy*- and -4-*cetoxy*-, and 1-*methylamino*-4-*dodecoxyanthraquinone*, m.p. 92°, are similarly prepared.

H. A. P.

Manufacture of 2-aminoquinizarin and substitution products thereof. W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 460,248, 25.7.35).—The corresponding NO_2-compounds are catalytically hydrogenated. *E.g.*, 2-nitroquinizarin with H_2–Ni at 45—60°/20 atm. gives 2-*aminoquinizarin*, m.p. 312°; 2-*amino*-1 : 3 : 4-*trihydroxyanthraquinone*, decomp. 355°, is similarly obtained. H. A. P.

Intermediates and dyestuffs of the anthraquinoneacridone series. W. Dettwyler, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,033,182, 10.3.36. Appl., 22.11.33).—*Bz*-Methylanthraquinoneacridones [1 : 2-phthaloyl-6-, -7- (I), -8-, or -9-methylacridone] are dichlorinated in the Me at a temp. > that normally used for ring-halogenation; the $CHCl_2$-compounds are then condensed with NH_2-compounds to give azomethines, which are fast orange to red dyes for cotton. In examples (I) (100) and Cl_2 in o-$C_6H_4Cl_2$ (500) at 170° give the *dichloromethyl*- or *dichloromethyl*-Bz-*chloro*-compound; the former is condensed with 1-amino-5- or -4-benzamidoanthraquinone in $PhNO_2$ at 180—185° to give the azomethine *dyes* and with 0·5 mol. of 1 : 5-diaminoanthraquinone to give the di(azomethine) *dye*. R. S. C.

Manufacture of double compounds of *sec.* amides of 3 : 5-dimethyl*iso*oxazole-4-carboxylic acid. F. Hoffmann–La Roche & Co. A.-G. (B.P. 460,566, 16.9.36. Ger., 22.11.35).—Solid, stable double compounds with Ca salts of aromatic OH-acids or $Ca(SCN)_2$ are claimed. Examples are the *compounds* 3 : 5-dimethyl*iso*oxazole-4-carboxydiethylamide (1 mol.) with $(o\text{-}OH{\cdot}C_6H_4{\cdot}CO_2)_2Ca$ (1 mol.), $(p\text{-}OH{\cdot}C_6H_4{\cdot}CO_2)_2Ca$ (1 mol.), and $Ca(SCN)_2$ (2 mols.), and of the corresponding dimethylamide with $(\beta\text{-}OH{\cdot}C_{10}H_6{\cdot}CO_2)_2Ca$ (equimols.) and di*iso*amylamide with $Ca(SCN)_2$ (1 : 2). H. A. P.

Manufacture of sulphuric acid derivatives of iminazolines. E. Waldmann and A. Chwala (B.P. 460,858, 9.8.35. Austr., 10.8.34).—Manufacture as wetting, washing, dispersing, and emulsifying agents of sulphonated iminazolines having $\nless C_{10}$ is claimed. *E.g.*, undecyliminazoline is condensed with $Br{\cdot}[CH_2]_2{\cdot}SO_3Na$, or $NH_2{\cdot}[CH_2]_2{\cdot}NH{\cdot}[CH_2]_2{\cdot}SO_3Na$ is condensed with stearic acid. H. A. P.

Centrifuge for nitration processes.—See I. **C_2H_2. Olefine concn. and polymerisation. C_6H_6 from coal-distillation gases. Purifying naphthenic acids. Treating hydrocarbons.**—See II. **Vat dye intermediates.**—See IV. **Polymerised carboxylic acids etc.**—See XIII. **Lactic acid by fermentation.**—See XVIII.

IV.—DYESTUFFS.

Dyes from furfuraldehyde. I. Synthesis of analogues of malachite-green, benzoflavin, and rosamine. N. N. Orlov and T. I. Florova (J. Appl. Chem. Russ., 1936, 9, 2039—2049).—The dyeing properties and absorption spectra of these three dyes are practically unaffected when one of the C_6H_6 rings is replaced by furan. R. T.

Reactions of 2-naphthylamine-6 : 8-disulphonic acid (amino-G-acid) with diazo compounds. Z. A. Veinberg (Trud. Leningrad Chim.-Tech. Inst. U.S.S.R., 1934, **1**, 125—133).—Diazotised m-$C_6H_4Cl{\cdot}NH_2$ reacts with the Na salt of amino-G-acid (I) to give an orange ppt. from an aq. solution of which naphthol AS ppts. a red dye insol. in H_2O and alkali. m- and p-$NH_2{\cdot}C_6H_4{\cdot}NO_2$ by a similar process, using the Na_2 salt of (I), yield dark red ppts., and dianisidine (II) affords a blue compound insol. in H_2O and alkali. Tetrazotised (II) yields a dark blue ppt. giving a dark red colour with NaOH. $(NH_2)_2$-compounds exist in tautomeric forms and yield different azo dyes. Ch. Abs. (p)

See also A., II, 87, **Anthraquinone colouring matters: galiosin; rubiadin primveroside.** 97, **Azo dyes.** 107, **Aminoanthraquinone dyes from tetrachloroquinizarin.** 115, **[Dyes from] 5 : 7-dimethyloxindole.** 121 and 124, **Cyanine dyes.** 124, **Benzthiodiazoles.**

Patents.

Manufacture of cupriferous [azo] dyes [for leather]. I. G. Farbenind. A.-G. (B.P. 455,229, 15.4.35. Ger., 17.4.34. Addn. to B.P. 437,657; B., 1936, 267).—A resorcinol or a m-aminophenol is coupled with 1 mol. of a diazotised aminodiphenylaminesulphonic acid and 2 mols. of the same or another diazo compound or of a diazoazo compound free from chelate groupings, and the resulting dye is treated with a Cu^{II} compound. Examples are: 3 mols. of 4′-nitro-4-aminodiphenylamine-2′-sulphonic acid (I) → m-$NH_2{\cdot}C_6N_4{\cdot}OH$ (II), $+CuSO_4$ (brown on chrome- or vegetable-tanned leather); p-nitroaniline-o-sulphonic acid (2 mols.) → (II) ← (I) (1 mol.), $+CuSO_4$ (brown); m-$C_6H_4(OH)_2$ with 1 mol. each of NH_2Ph, p-$NH_2{\cdot}C_6H_4{\cdot}SO_3H$, and (I), $+CuSO_4$ (brown). C. H.

Manufacture of water-insoluble azo dyes [for acetate silk]. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 456,343, 3.5.35 and 14.4.36).—A 4-aminoaryl alkyl sulphone, aryl being of the C_6H_6 or $C_{10}H_8$ series and free from CO_2H, SO_3H, and further NH_2, is diazotised and coupled with a p-coupling arylamine, ArNRR′, free from CO_2H, SO_3H, $CO{\cdot}NR''_2$, and $SO_2{\cdot}NR''_2$ ($R'' = H$ or a substituent), where Ar = aryl of the C_6H_6 or $C_{10}H_8$ series, R and $R' = H$, alkyl, or hydroxyalkyl or together = polymethylene, or one of them may be a polymethylene chain attached to Ar *ortho* to the N. Examples are: p-$NH_2{\cdot}C_6H_4{\cdot}SO_2Me$ (I) → 3-hydroxy-1 : 2 : 3 : 4-tetrahydro-α-naphthaquinoline (bluish-red) or α-$C_{10}H_7{\cdot}NH_2$ (scarlet-red); 3-NO_2-derivative of (I), m.p. 195°, → *N*-β-hydroxyethyl-*N*-*n*-butylcresidine (yellowish-red); 1 : 4-*aminonaphthyl Me sulphone*, m.p. 179°, → m-$C_6H_4Me{\cdot}NBu^a{\cdot}C_2H_4{\cdot}OH$ (scarlet-red); 1 : 4-*aminonaphthyl Et sulphone*, m.p. 154°, → 3 : 7-dihydroxy-1 : 2 : 3 : 4-tetrahydro-α-naphthaquinoline (light blue); (II) → cresidine (reddish-orange; → β-$C_{10}H_7{\cdot}OH$, reddish-violet). C. H.

Manufacture of azo dyes [for acetate silk and varnishes]. J. R. Geigy A.-G. (B.P. 455,216, 13.3.35. Switz., 7.4.34).—A 6-halogeno-2 : 4-dinitroaniline is diazotised in H_2SO_4 and the acid diazo solution added directly to a solution of α- or β-$C_{10}H_7{\cdot}NH{\cdot}CH_2{\cdot}CH(OH){\cdot}CH_2{\cdot}OH$ to give an easily dischargeable blue. C. H.

Manufacture of water-soluble azo dyes [for cotton, viscose silk, leather, paper, etc.]. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 445,352, 16.4.35).—A diazotised arylamine is coupled with an arylamine, $Ar\cdot NR''\cdot R'\cdot NH_3X$, in which Ar = aryl, NR_3X = quaternary NH_4, R' = alkylene or hydroxyalkylene, and R'' = hydrocarbon group or = $\cdot R'\cdot NR_3X$. Examples are: p-$NH_2\cdot C_6H_4\cdot NO_2$ (I) → β-(n-butylanilino)ethylpyridinium chloride (red); (I) → m-$C_6H_4Me\cdot NBu\cdot CH_2\cdot CH_2\cdot NMe_3Cl$ (red); (I) → $C_5H_5NCl\cdot CH_2\cdot CH(OH)\cdot CH_2\cdot NPh\cdot C_2H_4\cdot OH$ (red); 2 : 4 : 6-trichloroaniline → $NPh_2\cdot CH_2\cdot CH_2\cdot NMe_3Cl$ (greenish-yellow); α-$C_{10}H_7\cdot NH_2$ → $NPhEt\cdot CH_2\cdot CH_2\cdot NMe_3Cl$ (yellow); (I) → $NPh(CH_2\cdot CH_2\cdot NMe_3Cl)_2$ (yellowish-orange); 4 : 1 : 3-$NO_2\cdot C_6H_3(NH_2)_2$ → $NPh[CH_2\cdot CH(OH)\cdot CH_2\cdot NMe_3Cl]_2$ (brown). C. H.

Manufacture of [water-soluble] azo dyes [for acetate silk, silk, wool, and leather]. Imperial Chem. Industries, Ltd., and A. H. Knight (B.P. 455,643, 25.4. and 24.12.35).—An aminoaryl hydroxyalkyl ether is diazotised and coupled through a suitable middle component with a phenol, all components being devoid of SO_3H and CO_2H, and the OH of the hydroxyalkyl is sulphated; or sulphation may precede diazotisation. Examples are: p-$NH_2\cdot C_6H_4\cdot O\cdot C_2H_4\cdot OH$ → α-$C_{10}H_7\cdot NH_2$ → PhOH, sulphated (yellowish-orange on acetate silk); p-$NH_2\cdot C_6H_4\cdot O\cdot C_2H_4\cdot O\cdot SO_3H$ → 1 : 2 : 5-$NH_2\cdot C_6H_3(OMe)_2$ → PhOH (reddish-orange); *5-nitro-o-aminophenol β-hydroxyethyl ether*, m.p. 142°, → cresidine → PhOH (orange). C. H.

Manufacture of dis- and tris-azo dyes. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 459,441, 2.7.35).—Tetrazotised 4 : 4′-$NH(C_6H_4\cdot NH_2)_2$ (I) or its sulphonic acids are condensed in alkaline medium with 1 : 8-$NH_2\cdot C_{10}H_6\cdot OH$ or its derivatives and a phenol having at least one coupling position. The products are stated to be particularly suitable for dyeing leather. Examples are the *dyes*: p-cresol ← (I) → 1 : 8 : 3 : 6-$NH_2\cdot C_6H_4(OH)(SO_3H)_2$ (II) (blue-black), m-$C_6H_4(OH)_2$ (III) ← (I) → 1 : 8 : 2 : 4-$NH_2\cdot C_{10}H_4(OH)(SO_3H)_2$ (blue), (III) ← 4 : 4′-diaminodiphenylamine-2-sulphonic acid (IV) → (II) (black), m-$NHPh\cdot C_6H_4\cdot OH$ ← (I) → (II), and 2′ : 4′-dinitro-3-hydroxydiphenylamine ← (IV) → (II) (both blue-black). H. A. P.

Manufacture of anthraquinone derivatives [acid wool dyes]. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 455,092, 11.4.35).—*N*-Substituted aminoanthraquinones in which one or more of the substituents carries one or more OH are converted into acid phosphoric or phosphorous esters by treatment with P halides. Examples are: 1-(β-hydroxyethylamino)anthraquinone with PCl_3 (red on wool); 1 : 4-di-(β-hydroxyethylamino)anthraquinone with PCl_3 (clear blue); 1 : 4-di-(p-hydroxyanilino)-anthraquinone with $POCl_3$ in C_5H_5N (green). C. H.

Manufacture of vat dyes and intermediates therefor. Soc. Chem. Ind. in Basle (B.P. 459,333, 4.2.36. Switz., 4.2.35 and 15.1.36).—A ketone obtained by condensing pyrene with an αβ-unsaturated mono- or di-carboxylic acid (including nuclear aromatic carboxylic acids) is further condensed with a different acid of similar type or its halide or anhydride. *E.g.*, monobenzoylpyrene (I) is heated with p-$C_6H_4Me\cdot COCl$ and $AlCl_3$–NaCl at 110—165° in a stream of O_2; the methylpyranthrone produced dyes cotton orange. Alternatively, the condensation to open-chain diketone may be carried out using $FeCl_3$ in $C_2H_2Cl_4$ at the b.p., and the product cyclised by $AlCl_3$–NaCl at 110—165°. Other examples describe the condensation of (I) with $CHPh\colon CH\cdot COCl$ (II), o-$C_6H_4(CO)_2O$, α-$C_{10}H_7\cdot COCl$, and m- and p-$C_6H_4Br\cdot COCl$, and of o-carboxybenzoylpyrene with BzCl. The fastness properties of the unsymmetrical dyes produced are improved by halogenation; *e.g.*, the product from (I) and (II) is heated with Br in $PhNO_2$ until no more HBr is formed. H. A. P.

[Manufacture of] vat dye pastes. M. H. Fleysher and J. Ogilvie, Assrs. to Nat. Aniline & Chem. Co., Inc. (U.S.P. 2,026,623, 7.1.36. Appl., 11.5.32).—Finely-divided vat dyes are produced by rapid dilution of a solution of the dye in H_2SO_4 with a calc. quantity of warm or hot H_2O. Application to chloroindanthrones, flavanthrones, and halogenated violanthrones is specially claimed. C. H.

Manufacture of [blue] azine dyes [for wool]. Imperial Chem. Industries, Ltd., and F. H. S. Curd (B.P. 455,693, 25.4.35).—A diaryl-1 : 3-diaminonaphthalene-8-sulphonic acid is oxidised together with a 4-aminodiphenylamine-2-sulphonic acid carrying in position 4′ a C_3—C_8 alkyl. In the examples aryl = Ph or p-C_6H_4Me, and alkyl = Bu^a, iso-C_5H_{11}, Pr^β, n-C_6H_{13}, n-C_7H_{15}, or n-C_8H_{17}. C. H.

Anthraquinone dyes.—See III.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Relation of the inner fine structure of fibres to their mechanical properties. I. Y. Go and T. Kubo (J. Soc. Chem. Ind. Japan, 1936, **39**, 458—462b).—An *X*-ray method for the determination of the degree of parallelism of crystallites in fibres is described. Results are given for various fibres. T. W. P.

Determination of the resistance of textile fabrics to creasing. K. Risch (Textilber., 1937, **18**, 30—31).—Apparatus for testing consists of two vertically suspended, weighted discs connected by a steel tape which passes over two spaced, horizontal guiding rollers. The mid-point of the tape is attached to a crank rod operated by an electric motor so that the discs alternately rise and fall (2000 times per hr.), thereby compressing folded portions of the fabric placed under them for test. Resistance to creasing is measured by the resulting loss of tensile strength. Tabulated results are given to show the behaviour of unbleached and dyed cotton and cotton + linen mixture fabrics during 300,000 compressions. Linen is much less resistant than cotton, but its resistance is considerably improved after dyeing or the application of softening agents. A. J. H.

Behaviour of "Lanital" in dry microdistillation. A. Kutzelnigg (Textilber., 1937, **18**, 201—202).—Lanital (I) (casein-rayon; cf. B., 1936, 880, 1034) is readily distinguishable from wool and silk by observing the swelling changes produced by heating a few fibres between two microscope coverglasses. A. J. H.

Determining moisture in sawdust and leather by the Dolch method. S. M. Cholmianskaja (Kosh.-Oburn. Prom., 1935, **14**, 391—392).—The method is based on changes in separation temp. of EtOH–paraffin mixtures with changes in H_2O content derived from the sawdust. Results are accurate to within 0·5%. Ch. Abs. (*p*)

Optimum régime of preparation of viscose cellulose. I. L. Kagan (Mat. Tzent. Nautsch.-Issledov. Inst. Bumashn. Prom., 1936, **21**, 3—31).—The pulp, containing H_2O 33, SO_2 3·9, and CaO 0·81%, is heated to 110° during 2 hr., and then at 110° for 2, to 128° during 1·5, at 128° for 0·5, to 145° during 2, and at 145° for 3—4 hr. R. T.

Interaction of "oxycellulose" (oxidised cellulose) with Nessler's reagent. H. Ditz and F. Ulbrich (J. pr. Chem., 1936, [ii], **147**, 167—187; cf. B., 1928, 84).—Previous work and applications of Nessler's reagent for the detection of oxycellulose (I) formed during the bleaching of cotton fabrics are reviewed. Cotton containing (I), when spotted with Nessler's reagent, gives a yellow coloration which changes through orange and brown to grey, the rate and extent of the change being related to the extent of oxidation and the Cu no. The yellow coloration is attributed to the formation of Hg_2I_2 (II) by reduction of the $KHgI_3$ (III), presumably by the aldehyde groups present in (I). The subsequent colour changes result from the decomp. of (II) into HgI_2 (red) and Hg (grey-black). The KI formed in the reduction of (III) accelerates this decomp. by combining with the resulting HgI_2 to give (III). The final grey colour with strongly reducing (I) is therefore due to Hg. H. G. M.

Physico-chemical characteristics of viscose-precipitating baths. S. Danilov and L. Roguleva (Iskusst. Volok., 1935, **6**, 241—248).—Decomp. of viscose increases with the acid concn. of the bath. Max. velocity of decomp. occurs in the first 2 min. of contact. With progressing ripeness of viscose the decomposing action of the bath increases. The κ of the baths may indicate their character and changes in ionic balance during spinning. Ch. Abs. (*p*)

Fibro, its manufacture and uses. Anon. (Rayon Text. Month., 1936, **17**, 661—662, 664, 735—736, 753, 800—801; 1937, **18**, 37—38).—Fibro is produced by the normal methods of viscose manufacture as far as the coagulation of the spun filament. It may then be reeled and finished in the normal manner and subsequently cut, but modern practice favours cutting immediately after coagulation and working up in bulk. For spinning on cotton machinery, a staple length of $1\frac{7}{16}$ in. and a denier of 1·50 are preferred. In general, Fibro can be handled by the machinery and methods used for cotton; the slight modifications which may be required at various stages of processing are discussed. A. G.

Control of chemical stability of cellulose nitrates by *X*-ray diagrams. A. Alberto (Ann. Acad. Brasil. Sci., 1936, **8**, 331—332).—Application of Mathieu's results (A., 1935, 286, 434) to the control of the degree of nitration and stability of nitrocelluloses is suggested. L. A. O'N.

Preparation and working up of cellulose triacetate. K. Werner (Angew. Chem., 1937, **50**, 127—132).—The prep. of cellulose triacetate film by direct pptn. from the acetylating mixture saves several operations, and a new method results in a product of high stability, high resistance to H_2O, and high electrical resistance. It contains 61·5—62·5% of AcO, is only slightly browned after many hr. at 250°, when immersed in H_2O absorbs only 1·5—2·5%, is permeable to H_2O vapour, has ε about 2·9, and a dielectric loss of about 1%. A. G.

Ethylcelullose. J. M. de Bell (Chem. Met. Eng., 1937, **44**, 31—32).—Ethylcellulose (I) is prepared by the action on cellulose of aq. NaOH and EtCl or Et_2SO_4. The product containing about 47% of EtO forms films of low inflammability, high stability to heat and light, great flexibility even in absence of plasticisers and at low temp., high extensibility, and good stability to dil. alkalis and acids; it is readily miscible with oils, waxes, and resins, is sol. in cheap solvents, and is thermoplastic. When the EtO content is lower (I) is sol. in H_2O. A. G.

Benzylmannan. R. Shinoda and E. Inagaki (J. Cellulose Inst. Tokyo, 1935, **11**, 149—155).—Konjaku mannan $[(C_6H_{12}O_6)_9,6H_2O]$ is treated with 10—30% NaOH and benzoylated (CH_2PhCl). The properties of the product indicate its possible use as a substitute for benzylcellulose as a raw material for lacquers. Ch. Abs. (*p*)

Preparation of wood pulp from pine. M. Martinov and J. D. Veis (Mat. Tzent. Nautsch.-Issledov. Inst. Bumashn. Prom., 1936, **21**, 75—92).—The resin content of pine after defibration with 2% Na_2CO_3 at 80° is 50% > in larch pulp. This higher resin content does not interfere with the processes of paper manufacture, except insofar as readily foaming solutions are obtained, necessitating the use of paraffin for breaking the foams. Paper from pine pulp is of slightly inferior quality to that from larch. R. T.

[Manufacture of] unbleached sulphite pulp from Western hemlock. G. H. McGregor, W. N. Kelly, and H. R. Heuer (Paper Trade J., 1937, **104**, TAPPI Sect., 39—48).—Data collected over the past 5 years, relating to the various operations and testing procedures in a modern pulp mill, are given in detail. It is believed that the presence of S even in undetectable quantity may affect digester operation. The Palmrose iodate method (B., 1935, 490) of determining the concn. of cooking acid is advocated. H. A. H.

Microscopical investigations of unbleached, semibleached, and bleached sulphite and sulphate pulps. B. Schulze (Papier-Fabr., 1936, **35**, 25—29, 37—39).—The composition and application of a no. of fibre stains for the microscopical differentiation of pulps are described. The characteristic colorations obtained, as well as the primary and secondary fluorescence (stained with rhodamine), are tabulated, and attempts are made to correlate them with the

lignin content, varying from 6·5 to 0·5%, hardness scale (Noll), and cooking degree of the pulps. With sulphite pulps only the Lofton–Merritt stain shows changes consistent with those of the lignin content, and it is considered that a rough assessment of the lignin content by this means is possible. With sulphate pulps none of the stains shows a uniform colour gradation over the full lignin range, although the Lofton–Merritt differentiates the softer pulps.
D. A. C.

Hysteresis in water sorption by papermaking materials. C. O. Seborg (Ind. Eng. Chem., 1937, **29**, 169–172).—The ratio of the adsorption H_2O content to the desorption H_2O content at the corresponding R.H. and 25° is a const. (the "hysteresis const.," *H*) over a R.H. range of 12—88%. The *H* of papermaking pulps is slightly $>$ that of lignins, kapok, or wood and is unaffected by chemical processing (*e.g.*, bleaching) or physical operations (*e.g.*, beating), although both modify the equilibrium H_2O content. Consecutive sorption cycles showed a greater tendency for *H* to approach 1 at the extremes of the hysteresis loop in the case of cotton than with other pulps. The theory that sorption hysteresis is attributable to the difference in the no. of OH groups available for attachment of H_2O mols. during adsorption and desorption is inadequate. J. G.

Comparative tests with the new Schopper bending fatigue tester and the folding tester [for paper]. Korn (Papier-Fabr., 1937, **35**, 33—37).—The Schopper bending tester (*B*) operates with a 15-mm. wide strip, which is bent through 90° on both sides of the vertical, at a speed of 110 ~ per min. The bending surface is radiused 0·01 mm. and the tension on the test strip is adjustable by means of wts. Comparison of *B* with the Schopper folding tester (*F*) under identical load conditions, using a variety of papers, showed no correlation, and the ratio of results of *F* : *B* varied from 1 to 106. Furthermore, *B* and *F* showed differences in the behaviour of the paper towards load variation, but it is considered that some possible relation between *B* and *F* may exist since log resistance at load 0 kg. (obtained by extrapolation) was characteristic for each instrument provided the paper was composed of similar materials. It is suggested, for convenience in standardisation, that with *B* the ratio of load to the tensile strength of the paper should be kept const. With foils *B* gave considerably better duplication of individual results than *F*, but with the structurally less uniform papers the accuracy of *B* and *F* was practically equal. D. A. C.

Instrumentation studies. VI. Modified Oxford glarimeter [for paper]. VII. Comparison of the Bausch & Lomb glossmeter and the Ingersoll glarimeter [for measuring paper gloss]. Institute of Paper Chemistry (Paper Trade J., 1937, **104**, TAPPI Sect., 16—18, 19—21).—VI. A glarimeter of the fixed-angle type (angle of reflexion 15°) is considered superior to the Ingersoll variable-angle instrument for measuring paper gloss.

VII. Discrepancies in the gloss vals. of coated paper as determined by the two instruments are shown to be attributable to the different optical properties measured. H. A. H.

Anticorrosive paper. Z. V. Utschastkina (Mat. Tzent. Nautsch.-Issledov. Inst. Bumashn. Prom., 1936, **21**, 112—117).—Specifications for wrapping-paper designed to protect metal articles from corrosion and abrasion are given. R. T.

Correlation of distillation range with penetration of creosote into paper strips. C. J. Frosch (Physics, 1936, **7**, 167—178).—Measurements of the penetration tension ($\varepsilon \times \cos$ contact angle) are recorded; they conform to two equations of which the more empirical one is more convenient for application to practical problems. The contact angles for creosote–paper are extremely small or zero. Possible errors in the paper-strip method are considered; it is important to calibrate each strip with a reference liquid. Washburn's equation fails in its neglect of the hydrostatic head effects. Adsorbed H_2O does not affect the penetration of the series of creosotes examined. D. F. T.

Modern methods of sizing paper with emulsions of free resin. G. Tocco and C. Rossi (Atti V Congr. Naz. Chim., 1936, **14**, 880—883).—A brief survey. O. J. W.

Bituminous emulsions in the paper industry. G. Tocco and C. Rossi (Atti V Congr. Naz. Chim., 1936, **14**, 883—886).—The use of such emulsions in sizing paper is described. O. J. W.

Effect of fibre components on stability of book papers. M. B. Shaw and M. J. O'Leary (J. Res. Nat. Bur. Stand., 1936, **17**, 859—869).—Tests have been made on unsized paper (free from alum) made from wood pulp, soda and sulphite pulp, and new and old rags. Stability, cellulose content, and Cu no. were closely related; the content of α-cellulose was 78—93% and the Cu no. 3·8—0·4. The sulphite and soda pulps gave less stable papers than the purer fibres. R. S. B.

Production of absorbent paper of the American type "Gee" for making laminated insulation boards. A. Laube and Z. Gruzdeva (Tzent. Nautsch.-Issledov. Inst. Bumashn. Prom. Mat., 1934, No. 4, 178—193).—Manufacturing details and composition of the products are described.
Ch. Abs. (*p*)

Thermal conductivity of kaoliang board. T. Y. Chang, K. J. Ch'en, and C. L. Yin (Sci. Rep. Nat. Tsing Hua Univ., 1936, **3**, 539—544).—The conductivity of board made from kaoliang stalks is $<$ that of asbestos, straw pulp, and celotex board and is about $3\cdot8 \times 10^{-4}$ g.-cal./sq. cm./sec. for a temp. gradient of 1° C./cm. O. D. S.

Treatment of fibreboard waste. F. D. Snell (Ind. Eng. Chem., 1937, **29**, 238; cf. B., 1935, 832).—Filtration of neutral waste from the manufacture of black and red fibreboard from newspaper and rope stock was unsatisfactory, but sedimentation in a natural lagoon for 24 hr. reduced the suspended solids (pigment with 20% of fibre) from 134 to 15 p.p.m., and the O_2 consumed from 40 to 11 p.p.m. The latter method without chemical treatment is therefore recommended, and produces a sludge with no offensive properties. J. G.

Occurrence, reduction, and recovery of manufacturing wastes [in the pulp and paper industry]. M. M. Rubin (Pulp & Paper Mag. Canada, 1937, 38, 14—21).—The val. of waste control and utilisation in the main branches of the pulp and paper industry is outlined, to show quantitatively those items on which financial savings might best be effected. H. A. H.

Ultra-violet radiation.—See XI. **Cellulose plastics.**—See XIII. **Wood saccharification.**—See XVII. **Pyroxylin and collodions.**—See XX. **Stability of films. Blue-print paper.**—See XXI.

See also A., I, 133, **Hydrophilic properties of cellulose.** II, 88, **Hydroxyethyl ethers of cellulose.** 110, **Spruce lignin. Benzylated, and alkali-degraded, pine wood.**

Patents.

Fulling or felting of wool or hair. Chem. Fabr. J. A. Benckiser G.m.b.H. (B.P. 458,910, 11.7.36. Ger., 1.8.35).—Smoother running and a finer and more compact felting result from an acid, neutral, or alkaline milling treatment with a liquor containing 2—100 g. (per litre) of a H_2O-sol. phosphate derived from phosphoric acids containing less combined H_2O than has H_3PO_4, *e.g.*, $NaPO_3$, $Na_4P_2O_7$, and $(NaPO_3)_n$. A. J. H.

Manufacture of asbestos yarn. United States Rubber Co. (B.P. 458,961, 13.1.36. U.S., 17.1.35).—A mixed roving containing a minor proportion of vegetable fibres and $\nless 75\%$ of short asbestos fibres (mean length $\ngtr 0{\cdot}5$ in.) is moistened with a wetting agent, drafted (draft ratio 2—8 : 1) while moist, and twisted. Apparatus is claimed. F. R. E.

Drying and/or conditioning of textile articles and fabrics. W. Hare (B.P. 459,194, 2.8.35).—The articles are placed in a rotating, perforated drum and conditioned air is passed through diametrally. [Stat. ref.] B. M. V.

Cellulose treatment [for reduction of solution-viscosity]. W. D. Nicoll, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,033,782, 10.3.36. Appl., 27.6.34).—Cellulose is treated with dil. mineral acid ($\ngtr 0{\cdot}05\%$) and, after removal of excess of acid by centrifuging, is dried by a current of hot air at 100°. The treated material and esters or ethers produced therefrom have reduced solution-η. F. R. E.

Manufacture of cellulose derivatives and products obtained therefrom. H. Dreyfus (B.P. 458,596, 22.6.35).—Cellulose, or fabric, thread, etc. thereof, etherified to contain $\ngtr 1$ (0·25—1·0) ether (not hydroxyalkyl) group per $C_6H_{10}O_5$ (cf. B.P. 458,597; B., 1937, 228), is esterified in presence of an org. base, and optionally of $\ngtr 10\%$ of H_2SO_4, at $\ngtr 30°$ (20—30°). If acid halides are used, the etherification and esterification may be conducted consecutively or simultaneously. E. J. B.

Manufacture of cellulose derivatives and artificial filaments, films, and other shaped structures therefrom. L. Lilienfeld (B.P. 459,122—4, 29.3.35).—Cellulose is treated (a) in presence of alkali with <1 mol. of Et halide per 4 $C_6H_{10}O_5$, (b) in presence of aq. alkali ($\nless 11{\cdot}5$ mols. of H_2O per mol. of NaOH) at <70° with EtCl, (a, b) with or without an alkylating agent containing an alkyl other than Et, or a hydroxyalkylating agent, or a halogeno-fatty acid. The resulting ethers, of which (b) contains $\ngtr 1$ Et per 20 $C_6H_{10}O_5$, may be xanthated, shaped, and coagulated. (c) A cellulose compound of which at least one hydroxyl-H per n $C_6H_{10}O_5$ (n = 2—30) is substituted by an org. radical (alkyl or hydroxyalkyl) is treated in presence of alkali with <20 wt.-% of CS_2, brought to the required shape, and coagulated. F. R. E.

Esterification of cellulose. J. F. Haskins, Assr. to (a) Du Pont Rayon Co., (b) E. I. Du Pont de Nemours & Co. (U.S.P. 2,032,748—9, 3.3.36. Appl., [a] 24.7.31, [b] 24.6.32).—Cellulose is treated with (a) an org. acid RCO_2H (R = alkyl or aryl), an acyl chloride R′COCl (R′ = alkyl), and a *tert.* amine (C_5H_5N), (b) an aliphatic acid (C_{2-8}), $COCl_2$, and C_5H_5N. F. R. E.

Preparation of fibrous esters of cellulose. W. O. Kenyon and G. P. Waugh, Assrs. to Eastman Kodak Co. (U.S.P. 2,033,716, 10.3.36. Appl., 8.9.33).—Cellulose is pretreated, in absence of a catalyst, with a lower fatty acid anhydride, a petroleum distillate (b.p. 40—210°) as non-solvent for the ester, and a lower fatty acid to homogenise the mixture, and is subsequently esterified by addition of a catalyst (H_2SO_4). F. R. E.

[Manufacture of] coloured soluble cellulose. E. De Stubner (U.S.P. 2,034,861, 24.3.36. Appl., 5.5.33. Cf. U.S.P. 1,914,489; B., 1934, 188).—A pigment is wetted with EtOH by a suitable agitating machine and then dispersed with cellulose nitrate in EtOH. The product can be used in the making of lacquers etc. by addition of the usual addenda. F. R. E.

Manufacture of artificial filaments, ribbons, and the like. Brit. Celanese, Ltd., A. J. Daly, and W. G. Lowe (B.P. 459,164, 3.7.35).—A plastic mass containing approx. equal wts. of an org. derivative of cellulose and a plasticiser (preferably containing a phthalate radical) and substantially free from volatile solvent is extruded through a shaping device at 150°, and subsequently treated with a solvent or swelling agent to increase the lustre. F. R. E.

Manufacture of artificial wool. H. Chavassieu, Assr. to Du Pont Rayon Co. (U.S.P. 2,034,711, 24.3.36. Appl., 3.3.27. Renewed 4.8.31. Fr., 3.4.26).—A quantity of S $\nless$ that present in natural wool is introduced into the thread by mixing $NaHSO_3$ and Na_2S with the viscose before spinning or with the coagulating bath, or by treating the formed thread with NaOH, $NaHSO_3$, and Na_2S and then acidifying; a protein and a silicate, aluminate, or resinate may also be added if desired. F. R. E.

Process of making carbohydrate derivatives [cellulose sulphate]. G. W. Rigby, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,033,787, 10.3.36. Appl., 9.1.34).—Neutral, stable cellulose sulphate is prepared by esterification of a polymerised carbohydrate (wood pulp, cotton linters, starch, xylan, chitin, low cellulose ethers or esters, etc.)

with a sulphonating agent (SO_3, H_2SO_4, $ClSO_3H$) containing $\cdot SO_2\cdot O\cdot$ in presence of a *tert.* amine (usually C_5H_5N) and inert diluent, at 20—130°. Reaction may be catalysed by halide salts of amines. Generally sulphonating agent and base are mixed in the diluent, *e.g.*, by mixing in two streams with cooling, and the cellulose is added later. The product is washed free from Cl′, *e.g.*, by spirit. Under certain conditions the fibrous nature of the cellulose is retained.

R. S. C.

Dry-spinning cell. H. S. Ezzard and E. C. Kontz, jun., Assrs. to Tubize Chatillon Corp. (U.S.P. 2,035,872, 31.3.36. Appl., 15.12.34).—In a battery of cells for dry spinning, each cell is provided with a steam jacket and condensed H_2O is allowed to accumulate to an equal predetermined level to adjust the heating effect. The level is determined by a series of common exhaust cocks at different levels, with a by-pass from the steam inlet to the final H_2O exhaust to prevent steam blowing through the jackets. B. M. V.

Manufacture of [pigmented] artificial filaments, yarns, and similar materials. Brit. Celanese, Ltd. (B.P. 460,955, 12.9.36. U.S., 13.9.35. Addn. to B.P. 374,356; B., 1932, 767).—A substantial excess of spinning solution–pigment mixture over that required by the spinning jets is continually passed through the pump and mixing device towards the jets, the excess of the mixture being returned to the feed side of the system, whereby its homogeneity is improved. F. R. E.

Simultaneously spinning and twisting of artificial threads. K. Berndt (B.P. 460,744, 25.3.36. Ger., 27.3. and 12.6.35).—The threads are spun from a rotating spinning nozzle immersed in the pptg. liquid rotating simultaneously and co-axially therewith. Apparatus is claimed. F. R. E.

Manufacture of woven or knitted fabric mainly consisting of cellulosic fibres. R. Lant (U.S.P. 2,032,992, 3.3.36. Appl., 24.8.33. Austr., 6.9.32).—Woven or knitted fabric of cellulose fibres is " raised " on one or both sides so as to produce a down of projecting fibres, and then treated with a higher fatty acid chloride (stearyl chloride) in C_5H_5N until the increase in wt. due to esterification is 5—30% of the dry fabric. The resulting fabric has a smooth feel resembling buckskin and is H_2O-repellent.

F. R. E.

Treatment of cellulose fibres. I. G. Farbenind. A.-G. (B.P. 460,590, 31.7.35. Ger., 14.8.34).—Air-dry cellulose, *e.g.*, viscose staple fibre, is heated at $\ngtr$100° with ethyleneimine vapour. The resulting nitrogenous cellulose derivative may be dyed with wool dyes. F. R. E.

Drying of crêpe and other fabrics of paper, hair, wool, or other material. W. Ridgway, R. J. Hannay, and D. S. Berry (B.P. 460,306, 30.8.35).—The web of material is fed into the drying chamber at a definite speed and conveyed therethrough on a multiplicity of conveyors running at another definite speed (slower) so that the web takes up a crumpled form and dries without tension.

B. M. V.

Manufacture of crêped cellulosic wadding. A. F. Burgess. From Paper Patents Co. (B.P. 460,565, 2.9.36).—A cellulose web, the fibres of which have been impregnated with asphalt etc. to render them waterproof if desired, is transferred to the drying cylinder of a papermaking machine, sprayed with a fireproofing solution, *e.g.*, $(NH_4)_2SO_4$, $(NH_4)_3PO_4$, and borax, dried, and removed by a crêping doctor.

F. R. E.

[Pulp] digesters and valves therefor. E. Spencer and F. S. Mitchell (B.P. 457,891, 15.7.35).—In a digester having a perforated false bottom (*B*), a cylindro-conical valve with large ports is provided to discharge pulp from above *B* while the space below is closed, this valve being in addition to the usual pressure-resisting valves. B. M. V.

Perforated inner bottom plates of digesters. E. Spencer and F. S. Mitchell (B.P. 458,863, 15.17.35).—The bottom is formed with radial V-shaped corrugations of angle approx. 60° and inclined so that even the valleys slope towards the centre, at which point is an acutely conical discharge device.

B. M. V.

Fibre-liberating process. G. A. Richter, Assr. to Brown Co. (U.S.P. 2,032,437, 3.3.36. Appl., 11.10.34).—Wood is cooked with aq. Na_2SO_3 in which $(NH_4)_2SO_3$ is first formed by saturating the solution with NH_3 and then with SO_2. The liquor is regenerated by boiling with NaOH until all NH_3 is expelled, evaporating to dryness, roasting the residue, and treating the aq. extract with SO_2, NH_3, and SO_2 in succession. A. R. P.

Apparatus for refining fibrous material in a liquid medium. Noble & Wood Machine Co. (B.P. 457,654, 457,701—2, and 458,919, 28.3.35. U.S., 28.3.34).—Paper pulp refiners of the type comprising a rotor running in close proximity to stationary blocks, the whole being under pressure, are claimed. B. M. V.

Recovery of chemicals from waste [wood-] pulping liquors. H. R. Murdock, Assr. to Champion Fibre Co. (U.S.P. 2,031,974, 25.2.36. Appl., 4.11.33).—The waste liquor from treating wood with aq. NaOH is evaporated to dryness with sufficient $NaNO_3$ to replace the Na lost in the pulping process, the product is roasted, the residue extracted with H_2O, and the solution causticised for re-use.

A. R. P.

Moisture-proofing of non-fibrous cellulose sheets or films. E. I. Du Pont de Nemours & Co. (B.P. 458,814, 21.6.35. U.S., 21.6.34. Addn. to B.P. 458,813; B., 1937, 371).—Non-fibrous sheets of regenerated cellulose, or derivatives thereof, are treated, preferably at the gel stage, with a 0·2—2·0 wt.-% aq. solution of partly (50—100%, preferably 85—90%) deacetylated chitin or chondroitin in a (volatile) org. acid, so that the size is 0·5—4·0 wt.-% of the final dry sheet. The product is dried, neutralised if necessary, and then coated with a moisture-proofing lacquer. The latter coating will not flake off under very wet conditions. E. J. B.

[Waterproofing] coloured paper. E. I. Du Pont de Nemours & Co. (B.P. 458,819, 21.6.35.

U.S., 16.4.35. Addn. to B.P. 458,813; B., 1937, 371).—Paper, cardboard, etc. that has been surface-dyed with aq. basic or particularly acid dyes is treated with a dil. (≯0·1%) solution of a deacetylated chitin or chondroitin in aq. acid (AcOH), and subsequently dried, or treated with, *e.g.*, CH_2O, or an acid anhydride, to convert the size into a moistureproof coating, thereby stabilising and brightening the colour. E. J. B.

Emulsions [for coating paper etc.]. E. I. Du Pont de Nemours & Co. (B.P. 458,815, 21.6.35. U.S., 15.3.35).—Emulsions are made with (*a*) an aq. solution of a salt (acetate preferred) of deacetylated chitin or chondroitin (B.P. 458,839; B., 1937, 371), (*b*) a H_2O-insol. material which is liquid at room temp. or (*e.g.*, a wax) at the temp. of emulsification alone or in a liquid solvent, and (*c*) a wetting agent which is stable to acids (diethyl*cyclo*hexylamine lauryl sulphate preferred) with or without (*d*) a fixing agent [$Al(OAc)_3$ preferred]. Such emulsions are mixed with a paper slurry in the prep. of sized paper, giving products of improved H_2O-resistance. The emulsions are also used for coating fibres and leather, giving durable and H_2O- and weather-resisting coatings. The resistance of the film obtained may be increased by heating, treatment with CH_2O, Ac_2O, etc., addition of other waterproofing materials, etc. R. S. C.

Production of a book-binding material simulating the appearance of cotton or linen. E. Braeuer (B.P. 458,908, 26.7.35. Cf. B.P. 451,152, B., 1936, 982).—Paper or pasteboard, previously printed, painted, etc. to resemble cotton or linen, is coated on one or both sides with a layer of viscose of regulated thickness, coagulated, washed, and dried. F. R. E.

Cellulose derivative-coated fabric [for use in book-binding]. D. McBurney and E. H. Nollau, Assrs. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,033,202, 10.3.36. Appl., 6.7.33).—A fabric base coated with a cellulose derivative composition (cellulose nitrate, castor oil, and pigment with a suitable solvent) is dried and treated with an aq. acid (AcOH, citric) dispersion of gelatin tanned with CH_2O, to give a film of wt. 0·006—0·06 oz./sq. yard to render it non-sticky. F. R. E.

Manufacture of artificial leather. M. O. Schur, Assr. to Brown Co. (U.S.P. 2,033,486, 10.3.36. Appl., 14.11.31).—An interfelted cellulose-fibre sheet (≮93% of α-cellulose) is impregnated with vulcanised rubber-latex solids containing sufficient glycerin (15%) to diminish the stiffness without lowering the tensile strength of the impregnated sheet. F. R. E.

Manufacture of material for use as leather substitute. A. J. Hanley and R. B. Respess, Assrs. to Respro, Inc. (U.S.P. 2,033,099, 3.3.36. Appl., 29.7.33).—A woven fabric base is saturated with a solution of vulcanised rubber, dried, and coated on one or both sides with a film of a rubber compound containing a blowing agent [$(NH_4)_2CO_3$, or stearic acid and $NaHCO_3$] and short-length fibres. After heating the rubber compound to fill it with gas and bring the reinforcing fibres into an upright position, the whole is vulcanised and coated with a surface layer of dusting agent, or with varnish etc. F. R. E.

Drying of coated paper. Associated Paper Mills, Ltd., and R. S. Hendry (B.P. 458,414, 18.6.35).—The coated upper and uncoated lower sides are simultaneously subjected to jets of heated and conditioned air, respectively, the exhaust airs being removed separately by suction and the heated air being first conditioned if necessary. The paper travels on rollers through a suitable elongated casing. B. M. V.

Centrifuge for nitration processes.—See I. **Articles from asphaltenes.**—See II. **Solutions of polymerisation products.**—See III. **Dyes for paper.**—See IV. **Treating fibrous materials. Stiffened fabrics etc.**—See VI. **Wallboards.**—See IX. **Au alloys [for spinnerettes].**—See X. **Increasing slip of foils.**—See XIII. **Removing hair etc.**—See XV.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Bleaching of cotton goods containing metal effect threads. W. Hundt (Textilber., 1937, **18**, 228).—Tinsel threads (containing Cu or brass) are protected and their deleterious catalytic action is avoided by bleaching with aq. H_2O_2 (2—3 c.c. of 40-vol. H_2O_2 per litre), stabilised with water-glass and soap and containing 0·5 g. of Lamepon A per litre. A. J. H.

Bleaching and finishing [with mercerisation] of cotton + viscose staple fibre materials. H. Koste, E. Kayser, and W. Waibel (Textilber., 1936, **17**, 801—803, 864—865).—The suitability of large-scale processes [as used for cotton (I)] for (I) containing ≯16% of viscose staple fibre (II) is studied. Losses in tensile strength (T) resulting from successive kier-boiling (2 atm.), Cl- and H_2O_2-bleaching for (II) were 6·0, 5·1, and 4·6%, and the corresponding wt. losses for (I) were 3·8, 4·2, and 4·7% and for (II) 4·6, 4·7, and 5·1%, respectively. By kiering without pressure and using a stronger Cl-bleaching bath the resulting T and wt. losses were slightly less and higher, respectively. Tabulated data are given showing the effect of several variations of these bleaching processes, and it is concluded that the usual bleaching process for (I) is satisfactory for (II). Mercerisation of desized (II) with NaOH followed by washing, immediately after or after 3 days, with hot or cold H_2O resulted in T gains of 2·5—11·75%, and no abnormal adverse results were obtained on subsequent bleaching. Mercerisation with NaOH was satisfactory with (I) (50%) + (II) (50) yarn, and KOH gave only slightly higher T increases than did NaOH. Changes in T and wt. produced by mercerising non-desized (II) with NaOH were −3·7 to 7·0% and −3·6 to −3·8%, respectively. It is concluded that (II) can be satisfactorily mercerised by the methods used for (I). A. J. H.

Influence of sodium bicarbonate in chlorine bleach liquors. H. Wasser (Textilber., 1937, **18**, 225—226).—Bleaching of raw nettle or cotton fibres with aq. NaOCl is improved by addition of $NaHCO_3$

if the liquor is neutral, but is adversely influenced if slightly alkaline. Data are given showing that a dil. Griesheim (NaOCl) bleach liquor (p_H 9·6) bleaches with less loss of tensile strength and consumption of Cl and with production of a better white than when this liquor is first adjusted to p_H 6·9 (by neutralisation with AcOH) or to 7·5 (by addition of $NaHCO_3$ after neutralisation) or to 8·3 (by direct addition of $NaHCO_3$). In bleaching cotton with Griesheim NaOCl liquors (3 g. of Cl per litre) and adjusted to initial p_H 9·3, 8·4, 7·7, and 7·3 (corresponding to p_H 8·4, 8·0, 7·5, and 6·7 after bleaching) the losses of Cl were 0·71, 0·86, 0·93, and 0·75 g. per litre, respectively, and the resulting whiteness 1 (best), 2, 3, and 4. A. J. H.

Large-scale use of combinations of direct and basic dyes for colouring cotton. S. LATKIEWICZ (Textilber., 1937, **18**, 74—75).—Chrysamine Yellow G may replace tannic acid as a mordant for basic dyes on cotton, and satisfactory navy-blue shades are obtained by dyeing Victoria Blue B on cotton previously dyed with Diamine Blue. The most satisfactory fast-to-washing combination shades are produced by dyeing and mordanting in one bath containing a direct dye and a sulphurised phenol (Katanol O), followed by over-dyeing with a basic dye; increased fastness to light may be obtained with an after-treatment with Auxamine B (I.G.). A. J. H.

Colloid chemistry of modern after-treatments for increasing the fastness to water and washing of direct dyeings. A. CHWALA, A. MARTINA, and F. BECKE (Textilber., 1936, **17**, 583—586).—The usefulness of the Sapamines (S.C.I.), Fixanol (I.C.I.), Sandofix (S), and Solidogen B (I.G.) is discussed with reference to their composition. Titration of Sapamine CH (I) with Oxamine Violet and Brilliant Fast Blue B, with and without the presence of NaOAc, and analysis of the resulting ppts. show that 1 mol. of (I) unites with each SO_3H in the dye mol. to form a product which peptises slowly in H_2O containing a suitable [H] or [OH] resulting from the presence of acids or alkalis. A. J. H.

Identification of dyes on cotton. E. ZÜHLKE (Textilber., 1936, **17**, 866—868).—Existing systematic methods of identification are reviewed and their deficiencies, due to the introduction of new dyes (especially vat and azoic dyes), are pointed out. *E.g.*, Sirius Light Blue FFRL and Yellow 5 G (I.G.) behave as vat dyes toward $Na_2S_2O_4$. The use of boiling anhyd. (I) and aq. ($\not>$20% of H_2O) C_5H_5N (II) for distinguishing between direct and azoic dyeings is described, the dyeing having been first freed from basic dyes. Azoic dyes are stripped from the cotton by (I), but not (II), to yield a coloured extract, whilst direct dyes are stripped by (I) and (II) to yield coloured extracts, the latter being usually deeper. Logwood shades on Fe, Cr, and Cu mordants are also stripped by (I) and (II), but they can be identified otherwise. A. J. H.

Diffusion of dyes. S. LENHER and J. E. SMITH (J. Physical Chem., 1936, **40**, 1005—1020; cf. B., 1935, 541, 588).—The influence of micellar size on substantivity for dyeing cotton has been studied by determining the diffusion coeffs. of four electrolyte-free azo dyes under varied conditions of [NaCl], temp., and ageing. The results, taken in conjunction with dyeing experiments, show that (1) excellent dyeings with substantive colours on cotton may be obtained from baths containing micelles of any average radius $<18 \times 10^{-8}$ cm., and (2) substantivity of the dye mol. for cotton increases with its sensitivity to aggregation by NaCl. F. L. U.

[Printing] reserves under vat dyes. J. S. TURSKI and J. CHECINSKI (Textilber., 1937, **18**, 87—88).—$C_6H_4(NO_2)_2$ and $C_{10}H_6(NO_2)_2$ (I), but not $C_6H_2Me(NO_2)_3$, are satisfactory agents for obtaining pure white and coloured reserves. Before addition to the reserve paste they must be thoroughly dispersed, while molten, with the aid of gum arabic. A typical paste consists of (I) (180 pts.), 50% Turkey-red oil (80), castor oil (60), 50% aq. gum arabic (320), 20% aq. wheat starch (320), and H_2O (40). A. J. H.

Printing with indigosol colours. L. CABERTI (Boll. Staz. Sperim. Ind. Carta Fibre Tess., 1936, **31**, 611—612).—The process is simplified by the use of the single solvent Dehapan O (Durand & Huguenin); formulæ are given for mixtures employing this in the $NaNO_2$, $K_2Cr_2O_7$, and NH_4CNS processes. Vaporisation can be effected in 2 min. E. W. W.

Washing of textiles. R. S. SHANE (J. Chem. Educ., 1936, **13**, 563).—A summary. L. S. T.

Routine testing of "dry" mercerising liquors. F. T. HEYES (Text. Rec., 1935, **53**, 62—65).—Use of wetting agents in NaOH mercerising baths is described. Determinations of the drop no. of various materials are recorded. CH. ABS. (*p*)

Determination and occurrence of manganese in textiles [for rubber-proofing]. KEHREN (Textilber., 1936, **17**, 727—729).—In rubber-proofing textiles the adverse effect of small amounts of Mn is > that of Cu. Mn is determined by ashing 10—25 g. of fabric, adding 10 c.c. of HNO_3 (*d* 1·4) and evaporating to dryness, adding 20—30 c.c. of H_2O and then sufficient aq. $AgNO_3$ to ppt. the sol. chlorides, boiling, and filtering. A few drops of H_3PO_4 (*d* 1·15) and 1 g. of $(NH_4)_2S_2O_8$ are added to the filtrate and the mixture is boiled to complete oxidation of the Mn to permanganate, which is then evaluated colorimetrically against 0·01*N*-$KMnO_4$. The method allows 0·015 mg. of Mn to be determined accurately. The Mn contents (about 1 mg. per 100 g., but 14 mg. for raw sheep's wool) of various textile materials are given. Most H_2O used in bleaching and dyeing contains Mn and this is often preferentially absorbed by the material. A. J. H.

Oxycellulose.—See V. **Artificial leather.**—See XV.

PATENTS.

Treatment of fibrous materials with liquids. A. WACKER GES. F. ELEKTROCHEM. IND. G.M.B.H. (B.P. 460,140, 18.6.35. Ger., 30.6.34).—Aq. treatments of textiles, *e.g.*, sizing, kier-boiling, bleaching, mercerising, dyeing, or the working up of wood, paper, etc., are facilitated by the presence of small amounts of esters, free from S, derived from aliphatic

monocarboxylic acids of C_2—C_6 and monohydric aliphatic alcohols of C_4—C_8, containing no alkoxy-groups, *e.g.*, hexyl glycollate, amyl lactate.
N. H. H.

Washing, desulphurising, bleaching, and dyeing of artificial [regenerated cellulose] yarns. W. W. Triggs. From "Chatillon" Soc. Anon. Ital. per le Fibre Tessili Artif. (B.P. 460,079, 6.5.36).—Satisfactory control, for the avoidance of entanglement, of bundles or slivers of freshly spun rayon fibres in wet-processing is obtained by means of apparatus (claimed) in which the slivers etc. are led countercurrent to the liquor through horizontal slotted diaphragms which alternately press on the top and bottom sides of the slivers and thereby maintain them under slight tension. A. J. H.

Coloration of textiles and other materials. Brit. Celanese, Ltd., and P. F. C. Sowter (B.P. 460,575, 25.7.35).—Org. derivatives of cellulose, *e.g.*, the acetate, propionate, or the benzyl ether, are coloured by means of a freely fluid solution of a colouring matter, *e.g.*, a H_2O-insol. azo, nitrodiarylamine, indigoid, or aminoanthraquinone dye, but not a free leuco-compound of a vat dye or a salt thereof, in a homogeneous liquid containing a substantial proportion ($>5\%$) of a carboxylic ester of b.p. about 130° (100—110°), *e.g.*, EtOAc, HCO_2Et, and, if desired, a volatile, H_2O-miscible alcohol, *e.g.*, EtOH or MeOH, and a minor proportion of H_2O. If the ester has an undesirable softening effect on the material, diluents (C_6H_6, CCl_4, petrol) may be added.
N. H. H.

Dyeing of artificial shaped objects. W. W. Groves. From Aceta Ges. m.b.H. (B.P. 459,594, 8.4.35).—Dyes for fibres, sheets, ribbons, or films composed of plastic cellulose derivatives combined with artificial resins sol. in org. solvents and having affinity for basic substances contain one or more strongly basic groups which are not essential to the production of colour and may not be directly connected with the chromogen. Dyes may also be formed on the fibre from intermediates containing basic groups. A list of 20 dye types is given with directions for making members of each, the strongly basic properties being obtained either by N^V or heterocyclic quaternary NH_4 groups. Among examples, an acetate rayon containing 10% of the polymerisation product of 1 mol. of maleic anhydride with 1 mol. of $CH_2{:}CHCl$ is dyed (green) from an acid (AcOH) bath containing the condensation product of 1 : 4-di-*p*-hydroxyanilinoanthraquinone with $CH_2Cl{\cdot}CH_2{\cdot}NEt_2$. K. H. S.

Dyeing of cellulose esters and ethers. H. M. Bunbury, C. H. Giles, and Imperial Chem. Industries, Ltd. (B.P. 460,027, 19.7.35).—The fading of dyeings on cellulose esters and ethers, *e.g.*, on acetate rayon, caused by exposure to the fumes of burning coal gas, is partly or entirely obviated by impregnating the dyed fibre with a solution of a H_2O-sol. thiosulphate, *e.g.*, an alkali or alkaline-earth salt, and drying. N. H. H.

Improving the fastness of dyeings. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 460,961, 5.7.35).—The fastness to washing of dyeings of substantive dyes on cellulosic materials is improved by treating with solutions of bases or salts thereof containing $\nless 2$ quaternary NH_4 or ternary sulphonium groups but free from aliphatic radicals of $\nless 7$ C. Products obtained by condensing α-dichlorohydrin (I) with Na_2S or NH_3 followed by methylation (Me_2SO_4) and by condensing the formal of (I) with $({\cdot}CH_2{\cdot}NMe_2)_2$ are described. A. H. C.

[Apparatus for] treatment of textile materials. Brit. Celanese, Ltd. (B.P. 460,111, 30.4.36. U.S., 30.4.35).—Apparatus is claimed by means of which size, colour, or a weighting, dulling, or hydrolysing, etc. agent, is intermittently applied to cotton, wool, cellulose acetate rayon, etc. yarn while this is drawn forward at a rate continuously adjusted so that when the resulting yarn is knitted into circular fabric regular pattern effects do not appear. A. J. H.

[Apparatus for] wet treatment of [crêpe] fabrics. Mather & Platt, Ltd., and R. C. Mather (B.P. 458,935, 27.7.35).—Fabrics in which length shrinkage is desired are led in open width from an upper to a lower pair of nipping rollers within a narrow box, the relative rates of rotation of each pair being adjusted to allow the desired shrinkage, caused by contact on both sides of the fabric with hot liquor emerging from jets placed mid-way between the pairs of rollers, to take place. The lower end of the box is kept full of liquor. A. J. H.

Dry cleaning. Associated Dyers & Cleaners, Ltd., and M. Fort (B.P. 460,711, 2.8.35).—H_2O or other liquid (soap solution) immiscible with the dry-cleaning solvent (C_2HCl_3) (I) is sprayed in finely-divided state on to a moving film or surface of (I). Apparatus is claimed. F. R. E.

Treatment of mixed textile materials [for hydrolysis of cellulose ester rayon present therein]. Brit. Celanese, Ltd. (B.P. 459,831, 1.7.36. U.S., 30.7.35).—Animal-fibre (*e.g.*, wool) materials containing 50—90% of cellulose acetate etc. are treated with a 2% NaOH solution for 10 min. at 10° and a 6% NaOH solution for 3 min. at 20°, whereby the cellulose ester is sufficiently hydrolysed to dye with direct dyes whilst the wool is not damaged; the resulting material is fuller and softer than similar material made with yarn consisting of cellulose ester prehydrolysed. A. J. H.

Finishing of textile materials. Calico Printers' Assoc., Ltd., L. A. Lantz, J. R. Whinfield, and W. S. Miller (B.P. 460,201, 22.7.35).—Textile fabrics of vegetable origin are rendered crease-resistant and less liable to shrinkage by impregnating with CH_2O or its equiv., and an oxidising acid, *e.g.*, HNO_3, $HClO_4$, $H_2S_2O_8$, or salts which liberate such acids, *e.g.*, NH_4 salts, in absence of phenolic or amidic compounds capable of forming resins with CH_2O, drying, and finally heating to, *e.g.*, 60—200°. Agents which counteract tendering, *e.g.*, $NaPO_3$, $Al(OH)_3$, $(CH_2)_6N_4$, may be included.
N. H. H.

[Manufacture of] non-crumpling fabrics. J. B. Martin Co. (B.P. 458,979, 8.4.36. Fr., 9.4.35).—Fabric is impregnated with a mixture of the H_2O-sol. salts of boric and salicylic acids, *e.g.*, NH_4 salicylate (16%) and $(NH_4)_2B_4O_7$ (8%) solution, and then dried at 80—100°. A. J. H.

(A, B) Production of stiffened fabrics and articles made therefrom. (C) Manufacture of fabrics and articles of wearing apparel. Brit. Celanese, Ltd. (B.P. 460,232, 460,523, and 460,631, [A] 24.7.35, [B, C] 29.7.35. U.S., [A] 2.8.34, [B] 4.8.34, [C] 9.8.34).—(A) Permanently stiffened fabrics consisting of cellulosic material, wool, or silk are produced by uniting under heat (80—180°) and pressure (10—600 lb.) $\nless$ two layers of substantially non-thermoplastic material and $\nless$ one intermediate layer of non-thermoplastic material which has been coated with a thermoplastic cellulose derivative (I), *e.g.*, cellulose acetate, and dried. The union is effected in presence of a volatile liquid which preferably is a non-solvent for (I) at room temp., but assists adhesion at high temp., *e.g.*, $EtOH–H_2O$, $OH·CH_2·CH_2·OEt–H_2O$. (B) Such fabrics are produced by uniting as in (A) two uncoated layers and an intermediate layer of substantially non-thermoplastic textile material, *e.g.*, linen, cotton, wool, silk, coated or impregnated with (I), in finely-divided form, obtained, *e.g.*, by applying (I) as a fine powder or an aq. suspension and drying. The union is assisted by the presence of a volatile liquid which is a solvent for (I), *e.g.*, $COMe_2$, Et lactate, or preferably a non-solvent at room temp., but which assists the union on heating, *e.g.*, $EtOH–H_2O$. Adhesives, *e.g.*, gelatin, and plasticisers, *e.g.*, o-$C_6H_4(CO_2Me)_2$, may be included. (C) Stiffened fabrics so obtained are lacking in opacity and this is improved by incorporating with (I) a finely-divided pigment, *e.g.*, TiO_2, $BaSO_4$, $(·C_6H_4·NHAc$-$p)_2$, naphthylurea. Coloured effects are likewise obtained by using coloured pigments [1—10% on wt. of (I)]. N. H. H.

Impregnated or treated cloths etc. J. Halden & Co., Ltd., and J. Holden (B.P. 460,543, 13.11.35).—A pad, glove, etc. impregnated with an org. or inorg. salt of a sulphuric ester of a higher aliphatic alcohol of $\nless C_{12}$, a volatile wetting agent, *e.g.*, *cyclo*- or methyl*cyclo*-hexanol, and, if desired, a suitable hygroscopic agent, *e.g.*, glycerin, $CaCl_2$, is suitable for removing or preventing mistiness, steam, or bloom on polished surfaces. N. H. H.

Production of coated fabrics. C. A. Alt, E. H. Nollau, and D. A. Rankin, Assrs. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,033,170, 10.3.36. Appl., 25.8.32).—A fabric for high-quality window shades or the like is coated with cellulose nitrate 53·8—40·6, Bu_2 phthalate 18·0—28·0, and pigment 28·2—31·4%. The pigment is predominantly leaded ZnO and is applied at the rate of 1·5 oz. per sq. yard on each side. B. M. V.

Treatment of fibrous materials to make them resistant to mildew. F. T. Metcalf (B.P. 460,818, 6.3.36).—Materials treated with mildew-resisting substances (salicyl derivatives) are rendered still more resistant by fixation of the latter with a deposit of $Al(OH)_3$, *e.g.*, by padding with aq. $Al(OAc)_3$ (*d* 1·02) and heating. A. H. C.

Addition products of C_2H_2 etc. Wetting etc. agents. Iminazoline derivatives.—See III. **Emulsions.**—See III and V. **Electrolytic apparatus [for bleach].**—See XI. **Coated or impregnated materials.**—See XIII.

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

Oxidation space in the tower sulphuric acid process. I. N. Kuzminich, E. J. Turchan, and E. V. Juschmanov (J. Chem. Ind. Russ., 1936, **13**, 1338—1345).—In the tower process as ordinarily conducted, the reaction $NO + O \rightarrow NO_2$ proceeds to completion in the Gay Lussac towers, thereby increasing the necessary absorption capacity of the plant. The latter may be greatly reduced by including an oxidation space between the Glover and Gay Lussac towers. R. T.

Separate determination of nitrogen oxides in the gases of Gay Lussac towers. E. V. Juschmanov (Zavod. Lab., 1936, **5**, 1182—1184).—10 litres of gas are passed at the rate of 1 litre per min. successively through 50 ml. of conc. H_2SO_4 and a mixture of 40 ml. of 1% $KMnO_4$ with 10 ml. of 20% H_2SO_4. N_2O_3 ($NO + NO_2$) is absorbed in the first solution; 10 ml. of the acid are added to 8 ml. of 0·3N-$KMnO_4$, excess of which is titrated with standard $FeSO_4$ (29 g. of $FeSO_4,7H_2O$ per litre of 25% H_2SO_4), and the N_2O_3 content is calc. therefrom. 100 ml. of conc. H_2SO_4 are added to 10 ml. of the solution from the second wash-bottle, and the cooled solution is titrated similarly with $FeSO_4$; the NO content in excess of 50% of the N oxides is derived therefrom. HNO_3 is not formed in the first wash-bottle when $[NO]/[NO_2]$ is $\ngtr 1$; should HNO_3 be detected (brucine reaction) 10 ml. of the acid are titrated with $FeSO_4$ (brucine indicator), and hence the $[NO_2]$ is calc. R. T.

Application of absorptional cooling installations to intensification of sulphuric acid manufacture. I. P. Usiukin and V. N. Sutschkov (J. Chem. Ind. Russ., 1936, **13**, 1428—1431).—The velocity of reaction between NO and O_2 and of absorption of NO_2 by aq. SO_2 is much greater at 0° than at 30°; considerable economies are effected by conducting the tower process at 0°. Industrial equipment for this purpose is described. R. T.

Corrosion of lead in the tower process. I. E. Adadurov and A. N. Tzeitlin (Ukrain. Chem. J., 1936, **11**, 368—386).—Corrosion of Pb by the solutions encountered in the tower process may be quantitatively derived from the e.m.f. developed on immersion of Pb plates in the given solution. Corrosion is intensified slightly when the Pb contains Bi, but not Sn, Sb, or Cu. Corrosion is at a max. in 77% H_2SO_4; in more dil. H_2SO_4 it increases with rising $[NO·HSO_4]$, to a greater extent than in more conc. H_2SO_4. Corrosion increases with rising temp. in all cases. R. T.

Use of iron pipes in the tower sulphuric acid process. I. E. Adadurov and A. N. Tzeitlin (Ukrain. Chem. J., 1936, **11**, 408—414).—Corrosion of Fe by circulating 73—78% H_2SO_4 is $\ngtr$ that of Pb; presence of N oxides in the acid greatly enhances corrosion, to an extent directly $\propto$ [$NO\cdot HSO_4$], and inversely $\propto$ [H_2SO_4]. Temp. variations from 20° to 90° do not affect corrosion. R. T.

Concentration of nitric acid by means of phosphoric acid. A. V. Tichonov and J. V. Korzinkina (J. Chem. Ind. Russ., 1936, **13**, 1345—1348).—96—97% HNO_3 is obtained by adding 0·5—1 g.-mol. of P_2O_5 per g.-mol. of H_2O present in the dil. HNO_3, and distilling. The same effect is achieved by a two-stage distillation, taking $H_2O : P_2O_5 = 3 : 1$. R. T.

Preparation of sodium hydroxide and sulphuric acid from mirabilite. I. M. Boguslavski, S. V. Benkovski, and V. E. Sintschuk (J. Chem. Ind. Russ., 1936, **13**, 1467—1473).—Na_2SO_4 is reduced with C to Na_2S, an aq. solution of which is treated with a 20% excess of CuO (95°; 25 min.) to yield NaOH 90, $Na_2S_2O_3$ (I) 3·3, and Na_2CO_3 (II) 7·2%; the content of (I) rises to 7 and of (II) to 13% of the total Na salts during causticisation. The % causticisation is the same for 1—8N-Na_2S, but the rate of sedimentation of CuS is greatly retarded in concns. $>7N$. The washed ppt. contains H_2O 14 and NaOH 0·25%. 88% of the (I) undergoes decomp. during concn. at 180° of the NaOH solution, to yield Na_2SO_4 and Na_2S, and the latter is oxidised to insol. Na_2SO_4 during fusion of NaOH. The final product contains 0·5% of (I). The CuS is heated at 800° in a stream of air, yielding a mixture of SO_2 and SO_3 and regenerating CuO. The loss of Cu involved in the prep. of 1 ton of NaOH and 1·2 tons of H_2SO_4 is 10—15 kg. R. T.

Composition of precipitates forming in apparatus used in soda production, and methods for their elimination. V. E. Vorontschichin (J. Chem. Ind. Russ., 1936, **13**, 1486—1489).—The scale forming in the NH_3-distilling plant consists chiefly of anhyd. $CaSO_4$ (92%), together with SiO_2, $CaSiO_3$, $CaCO_3$, $MgCO_3$, Fe_2O_3, Al_2O_3, $CaCl_2$, and NaCl. The amount of scale forming in the distiller can be greatly reduced by raising the temp. in the pre-limer to 110°, when gypsum undergoes conversion into insol. $CaSO_4$. R. T.

Determination of chlorine ion in solutions encountered in the soda industry. V. E. Vorontschichin (Zavod. Lab., 1936, **5**, 1064—1067).—Mohr's method is recommended. R. T.

Coke-oven gas and the synthesis of ammonia. G. Claude (Chim. et Ind., 1937, **37**, 3—16).—A lecture. The author's contribution to the rise of the synthetic NH_3 industry in France is described, with special reference to the use of H_2 obtained by liquefaction of coke-oven gas. C. R. H.

Mechanism of oxidation of ammonia in presence of platinum. N. A. Figurovski (J. Appl. Chem. Russ., 1936, **9**, 1965—1968).—Polemical, against Adadurov (B., 1937, 33). R. T.

Production of ammonium sulphate without the use of sulphuric acid. P. Leone and M. Bontà (Atti. V Congr. Naz. Chim., 1936, **14**, 777—784).—A process for the manufacture of $(NH_4)_2SO_4$ from SO_2 and NH_3, using Cr compounds as oxidising agents, is proposed. It is based on the following reactions: (1) $Cr_2(SO_4)_3 + 6NH_3,aq. = 3(NH_4)_2SO_4 + 2Cr(OH)_3$; (2) $2Cr(OH)_3 + 2Ca(OH)_2 + 3O = 2CaCrO_4 + 5H_2O$; (3) $CaCrO_4 + CO_2 + 2NH_3,aq. = CaCO_3 + (NH_4)_2CrO_4 + H_2O$; (4) $6(NH_4)_2CrO_4 + 9SO_2 = 6(NH_4)_2SO_4 + Cr_2(SO_4)_3 + 2Cr_2O_3$. Reaction (2) has been studied at various temp. O. J. W.

Properties of ammonium nitrate. P. A. Baranov and I. A. Kresalov (J. Chem. Ind. Russ., 1936, **13**, 1462—1466).—The hygroscopicity of granulated is > that of powdered NH_4NO_3 (I); the advantage of granulation lies in the ease with which damp granules can be distributed over the soil. Absorption of H_2O by (I) is associated with passage of H_2O from the surface to the lower layers, and involves a reduction in the intercryst. spaces. Paraffined, finely-cryst. (I) and mixtures of (I) with phosphorite meal have the least hygroscopicity of a no. of (I) products, together with the most uniform distribution of H_2O throughout the mass. R. T.

Fire and explosion hazards in connexion with ammonium nitrate. G. A. Abinder (J. Chem. Ind. Russ., 1936, **13**, 1351—1354).—NH_4NO_3 is a feeble explosive, and no exceptional fire or explosion hazards are involved in its storage or transport, in any type of container. Explosives should not be used for breaking up caked masses of NH_4NO_3. R. T.

Preparation of ammonium sulphonitrate from gypsum, carbon dioxide, ammonia, and nitric acid. V. A. Klevke (J. Chem. Ind. Russ., 1936, **13**, 1405—1412).—Aq. NH_4NO_3 (I) is diluted to a concn. of 33 g. of (I) per 100 g. of H_2O, and the solution saturated with NH_3 and CO_2, to a concn. of 44 g. of $(NH_4)_2CO_3$ per 100 g. of H_2O. The resulting solution reacts with $CaSO_4$ at 40° to yield a solution of $(NH_4)_2SO_4$ and (I); the $CaCO_3$ pptd. is collected and washed, and the wash-H_2O returned to the initial stage of the process [dilution of aq. (I)]. The final product obtained by evaporation of the filtrate is non-hygroscopic, and does not cake even after prolonged storage. R. T.

Production of 98—99% potassium chloride from crude potassium chloride by washing with dilute brine and water. O. Martens (Kalii, 1934, No. 2, 20—22).—(1) Crude KCl was washed in a mixer with a solution containing KCl 200, NaCl 120, and H_2O 850 g./litre at 8°. (2) The resulting solution and salt were filtered and the filtrate (KCl 150, NaCl 230, H_2O 850 g/litre) was used to dissolve a new batch of sylvinite. (3) The salt was charged into a mixer, washed with cold H_2O, centrifuged, and dried. The solution from the last washing was used in (1). A uniform product containing KCl 99, NaCl $\not>$0·5% was obtained. Ch. Abs. (*e*)

Production of concentrated potassium–ammonium superphosphates. L. E. Berlin and L. S. Goritzkaja (Kalii, 1934, No. 5, 19—27).—Phosphate rock is treated with a mixture of H_2SO_4 and $K_2NH_4PO_4$. Best results are obtained with 50% acid concn. after admixture of the salt. In mixtures prepared with $(NH_4)_2HPO_4$ and KCl an increase in the KCl/NH_4 ratio increases the ratio of

available to total PO_4''' in the product. Storage of the superphosphate does not affect its composition.
Ch. Abs. (*p*)

Polarographic analysis of commercial barium chloride, in relation to the requirements of the U.S.S.R. Bureau of Standards. J. P. Gochschtein (Zavod. Lab., 1936, 5, 28—32).—Fe in $BaCl_2$ is determined polarographically, with an error of $\pm 1\%$, and $BaCl_2$ with an error of $\pm 2\cdot5\%$.
R. T.

Reduction of calcium sulphate suspensions. P. P. Budnikov and E. I. Kretsch (J. Appl. Chem. Russ., 1936, 9, 1929—1936).—A mixture of finely-powdered $CaSO_4 + C$ is poured in a steady stream down a tube heated at 800—1200°; % reduction $\propto$ temp., relative [C], and concn. of mixture in the reaction space, and inversely $\propto$ the diameter of the particles.
R. T.

Reactions of calcium phosphate in aqueous solution at high temperatures. N. N. Korobov, T. I. Kunin, and B. F. Postnikov (J. Appl. Chem. Russ., 1936, 9, 1920—1925).—The content of P_2O_5 sol. in aq. NH_4 citrate after heating $Ca_3(PO_4)_2$ with aq. suspensions of SiO_2 (SiO_2 gel, quartz, emery) at 110—250° is considerably < with H_2O alone, but is increased when $NaHSO_4$, Na_2SO_4, Na_2CO_3, or $(NH_4)_2CO_3$ is substituted for SiO_2.
R. T.

Determination of free arsenic trioxide in calcium arsenite. N. S. Artamonov and Z. C. Bachtiarova (Zavod. Lab., 1936, 5, 1176—1179).—0·2—0·3 g. of Ca arsenite is heated at 250° in a crucible covered with a cooled funnel, the sublimed As_2O_3 dissolved in 30% NaOH, and H_3AsO_3 determined by titration.
R. T.

Dehydration of magnesium sulphate in Gaillard towers. A. S. Mikulinski and A. A. Schtscherbakov (J. Chem. Ind. Russ., 1936, 13, 1354—1356).—Aq. $MgSO_4$, saturated at 20°, falls through a current of air at 200°, to yield $MgSO_4,2H_2O$, which is briquetted. The briquettes, after treatment with saturated $MgSO_4$, are coherent and practically non-hygroscopic, and may be transported without packing.
R. T.

Combined alkaline method for production of alumina. V. A. Mazel (Legk. Metal, 1935, 4, No. 2, 22—31).—In the treatment of bauxites high in SiO_2 by the Bayer process, the residue from the NaOH treatment contains large amounts of Al_2O_3 and Na_2O. It can be sintered with CaO and Na_2CO_3 and the sinter leached with H_2O. The two solutions are then combined.
Ch. Abs. (*e*)

Stabilising solutions of aluminates. B. Gromov (Technika, 1935, No. 25, 414).—Spontaneous decomp. with deposition of $Al(OH)_3$ is avoided by adding an alkaline extract of peat.
Ch. Abs. (*e*)

Use of ozone for purification of zinc sulphate solutions. F. L. Vodret and M. Gallo (Atti V Congr. Naz. Chim., 1936, 14, 938—959).—The use of O_3 is recommended for purifying $ZnSO_4$ solutions prior to the electrodeposition of Zn. Photomicrographs of Zn deposited by electrolysis of impure and purified solutions are shown. The val. of this method of purification in the lithopone industry is also discussed.
O. J. W.

Rapid determination of zinc in sulphide copper ores, concentrates, and tailings. L. M. Jolson and E. I. Dubovitzkaja (Zavod. Lab., 1936, 5, 17—22).—1—2 g. of material are heated at 100° with 10—20 ml. of conc. HNO_3, 2 ml. of H_2SO_4 are added to the product, and the whole is further heated until SO_3 fumes appear. 100 ml. of H_2O are added, followed by a 25-ml. excess of conc. aq. NH_3, the vol. is made up to 200 ml., and the solution filtered. 1 ml. of 10% N_2H_4,HCl is added to 50 ml. of the filtrate at 60°, and C_2H_2 passed in to complete pptn. of Cu. The suspension is filtered, 10 ml. of 20% H_2SO_4 and 1 ml. of 10% $(NH_4)_2S_2O_8$ are added, the solution is evaporated to 50 ml., 5 drops of 1% $NHPh_2$ in H_2SO_4 are added, and the solution is titrated at 50° with aq. $K_4Fe(CN)_6$ containing $K_3Fe(CN)_6$.
R. T.

Volumetric determination of sulphur in pyrites. V. P. Zemlianitzin (J. Chem. Ind. Russ., 1936, 13, 1484—1485).—The results obtained by this method (titration with $AgNO_3$ or Na_2PbO_2) are somewhat < for the gravimetric method, but the rapidity of the methods renders them preferable for factory purposes.
R. T.

Determination of arsenic in ores and products. N. N. Seriukov (Zavod. Lab., 1936, 5, 1067—1069).—1—2 g. of substance are fused with 1 : 2 Na_2CO_3–Na_2O_2, the melt is extracted with 150 ml. of H_2O, the vol. made up to 250 ml., and the solution filtered. 50—100 ml. of filtrate are made acid with 50% H_2SO_4, 0·1*N*-$KMnO_4$ is added to give a pink coloration, and excess of $KMnO_4$ removed by boiling with 3 ml. of EtOH (1—2 min.). 30 ml. of conc. HCl and 5 g. of KI are then added, and the I liberated is titrated with 0·1*N*-$Na_2S_2O_3$; the As_2O_5 content is calc. therefrom.
R. T.

Mineralogical characteristics of smectites. Application to the determination of some fuller's earths susceptible of use as decolorising earths. J. de Lapparent (Ann. Off. nat. Comb. liq., 1936, 11, 863—943).—The *X*-ray absorption spectrum, the absorption or evolution of heat on heating, and the loss of H_2O as a function of temp. were determined for various smectites, *i.e.*, absorbent clays, such as attapulgite and sepiolite, some of which exhibit decolorising properties. Typical French clay deposits are described.
R. B. C.

Absorption of moisture by certain salts and by glucose when stored in atmospheres of varying relative humidity. R. F. Innes (J. Soc. Leather Trades Chem., 1937, 21, 55—64).—NaCl is hygroscopic only in atm. of >80% R.H. and more so at higher than at lower temp. $Na_2SO_4,10H_2O$ (I) is non-hygroscopic. Anhyd. Na_2SO_4 is hygroscopic only in atm. of >70% R.H. and absorbs H_2O until (I) has been formed. $MgSO_4$ and glucose are not very hygroscopic in atm. of <95% R.H., but are more so above that val. NaCl is suitable for curing raw hides in countries where the R.H. is $\not> 80\%$, but Na_2SO_4 (anhyd.) should be used in more humid countries.
D. W.

Rapid determination of small amounts of moisture in salts. I. Veichhertz and S. Katz (J. Chem. Ind. Russ., 1936, **13**, 1490—1494).—The carbide method is recommended for rapid determination in salts of high H_2O content. R. T.

New sources for production of hydrogen. C. Berthelot (Atti V Congr. Naz. Chim., 1936, **14**, 681—686).—The production of H_2 as a by-product in the artificial anthracite industry and by the injection of steam into coke ovens is discussed in regard to their economic application to the hydrogenation of C and of petrol in France and Italy. O. J. W.

Fixation of atmospheric nitrogen. F. Howles (Mem. Manchester Phil. Soc., 1935—6, **80**, 105—110). A lecture. C. R. H.

Oxidation of ammonia to nitrous oxide. V. F. Postnikov, L. L. Kuzmin, and N. K. Tzalm (J. Chem. Ind. Russ., 1936, **13**, 1348—1350).—NH_3–air is passed over a $MnO–Bi_2O_3$ catalyst at 200—300°, when N_2O is obtained in 80—88% yield; the by-products are chiefly N_2, with traces of NO and NO_2. The yield is independent of the $[NH_3]$ of the mixture, but varies with duration of contact. R. T.

Production of crude nitrogen–hydrogen mixture for synthesis of methyl alcohol and ammonia by condensation of coke-oven gas at low temperature and high pressure. P. Sakmin (Brennstoff-Chem., 1937, **18**, 69—71).—By condensation of coke-oven gas at about −160°/50 atm. a gaseous phase of the following composition was separated: O_2 1·0, CO 3·4, CH_4 2·7, N_2 18·4, H_2 74·5%. This gas mixture is suitable for the synthesis of MeOH and NH_3 at $>$1000 atm. The method of separation is more efficient than Claude's process. A. B. M.

Claus process [of sulphur recovery]. D. V. Bezuglii and F. M. Kutzakov (Ukrain. Chem. J., 1936, **11**, 355—367).—Possibilities of intensifying the process are investigated. The % recovery of S from the H_2S varies with the rate of flow of the gas and the thickness of the layer of bauxite catalyst; varying the air content from 1·9 to 2·3 times theoretical does not affect the yield of S. R. T.

Absorption of hydrogen sulphide by thioarsenate solutions. G. O. Nusimov (J. Chem. Ind. Russ., 1936, **13**, 1420—1428).—The % elimination of H_2S from gases by scrubbing with aq. $Na_4As_2S_5O_2$ is independent of temp. from 20° to 40°, of $[H_2S]$, and of $[As_2O_3]$ $>$0·8%; it varies with intensity of scrubbing. R. T.

Determination of arsenic in gases. J. J. Slobodskoi (Zavod. Lab., 1936, **5**, 1185—1189).—The air, containing 0·07—2·3 g. of suspended As_2O_3 per cu.m., is aspirated through a plug of cottonwool, packed tightly enough to give a resistance of 20 mm. Hg to the flow of gas. The plug is then treated with aq. NaOH, and AsO_3''' titrated in the solution. R. T.

Possibilities of lowering loss of iodine involved in its recovery, and of improving the quality of the product. A. G. Baitschikov (J. Chem. Ind. Russ., 1936, **13**, 1479—1483).—The alkalinity and naphthenic acid content of H_2O containing I fall, and the I content rises, during storage in open reservoirs. At the same time a suspension of plant matter forms, which interferes with the process of I extraction, lowering the yield and the purity of the product. Preliminary purification of the H_2O by shaking with kerosene, or by coagulation with $Al_2(SO_4)_3$ (0·37—0·5 g. per litre), raises the yield of I by 30%, and gives a purer product, with a smaller expenditure of reagents. R. T.

Leaching.—See I. **Coke-oven by-products. [Products from] heating wood. Gas-analysis apparatus. $Ca(OAc)_2$ from gas liquor.**—See II. **MgO,Fe_2O_3.**—See IX. **Corrosion of metals and alloys by SO_2.**—See X. **Prep. of $M_2S_2O_8$.**—See XI. **Fertilisers. Determining K in mixed fertilisers.**—See XVI. **Extracting HCN from air of rooms. Accident prevention [with molten NH_4NO_3].**—See XXIII.

See also A., I, 133, **Prep. of colloidal solutions of Au, Pd, Pt, Ag, Se, Te, Mo-blue, and W-blue.** 137, **Systems $NaCl–NH_4Cl–NH_3$, and $CaSO_3–H_3PO_4–H_2O$.** 140, **Electrolysis of H_2O.** 143, **Synthesis of $NaNH_2$.** 146, **Prep. of Hf salts, and of Mg hypophosphate.**

Patents.

Sulphuric acid contact process. J. H. Perry and E. S. Ridler, Assrs. to Grasselli Chem. Co. (U.S.P. 2,031,787, 25.2.36. Appl., 30.11.34).—A 75 : 10—15 : 15—10 mixture of Mg, Al, and Fe^{III} sulphates is dehydrated at 450—500°, granulated, sprayed with aq. $PtCl_4$ containing 0·3% of sugar, and heated to expel the Cl_2. The product is used as the catalyst in SO_2 oxidation. A. R. P.

Concentration of sulphuric acid. M. F. Acken, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,032,457, 3.3.36. Appl., 9.12.32).—H_2SO_4 (93—96%) is distilled with $H_4P_2O_7$ (I) to give a product $\equiv$ 104·5% H_2SO_4. The residue in the still is heated to 520° to regenerate the (I). A. R. P.

Production of concentrated nitric acid. E. I. Du Pont de Nemours & Co. (B.P. 456,446, 8.2.35. U.S., 20.2.34).—The gases from NH_3 oxidation are cooled to remove H_2O and compressed to liquefy most of the N_2O_4; the residual gases are passed into the upper part of a tower down which dil. HNO_3 is trickled to produce 60% HNO_3 at the middle, at which point the N_2O_4 is introduced at 50—80°/20 atm. a little above a series of inlets through which warm compressed air is passed into the tower. A. R. P.

Production of highly concentrated nitric acid. G. P. Davies, and Imperial Chem. Industries, Ltd. (B.P. 456,518, 5.4.35).—The gases from NH_3 oxidation are cooled to remove most of the H_2O and absorbed in 90% HNO_3 at 0—10°/3—5 atm. The solution of N_2O_4 in HNO_3 thus obtained is oxidised with air at 60—120°/50—200 atm., the H_2O necessary to produce HNO_3 being added as dil. HNO_3 obtained by scrubbing with H_2O the effluent gases from the first absorber. A. R. P.

Manufacture of phosphoric acid. R. E. Vivian, Assr. to Gen. Chem. Co. (U.S.P. 2,035,850, 31.3.36.

Appl., 4.4.33).—Crude H_3PO_4 liquor is rendered weakly alkaline to Me-orange, whereby insol. phosphates and F compounds are pptd. H_2SO_4 is added to the clear liquor to form alkali sulphate, which is crystallised out; the mother-liquor is conc. and the remaining sulphate separated. Further purification is effected by treatment with H_2S, H_2SiF_6, and CaO in succession. B. M. V.

Manufacture of caustic soda. H. K. MOORE, Assr. to BROWN Co. (U.S.P. 2,031,844, 25.2.36. Appl., 26.10.33).—Aq. NaOH prepared by addition of CuO to aq. Na_2S is electrolysed (after removal of the bulk of the CuS ppt. by decantation) in a large Fe vessel (as cathode), using a small central anode, and is then heated to coagulate the remainder of the CuS and other colloidal impurities. A. R. P.

Apparatus for manufacture of sodium carbonate monohydrate. W. H. ALLEN, W. A. GALE, and C. F. RITCHIE, Assrs. to AMER. POTASH & CHEM. CORP. (U.S.P. 2,035,441, 31.3.36. Appl., 8.3.33).—The apparatus claimed deals with the last or NH_3-pptn. stage of the process described in U.S.P. 1,937,937 (B., 1934, 1010). The sludge of Na_2CO_3,H_2O is settled as densely as possible from its ammoniacal mother-liquor in an upper chamber of the apparatus, and the underflow after falling through an annular spigot is washed in the lower chamber with the feed liquor, which is "hot carbonate liquor" (cf. U.S.P. 1,836,426; B., 1932, 885), after removal of Na_2SO_4 as burkeite, but before removal of NaCl and addition of NH_3. The overflows of the two chambers are adjusted to such height that the relative *d* of the liquids keeps the interface at the level of the spigot, which is elongated vertically. B. M. V.

Lime kiln. N. E. MCLOON (U.S.P. 2,034,952, 24.3.36. Appl., 21.1.35).—In a shaft kiln, the bottom is triangular in vertical section, a tubular burner is within the apex, and the heating gases pass through apertures in the apex. Poker holes are provided up the shaft. B. M. V.

Treatment of whiting and the like. J. W. CHURCH and R. R. MCCLURE, Assr. to PURE CALCIUM PRODUCTS Co. (U.S.P. 2,034,797, 24.3.36. Appl., 22.8.33. Can., 21.11.31).—Whiting or other alkaline-earth carbonate is prepared for use as filler in paint or rubber by severe and prolonged grinding in presence of 0·1—5·0% of an anti-compactant and interbonding agent of composition $X(CO_2R)_n$, where X is an org. radical and R is H or a metal. B. M. V.

Production of chemical salts. B. G. KLUGH, Assr. to SWANN FERTILIZER Co. (U.S.P. 2,034,582, 17.3.36. Appl., 7.10.31).—The apparatus comprises an edge-runner mill with means for admitting reagents gradually into an already formed mass of dry crystals and for condensing any evolved H_2O and returning it to the reaction zone or removing it. NH_4 phosphate may be manufactured from gaseous or liquid anhyd. NH_3 and H_3PO_4 of such concn. that the product is dry. B. M. V.

Drying of inorganic salts and sludges. D. J. VAN MARLE, Assr. to BUFFALO FOUNDRY & MACHINE Co. (U.S.P. 2,034,599, 17.3.36. Appl., 10.7.33).—A drying drum, smooth and composed of Cr-Fe-Ni alloy of austenitic grain, is maintained at a temp. > the b.p. of the solution of Na_2SO_4, Na_2SO_3, $(NH_4)_2HPO_4$, Na_2HPO_4, Na_2CO_3, NaCl, or of K salts which is being evaporated. The entire hardened coating of salt is removed from the drum at every revolution. B. M. V.

Plant for concentration of salt water. P. A. BARREAU (B.P. 460,351, 29.5.36. Fr., 6.6.35).—The brine is cascaded over faggots which are stacked with wide open spaces. B. M. V.

Preparation of stable alkali polysulphides and of preparations containing them. O. RÖHM (B.P. 453,266, 31.3.36. Ger., 1.4.35).—The use of alkali thiocyanates as stabilising agents is claimed; stable polysulphide products suitable for use as vermicides are prepared, *e.g.*, by fusing a mixture of $Na_2S,10H_2O$ 65, NaCNS 8·5, and S 26·5, and adding soap powder 200 pts. L. C. M.

Cooling of molten material [cyanide]. E. J. PRANKE, Assr. to E. I. DU PONT DE NEMOURS & Co., INC. (U.S.P. 2,031,790, 25.2.36. Appl., 12.10.31).—The molten cyanide is run from the furnace on to a rotating, slightly inclined drum, to cool the salt in thin layers. A. R. P.

Manufacture of tetraphosphates. A. H. FISKE and C. S. BRYAN, Assrs. to RUMFORD CHEM. WORKS (U.S.P. 2,031,827, 25.2.36. Appl., 7.12.34).—P_2O_5 (2) is mixed with powdered NaOH (6 mols.), whereby a vigorous reaction occurs with evolution of H_2O and formation of $Na_6P_4O_{13}$. A. R. P.

Manufacture of calcium chlorite. G. P. VINCENT, Assr. to MATHIESON ALKALI WORKS, INC. (U.S.P. 2,031,681, 25.2.36. Appl., 3.5.35).—A suspension of $Ca(OH)_2$ (18·3 g.) in aq. $Ca(ClO_3)_2$ (I) (52 g./100 c.c.) is treated with ClO_2, whereby $Ca(ClO_2)_2$ (II) is pptd. and the solution becomes richer in (I). The mother-liquor is diluted to the original concn. for re-use. At 25° the solubility of (II) in 52% aq. (I) is 4·3 g./100 c.c.; addition of NaCl reduces this appreciably. A. R. P.

Dry soluble chlorine compound. A. H. JOHNSON and H. A. TREBLER, Assrs. to SEALTEST SYSTEM LABS., INC. (U.S.P. 2,032,173, 25.2.36. Appl., 3.8.35).—Claim is made for a mixture of $Ca(OCl)_2$ and sufficient $Na_6P_6O_{18}$ to prevent pptn. of a Ca compound when the mixture is dissolved in H_2O. A. R. P.

Decolorising [native] gypsum. F. L. MARSH, Assr. to BEST BROTHERS KEENE'S CEMENT Co. (U.S.P. 2,031,898, 25.2.36. Appl., 18.9.33).—The mineral is ground, mixed with sufficient H_2SO_4 to react with the contained $CaCO_3$, and calcined to remove H_2O and org. matter. A. R. P.

Manufacture of zinc oxide. SOC. ITAL. PIRELLI (B.P. 453,318, 2.12.35. It., 30.1.35).—Ground calcined calamine (55% ZnO; 100 g.) is boiled with aq. 20% NaOH (1 litre) for several hr. and the decanted clear solution treated with CO_2 until ZnO begins to be pptd. The calc. amount of $NaHCO_3$ is then added during vigorous agitation of the hot solution, and the ZnO washed and dried. The aq. Na_2CO_3 is recausticised with CaO, and the $CaCO_3$ produced utilised as a source of CaO and CO_2. L. C. M.

Manufacture of precipitated zinc oxide. G. Antonoff (B.P. 459,238, 5.6.35 and 1.5.36).—Shrinkage of the oxide after washing for removal of any SO_4'' or Cl' is avoided if these are replaced by CO_3'' or SO_3'', the latter being conveniently introduced into the basic pptg. solution (aq. NH_3) of controlled dilution and subsequently eliminated by heat. NH_3 is recovered by pptn. with a Ba compound, $BaSO_4$ being formed as a by-product. W. J. W.

Manufacture of anhydrous ferric sulphate. W. W. Groves. From Monsanto Chem. Co. (B.P. 459,436, 4.6.35).—A solution of $Fe_2(SO_4)_3$ (I), containing 3—10% of free acid and prepared by treating burnt pyrites with H_2SO_4, is mixed with anhyd. (I) in amount sufficient to remove all the H_2O of dissolution, the temp. and acidity of the solution being controlled so as to prevent the formation of insol. products. W. J. W.

Recovery of beryllium compounds from beryllium-containing minerals. Deuts. Gold- u. Silber-Scheideanstalt vorm. Roessler (B.P. 457,315, 11.6.36. Ger., 20.6.35).—Beryl is heated at 400—450° in a closed tube with NH_4F or NH_4HF_2 in amount < that necessary to convert all the Be into $(NH_4)_2BeF_4$, and the resulting BeF_2 is extracted from the residue by leaching with hot H_2O. A. R. P.

Base-exchanging material for bringing about ion exchanges. S. Møller (B.P. 459,286, 16.3.36. Addn. to B.P. 456,344; B., 1937, 36).—A mineral from the Faroe Islands, containing SiO_2 40·87—34·28, Fe_2O_3 1·47—3·54, Al_2O_3 34·5—31·74, CaO 1·04—0·85, TiO_2 2·52—2·19%, Na_2O, and K_2O, is treated with a non-alkaline alkali salt (Na_2SO_4, NaCl) or its solution. W. J. W.

Coated catalysts. A. O. Jaeger, Assr. to Amer. Cyanamid & Chem. Corp. (U.S.P. 2,035,606, 31.3.36. Appl., 30.4.31).—Quartz or other non-porous siliceous material, previously etched with HF or NaOH, is coated with active material (metal, metal salt, or metal oxide catalysts) by spraying with an aq. solution at elevated temp. The catalyst used may be varied according to the reaction under consideration, *e.g.*, NH_4 vanadate, $Ni(NO_3)_2$, salts of Mo, Cr, Cu, etc. D. M. M.

Preparation of manganese phosphates. C. F. Booth, Assr. to Swann Res., Inc. (U.S.P. 2,031,579, 18.2.36. Appl., 13.4.33).—Aq. $MnSO_4$ is treated with Na_2CO_3 to p_H 7·3 and the ppt. of basic Mn carbonate is dissolved in H_3PO_4 to produce a dry phosphate. A. R. P.

Purification of titanium suboxide materials. F. von Bichowsky, Assr. to Krebs Pigment & Color Corp. (U.S.P. 2,031,750, 25.2.36. Appl., 23.2.35).—Ti_3O_5 from high-temp. reduction of ilmenite is treated with CaF_2 and H_2SO_4, or heated with CaF_2 and NH_4Cl to volatilise the Si as SiF_4. A. R. P.

Manufacture of titanium dioxide. Amer. Zinc, Lead & Smelting Co. (B.P. 456,544, 5.7.35. U.S., 12.7.34).—A 10—20% solution of $Ti(SO_4)_2$ (2 vols.) at 80° and a 0·75% solution of dextrin (2 vols.) at 80° are added simultaneously at a const. rate to 1 vol. of H_2O at 90° and the mixture is boiled until the dextrin is converted into sugar. The $TiO(OH)_2$ ppt. is washed and calcined at 800°. A. R. P.

Decomposition of substances containing tungsten sulphide. G. W. Johnson. From I. G. Farbenind. A.-G. (B.P. 458,699, 3.9.35).—Spent WS_3 catalyst from coal or tar hydrogenation is packed into a tower up which hot air is passed to burn the org. matter and roast the WS_3 to WO_3. The product is extracted with 10% aq. NH_3 containing some H_2S, >90% of the W dissolving in 6—12 hr. at 65—85°. A. R. P.

Oxidising catalysts [for carbon monoxide]. J. C. W. Frazer (U.S.P. 2,031,475, 18.2.36. Appl., 25.6.31).—The gas mixed with O_2 is passed at 200° over CuO,Cr_2O_3 made by dissolving $Cu(OH)_2$ in aq. CrO_3, evaporating the solution to dryness, and calcining the residue. A. R. P.

Production of hydrogen peroxide. Elektrochem. Werke München A.-G. (B.P. 453,458, 14.6.35. Ger., 16.6.34).—An electrical discharge is passed through a preheated stream of H_2 and O_2, saturated with H_2O, at >40°; aq. H_2O_2 is removed from the treated gases by cooling, and the residual gases, reheated by heat exchange with the treated gases, are resaturated with H_2O and returned to the circuit. L. C. M.

Vacuum distillation of hydrogen peroxide and other easily decomposable liquids. J. Mercier (B.P. 457,291, 21.8.35. Fr., 21.8.34).—The apparatus used comprises a feed tank, an intermediate heating tube for regulating the flow, an evaporator, a condenser, and a receiver, the feed tanks and receiver being connected to the same vac. system. A. R. P.

Ozonisers. M. Prat (B.P. 457,699, 8.5.36. Fr., 11.5.35).—In an ozoniser comprising a discharge space between two concentric tubes at least one of which is of insulating material, a circulating conducting fluid is used for cooling the insulating tube and also forms one electrode, and a circulating non-conducting fluid liquid serves to cool the conducting tube, which forms the other electrode, or, if it also is an insulator, a conducting coating is provided for the purpose. B. M. V.

Production of nitrogen or of a nitrogen–hydrogen mixture from ammonia. Gen. Electric Co., Ltd., I. Jenkins, and S. V. Williams (B.P. 453,307, 23.8.35).—The apparatus consists of an Fe cylinder filled with broken firebrick coated with an NH_3-cracking catalyst; the cylinder is heated at 1000° by the combustion of a coal gas–air mixture, which is then replaced by a 3 : 1 air–NH_3 mixture. The gases produced are dried and can be utilised in bright-annealing. L. C. M.

Sulphur burner. I. Bencowitz, Assr. to Texas Gulf Sulphur Co. (U.S.P. 2,031,403, 18.2.36. Appl., 12.3.32).—Molten S is sprayed into a heated combustion chamber where it meets a whirling current of hot air, the resulting mixture then passing through a tortuous path in a chequerwork chamber. A. R. P.

Manufacture of sulphur dioxide. B. E. F. Rhodin, Assr. to A. H. Chitty and D. Munroe (U.S.P. 2,031,504, 18.2.36. Appl., 18.11.31).—Details of a shaft furnace for the suspension-roasting of fine pyrites in a down-draught of air and for removing the SO_2 and Fe_3O_4 produced are claimed. (Cf. B.P. 442,437; B., 1936, 369.) A. R. P.

Desulphurisation of gases. SULFUR-CHEMIE A.-G. (B.P. 459,418, 2.3.36. Ger., 25.3.35).—A thiosulphate solution is activated by vigorous agitation and the introduction of gases containing H_2S and SO_2, the solution being kept neutral, so that 90—95% of the S is pptd. in a flaky form and no polythionates are formed. The activated solution is employed to remove the S from the remaining gases. W. J. W.

Washing out gaseous weak acids from gases. COUTTS & Co., and F. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 457,343, 4.6.35).—CO_2, H_2S, or SO_2 is absorbed from admixture with air by passing the gases through conc. solutions of an alkali, alkaline-earth, or strong org. base ($\nless 2$N) salt of an NH_2-, NH-, or *tert.* N acid derived from a primary, *sec.*, or *tert.* amine containing $\nless 2$N, *e.g.*, $C_2H_4(NH_2)_2$. 29 examples are given. A. R. P.

Recovering acidic gases from gaseous mixtures. R. R. BOTTOMS, Assr. to GIRDLER CORP. (U.S.P. 2,031,632, 25.2.36. Appl., 21.6.34).—In the removal of H_2S and CO_2 from gas mixtures by scrubbing with aq. $N(C_2H_4{\cdot}OH)_3$, 0·1—2% of $NaAsO_2$ or $NaVO_3$ is added to the solution. A. R. P.

Production of chlorine dioxide. L. MELLERSH-JACKSON. From MATHIESON ALKALI WORKS (B.P. 456,569, 28.5.36).—Cl_2 is bubbled through a 45% solution of $NaClO_2$ at 20—25°. The process may be used for separating Cl_2 from admixture with ClO_2. A. R. P.

Obtaining rare gases. I. G. FARBENIND. A.-G. (B.P. 458,371, 17.6.35. Ger., 16.6.34).—Liquid O_2 obtained from air in a rectifier and containing rare gases of higher b.p., especially Kr, and usually hydrocarbons of still higher b.p., is partly distilled while flowing through a tube of narrow bore, the vapour being returned to the rectifier and the concurrent passage of liquid and vapour through the still being effected by gravity alone. B. M. V.

Calcium hypochlorite pellet. W. S. BACHMAN (B.P. 457,416, 8.11.35).—See U.S.P. 2,023,459; B., 1936, 1037.

Flotation-separation apparatus.—See I. **Treating waste wood-pulp liquors.**—See V. **Marble.**—See IX. **Soft-soldering fluxes. Pptg. Cu from solutions. Te from Pb etc. [NaOH] electrolytic cells. HF from Al-electrolysis cells.**—See X. **Determining O_2 and CO_2 content of gases.**—See XI.

VIII.—GLASS; CERAMICS.

Swelling of sand. A. S. VASILIEV (Kolloid. Shurn., 1935, **1**, No. 2, 51—59).—Quartz sand, treated with conc. HCl and washed, quickly absorbs $Ca(OH)_2$ and sets. Subsequently the formation of $CaSiO_3$ takes place slowly. J. J. B.

Philippine bagasse ash as a raw material for glass-making. S. DEL MUNDO (Philippine J. Sci., 1936, **60**, 125—135).—Green bottle glass was made from the ash by suitable admixture of Na_2O, K_2O, or CaO. J. A. S.

Determination of sulphate in glass-furnace charges. M. A. FREZE and N. A. FREZE (Zavod. Lab., 1936, **5**, 1194—1196).—Blacher's method (cf. Zink and Hollandt, B., 1914, 803) is preferred. R. T.

Glasses coloured by carbonaceous matter. IV. K. FUWA (J. Soc. Chem. Ind. Japan, 1936, **39**, 398—400B; cf. B., 1937, 138).—A method for the micro-determination of C in glasses is described. The ground sample is dissolved in HF–H_2SO_4 in an inert atm. and then heated in a closed evacuated tube with H_2SO_4 and $K_2Cr_2O_7$ until interaction is complete. The gas generated is transferred to a second vessel, the CO oxidised to CO_2, and the CO_2 absorbed in NaOH. The brownish-yellow colour of the glasses is due to a suspension of colloidal C. T. W. P.

Surface tension of molten glass. W. B. PIETENPOL (Physics, 1936, **7**, 26—31).—A modified bubble method of determining γ for glasses at temp. up to 200° above the annealing point is described. Vals. of 230—360 dynes per cm. were obtained for six glasses investigated in this temp. range. A. J. E. W.

Electrical conductivity of glass. III. Current–voltage relationships with highly resistant layers. H. R. KIEHL (Physics, 1936, **7**, 20—25).—The formation of highly resistant layers on glass in the neighbourhood of electrodes is discussed. In absence of such layers Ohm's law is valid; the character of the current–voltage relationships after the layers are formed depends on their nature. A. J. E. W.

Scratch-resisting power of glass and its measurement. J. BAILEY (J. Amer. Ceram. Soc., 1937, **20**, 42—52).—The mechanism of the disruption of a glass surface by pressure is discussed and illustrated. Distinction is drawn between abrasion and crack formation. The formation of a scratch depends not only on the nature of the glass, but also on the velocity and softening temp. of the scratching point. A test apparatus consists of a lever system which exerts a gradually increasing pressure on a $\frac{1}{8}$-in. diameter steel ball as it is rolled along the surface being tested at a velocity of 0·5—1 mm./sec. The pressure corresponding to the initial formation of conchoidal fractures is noted. The hardness of a fire-polished surface was found to vary greatly from point to point (20—43 lb.), and a ground and polished surface is necessary when the effect of glass composition is being studied. J. A. S.

Rôle of chemistry in polishing processes. I. V. GREBENCHTSCHIKOV (Sozial. Rekonstr. Nauk., 1935, No. 2, 22—23).—The greatest thickness of a polished layer of glass is obtained by use of H_2O acidified to p_H 3·8, and the least thickness with transformer oil. NaF and certain salt solutions retard polishing. H_2O acts hydrolytically on polished glass, basalt, or felspar, forming a protective covering layer of silicic acid of thickness 14—70 A. Fe_2O_3, calcined at 750°, at the highest dispersion is adsorbed simultaneously by the SiO_2 film and by the surface of the resin polishing composition. In polishing metals a protective oxide layer is formed. Polishing steel in H_2 or by connecting with a cathode is slower than in H_2+H_2S or air, or when connected to an anode. Polishing powders (Cr_2O_3, $K_2Cr_2O_7$, and S are best) absorb the fatty part of the stearic acid mol. (I) used as a lubricant and are deposited on it in a unimol. layer. Acid parts of (I) combine with surface oxides. Connexion between metal and polishing material is broken during movement of the metal, and then re-established. Ch. Abs (*p*)

Laminated safety glass. R. H. McCarroll (J. Soc. Auto. Eng., 1937, **40**, 11—12T).—The process employed by the Ford Motor Co. for the manufacture of the above is described. R. B. C.

Effect of zirconium and titanium dioxides on resistance to crazing of a typical glaze for semi-vitreous dinnerware. J. W. Hepplewhite (J. Amer. Ceram. Soc., 1937, **20**, 60—61).—Additions of ZrO_2 (4%) and TiO_2 (2%) increase the resistance to crazing without adversely affecting the colour and finish. Greater amounts may cause development of matt finish (ZrO_2) or yellow colour (TiO_2). J. A. S.

Effect of various zirconium and titanium compounds on a glaze. C. J. Kinzie and C. H. Commons, jun. (Bull. Amer. Ceram. Soc., 1937, **16**, 1—4).—Extensive data on the quality and thermal expansion of various glaze compositions are recorded. J. A. S.

Cultivation of crystals on glazes. J. W. Mellor (Trans. Ceram. Soc., 1937, **36**, 13—15).—The production of decorative patterns by the crystallisation of colouring salts on glazed tiles is described. The pattern is fired on. J. A. S.

Retrospection. J. W. Mellor (Trans. Ceram. Soc., 1937, **36**, 44—48).—Further comments on the author's previous papers on the crazing, peeling, and spitting-out of glazes (cf. B., 1936, 496, 989, 1040). J. A. S.

Synthetic enamels. R. C. Martin (Metal Ind., N.Y., 1936, **34**, 60—61).—Their nature, uses, and advantages are outlined. L. S. T.

Porcelain enameling. W. J. Miskella (Metal Ind., N.Y., 1936, **34**, 96—98).—The dry and wet processes are described, together with raw materials and methods of application. L. S. T.

Mechanics of enamel adherence. XIII. Review of the theoretical explanations for formation of metal particles in "cobalt" groundcoats and some pertinent experiments. R. M. King (J. Amer. Ceram. Soc., 1937, **20**, 53—55; cf. B., 1936, 1040).—*X*-Ray analysis of a fired Co groundcoat showed the presence of Fe_3O_4, FeO, and Fe. Metallic particles (Fe ?) were observed in a Fe_3O_4 enamel. Luther's theory of simultaneous oxidation and reduction may explain these reactions. J. A. S.

Ferric oxide colours. G. E. Meir and J. W. Mellor (Trans. Ceram. Soc., 1937, **36**, 31—43).—A general discussion of the subject. J. A. S.

Discoloration of chrome-green colours. J. W. Mellor (Trans. Ceram. Soc., 1937, **36**, 28—30).—Discoloration may be caused by (1) an insufficiently reducing fire, (2) certain secondary colour constituents (*e.g.*, SnO_2, ZnO), (3) certain glaze compositions (*e.g.*, lack of SiO_2, excess of B_2O_3, presence of $BaSO_4$). J. A. S.

Chemistry of the chrome–tin colours. J. W. Mellor (Trans. Ceram. Soc., 1937, **36**, 16—27).—The constitution and production of the various colours are discussed in detail. The "pink" is probably a dispersion of Cr_2O_3 on the inert SnO_2. J. A. S.

Cobalt and nickel colours. J. W. Mellor (Trans. Ceram. Soc., 1937, **36**, 1—9).—A review of the subject. J. A. S.

Changes in structure of Central Asiatic clays under the influence of peptisation. V. G. Zaprometov, L. V. Smolina, and A. Schamsiev (Kolloid. Shurn., 1936, **2**, 3—15).—The plasticity of clays is increased, and their filtration rate and sorption velocity are diminished, by peptisation with 0·01*N*-Na tartrate in 0·002*N*-NaOH or with alkaline straw extract. R. T.

Influence of adsorptivity of clay and composition of sorption complexes of clay on its ceramic properties. O. V. Tereschtschenko and B. E. Pindrik (Ukrain. Chem. J., 1936, **11**, 387—407).—The plasticity of clay varies with the nature and concn. of adsorbed substances (NaCl, $Na_2C_2O_4$, humic acids, dextrin). R. T.

De-airing [of clay] in the auger machine without vacuum pump. W. D. Richardson (Bull. Amer. Ceram. Soc., 1937, **16**, 14—16).—Effective de-aëration is secured in an ordinary machine with a conical barrel. The air is expressed at the hopper instead of being carried forward. J. A. S.

Development of a successful periodic humidity dryer for grogged ware. A. C. Gerber (J. Amer. Ceram. Soc., 1937, **20**, 56—59).—The construction and operation of a 72-hr. schedule, sanitary-ware dryer are described. J. A. S.

Carolina stone. J. H. Weis and J. E. Boyd, jun. (J. Amer. Ceram. Soc., 1937, **20**, 62—63).—Cornish stone may be substituted, for pottery use, by partly "altered" North Carolina felspars. J. A. S.

Contribution of mineralogy to ceramic technology. W. J. McCaughey (J. Amer. Ceram. Soc., 1937, **20**, 31—42).—The Orton Memorial Lecture. The applications of microscopical and *X*-ray methods to the study of practical silicate and other systems are described, with special reference to cases where the phase-rule deductions give anomalous indications. J. A. S.

Bibliography of ceramic microscopy. T. N. McVay [with K. E. Buck] (Bull. Amer. Ceram. Soc., 1937, **16**, 33—64).

Rapid determination of moisture in unbaked brick. S. Karpatschev, S. Rempel, and A. Sesjunin (Zavod. Lab., 1936, **5**, 1225—1226).—The H_2O content $\propto \kappa$. R. T.

Testing the resistance of ceramic materials to changes in temperature. R. Barta (Bull. Amer. Ceram. Soc., 1937, **16**, 5—7).—The tile is chilled from 300° by placing it, glazed side downwards, on a trough of cold Hg. The total length of the cracks formed per unit area (L) (revealed by wiping with stained wax) is measured. $L = a + kt$, where a is the apparatus const., k is characteristic of the material, and t is the temp. interval. J. A. S.

Spontaneous rupture of aged pottery. J. W. Mellor (Trans. Ceram. Soc., 1937, **36**, 10—12).—Cases of delayed cracking of plates are described. The phenomenon is due to internal strains set up by sluggish thermal contraction. J. A. S.

Specification of silica bricks for coke ovens. A. Kôra (J. Fuel Soc. Japan, 1937, **16**, 1—4).—Fe_2O_3, Al_2O_3, and CaO contents 1·5—3·0, $\not>$1·5, 1·5—3·5%, respectively; refractoriness > cone 32; under-load refractoriness 2 kg./sq. cm., 1500—1600°; d <2·35; porosity 22—28%; compressive strength >180 kg./sq. cm.; thermal expansion (permanent) 0·5—0·7% and (reversible) 1·35—1·5%, at temp. not given. J. A. S.

Analysis of carborundum and of refractory carborundum articles. V. F. Vepritzkaja (Zavod. Lab., 1936, **5**, 1191—1194).—Total and free SiO_2 are determined by known methods. SiC is determined in the SiO_2-free residue obtained by treatment with H_2SO_4–HF; the residue is fused with 97·5 : 2·5 Na_2CO_3–KNO_3, and SiO_2 formed is isolated and weighed. Total C is determined by fusion with Pb, followed by combustion of the melt at 1100° in a stream of O_2; the CO_2 produced is measured. Graphite is determined similarly, but in absence of Pb. R. T.

Refractory cements etc.—See IX. **Plastics [and safety glass].**—See XIII. **H_2O-pipes.**—See XXIII.

See also A., I, 118, **PbO–SiO_2 glasses.** 137, **Fusion diagrams of systems with CaO and BeO. System CaO–B_2O_3–SiO_2.** 149, **Determination of Al_2O_3.** 153, **Sealing wires into glass.**

Patents.

Purification of silica [sand]. R. Hutchinson and W. H. Reynolds (B.P. 456,513, 7.5.35).—The sand is heated at 500—650° in a stream of coal gas, quenched in H_2O, boiled in dil. H_2SO_4 (d 1·14—1·22) to remove the surface Fe, washed, and calcined in air. A. R. P.

Purification of glass sand. R. R. McGregor and E. W. Tillotson, Assrs. to Macbeth-Evans Glass Co. (U.S.P. 2,031,969, 25.2.36. Appl., 30.8.34).—The sand is heated at 420—430° with powdered borax or an alkali carbonate or phosphate, and then extracted with hot dil. HCl to remove surface impurities. A. R. P.

Electrically heated glass-tank furnaces. H. J. Bivort (B.P. 458,062, 19.3.36. Belg., 22.3.35).—Arrangement of electrical radiant heaters in the roof is described. B. M. V.

Cooling devices for tempering glass. Herzogenrather Glaswerke Bicheroux & Co. G.m.b.H. (B.P. 458,790, 27.6.35. Ger., 9.3.35).—The cooling air is emitted through convergent–divergent nozzles shaped (to a given formula) so as to form jets substantially free from turbulence and giving a velocity > that of sound. B. M. V.

Fining of borosilicate glasses. H. P. Hood, Assr. to Corning Glass Works (U.S.P. 2,035,318, 24.3.36. Appl., 8.5.34).—A borosilicate glass of usual composition and containing Fe^{II} is melted with 2—5% of a chloride (I) and sufficient reducing agent to keep the Fe reduced, at such temp. that a substantial part of the (I) is volatilised, the final proportion being 0·05—0·2% Cl. B. M. V.

Refractory glasses. Gen. Electric Co., Ltd., and J. H. Partridge (B.P. 458,881 and 459,065, [A] 11.11.35 and 27.4.36, [B], 25.11.35).—(A) Glasses similar to those described in B.P. 426,129 (B., 1935, 496), but having a softening point as high as 1000° and capable of being founded at 1600°, contain SiO_2 50—70, Al_2O_3 25—35, CaO 6—11, MgO and/or BaO, ZnO, or ThO_2 1—6%. (B) A glass with a high softening temp. and electrical resistivity, and a coeff. of expansion of $(3—5) \times 10^{-6}$, contains SiO_2 $\not>$55, CaO $\not>$12, CaO + ZnO $\not<$13·5, Al_2O_3 $\not<$20, alkali <2%. B_2O_3, MgO, BaO, or P_2O_5 may also be present to limited extents. J. A. S.

Photoluminescent glass. I. G. Farbenind. A.-G. (B.P. 460,210, 22.7.35. Ger., 21.7.34).—A batch containing P_2O_5 in an amount $\not<$20% of the acid constituents, and a compound of an excitable metal, *e.g.*, Cu, Bi, Cd, Sn, etc., is melted under reducing conditions. A reducing flame may be used or carbonaceous matter may be added to the batch, consisting of, *e.g.*, H_3PO_4 (d 1·75) 1000, $BaCO_3$ 175, Al_2O_3 70, MgO 55, CuO 10, sugar 25 pts. J. A. S.

Coating [glass] surfaces with fluorescent materials. Brit. Thomson-Houston Co., Ltd., and J. A. V. Fairbrother (B.P. 453,507, 12.3.35).—The surface is etched by treatment with aq. 2—3% HF for 1 min., the etching solution then removed, and the fluorescent material dusted on in the form of a fine powder, which adheres to the jelly-like etched surface on drying. L. C. M.

High-electrical resistant, soft glass composition. W. C. Taylor, Assr. to Corning Glass Works (U.S.P. 2,038,690, 28.4.36. Appl., 7.2.34).—Glass suitable for electric lamp parts is claimed containing SiO_2 55—60, Na_2O 3—4, K_2O 8—10, PbO 19—21·5, BaO 6·5—7·3, and B_2O_3 1—1·1%, the K_2O/Na_2O ratio being 2·4 : 1. D. M. M.

Colouring agents for glass batches and their employment. E. I. Du Pont de Nemours & Co. (B.P. 459,886, 17.7.35. U.S., 18.7.34).—Glasses which are coloured in the pot (and therefore do not require reheating in order to " strike " the colour) are produced by admixture of Cd, CdSe, or Cd_2SeS to the usual SeS + CdS, without the necessity of further reducing agents. J. A. S.

Manufacture of laminated glass. F. L. Bishop (U.S.P. 2,040,238, 12.5.36. Appl., 25.2.33).—A glass sheet is passed along a conveyor, beneath a flow machine which feeds on to it a liquid strengthening material (*e.g.*, solution of a synthetic resin) of such η that it cuts off along the edges of the glass sheet. A second glass sheet is then placed on top of the first and the whole dried. D. M. M.

Production of decorative [enamel] surfaces [on copper]. K. Turk, Assr. to Porcelain Enamel & Manufg. Co. of Baltimore (U.S.P. 2,032,236, 25.2.36. Appl., 28.1.33).—The enamel has the following approx. composition: SiO_2 59·2, borax 8·45, $NaNO_3$ 6·9, cryolite 6·95, Na_2CO_3 6·95, CaF_2 2·91, PbO 25, TiO_2 6·2, K_2HPO_4 1·9, $BaCO_3$ 9, NiO 0·755, FeO 0·1, and $KMnO_4$ 0·145 pts. The frit is fired on at 815°. A. R. P.

Apparatus for de-airing clay and similar plastic substances. J. M. and C. L. Willis (B.P. 460,785, 31.8.35).—At the base of the vac. chamber paddles and/or rollers are provided to urge the de-aired clay into the worm of the pug mill. B. M. V.

Conditioning of freshly quarried clay. Bird Machine Co. (B.P. 459,778, 7.5.35. U.S., 18.1.35).—A slurry of $\nless 15\%$ of solids is continuously centrifuged to delete one or two oversize products, and the remainder is subjected to combined electrophoresis and centrifugal treatment to separate fine solids as a plastic mass with $\nless 50\%$ of solids, which is then extruded and dried in small discrete masses. B. M. V.

Firing of porcelain or ceramic material in electrically or indirectly heated tunnel furnaces. Keramische Industrie-Bedarfs-A.-G. (B.P. 460,386, 26.11.35. Ger., 22.12.34 and 4.10.35).—In the manufacture of dead-white porcelain or the like a reducing atm. is produced at suitable points only in the kiln by the volatilisation and burning of oil or the like placed in the centre of the charge on a truck, also introduced through the walls of the kiln if desired. B. M. V.

Manufacture of bricks or the like. G. E. Rogers (B.P. 457,884, 4.6.35. Addn. to B.P. 426,444; B., 1935, 546).—Rollers for embedding the sand are described. B. M. V.

Abrasive articles. Bakelite, Ltd. From Bakelite Corp. (B.P. 457,963, 13.6.35).—A fibrous base is coated with an emulsion of a penetrative synthetic resin varnish (oil-sol. phenolic) and a non-solvent (H_2O), the abrasive particles are applied, and the coating is hardened. B. M. V.

Production of abrasive grain and rubber mixes for manufacture of bonded abrasive articles. Carborundum Co. (B.P. 460,226, 23.7.35. U.S., 5.10.34).—A mixture of the grains, an artificial dispersion of rubber (coagulated rubber, bentonite, and H_2O), and a vulcanising agent is dried, heated at 107—120° until disintegratable, and then disintegrated to form a distributable mixture. B. M. V.

Manufacture of grinding wheel. W. L. Howe, Assr. to Norton Co. (U.S.P. 2,034,721, 24.3.36. Appl., 6.9.33).—An already formed wheel having a vitrified bond is reheated to the softening point and cooled from the centre outwards, so that when wholly cool the circumference is in tension and the inner part in compression. B. M. V.

Manufacture of compact bodies [sparking-plug insulators] consisting of pure magnesium oxide or beryllium oxide. R. Reichmann, Assr. to Siemens & Halske A.-G. (U.S.P. 2,033,300, 10.3.36. Appl., 20.2.33. Ger., 19.11.32).—A sparking-plug insulator is composed mainly of Be_2O_3 or MgO, a mixture thereof with 0·10—0·012 mol. of other non-plastic oxide (*e.g.*, MgO, Al_2O_3, or Be_2O_3) being sintered at 1700—1800°. B. M. V.

[Frame] apparatus for tempering glass sheets. Amer. Securit Co., Assees. of D. H. Goodwillie (B.P. 459,870, 16.7.35. U.S., 16.7.34).

Means for manufacturing [moulding and pressing] clay and marl products such as bricks, tiles, and the like. H. Leigh (B.P. 460,695, 23.6.36).

Spun-glass heat insulation. Drying semi-plastic material etc.—See I. **Metal articles for enamelling. Enamel-coated wires.**—See X. **Wire-glass seals.**—See XI.

IX.—BUILDING MATERIALS.

Influence of size of particles and of different salts on the heat of hardening and the mechanical properties of Portland cement. P. P. Budnikov and L. G. Gulinova (J. Appl. Chem. Russ., 1936, **9**, 1937—1950).—The heat of hydration of cement is reduced by addition of 1—2% of $MgCl_2$, and increased by $CaCl_2$, $AlCl_3$, or burnt dolomite. The setting time is also shortened by the above salts, and in particular by Na_2SiF_6. The mechanical strength of the product is augmented by the above salts (except Na_2SiF_6), and reduced by addition of $BaCl_2$, Na_2CO_3, $Ca(OH)_2$, or NaOH. The rate of evolution of heat is inversely $\propto$ the diameter of the particles of cement. R. T.

Mixed Portland cements. XVI. K. Inoue and S. Nagai (J. Japanese Ceram. Assoc., 1936, **44**, 617—637; Zement, 1937, **26**, 92).—Cements containing siliceous admixtures can be classified according to their sol. SiO_2. Mixed cements generally have lower *d*, longer setting times, higher SiO_2 and lower CaO contents than pure Portland cements. They have good strength when mixed to Japanese standard damp consistency, but are inferior to Portland cement when mixed to plastic consistency. They show better resistance to 10% Na_2SO_4 solution. G. H. C.

Magnesia of Portland cement. I. Preparation of magnesium ferrite, MgO,Fe_2O_3. Y. Sanada and G. Nishi (J. Soc. Chem. Ind. Japan, 1936, **39**, 400—401B).—MgO,Fe_2O_3 (I) is prepared by heating the mixed oxides at 1350°. $2MgO,Fe_2O_3$ does not exist; mixes of this composition produce (I) and free MgO after heating, the latter being sol. in 0·5*N*-AcOH and the former insol. T. W. P.

Special cements for mass-concrete structures and their specification. F. M. Lea (J. Inst. Civil Eng., 1936—7, **3**, 217—229).—Recent American practice in specifications for low-heat Portland cements for dams has been to place limits on the compound content (*e.g.*, $3CaO,SiO_2$, $3CaO,Al_2O_3$, etc.) and sp. surface rather than on the performance of the product as regards setting time, heat evolution, strength, etc. G. H. C.

Refractory cements and mortars. I. S. Nagai and J. Katayama (J. Japanese Ceram. Assoc., 1936, **44**, 441—453; Zement, 1937, **26**, 91).—Analyses and physical properties of 9 commercial products are given. G. H. C.

Differences in limes as reflected in certain properties of masonry mortars. L. S. Wells, D. L. Bishop, and D. Watstein (J. Res. Nat. Bur. Stand., 1936, **17**, 895—907).—Soundness, plasticity, and flow after suction (*F*) have been studied with putties from 43 quicklimes and hydrated limes. Plasticity either increased or decreased after 3 days' soaking. *F* for CaO mortars is greater for quicklime than for hydrated CaO, and is dependent on the plasticity of the putty. For cement–CaO–sand mortars *F* is scarcely increased by addition of non-plastic, dry, hydrated CaO, but when the same CaO is used as an aged putty *F* increases. *F* depends more on the nature of the CaO than on the cement/CaO ratio. R. S. B.

Aggregate grading in relation to concrete mix design. H. N. Walsh (Bull. Inst. Civ. Eng. Ireland, 1936, **62**, 197—236).—Diagrams of grading curves of concrete aggregates are given, and their characteristics and method of use in designing mixes discussed. T. W. P.

Passage of water under constant pressure through a mass of concrete. F. Grisel (Compt. rend., 1936, **203**, 1351—1353).—Measurements were made at H_2O pressures up to 8 kg. per sq. cm. After complete impregnation the vol. of H_2O passing $\propto$ log time. H. J. E.

Effect of heat of hydration of cement on quality of concrete. A. Bereczky and A. Koch (Zement, 1937, **26**, 87—90).—Since the velocity of setting $\propto$ the temp. of the mass, and the latter $\propto$ heat evolution and heat loss, the speed of development of strength is least affected by external conditions in the case of cements with rapid evolution of their heat of hydration, and most in the case of cements with slow evolution. Accepted methods for testing setting time etc. are not suited to comparing widely differing materials. G. H. C.

Is there a connexion between the fineness of cement and the water-permeability of concrete? H. Kolb (Zement, 1937, **26**, 69—72).—The permeability to H_2O of concretes containing 250 kg./cu. m. of Portland cement or of 30/70 trass–cement (more finely ground) is a min. with a H_2O–cement ratio of 0·79 when using an aggregate consisting of crushed stone and river sand. Replacement of varying proportions of the fine part (0—7 mm.) of the aggregate by river sand of the same grading, but having more rounded grains, steadily diminishes the H_2O retention, whilst the permeability passes through a min. val. Trass–cement gives less permeable concrete, except when higher proportions of angular sand are present. Trass–cement concrete is more susceptible to changes of H_2O–cement ratio and character of aggregate, and requires a higher proportion of rounded sand to afford min. permeability. G. H. C.

Acidproof lutes and concretes. B. G. Peretz and E. W. Tretiakova (Trans. VI Mendeleev Congr. [1932], 1935, **2**, No. 1, 291—313).—Suitable specifications are discussed. Caucasian andesite cannot be completely replaced by quartz in these materials. Ch. Abs (*p*)

Composition, workability, and structure of marble. V. Caglioti (Atti V Congr. Naz. Chim., 1936, **14**, 706—717).—The influence of the composition and of the size and possible orientation of the crystallite particles on certain physical properties of various samples of marble has been studied. O. J. W.

Mixing process in bituminous road construction. E. Gerlach (Mitt. Forsch. f. Maschinenw. beim Baubetrieb, Techn. Hochschule, Berlin, 1936, **9**, 31 pp; Road Abs., 1937, **4**, No. 26).—A method for testing the efficiency of coating of stone with binder in the mixer is described, in which the amount of absorption of aq. safranine-T by the residual stone surface is determined. Lean mixes and low mixing temp. require longer mixing times, but the use of high temp. and fast mixing speeds is not recommended. The effect on the mixture of drying stone slowly at room temp. is similar to that of drying by heating. The mixing process is improved by use of a full charge in the mixer. Small differences in the completeness of coating have no influence on strength characteristics of moulded specimens unless the latter are stored in H_2O. T. W. P.

Bituminous mortars. J. Z. Zaleski (Roads, 1937, **15**, 36—39; Road Abs., 1937, **4**, No. 25).—A penetration apparatus for studying the properties is described. Changes in properties of limestone (I)–bitumen (II) mortars with heating are due more to the absorption of (II) by (I) than in changes to (I) itself. T. W. P.

Preparation of bituminous cement and investigation of some of its properties. V. Ponomarev and L. Daniluschkina (Kolloid. Shurn., 1936, **2**, 171—174).—Small amounts of an aq. emulsion of bitumen lower the strength of cement, whilst bitumen in solvent naphtha has almost no effect. The absorption of H_2O by, and the κ of, bituminous cement are $<$ that of an ordinary one. J. J. B.

Materials of the type of "Prodorite" and "Haveg." P. P. Karpuchin (Trans. VI Mendeleev Congr. [1932], 1935, **2**, No. 1, 276—277).—An acidproof composition is prepared from sand 80, coal or oil bitumen 15, acid-resisting minerals (clay etc.) 5%, the mixture being heated at 150—200° and moulded. Properties of this and other preps. are described. Ch. Abs. (*p*)

Influence of nine cements on the shrinkage, elasticity, and strength of road concrete. F. Weise (Zement, 1937, **26**, 39—43).—The differences were insignificant. G. H. C.

Shrinkage of Australian timbers. I. Method of determining shrinkage and shrinkage figures for a number of Australian species. W. L. Greenhill (Counc. Sci. Ind. Res. Australia, Pamph. 67, 1936, 54 pp.).

Composition of ancient buried Kauri wood. F. P. Worley and S. G. Brooker (J.S.C.I., 1937, **56**, 74—76T).—Kauri swamp wood (probable age 20,000 years) consisted of sound inner wood (A_1) and decomposed outer layer (A_2). The d of air-dried A_1 was 72%, and the mechanical strength 30%, of that of modern normal wood. On analysis, A_1 and A_2 had, respectively, ash 1·33, 13·15; cellulose 30·4, 19·0; lignin 62·5, 71·6%, compared with the vals. 0·28, 53·8, and 31·9 for recent kauri heartwood. A second specimen taken from a cliff face on the sea shore showed a high degree of lignification, viz., ash 24·7, cellulose 2·4, and lignin 97%. Corresponding vals. for OMe and pentosan are also given. E. A. R.

[Cement from slag from] low-grade fuels.—See II. **Kaoliang board.**—See V. **Carolina stone.**—See VIII. **Painting and lacquering wood. Polishing etc. varnishes.**—See XIII. **Glueing [plywood].**—See XV.

Patents.

(A) Apparatus for extracting sand from a supply of sand and water, such as is delivered by a gravel pump after the stones larger than sand have been screened out. (B) Separating sand from a mixture of sand and water. Cheshunt Sand & Gravel Co., Ltd., and G. F. Squire (B.P. 422,322 and Addn. B.P. 459,838, [A] 31.5.34, [B] 14.8.36).—An elevator boot is constructed so that it may serve as a thickening settler, and very fluid sand and H_2O that may be lifted is run back from the top of the elevator to the boot. (B) The overflow of the boot is more particularly described. B. M. V.

Waterproof cement, concrete, lime-plaster, and the like lime-containing compositions. W. T. Howe (B.P. 460,736, 11.12.35).—A method for waterproofing calcareous cements, other than those of $CaSO_4$ type, consists in adding an aq. dispersion of a higher fatty acid (4½ oz. per 1 cwt. of cement), a dispersing agent (*e.g.*, sulphonated castor oil, Na silicate), and a stabiliser (*e.g.*, glue, size) to the mixing-H_2O or during the gauging operation. T. W. P.

[Light-weight] cement concrete. M. Levi (B.P. 458,537, 27.1.36).—The composition comprises 1 pt. of Portland cement, ½—6 pts. of sand if desired, and 2—12 pts. of seed husks, with H_2O to give sufficient fluidity to cast. B. M. V.

Structural concrete and hydraulic cement therefor. Dewey & Almy, Ltd. From Dewey & Almy Chem. Co. (B.P. 460,366, 21.6.35).—A H_2O-sol. org. compound ($\nless C_{15}$) and at least one aromatic nucleus attached to a heterogeneous nucleus (*e.g.*, various dyes, phenyl-peri- or -γ-acid), such as will peptise cement particles, are added to concrete mixes. Less mixing-H_2O is required than normal, without reduction of plasticity. T. W. P.

Production of porous light-weight aggregate from liquid slag. E. B. Bjorkman (B.P. 457,707, 3.5.35).—H_2O is added to liquid slag to render it porous, the slag cooled to a substantially viscous state, and the whole mixed to break up and solidify the product. Various methods for carrying out the operations, and apparatus, are claimed. T. W. P.

Calcium sulphate plasters. J. S. Dunn, F. R. Himsworth, V. Lefebure, and Imperial Chem. Industries, Ltd. (B.P. 458,767, 24.6.35).—A 3 : 1 mixture of $CaSO_4$ (I) and $CaSO_4,0{\cdot}5H_2O$ (II) is intimately mixed with an accelerator for the setting of (I) (1·1% $ZnSO_4$) and a retarder for the setting of (II) (0·1—0·2% of Ca citrate, malate, succinate, or propionate). A. R. P.

Calcium sulphate plasters. F. R. Himsworth, J. S. Dunn, and Imperial Chem. Industries, Ltd. (B.P. 460,242, 24.7.35).—A plaster consisting of $CaSO_4,\frac{1}{2}H_2O$ with 0·1—1 wt.-% of Ca citrate, malate, or succinate as retarder is claimed. T. W. P.

Manufacture of anhydrite plasters. R. W. Himsworth, Imperial Chem. Industries, Ltd., and V. Lefebure (B.P. 459,134, 26.6.35).—Anhydrite plasters having an addition of $ZnSO_4$ and K_2SO_4 in amounts up to 1·7 g. per 100 g. of plaster, and in the ratio of 0·2—0·7 pt. of $ZnSO_4$ to 1 pt. of K_2SO_4 by wt., are claimed. These proportions give the max. acceleration of setting time. T. W. P.

Manufacture of marble. R. Beyer Industrial Inventions, Ltd. From R. Beyer (B.P. 457,623, 19.8.35).—Marble dust is partly calcined and mixed with an aq. solution of a salt or salts to a paste which is pressed to shape and exposed to CO_2, and afterwards, if desired, treated with $Ba(OH)_2$ and a solution of MgF_2 and/or ZnF_2 or $ZnSiF_6$. Suitable salts are $Al_2(C_2O_4)_3$, $Al(OH)_3$, $Al_2(SO_4)_3$, $MgSO_4$, silicate of Mg, Al, K, or Na, "oxalic," "tartaric," or "arsenic" silicate, or combinations of these. B. M. V.

Manufacture of building materials. R. Beyer Industrial Inventions, Ltd. From R. Beyer (B.P. 459,673, 19.8.35).—Bricks or the like are manufactured of non-metallic material, CaO, and an aq. solution of one or more of the following binders: Al oxalate, sulphate, or hydroxide; Mg sulphate or silicate; K, "oxalic," "tartaric," or "arsenic" silicate, the H_2O being sufficient to slake the CaO and form a plastic mass and the salts insufficient to react with all the CaO. Hardening is effected by exposure to CO_2, external or developed from reagents in the mixture. A final treatment may comprise immersion in a decanted "solution of $BaSO_4$" or of $Ba(OH)_2$ followed by one of MgF_2 and/or ZnF_2. B. M. V.

Production of road-surfacing or like material. J. A. Montgomerie and P. K. Archibald (B.P. 459,957, 4.9.35).—Coarse mineral aggregate is coated with creosote oil or similar flux and then mixed with a cold aq. emulsion of asphalt, tar, or pitch. After coagulation mineral dust is mixed in. B. M. V.

Production of concrete road surfaces. A. Holter (B.P. 460,258, 25.11.35. Norw., 1.12.34 and 12.7.35).—The foundation is covered with cement–sand mortar and on that is spread a layer of stones, the two being mixed by plungers attached to the drum of a roller or the like. B. M. V.

Road coverings. K. Halbach (B.P. 460,279, 24.7.35. Ger., 18.9.34).—In laying down a mortar-bound road covering, a layer of a substance capable of taking up H_2O, but with little or no perviousness to mortar, *e.g.*, comminuted slag, foam lava, having a fineness up to 3 mm. in diameter, is applied temporarily to the covering prior to the setting of the mortar; rolling takes place over this layer, which is removed either immediately or some time after the completion of the last rolling. D. M. M.

Production of [granular] surfacing material. P. R. Smith, Assr. to Central Commercial Co. (U.S.P. 2,033,656, 10.3.36. Appl., 18.1.32).—Base granules are coated with a glaze-forming material reduced to a slurry, and then the liquid of the slurry is removed and the glaze burned without substantial agitation of the granular mass. B. M. V.

Manufacture of bituminous paving composition. R. M. Grower, Assr. to S. J. Tomasello (U.S.P. 2,040,481, 12.5.36. Appl., 4.9.35).—Particles of crushed aggregate are mixed with bituminous material at 103° until thoroughly coated, then rapidly cooled with agitation. The coated particles are mixed with fine aggregate and incorporated with emulsified asphalt. The product can be stored in this condition. D. M. M.

Manufacture of asphaltic paving composition. J. W. Fraser (U.S.P. 2,036,130, 31.3.36. Appl., 3.12.34).—Hot (177°) mineral aggregate is agitated with cold rock sand containing " malthenes " (I), and when the (I) begin to volatilise asphaltic cement is mixed in. B. M. V.

Bituminous emulsion. P. R. Smith, Assr. to Barber Asphalt Co. (U.S.P. 2,033,657, 10.3.36. Appl., 27.1.34).—To an aq. emulsion of clay (bentonite) and bitumen is added a fluosilicate of NH_4, Na, K, Ba, Ca, Mg, Pb, or Cu^{II} sufficient to render the dried clay film resistant to H_2O. B. M. V.

Manufacture of hard products [wallboards]. T. A. I. Lundbäck, Assr. to Aktieb. Mo Och Domsjö Wallboard Co. (U.S.P. 2,036,156, 31.3.36. Appl., 1.3.33. Swed., 5.10.32).—Cellulosic material containing lignin is finely divided, mixed with 0·1—10 wt.-% of a phenol, and made into boards or the like by heat and pressure (100—260°/10—450 kg. per sq. cm.), the pressure being maintained during cooling. B. M. V.

Impregnation of wood. Chem. Fabr. Grünau, Landshoff & Meyer A.-G. (B.P. 459,975, 23.12.35. Ger., 29.3.35).—To control the impregnation with aq. solutions of inorg. salts (*e.g.*, silicates or fluorides), sulphates or hydrochlorides of NH_2Ph or $NPhMe_2$ are added to colour the wood and in such quantity that the colorant is used up at the same time as the inorg. salt. B. M. V.

Impregnation of wood [with montan wax]. C. W. Mudge, Assr. to Standard Oil Development Co. (U.S.P. 2,031,973, 25.2.36. Appl., 24.10.31).—The wood is previously wetted with dil. aq. HCl. A. R. P.

Manufacture of artificial lumber and pressed and moulded products. F. L. Carson, Assr. to Pacific Lumber Co. (U.S.P. 2,033,411, 10.3.36. Appl., 6.9.32).—The preferred raw material is Californian redwood sawdust, produced when ripping with the grain. The sawdust, containing 12% of H_2O, is treated at 93° with aq. AcOH to render certain constituents insol., with $(NH_4)_2HPO_4$ for fireproofing, and with $MgSiF_6$ as antiparasitic. It is screened through 14- and 30-mesh screens and 3 pts. of the coarser product are sprayed with PhOH- and/or urea-CH_2O binder, 1 pt. of the finer-grade material is added with more binder, and the whole worked through screens. The articles are shaped by pressure in an oiled mould. B. M. V.

[Expansion joint for] concrete road surfaces. K. Winkler (B.P. 457,606, 29.3.35. Ger., 26.5.34).

Manufacture of roofing tiles. H. Hawkins, Ltd., and C. L. Hawkins (B.P. 460,296, 4.7.35).

[Flexible-board] roof coverings. P. Sattig (B.P. 460,550, 20.4.36. Ger., 20.4.35).

Sound-absorbing surfaces and structures. R. E. Rowlands, and Brit. Acoustic Films, Ltd. (B.P. 460,404, 18.5.36).

Bituminous compositions. Articles from asphaltenes.—See II. **Mould-preventing coatings.**—See XIII.

X.—METALS; METALLURGY, INCLUDING ELECTROMETALLURGY.

Notch-sensitivity of cast iron. G. Bierett (Arch. Eisenhüttenw., 1936—7, **10**, 165—169).—Tests on cast-Fe rods in compression and tension show that a high-grade cast Fe is superior as regards resistance to deformation and notch-sensitivity to a low-alloy constructional steel and is a satisfactory reinforcing material for concrete columns in building. A. R. P.

Nickel cast irons in engineering. Anon. (Metallurgia, 1937, **15**, 99—101).—High-duty Ni cast irons suitable for severe chemical service are described. A. J. K.

Chilled iron rolls: chemical and physical properties. A. Allison (J. West Scotland Iron & Steel Inst., 1936, **44**, 23—27).—The effect of Si, Mn, S, and P on the chill is discussed, and a tendency for the barrel to differ in composition from the body of the roll is shown. The use of molten Pb to supplement the chilling effect of the mould is described. The val. of alloying elements in modifying the chill properties of the metal is summarised. Stress is laid on the need for care in service for long life of the rolls, and some causes of failure are dealt with. S. J. K.

Recrystallisation [of iron] during hot-working. H. Kornfeld (Arch. Eisenhüttenw., 1936—7, **10**, 161—163).—The characteristics of the recrystallisation grains obtained in working Fe below the α–γ transformation point depend on the size of the original grains; only when the metal is worked above this temp. is the final grain-size dependent on the deformation and the temp. of working. A. R. P.

Use of polarised light in the examination of the structure of iron and steel. P. Schafmeister and G. Moll (Arch. Eisenhüttenw., 1936—7, **10**, 155—160).—Many constituents which have an anisotropic structure can be identified in well-polished steel sections by examination in polarised light. Their characteristics are described and micrographs of sections showing some of the more common constituents identifiable in this way are included. A. R. P.

Influence of added elements in steel on the absorption of nitrogen on fusion in the arc. A. Portevin and D. Séférian (Compt. rend., 1937, **204**, 48—51).—Quant. data are given. V, Al, Cr, Zr, and Mo increase the capacity for absorbing N_2; U, Si, Mn, Ti, and C decrease it. The absorption is decreased by increasing the thickness of solid medium surrounding the electrode. A. J. E. W.

Low-alloy structural steels. E. C. Bain and F. T. Llewellyn (Proc. Amer. Soc. Civil Eng., 1936, 62, 1184—1200).—A comprehensive review. R. B. C.

Application of stainless steel in light-weight construction. E. J. W. Ragsdale (Proc. Amer. Soc. Civil Eng., 1936, **62**, 1304—1311).—A comprehensive review. R. B. C.

Welded structures in locomotive construction. E. Kalisch (Tech. Mitt. Krupp, 1936, **4**, 164—168).—The types and properties of various steels, *e.g.*, Izett steel, now used in Germany to replace Cu in locomotive fireboxes, are discussed. R. B. C.

Wire-rope problems. B. P. Haigh (Proc. South Wales Inst. Eng., 1937, **52**, 327—357).—The structure of drawn steel wire, and the fracture and corrosion fatigue of wires are discussed. Fatigue-testing machines are diagrammatically described. R. B. C.

Equilibria between metals and slags. R. Perrin and J. Lamberton (Compt. rend., 1937, **204**, 267—269).—The mass-action law is applied to systems containing a mixture of metals and a slag of their oxides. A. J. E. W.

Slag inclusions in steel. P. I. Melichov (Zavod. Lab., 1936, **5**, 1217—1220).—Microscopical methods of detection are described. R. T.

Application of the polarising microscope to the study of non-metallic inclusions in steel. J. T. Lukaschevitsch-Duvanova and B. V. Ivanov (Zavod. Lab., 1936, **5**, 37—41).—SiO_2, glass, α-Al_2O_3, and $Fe_2SiO_4 + Mn_2SiO_4$ inclusions have been identified by means of a polarising microscope. R. T.

Non-metallic inclusions examined by means of a polarising microscope with a Fedorov table. F. A. Jakschevitsch (Zavod. Lab., 1936, **5**, 41—44).—Two groups of inclusions are identified: those found in steels originating from anhyd. ores, and including olivine, augite, felspar, anorthite, nepheline, spinel, tridymite, magnetite, and corundum; and those in steels formed in presence of H_2O, chlorides, fluorides, or borates, viz., silicates, hydrated aluminosilicates, SiO_2, microcline, and albite. R. T.

Determination of ferrous and ferric oxides in electric and open-hearth furnace slags. M. S. Kovtun (Zavod. Lab., 1936, **5**, 1042—1046).—Knop's method, involving titration of Fe^{II} with $K_2Cr_2O_7$ in presence of $NHPh_2$ and NaH_2PO_4, is recommended. Total Fe is determined similarly in the solution obtained by treating the material with HCl–HF mixture. R. T.

Temperature and through-heating of the charge in soaking pits. W. Heiligenstaedt (Arch. Eisenhüttenw., 1936—7, **10**, 131—138).—Mathematical expressions are derived and graphs constructed for determining the temp. distribution in ingots in the soaking pit from the heat radiated from the sides of the furnace, the time the metal is in the furnace, and the surface temp. of the metal. A. R. P.

Heat conductivity of chromium steels at high temperatures. E. Maurer (Arch. Eisenhüttenw., 1936—7, **10**, 145—154).—Various procedures for determining the heat conductivity of metals at high temp. are discussed and comparative results obtained with them on Ni, Al, and several Cr steels are shown in tables and graphs. In many cases quite wide divergencies in the results were obtained; only with ferritic steels was there any reasonable agreement with those of other workers. A. R. P.

***X*-Ray examination of low-tempered blister steel.** M. A. Gurevitsch and N. V. Kariakina (Zavod. Lab., 1936, **5**, 1106—1108).—Complete conversion of α- into β-martensite is attained in Ni–Cr steel in <5 min. at 180°. R. T.

Rapid testing of steel for susceptibility to growth of austenite grains during heating. S. A. Elgot (Zavod. Lab., 1936, **5**, 1208—1217).—The polished surface is etched with fused 1 : 1 : 1 $BaCl_2$–$CaCl_2$–NaCl at 930° (1—2 min.) and cooled in kerosene. R. T.

Determination of residual strains [in steel] on the basis of hardness measurements. L. A. Glikman (Zavod. Lab., 1936, **5**, 63—69).—The presence of strains is indicated by variations in hardness. R. T.

Specific heat of high-speed steel. A. A. Skvortzov, S. P. Maslennikov, and I. I. Schmutov (Zavod. Lab., 1936, **5**, 1220—1224).—Data are recorded. R. T.

Effect of small proportions of added substances on marine corrosion of extra-soft steel. A. Portevin and E. Herzog (Compt. rend., 1936, **203**, 1514—1516; cf. B., 1935, 63).—Data for the effect of added P, Al, Cr, Si, and Ni on the rate of corrosion are given; the effectiveness of these elements in resisting corrosion decreases in the order stated. Magnetite and hydrated Fe_3O_4 are produced under certain conditions during corrosion. Addition of Cr, Ni, or Al makes the electrode potential of the steel more positive. A. J. E. W.

Potentiometric methods for predicting corrosion of ferrous alloys. L. Guitton (Compt. rend., 1936, **203**, 1066—1068).—For nine ferrous alloys studied, the rate of corrosion in HCl and H_2SO_4 solutions is a simple function of the electrode potential of the alloy in the corroding solution. A. J. E. W.

Chemical stability of Soviet metals and alloys to the action of damp sulphur dioxide. I. J.

Klinov and V. V. Andreeva (J. Chem. Ind. Russ., 1936, **13**, 1474—1477).—A no. of Soviet austenite Cr–Ni steels, and Pb containing 8% of Sb, are resistant to corrosion by damp SO_2 at 300°, although deterioration of their mechanical properties is observed. Heat-treatment of steels did not affect their corrosivity. Bronzes and alloy steels with a low Cr, Ni, Mo, V, or W content were readily corroded.

R. T.

Determination of small quantities of copper in iron. I. Use of the revolving anode. II. Determination by internal electrolysis. J. G. Fife and S. Torrance (Analyst, 1937, **62**, 29, 30—31; cf. A., 1934, 620; 1936, 1479).—I. The catholyte (150 ml.) contained the Cu, $FeSO_4 \equiv 10$ g. of Fe, 1·5 ml. of 96% H_2SO_4, and 10 ml. of 2% aq. $N_2H_4,\frac{1}{2}H_2SO_4$ (I). The anolyte was 10% aq. $Na_2SO_4,10H_2O$ + 1% H_2SO_4. Electrolysis was carried out at room temp. with a p.d. from the auxiliary electrode to the cathode of 0·4 volt until the catholyte was free from Cu.

II. Cu could be determined by internal electrolysis using an Fe wire as anode, provided all Fe were present as Fe^{II} and there were sufficient acid to keep the solution clear. 100 ml. of the anolyte contained $FeSO_4 \equiv 5$ g. of Fe, 3 ml. of 96% H_2SO_4, and 0·2 g. of (I); and the catholyte (300 ml.) the Cu to be determined, $FeSO_4 \equiv 5$ g. of Fe, 0·2 g. of (I), and 3 ml. of 96% H_2SO_4. Electrolysis was carried out for 20—45 min. at 70°. The procedure to be followed in the case of Cu in steels is outlined.

E. C. S.

Determination of aluminium in ferrosilicon and ferrosilide. P. A. Epik and E. G. Remesnikova (J. Appl. Chem. Russ., 1936, **9**, 2088—2096).—The sample is dissolved in HNO_3– or H_2SO_4–HF, and Fe eliminated electrolytically (Hg electrode; c.d. 0·15 amp./sq. cm.) from the solution, the acidity of which is adjusted to 0·4*N*, and Al pptd. as $Al(OH)_3$ or $AlPO_4$. R. T.

New apparatus for determining small amounts of carbon in steel by the baryta method. G. M. Korovin and E. N. Jurkin (Zavod. Lab., 1936, **5**, 1131—1132).—C is determined in steel, with a mean error of ±0·001%, by means of an apparatus in which the gases obtained by combustion of Fe in O_2 are absorbed in aq. $Ba(OH)_2$, which is passed through a glass filter, and titrated, the amount of pptd. $BaCO_3$ being calc. therefrom. R. T.

Determination of the variation of carbon content in mild steel by magnetic analysis. D. L. Soltau and D. H. Loughridge (Physical Rev., 1935, [ii], **48**, 487).—A method is described.

L. S. T.

Detection of sulphur [in steel] by the Baumann stain method. K. M. Rauner (Zavod. Lab., 1936, **5**, 1069—1071).—The gases evolved during dissolution of steel in HCl or H_2SO_4 stain AgBr paper (wet or dry) brown; the intensity of the stain $\propto$ the S, but not the P, content of the steel. PH_3 does not give the stain, whence it is concluded that the Baumann stain reaction is due only to sulphides. R. T.

Determination of titanium in non-rusting steels. A. V. Dimov and O. E. Volodina (Zavod. Lab., 1936, **5**, 1047—1051).—1 g. of steel is dissolved in 45 ml. of 20% H_2SO_4, the solution boiled with 3 ml. of HNO_3 to complete elimination of N oxides and then evaporated to the appearance of SO_3 fumes, and 60 ml. of H_2O are added, the resulting ppt. of SiO_2 being collected and the filtrate + washings conc. to 50 ml. Si is eliminated from the ppt. by heating with H_2SO_4 + HF, and the residue is fused with $KHSO_4$; the melt is extracted with 2% H_2SO_4 and the extract added to the above filtrate. Na_2CO_3 is then added to appearance of turbidity, when 2 ml. of conc. H_2SO_4 are added and the solution is electrolysed (Hg cathode; 3—3·5 amp./6—8 volts; 2—3 hr.) to complete elimination of Fe. The electrolyte is then siphoned off, without interrupting the current, and the vessel washed. Ti is pptd. from the filtered solution + washings by 3% cupferron, and the ppt. collected, washed, ignited, and weighed as TiO_2. A modification of the above procedure is described, for use in presence of V.

R. T.

Colorimetric determination of manganese and molybdenum in steel. N. M. Miloslavski and E. G. Vavilova (Zavod. Lab., 1936, **5**, 12—16).—0·2 g. of steel is dissolved in 12 ml. of HNO_3, N oxides are eliminated, 40 ml. of 0·17% $AgNO_3$ and 4—5 ml. of 50% $(NH_4)_2S_2O_8$ are added, the vol. is made up to 250 ml., and the coloration compared with that given similarly by steel of known [Mn]. 1 g. of steel is dissolved in HNO_3, 40 ml. of 20% NaOH are added, to ppt. Fe, and the solution is diluted to 250 ml. and filtered. 50—100 ml. of filtrate are evaporated to 10—15 ml., and excess of H_2SO_4 is added, followed by 6—8 ml. of 5% $2N_2H_4,H_2SO_4$. The solution is heated at 100° for 15 min., diluted to 50 ml., and the coloration compared with that given by standard Mo steel. R. T.

Microcolorimetric determination of tungsten in alloy steels. N. M. Miloslavski and A. B. Gurevitsch (Zavod. Lab., 1936, **5**, 1170—1172).—0·03—0·3 g. of steel is dissolved in 3—4 ml. of 50% HCl, with gradual addition of HNO_3. The suspension of WO_3 so obtained is diluted and filtered. The washed ppt. is dissolved in 1 ml. of 5% NaOH, the solution conc. to 0·5 ml., and 0·5 ml. of H_3PO_4 and 3 ml. of conc. HCl are added, followed by 2 ml. of aq. $SnCl_2$ (5 g. of Sn are dissolved in 100 ml. of 50% HCl). The vol. is made up to 10 ml. after 15 min. and the coloration compared with that given by a standard solution. R. T.

Spectrum analysis of steel for chromium and tungsten. L. A. Alifanova and S. M. Raiski (Zavod. Lab., 1936, **5**, 1202—1207).—The most convenient bands for spectrum analysis of steel containing Cr and W are: Cr λ 4254 and Fe 4250 A., and Cr 5208 and Fe 5227 A. (for 0·1—7% Cr); Cr λ 4496 and Fe 4494, or Cr 5346 and Fe 5324 A. (for 4—20% Cr); W λ 4008 and Fe 4015 A. (1—7% W); W 4012 and Fe 4107 A. (4—20% W). R. T.

Rapid determination of silicic acid and calcium oxide in copper slags. L. M. Jolson, E. I. Dubovitzkaja, and E. K. Graf (Zavod. Lab., 1936, **5**, 1053—1058).—0·5 g. of finely-powdered slag is fused with 4—5 g. of 1 : 4 borax–$NaKCO_3$, the melt extracted with 15 ml. of HNO_3, 15 ml. of 0·2% gelatin are added, and the SiO_2 is collected, washed with dil. HNO_3 and H_2O, ignited, and weighed. 10 ml. of 10% H_2SO_4 and 25 ml. of 20% Na tartrate are added to the filtrate + washings, and 100 ml. of hot 4% $(NH_4)_2C_2O_4$, followed by excess of aq. NH_3, are added to the boiling solution, and the ppt. of CaC_2O_4 is collected, washed, dissolved in H_2SO_4, and titrated with $KMnO_4$. R. T.

Stress–strain characteristics of copper, silver, and gold. J. McKeown and O. F. Hudson (J. Inst. Metals, 1937, **60**, Advance copy, 571—592).—Tests on pure Cu, Ag, and Au indicate that none of these metals in the fully annealed state shows any proportionality of stress to strain in any part of the stress–strain diagram, *i.e.*, the metals have no elastic limit. After cold-working, the induced elastic properties are retained after heating for short periods at moderately high temp. when the tensile overstrain is low, and the effects of a small overstrain are evident in the stress–strain characteristics even after reheating to relatively high temp. After a 5% tensile overstrain Young's modulus (E) for O-free Cu is reduced by about 12%, but after a 15% overstrain E returns to its original val. On annealing, the val. of E in the first case is restored to a val. slightly > the original. Similar effects occur with Ag and Au. A. R. P.

Directional properties in rolled brass strip. M. Cook (J. Inst. Metals, 1937, **60**, Advance copy, 511—526).—The tensile properties of 64 : 36 and 70 : 30 brass have been determined at 0°, 45°, and 90° to the direction of rolling after reductions of 10—95%; with sufficient reduction to produce directionality, max. strength is obtained at 90° and max. ductility at 0° to the rolling direction. Heavily cold-rolled brass shows directionality even after a complete recrystallisation anneal, as shown by the appearance of ears on the edges of cups made from the sheet; this annealed sheet shows min. strength and max. ductility at 45° to the rolling direction, in which position ear-formation occurs. The conditions of annealing in the penultimate and final stages and the intermediate degree of reduction determine the magnitude of these effects in the annealed sheet. The frequency of orientation of the twinning planes of annealed 70 : 30 brass is lowest at 45° to the rolling direction in sheet showing directionality of tensile properties, but the orientation of these planes is random in sheet free from this effect. A. R. P.

***X*-Ray examination of compression effects involved in turning brass articles.** N. A. Kravtschenko, J. P. Selisski, and V. N. Tiulenev (Zavod. Lab., 1936, **5**, 1085—1094).—The thickness of the layer of increased d due to compression $\propto$ the angle of incidence of the cutter and the thickness of the turning, and is inversely $\propto$ the rate of cutting. R. T.

Hardenable bronzes on a copper–nickel–tin basis. VII. Temperature-stability of hardened alloys. E. Fetz (Z. Metallk., 1936, **28**, 350—353; cf. B., 1936, 889).—The stability of hardened Cu–Ni–Sn alloys is the greater the more complete is the decomp. of the supersaturated solid solution in the hardening treatment, and, since the pptd. phase coagulates only extremely slowly after max. hardness is attained, it is recommended that alloys for use under high stresses and temp. be over-aged. The static mechanical properties of over-aged and normally-aged alloys of the same tensile strength are approx. equal. Prolonged heating at >350° causes very slow softening of alloys hardened either by quenching and reheating, or by slow cooling, irrespective of the previous history of the metal. Stability to heating of similarly treated alloys of equal supersaturation is the greater the higher is the Ni content and, therefore, the higher is the m.p. Complete softening of over-aged alloys does not occur at any temp. < the α-phase boundary, however prolonged is the heating; the hardening and softening processes come to a definite equilibrium at all temp. < this line at a hardness which is always > that of the homogeneous α-phase. A. R. P.

Resistance of some special bronzes to fatigue and corrosion-fatigue. H. J. Gough and D. G. Sopwith (J. Inst. Metals, 1937, **60**, Advance copy, 527—539).—The results of fatigue tests in air and in a salt spray are recorded for bronzes containing (I) Sn 4·23, P 0·13%, (II) Al 8·9, Fe 0·15, Zn 1·4%, (III) Ni 0·3, Fe 0·1, Be 2·25%, and (IV) Al 9·73, Ni 5, Fe 5·4%. The endurance limits of (I) and (III) were in the salt spray 7 and 19%, respectively, > in air, whereas those of (II) and (IV) were about 33% less. These results compare favorably with those obtained on stainless steels, (III) being much superior to the best 18 : 8 Cr–Ni steel. (IV) gives very good results in air, but appears to be highly susceptible to stress–concn. effects. A. R. P.

Determination of nickel [in alloys] as nickel dimethylglyoxime. E. Azzarello, A. Accardo, and F. Abramo (Atti V Congr. Naz. Chim., 1936, **14**, 658—667).—The determination of Ni in Al alloys by the above method may give inexact results if Zn has previously been separated as ZnS in presence of $CH_2Cl\cdot CO_2H$. Exact results are obtained if the solution is treated with SO_2 and the pptn. of the Ni complex carried out in aq. NH_3 solution. O. J. W.

Application of nickel alloys in generators. H. Notomi (Japan Nickel Rev., 1937, **5**, 67—75).—Japanese practice in the use of Ni alloys in turbogenerators and transformers is described, including non-magnetic cast irons. S. J. K.

Nickel alloys in steam-power plants. S. Niwa (Japan Nickel Rev., 1937, **5**, 28—66).—Specifications of Ni alloys used in boilers and turbines operating with high-temp., high-pressure steam are reviewed. A. J. K.

Application of nickel alloys in water-power plants. S. Uchimaru (Japan Nickel Rev., 1937, **5**, 4—27).—Specifications are given for Ni alloys used in recent United States dam construction and in H_2O-wheels, showing a wide range of use. S. J. K.

Determination of zinc in coloured alloys by means of hydroxyquinoline. L. D. Raskin (Zavod. Lab., 1936, **5**, 1129).—The alloy is dissolved in acid, Pb, Sb, Sn, and Cu are eliminated from the solution, and Fe^{II} is oxidised to Fe^{III} by Br, excess of which is removed by boiling. Fe and Al are pptd. by aq. NH_3, the filtrate is made acid with AcOH, and Zn pptd. by 3% 8-hydroxyquinoline in EtOH. The washed ppt. is dissolved in 200 ml. of 0·5% H_2SO_4, and the solution titrated with $KMnO_4$ (1 atom of Zn ≡ 6 mols. of $KMnO_4$). R. T.

Creep of lead and lead alloys. I. Creep of virgin lead. J. McKeown (J. Inst. Metals, 1937, **60**, Advance copy, 623—644).—Tensile creep tests have been made on extruded rod, pipe, and cable sheath of very pure commercial Pb at stresses up to 700 lb./sq. in. In general, the rate of creep decreases with increasing grain size, rapidly between 0·01 and 0·14 sq. mm., and then more slowly. With increasing stress the elongation of coarse-grained metal increases whilst that of fine-grained metal decreases. Flattening of cable sheath and bending and straightening of pipe produce slight grain refinement yet increase the resistance to creep in the early stages. A theoretical explanation of these phenomena, based on the transition from plastic to viscous flow, is offered. Intercryst. cracking has been observed in coarse-grained extruded metal under stresses of 400—500 lb./sq. in. as well as in metal which has previously been slightly overstrained. A. R. P.

Rapid determination of antimony in lead-rich alloys. K. Stanford and D. C. M. Adamson (Analyst, 1937, **62**, 23—28).—The alloy is fused with $KHSO_4$, and the melt, when cool, dissolved in a mixture of 10 ml. of conc. HCl, 30 ml. of conc. H_2SO_4, and 200 ml. of H_2O. Sb is titrated in this solution with $KMnO_4$. The method also gives accurate results with As, none of which volatilises during the fusion process. In Pb–Sb alloys containing As the latter is separately determined and its mass deducted from the total As + Sb. Sn does not interfere with the determination except by increasing the η of the melt. E. C. S.

Durability of moulding sands. C. H. Casberg and C. E. Schubert (Univ. Illinois Eng. Exp. Sta. Bull., 1936, No. 281, 54 pp.).—The mould, the oven, and the hydration and dehydration test-methods of determination have been investigated, using various natural and synthetic sands. It was not possible accurately to predict the life of a sand by any one of these methods. The amount of bonding material (clay or sand) necessary to bring a given sand back to its original compression strength after a series of heats depended on the kind and nature of the addendum. It is considered more economical to add bonding material after a series of heats then to maintain the strength of the sand continuously const. by frequent additions. R. B. C.

Corrosion in relation to engineering structures. J. Aston (Proc. Amer. Soc. Civil Eng., 1936, **62**, 1239—1249).—Corrosion of ferrous and non-ferrous materials is discussed. R. B. C.

Corrosion protection in [oil] refineries. A. Marks (Refiner, 1936, **15**, 507—523).—A comprehensive summary is given of work carried out by the American Petroleum Institute since 1928 on the cause and prevention of corrosion at high and low temp. R. B. C.

Corrosion of [metal] assemblages. J. Cournot and M. Baudrand (Compt. rend., 1936, **203**, 1361—1363).—Atm.-corrosion data are recorded for rivetted sheets of various Al alloys and steels. The corrosion-resistance with pressed rivets was > that with hammered ones. H. J. E.

Apparatus for corrosion tests with slowly flowing liquids over long periods. H. Grubitsch (Chem. Fabr., 1931, **10**, 83—84).—The corroding solutions runs from a const.-level vessel, by cocks having a groove filed in the plugs, into beakers carrying the test-specimens on a glass rod and having an overflow. The flow requires regulating only twice daily, and loss-of-wt. data can be obtained concordant to 5—6%. C. I.

Application of the logarithmic sector to corrosion problems. S. A. Burke (Trans. Faraday Soc., 1937, **33**, 309—324).—The logarithmic sector method of spectrographic analysis (B., 1931, 68) is applied to the detection of very small quantities of metals in liquids in which they have been allowed to corrode. Tests of Cr, Ni, and Mn steels indicate that the metals dissolve in the same proportions as they exist in the solid steel. The method permits detection of 0·001 g. of Cr, 0·0004 g. of Mn, 0·01 g. of Ni, or 0·002 g. of Fe in 20 c.c. of solution. It is suggested that the method may be applied to the determination of metal impurities in foodstuffs or industrial liquors, derived from metallic containers or industrial plant. J. W. S.

Recent tendencies in the study of mechanical properties of metals and alloys. L. Guillet fils (Mém. Soc. Ing. Civ. France, 1936, **89**, 647—658).—A lecture.

Development of measuring methods in metallurgy. E. Scheil (Z. Ver. deut. Ing., 1936, **80**, 1466—1468).—Advances made in microscopy, chemical and thermal analysis, the measurement of mechanical, magnetic, and electrical properties, and in *X*-ray work are reviewed. R. B. C.

Determination of thermal conductivity of metals. F. Gabler (Physikal. Z., 1937, **38**, 78—82).—A process applicable at high as well as room temp. is described. A. J. M.

Isothermic method of carrying out creep tests over long periods of time. P. B. Michailov-Micheev and G. M. Denisov (Zavod. Lab., 1936, **5**, 48—63).—Apparatus is described. R. T.

Complex method of microscopical and thermal analysis of alloys. B. E. Volovik (Zavod. Lab., 1936, **5**, 1079—1084).—Apparatus for microscopical observation of heated metal surfaces is described. R. T.

Determination of conditional yield point. N. N. Davidenkov and L. I. Kukanov (Zavod. Lab., 1936, **5**, 1112—1121).—Various types of extensometers are described, with directions for their use. R. T.

Estimation of grain-size [of metals] in the region above 10^{-3} cm. R. A. STEPHEN and R. J. BARNES (J. Inst. Metals, 1937, 60, Advance copy, 593—604).—A graphical method is described by means of which the average grain size of a polished specimen may be determined from the no. of spots on a given (*hkl*) line in a back-reflexion, *X*-ray photograph. A. R. P.

Scratch-hardness [of metals]. G. TAMMANN and R. TAMPKE (Z. Metallk., 1936, 28, 336—337).—Cold-working and subsequent annealing at $<$ the recovery temp. have no effect on the scratch-hardness (H_s) of Al, Cu, Ni, or Fe; annealing at higher temp. rapidly reduces H_s. Ageing of duralumin does not affect H_s. A. R. P.

Recent progress in magnesium and ultra-light alloys. P. BASTIEN (Mém. Soc. Ing. Civ. France, 1936, 89, 659—687).—A lecture.

Magnesium-base alloys. S. TOUR (Metal Ind., N.Y., 1936, 34, 62). L. S. T.

Magnesium alloys and their structural application. A. W. WINSTON (Proc. Amer. Soc. Civ. Eng., 1936, 62, 1329—1340).—The fabrication, properties, surface treatment, painting, and uses of Mg alloys are discussed. R. B. C.

Metallography of aluminium forging alloys. A. J. STELLJES (Aluminium, 1936, 18, 601—607).—The changes in structure of an alloy containing Cu 4 and Mg 1%, in the various stages from the ingot to the finished rolled and aged material, are illustrated by a series of photomicrographs, with descriptive notes. C. E. H.

Aluminium in high-frequency work. A. HABERMANN (Aluminium, 1936, 18, 612—617).—The applications of Al in this field are reviewed, and its properties discussed from this viewpoint. C. E. H.

Aluminium after fifty years. ANON. (Metal Ind., N.Y., 1936, 34, 54—59).—A history of development in the uses of Al. L. S. T.

Action of amines as inhibitors in the dissolution of pure aluminium in acids. W. GELLER (Z. Metallk., 1936, 28, 354—356).—In 10% H_2SO_4 aliphatic amines have no effect on the rate of dissolution of Al, but in 5% HCl they considerably prolong the period of induction, the effect being greatest with NH_2Me. A. R. P.

Light-weight structural alloys. I. Aluminium. II. Magnesium. Z. JEFFRIES, C. F. NAGEL, and R. T. WOOD (Proc. Amer. Soc. Civil Eng., 1936, 62, 1211—1237).—The available types, production, properties, and uses of these alloys are discussed. R. B. C.

Structural applications of aluminium alloys. E. C. HARTMANN (Proc. Amer. Soc. Civil Eng., 1936, 62, 1313—1328).—The fabrication, properties, and uses of duralumin alloy 17ST (Al 95, Cu 4, Mn 0·5, and Mg 0·5%) are discussed. R. B. C.

Coloration of aluminium and its alloys with inorganic materials after M.B.V. treatment. W. HELLING and H. NEUNZIG (Aluminium, 1936, 18, 608—611).—Al and its Cu-free alloys are treated in solutions containing $KMnO_4$, $Cu(NO_3)_2$, $Co(NO_3)_2$, or $K_3Fe(CN)_6 + FeCl_3$, to give brown, black, or blue colours. (Cf. B., 1935, 1146.) C. E. H.

Resistance of light-metal wood screws to atmospheric attack. W. NICOLINI (Aluminium, 1936, 18, 622—623).—Variously pretreated screws of Al–Cu–Mg, Al–Mg, Al–Mg–Mn, and Al–Mg–Si alloys were screwed into beech, oak, and pine wood, and exposed to hot H_2O and vapour in a cooler for 1 year. The Al–Cu–Mg alloy was most corroded, and beech and pine wood caused more corrosion than oak. Eloxal treatment and greasing gave max. protection, but the Al–Cu–Mg alloys should be used only in dry places. C. E. H.

Microchemical examination of products of corrosion of aluminium and magnesium alloys. E. I. NIKITINA (Zavod. Lab., 1936, 5, 1058—1063).—The sample (45—12 mg.) is dissolved in HCl and then Mg and Al are determined by known hydroxyquinoline methods and Cu by pptn. with benzoinoxime. For Zn, the sample is dissolved in 20% H_2SO_4, HNO_3 added, and the solution evaporated to dryness. The residue is dissolved in dil. AcOH, tartaric acid and 0·1 ml. of 0·5% $CuSO_4,5H_2O$ are added, followed by 5 ml. of aq. $K_2Hg(CNS)_4$, and the ppt. of $ZnCuHg_2(CNS)_8$ (I) and $CuHg(CNS)_4$ (II) is collected and weighed; the amount of (II) corresponding with the Cu content of the solution is subtracted from the wt., and the Zn content is derived from the difference. Fe is determined by adding KI to the HCl solution of the sample, and titrating the liberated I. Mn is determined by dissolving the substance in 3—4 ml. of H_2SO_4 with 3—4 drops of HNO_3, and adding 0·5 ml. of $0{\cdot}1N$-$AgNO_3$ and 1 ml. of 10% $(NH_4)_2S_2O_8$. The coloration due to MnO_4' is compared with that of standard $KMnO_4$. R. T.

Hard soldering of light metals in the electric furnace. M. MAIER (Aluminium, 1936, 18, 618—621).—The method is particularly suitable for the soldering of thin sections, where the use of a blow-lamp is difficult. C. E. H.

Determination of mechanical properties of welded joints by means of *X*-ray examination. J. A. DUNAEV (Zavod. Lab., 1936, 5, 44—47).—The strength of the joints can be deduced from the *X*-ray picture. R. T.

***X*-Ray examination of thin welded joints.** A. A. KISELEV (Zavod. Lab., 1936, 5, 1094—1102).—Defects are readily detected by this method. R. T.

Deposition of metals by cathodic spluttering. G. L. D'OMBRAIN and C. L. FORTESCUE (World Power, 1936, 26, 176—177).—An apparatus for depositing a thin layer of Pt, Au, Ag, or Cu on to a surface by cathodic spluttering is described. The procedure adopted and the precautions necessary are discussed. R. B. C.

Electrolytic preparation of ferrochromium. L. N. GOLTZ and V. N. CHARLAMOV (J. Appl. Chem. Russ., 1936, 9, 1951—1964).—1 : 4 Fe–Cr is obtained in 30% yield by continuous electrolysis (10—15 amp./sq. dm., at 20—40°) with a flowing electrolyte,

maintained at a const. concn. of 1·6*M*-(Cr + Fe) sulphates (Cr : Fe = 15 : 1) and 1% of H_2SO_4.
R. T.

Chromium-plating. M. Gould (J. Chem. Educ., 1936, **13**, 538).—Directions for a laboratory demonstration are given. L. S. T.

Analytical control of chromium-plating solutions. E. E. Halls (Metallurgia, 1937, **15**, 105—107).—Methods of analysis are given for total H_2CrO_4, H_2SO_4, $Fe^{\cdot\cdot\cdot}$, and $Cr^{\cdot\cdot\cdot}$. Wall charts are shown for conversion of analytical vals. into corresponding " oz./gal." A. J. K.

Zinc-plating. C. M. Hoff (Metal Ind., N.Y., 1936, **34**, 99—100). L. S. T.

Amalgamation of platinum as an electrolytic process. V. V. Schtschekin (Ann. Sect. Platine, 1936, **13**, 113—122).—Amalgamation of Pt with Hg–Zn, –Na, or –Fe in H_2O or aq. acids takes place as a result of an electrolytic process in which the amalgams are the anodes and the Pt is the cathode. Amalgamation of Pt or Au is conducted on an industrial scale by electrolysis in aq. NaCl, with the mineral dipping in Hg as the cathode and with a Pt anode (c.d. 42—57 amp./sq. m., at 3·7—3·8 volts). R. T.

Determination of thickness of layers of electrolytically deposited metals. D. V. Stepanov, I. P. Liaschtschenko, and M. S. Matveeva (Zavod. Lab., 1936, **5**, 1189—1191).—Minor modifications of Clarke's drop method (B., 1933, 923) are described.
R. T.

Measuring conductivity of metals. Leaching.—See I. **Ferro-coke. Effect of metals on bituminous emulsions.**—See II. **Anticorrosive paper.**—See V. **Corrosion of Pb [in H_2SO_4]. Use of Fe pipes for H_2SO_4. Purifying $ZnSO_4$ solutions.**—See VII. **Polishing [metals]. Enamel adherence.**—See VIII. **Recovering battery scrap.**—See XI. **Corrosion and paint. Painting galvanised Fe.**—See XIII. **Al and alloys for milk and food [processing]. Al-foil butter wrappers.**—See XIX. **Changes in steel of guns.**—See XXII. **H_2O-pipes.**—See XXIII.

See also A., I, 121, **Resistance of Pd and Pd–Au alloys.** 127, **Fe–Ni, Cu–Ni, Pb–Sb, Au–Na, Au–Mn, Pt–Fe, Pd–Ag, Pb–Si, and W–Mo alloys.** 128, **Amalgamation.** 129, **Diffusion of O_2 and H_2 through Ni.** 140, **Pptn. of Zn from solutions of simple salts, and of Cu and Zn from solutions of complex cyanides. Discharge of Cd and H ions from solutions of complex cyanide salts.** 144, **Prep. of Pb and Zn from their sulphides. Separation of $Yb^{\cdot\cdot}$. Electrolysis of Fe^{II} halides and of $FeCl_2$ in H_2O–EtOH mixtures.** 145, **Corrosion patinas of Cu.** 149, **Photometric determination of Mn, Si, and Cr.** 150, **Electro-analysis of Co.** 153, **Sealing wires into glass.**

Patents.

Cupolas. G. and W. Walmsley (B.P. 458,137, 22.6.35).—The tap hole is a very refractory nozzle in the bottom and is intended to remain open nearly continuously. It leads to a ladle which remains under the cupola, but can be tilted and is provided with means to skim slag and pour metal only into moulds or other ladles which are brought up to it.
B. M. V.

Heat-treating apparatus [for case-hardening steel]. J. W. Harsch, Assr. to Leeds & Northrup Co. (U.S.P. 2,032,209, 25.2.36. Appl., 28.1.31. Renewed 9.5.33).—The articles are heated by high-frequency induction in a closed chamber to which a mixture of NH_3 and hydrocarbon vapour is admitted and kept in circulation through the charge by means of a fan in the lower part of the chamber. (Cf. U.S.P. 1,999,757; B., 1936, 153.) A. R. P.

Heat-treating furnace [for metals]. E. G. de Coriolis and J. R. Moser, Assrs. to Surface Combustion Corp. (U.S.P. 2,033,331, 10.3.36. Appl., 28.9.33. Renewed 11.1.36).—A metallic muffle tube suitable for the gas-carburisation of metals is approx. closed at the ends by doors of known type, and divided at two intermediate points near the ends by V-seated, full-way valves just outside the heating furnace and making gastight closures. The tube is mounted to be free to expand, and one of the V-valves is fixed as a locator whilst the other is flexibly mounted. B. M. V.

Hardening surfaces of metal articles. I. G. Farbenind. A.-G. (B.P. 453,527, 14.3.35. Ger., 14.3.34).—The metal is heated uniformly by passage over a burner which oscillates transversely to the path of the object. L. C. M.

Surface-hardening of iron and steel articles. P. F. Peddinghaus (B.P. 456,673, 26.6.35. Ger., 30.6.34).—A mixing chamber for the gas–air mixture for heating the surface of the articles to hardening temp., and a cooling spray in combination therewith are claimed. A. R. P.

Annealing furnaces. Gen. Electric Co., Ltd., and S. V. Williams (B.P. 459,172, 4.7.35).—In the continuous bright-annealing of metallic strip, before emerging to atm. the strip is pressed between grooved rollers one of which is H_2O-cooled. B. M. V.

Annealing furnaces. Staveley Coal & Iron Co., Ltd., and R. Fabry (B.P. 460,822, 9.4.36).—For continuous annealing a primary supply of combustible gas and air is provided at the end where the goods enter and auxiliary supplies enter at various points distributed along the length, preferably through the roof, all gases being exhausted at the end at which the goods leave. B. M. V.

Annealing furnaces. C. B. Hoak (B.P. 460,941, 4.5.36).—A beehive furnace for annealing tinplates is fired by gas burners in the base, their products of combustion being sent up vertical boxes within the outer metallic shell and forming the boundary of the goods chamber. From the upper parts of the boxes the gases enter the goods and leave by a central flue. B. M. V.

Drawing furnaces. L. A. Lindberg (B.P. 460,928, 14.1.36. U.S., 14.1.35).—A tempering furnace is composed of a chamber for goods with detachable cover and a separate air-heating chamber, air being continuously circulated through both chambers and this convection being the sole method of heating the goods. B. M. V.

[Apparatus for] treatment [of metal articles etc.] with solvents. C. F. Dinley, Assr. to J. H. Bell (U.S.P. 2,028,759, 28.1.36. Appl., 30.9.31).—Apparatus for treating the articles, for cleaning, degreasing, etc. purposes, with a liquid solvent (1) by spraying, and (2) by dipping, is open for the (continuous) removal and introduction of work, but is sealed against draughts, *e.g.*, by the dip tank (2). A still for recovering clean solvent is included, but the articles are treated in (1) with warm liquid solvent rather than with vapour. B. M. V.

Agglomeration of fine iron ores. Neunkircher Eisenwerk A.-G. vorm. Gebr. Stumm, and E. Kugener (B.P. 453,553, 16.12.35).—A mixture of the powdered ore with coke [produced from " middle-quality " coal (containing much shale and waste)] and H_2O is sintered at 1050—1100° before smelting. L. C. M.

Production of cast iron. W. J. Tennant. From Fondrilux, Soc. Anon. (B.P. 453,423, 5.2.35).—Ore is treated with preheated reducing gases in a shaft furnace, passing first through a zone at 700°, where approx. 75% reduction occurs, and then to one at 1000°, where the Fe sponge sinters and acquires a vitreous coating of flux. The Fe is then transferred to a second shaft furnace, where the smelting is completed by addition of coke and the metal is melted. L. C. M.

Metal [cast-iron] casting. P. C. Lemmerman, Assr. to Grasselli Chem. Co. (U.S.P. 2,031,538, 18.2.36. Appl., 30.11.34).—The sand moulds used are lined with a mixture of fine sand, $CaCO_3$, and conc. aq. Na or K silicate. A. R. P.

Manufacture of cast-iron alloys. Dr. Schumacher & Co., and E. Schumacher (B.P. 453,317, 25.11.35. Ger., 24.11.34).—In the deoxidising of and addition of Cr to cast Fe, briquettes consisting of a core of small fragments (0·5—1·5 mm.) of Fe–Cr surrounded by an outer layer of larger ones (2—5 mm.) of Fe–Si–Mn alloy, and bound with CaO 15 wt.-%, are employed. The particles of deoxidant react with the molten metal before the Cr dissolves. L. C. M.

Manufacture of metallic articles [dies for stamping]. Brit. Thomson-Houston Co., Ltd. (B.P. 453,338, 16.3.36. U.S., 16.3.35).—In the production of steel dies for pressing metal objects, the blank is rendered light-sensitive by coating it with dichromated gelatin, and a drawing is printed directly on it as a guide to the toolmaker. L. C. M.

Improving the structure of steel products [rails]. Verein. Stahlwerke A.-G. (B.P. 456,478, 22.11.35. Ger., 21.2.35).—A method of rolling to produce square ingots is claimed. A. R. P.

Cleaning of metal [cold-rolled steel] surfaces. C. Johnson, Assr. to Oakite Products, Inc. (U.S.P. 2,032,174, 25.2.36. Appl., 17.8.33).—Grease and grit are removed from steel surfaces during rolling by washing them in an emulsion of kerosene (80—95%), Na oleate, and cresol and then with a grease solvent. A. R. P.

Metal [iron or steel] articles for coating [with enamel]. J. J. Canfield and G. W. McGohan, Assrs. to Amer. Rolling Mill Co. (U.S.P. 2,032,256, 25.2.36. Appl., 6.9.32).—The metal is immersed in 8% HNO_3 for 40 sec., washed in H_2O and then in aq. Na_3PO_4, and dried prior to enamelling. A. R. P.

Zinc chloride-base flux. E. A. Taylor, Assr. to Grasselli Chem. Co. (U.S.P. 2,031,913, 25.2.35. Appl., 3.11.33).—For soldering Fe and steel the flux consists of $ZnCl_2$ mixed with 0·25—1% of $NaNO_3$ or $NaClO_3$, which latter remove the black C stain normally left after using $ZnCl_2$ alone. A. R. P.

Coating of ferrous bodies with other metals [zinc or cadmium]. A. O. Rodriguez (B.P. 456,660, 8.5.35).—The article is coated with Zn or Cd oxychloride and heated in an inert atm. to volatilise the coating and remove C from the surface layers; the hot article is then passed through a bath of molten Zn or Cd. A. R. P.

Precipitation of copper from solutions containing copper. K. Albert Ges. Chem. Fabriken (B.P. 458,959, 28.12.35. Ger., 10.10.35).—The solution is autoclaved with Ni or Ni-alloy scrap at >100° (160—180°/8—10 atm.). A. R. P.

Increasing the tenacity of metal articles [copper anodes for *X*-ray tubes]. N. V. Philips' Gloeilampenfabr. (B.P. 459,103, 2.6.36. Ger., 3.6.35).—The Cu is cast into a mould packed with " wool " of W wire so that the wire is uniformly dispersed through the casting. A. R. P.

Manufacture of alloys containing copper and zinc. H. W. Brownsdon, M. Cook, G. K. Dudridge, and Imperial Chem. Industries, Ltd. (B.P. 453,577, 11.3.35).—α–β-Brasses containing, *e.g.*, Zn with Cu 59·5—64·5, Ni 5·5—6·5, and Al 0·5—3·0% are hardened by quenching from 800—900°, cold-working if required, and tempering at 300—600°. L. C. M.

Production of uniformly fine-grained castings from metals and metal alloys. R. Jahn and C. Reisinger (B.P. 456,657, 7.5.35. Austr., 7.5.34).—The molten metal, *e.g.*, Cu–Al alloy, is subjected to ultrasonic vibration waves with a frequency of $1—3 \times 10^5$ vibrations per sec.; gas inclusions are thus removed and the alloying constituents become more uniformly distributed. A. R. P.

Production of coatings of tin or tin alloys on [copper or ferrous] metal articles. R. Thomas & Co., Ltd., A. W. Kieft, E. Mehl, and O. Smetana (B.P. 458,940, 20.8.35).—The Cu or Fe article is anodically oxidised in a CrO_4'' or MnO_4' bath, then dipped in dil. HCl, HF, or H_2SO_4, Sn-plated in an alkaline stannate bath, and finally immersed in palm oil at 280° for a few sec. and quenched in palm oil at 100°. A. R. P.

Tin alloys. (Sir) J. Campbell, D. Hanson, and W. T. Pell-Walpole (B.P. 453,349, 9.2.35).—Sn alloys containing Cd 1—15 (4—6)% are heated at >130° but < the m.p., quenched, and again heat-treated at $\ngtr$130° (100°). L. C. M.

Impregnating a metallic mass [iron or nickel] or metallic article with other metal [copper].

F. Leverick (B.P. 458,854, 31.1.36).—The article is embedded in a mixture of Cu, $Ca(NO_3)_2$, and glycerin, and heated slowly to 1000°. A. R. P.

Removing metals as volatile chlorides from ores and other matters containing same. C. Hart, Assr. to P. Shields (U.S.P. 2,030,867—8, 18.2.36. Appl., [A] 14.2.34, [B] 21.4.34).—(A) Oxidised ores containing Fe_2O_3 and NiO are heated at $<$ 1000° with C sufficient to reduce these oxides to sponge metal, then treated with Cl_2 at 200—500° to chlorinate the metals and volatilise the Fe as $FeCl_3$, and finally heated in Cl_2 at 700—900° to remove the remainder of the $FeCl_3$ and all the Ni as $NiCl_2$, the vapours being fractionally condensed to separate the two chlorides. (B) If the ore contains chromite the residue from treatment (A) is mixed with more C and again chlorinated to recover $CrCl_3$. A. R. P.

Separation and recovery of metals. W. W. Triggs. From Soc. Gén. Metallurg. de Hoboken Soc. Anon. (B.P. 453,273, 4.1.35).—A mixture of oxidised or sulphided ores (containing Zn and/or Cd, with Cu and Fe) with CaO and C is charged into a rotary electric furnace having resistance elements traversing its entire length, and is heated to 1250°; the bulk of the Zn and/or Cd is volatilised without fusion of the charge, and is recovered from a condensing plant. The temp. is then raised to 1400° in presence of a reducing atm., and the charge fused; the remainder of the Zn is obtained by the slag, and the Cu etc. forms a matte bottom. L. C. M.

Centrifugal devices for metallic mineral recovery. H. N. Skerrett. From Gold Savers, Ltd. (B.P. 460,016, 4.9.36).—A bowl is made in a form (including a rim) to retain a layer of Hg when rotated. The feed is axially downwards to the bottom. Reticular means may be provided in the Hg to divide it into a no. of connected masses, and agitating means in the layer of ore passing over the Hg. B. M. V.

Recovery of gold from ores. W. J. Tennant and S. Tucker. From A. F. B. Norwood [in part] (B.P. 458,598, 22.6.35).—The ore is ground with activated C in dil. aq. NaCN and the resulting pulp, in which the Au is deposited on the C, is subjected to flotation to recover the C. A. R. P.

[Hardening of] precious-metal [gold] alloys. A. R. Powell, E. R. Box, and Johnson, Matthey & Co., Ltd. (B.P. 456,743, 13.5.35).—Alloys containing Au 50—75 (70), Pt 40—15 (20), and Pd 5—25 (10)% are homogenised by prolonged heating at 1100° after a 50% reduction of the cast ingot, quenched, further rolled to sheet in several stages with intermediate short anneals at 1100° followed by quenching, and finally annealed at 1000—1100° for 1—3 min., quenched, and reheated at 500—750° to produce pptn.-hardening. Alternatively, the last high-temp. anneal may be followed by slow cooling to 600—700° and quenching. Cold-working after high-temp. quenching induces a greater hardness after pptn. treatment. The soft sheet is suitable for deep-drawing into spinnerettes for artificial silk, and the hardening treatment may be applied to the finished articles without producing distortion. A. R. P.

Recovery of osmium [from osmiridium]. Standard Brands, Inc. (B.P. 449,251, 17.12.34. U.S., 23.12.33).—The mineral is fused with Zn, the alloy digested with dil. H_2SO_4 to remove the Zn, the resulting precious-metal powder fused with NaOH and $NaClO_3$, and the aq. extract of the melt acidified with HCl and shaken with C_6H_6 or CCl_4 to extract the OsO_4, which is recovered by shaking the oily layer with aq. NaOH. A. R. P.

Stripping [precious-metal] coatings from coated metal articles. W. W. Triggs. From Baker & Co., Inc. (B.P. 459,130, 24.5.35).—Rh- or Pt-plate may be stripped from Ag articles when a Ni undercoat is present by immersing the articles in a 2 : 1 mixture of H_3PO_4 (*d* 1·75) and H_2O containing $Al_2(SO_4)_3$ 56 and NaCl 56 g./litre. Part of the H_3PO_4 may be replaced by HCl. The solution attacks the Ni and the Rh or Pt then peels off. A. R. P.

Treatment of metals [lead] or alloys for separation or recovery of metallic impurities or constituents [tellurium]. H. J. Enthoven & Sons, Ltd., and E. P. Harris (B.P. 458,679, 18.6.35).—The molten Pb is circulated through a fused mixture of NaOH and NaCl in presence of air or $NaNO_3$ as oxidiser, the slag is dissolved in H_2O, and the Te pptd. by adding $SnCl_2$ or digesting with Sn. If Sn or As is present in the metal the Te dissolves in the slag as Na_2Te, which yields Te on extracting the slag with H_2O; if Sb is also present the Te ppt. is contaminated with $NaSbO_3$, from which it is separated by roasting and extracting with NaOH. A. R. P.

Presses for extruding metals or other materials. Goodlass Wall & Lead Industries, Ltd., and W. Eckford (B.P. 457,445, 27.3.35).—Mechanical details of a press for extruding Pb pipes are claimed. A. R. P.

Coating of metallic surfaces [to prevent wetting with oil]. Brit. Thomson-Houston Co., Ltd. (B.P. 458,723, 8.4.36. U.S., 12.4.35).—The surface is cleaned with aq. NaOH, CCl_4, or C_6H_6, and then coated with a 10% solution of Fe^{III} stearate (I) in kerosene at 120°. The film of (I) is oil-repellent. A. R. P.

Welding-rod coating. P. C. Lemmerman, Assr. to Grasselli Chem. Co. (U.S.P. 2,031,494, 18.2.36. Appl., 19.12.33).—The coating has the composition $FeO,xMO,ySiO_2$ (I), where $M = Ca$ or Ba, $x = \ngtr 1{\cdot}11$, and $y = 0{\cdot}25$—$1{\cdot}6$, the vals. of x and y being such that the m.p. of (I) is $<1300°$. When $M = Ca$, $x = 0{\cdot}5$ and $y = 1{\cdot}25$; the m.p. is 1110°. A. R. P.

[Soft-]soldering flux. W. K. Schweitzer, Assr. to Grasselli Chem. Co. (U.S.P. 2,031,909, 25.2.36. Appl., 31.10.33).—Use of $NH_4H_2PO_4$ or an org. phosphate is claimed. A. R. P.

Casting of metals [magnesium] and ladles therefor. L. G. Day, Magnesium Castings & Products, Ltd., and High Duty Alloys, Ltd. (B.P. 457,484, 30.5.35).—The ladle is provided with a hood device of which part dips below the surface of the molten metal just behind the spout; in this way the metal can be kept in the inert atm. of the melting crucible during its transfer to the mould. A. R. P.

[Magnesium-base] alloys. R. E. Paine, Assr. to Magnesium Development Corp. (U.S.P. 2,031,978, 25.2.36. Appl., 4.1.34).—The alloys contain Sn 0·1—20 (5), Co 0·1—4 (1), and Zn 0·1—10 (4)%. A. R. P.

Casting of aluminium and its alloys. Brit. Non-Ferrous Metals Res. Assoc., D. Hanson, I. G. Slater, and R. T. Parker (B.P. 456,462, 26.6.35. Addn. to B.P. 435,104; B., 1936, 155).—Adsorbed gas is removed from molten Al or its alloys and the grain-size of subsequent castings refined by heating the metal with a 2 : 1 : 1 mixture of NaCl, NaF, and borax, $NaBF_4$, or Na_2TiF_6, or a 1 : 1 mixture of NaCl and K_2TiF_6. A. R. P.

Aluminium alloys. Aluminium Ind. A.-G. (B.P. 458,549, 1.4.36. Ger., 2.4.35).—Alloys of high tensile strength after heat-treatment contain Cu 3—6 (4·3—4·7), Mg 0·2—1·5 (1), Si 0·1—0·45 (0·1—0·3), Mn 0·2—3·0 (0·5), Fe $\ngtr$0·5, and Cr 0·05—0·35 (0·25—0·35)%. A. R. P.

Impregnation of metallic objects with a filling or sealing composition. H. Sutton and L. F. Le Brocq (B.P. 453,226, 1.2.35).—Articles of Al or Mg alloys are alternately boiled and cooled for 5 hr., or autoclaved at 70—200 lb. per sq. in., in solutions containing Na silicate ($SiO_2 : Na_2O = 3{\cdot}8$) 150 and $K_2Cr_2O_7$ 23, or Na silicate ($SiO_2 : Na_2O = 2$) 150 and $K_2Cr_2O_7$ 80 or $ZnCrO_4$ 100 g. per litre. L. C. M.

Production of magnetic cores. Associated Electric Labs., Inc. (B.P. 456,739, 13.5.35. U.S., 20.6.34).—Finely-divided Fe is tumbled in air or steam at 100° to coat the surfaces of the particles with Fe_3O_4, and then heated at 800° in a rotary vac. furnace into which Al vapour is passed to reduce the surface films to an intimate mixture of Fe and Al_2O_3. The product is formed into cores with the aid of alundum cement as binder, and the cores are heated in H_2 at $>$ the m.p. of Fe. A. R. P.

Production of magnetisable [nickel–iron] alloys. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 456,823, 16.5.35).—Ingots of 50 : 50 Fe–Ni alloy produced by sintering carbonyl powders in H_2 are reduced $>$60 (80—90)% by cold-work, annealed at 1000° in H_2 for 4 hr., reduced $<$20 (5—15)% by cold-rolling, and annealed at $>$700° (1100—1200°). A. R. P.

(A) Electromagnetic devices for use in weak magnetic fields. (B) Magnetic [nickel–iron alloy]. Allgem. Elektricitäts-Ges. (B.P. 363,697 and Addn. B.P. 455,268, [A] 17.7.30, [B] 14.2.35. Ger., [A] 28.8.29, [B] 14.2.34).—(A) Fe–Ni alloy wire containing small amounts of Si, Mn, and Cu is homogenised for 1 hr. at 800—900°, stretched 10%, annealed for 1 hr. at 900°, stretched cold several times with intermediate anneals, and finally stretched 60—70% cold. (B) The alloys are made from carbonyl powders and worked to ribbon, which is stretched 98%, annealed, and stretched 60% to produce material of low hysteresis and improved stability. A. R. P.

[Aluminium–nickel–iron alloy] permanent magnets. Marrison & Catherall, Ltd., and A. C. Catherall (B.P. 442,127 and Addn. B.P. 454,406, [A] 1.5.34, [B] 2.1.36).—(A) The alloy used contains Ni 30—35 (32), Al 10—15 (12), and Ti 0·4—4 (2)% with C $<$0·15%; the castings are quenched from 1100—1300° in oil and reheated at 650—800°. (B) The Ti content is reduced to $<$0·4%. A. R. P.

Treatment of alkali-metal amalgam obtained in electrolytic cells having mercury cathodes. Soc. Anon. Krebs & Co. (B.P. 453,517, 13.3.35. Fr., 13.3.34).—The decomp. cell is divided into a no. of sections and is operated at 40—120° (95°); freedom from cryst. $NaOH,H_2O$ and less frequent need for cleaning are claimed. Lye containing up to 750 g. of NaOH per litre is obtained. L. C. M.

Manufacture of alloys containing boron [by continuous electrolysis]. J. L. Andrieux, Assr. to Soc. d'Electrochim., d'Electrométall., et des Aciéries Electr. d'Ugine (U.S.P. 2,033,172, 10.3.36. Appl., 19.7.33. Fr., 21.7.32).—Continuous electrolysis is effected in a bath of fused B_2O_3 or borates, the cathode comprising a bath of fused alloying metal (R); the composition of both baths is maintained const., and the temp. held at $\nless$ the m.p. of the eutectic of R and B, but $<$ the m.p. of R. B. M. V.

Manufacture of free gold leaf. Peerless Gold Leaf Co., Ltd. (B.P. 456,749, 13.5.35. U.S., 14.5.34).—Au is plated on to Ag bands, the Ag dissolved in HNO_3, and the resulting Au leaf floated on to a bath of size so that the side next the Ag is coated with size and the other side with oil. A. R. P.

Manufacture of [enamel-]coated insulated wires. Zaidan Hojin Rikagaku Kenkyujo (B.P. 453,377, 5.7.35. Jap., 19.7.34).—An apparatus for coating wire with enamel, incorporating an electrical device for detecting and recoating weak spots in the covering, is described. L. C. M.

Production of protective layers on magnesium and its alloys. Siemens & Halske A.-G. (B.P. 459,017, 4.5.36. Ger., 1.6.35).—The metal is anodically oxidised at 20—25° in a bath containing H_2O-sol. compounds selected from all the following groups: (*a*) hydroxides, (*b*) carbonates, borates, or silicates, (*c*) cyanides, cyanates, or thiocyanates. Small amounts of sol. sulphates, nitrates, phosphates, halides, chromates, tungstates, or silicofluorides may also be added; *e.g.*, the bath may contain NaOH 5, Na_2CO_3 5, KCN 2, and Na_2WO_4 0·1%. A. R. P.

Recovery of gases [hydrogen fluoride] and dust evolved in the electrolytic manufacture of aluminium. P. J. M. Torchet, Assr. to Comp. de Prod. Chim. et Electromét. Alais, Froges et Camargue (U.S.P. 2,031,554, 18.2.36. Appl., 4.4.34. Fr., 5.4.33).—The gases from Al-electrolysis cells are exhausted into a wide flue in which they are cooled by admixture with a large vol. of air, and the air is then passed through a scrubber fed with aq. Na_2CO_3. A. R. P.

Erratum.—On p. 147, col. 2, line 2 from bottom, *for* B.P. 425,401 *read* B.P. 452,401.

Manufacture of [high-nitrogen ferrochromium] alloys. Electro Metallurg. Co., Assees. of W. C. Read (B.P. 456,465, 22.7.35. U.S., 21.7.34).—See U.S.P. 2,027,837; B., 1937, 250.

[Rivet-heating] furnaces. H. Alexander & Co., Ltd., and H. Alexander (B.P. 458,141, 29.8.35).

Concentrating tables for concentrating ores and the like by the wet process. C. T. Setterberg and E. O. E. Tydén (B.P. 460,125, 3.7.36. Swed., 5.7.35). B. M. V.

Ore concentrator. Flotation-separation apparatus. Bearings.—See I. **N_2 and N_2–H_2 [for bright-annealing].**—See VII. **Enamel on Cu.**—See VIII. **Welding electrode.**—See XI. **Bonding rubber to metal.**—See XIV. **Detecting Hg in the atm.**—See XXIII.

XI.—ELECTROTECHNICS.

Temperature measurement with resistances and T-coil apparatus. H. R. Eggers (Arch. Wärmewirts., 1936, **17**, 337).—A movable-coil apparatus, in which the main and auxiliary coils are at right-angles in the form of a T, is used in conjunction with a Wheatstone bridge. R. B. C.

Dry cells. I, II. Measurement of the potential of the zinc electrode. G. Fuseya, T. Miyakawa, Y. Akai, and K. Simazakai (J. Soc. Chem. Ind. Japan, 1936, **39**, 401—404b).—Data on the amalgamated Zn electrode in mixed solutions of NH_4Cl and $ZnCl_2$ at various concns. and temp. are given. The changes in the anode potentials of Leclanché or dry cells during very slow discharge are discussed. T. W. P.

Dry cells for use at low temperatures. II. N. Kameyama and H. Iida. **III.** N. Kameyama and A. Naka (J. Soc. Chem. Ind. Japan, 1936, **39**, 431b, 432b).—II. Dry cells containing NH_4Cl cannot be used below the eutectic f.p. (−16°), but cells containing an aq. solution of $CaCl_2$ (29·9%) can be used to −50°. An electrolyte of aq. NH_4Cl with added $ZnCl_2$, $(CH_2{\cdot}OH)_2$, and EtOH may also be used to −50°.

III. A satisfactory electrolyte for use in dry cells at −50° to −100° consists of mixture of $CaCl_2$, $ZnCl_2$, and H_2O in a definite ratio. T. W. P.

Recovery of [secondary] battery scrap and residues by metallurgical processes. E. R. Thews (Canad. Chem. Met., 1937, **21**, 17—19).—Reverberatory- and blast-furnace smelting processes are compared. Separation of the metallic from the non-metallic constituents followed by reverberatory or pot smelting is common practice. Oxide residues, free from metallic impurities other than Sb, may be added to the Pb-refining furnace. The reverberatory furnace is easy to control and operate, but the Pb-rich slags produced require further blast-furnace treatment. The blast furnace is preferable for the handling of large quantities of uniform and homogeneous material. J. W. C.

Dielectrics for [electrical] condensers. Y. Hichiri (J. Electrochem. Assoc. Japan, 1935, **3**, 218—220).—A 50% solution of bakelite in castor oil has ε 5·6 (transformer oil 2·3). Ch. Abs. (*p*)

Continuous automatic control of acidity in the electrolytic preparation of persulphates. E. C. Gelgren and T. M. Menschikova (Zavod. Lab., 1936, **5**, 1179—1182).—The p_H of the electrolyte in the prep. of $(NH_4)_2S_2O_8$ and $K_2S_2O_8$ is determined potentiometrically (Pt or Pt–HgCl electrodes). Continuous automatic p_H control is achieved by means of a cathode voltameter. R. T.

Ultra-violet radiation in chemical industry. F. Lauster (Chem. Fabr., 1937, **10**, 61—63).—The effect of the rays in producing fluorescence may be used for discovering defects in textile goods. Irradiation of milk for production of vitamin-*D* and for the sterilisation of H_2O, especially for washing butter and yeast, has been employed. Irradiation of grain saves the use of injuriously high temp. in drying, and a similar treatment of leather can compete with oven-drying. C. I.

Measuring κ of metals.—See I. **[Electro-osmosis of] peat. Determining m.p. of coal ash. Concn. of graphite suspensions. Transformer oil.**—See II. **Insulation boards.**—See V. **Purifying $ZnSO_4$ solutions.**—See VII. **κ of glass.**—See VIII. **Examining blister steel and welds by *X*-rays. Determining Cu in Fe, and Al in Fe–Si. Magnetic analysis of steel. Determining Ti in steels. Ni alloys in generators. Measurements with metals. Al in high-frequency work. Hard-soldering furnace. *X*-Ray examination of welded joints. Cathodic sputtering of metals. Fe–Cr. Cr- and Zn-plating. Pt amalgam. Determining plating thickness.**—See X. **Plastics in electrical industry. Measuring brightness of luminous paint.**—See XIII. **Properties of rubber compounds. Cable insulation.**—See XIV. **Titration of gelatin suspensions.**—See XV. **Determining ash in molasses.**—See XVII. **Estimating konimeter dust spots. H_2O purification.**—See XXIII.

See also A., I, 117, **X-Rays in industry.** 121, **Resistance of Pd and Pd–Au alloys. κ of Rb on Pyrex glass.** 137, **Electrolysis of NaCl in liquid NH_3.** 140, **Electrolysis of H_2O. Pptn. of Zn from simple salt solutions, and of Cu and Zn from complex cyanide solutions. Discharge of Cd and H ions from solutions of complex cyanide salts.** 144, **Electrolytic prep. of Pb and Zn from their sulphides. Electrolytic separation of $Yb^{\cdot\cdot}$. Electrolysis of Fe^{II} halides and of $FeCl_3$ in H_2O–EtOH mixtures.** 145, **Prep. of conductivity H_2O.** 150, **Electro-analysis of Co.** 153, **Standard quinhydrone electrode. Sealing wires into glass.** A., II, 92, **Electrochemical oxidation of ψ-cumene.** 95, **Electrolytic introduction of CNS′ into arylamines and phenols.** 101, **Electrolysis of benzaldehyde-2-carboxylic acid.**

Patents.

Electric [crucible] furnace. A. W. Fannin, Assr. to Food Machinery Corp. (U.S.P. 2,035,306, 24.3.36. Appl., 30.8.33).—Refractory interlocking blocks for the furnace wall around a crucible are so shaped (roughly L-shaped) that a continuous spiral groove is formed in which is threaded a heating element, preferably a crinkled ribbon. Provision is made for replacing broken blocks after only slight displacement of the heater. B. M. V.

Apparatus for charging [arc] furnaces. DEMAG-ELEKTROSTAHL GES.M.B.H. (B.P. 410,646 and Addn. B.P. 459,099, [A] 29.7.33, [B] 21.4.36. Ger., [A] 6.8.32, [B] 13.7.35).—(A) A basket for lowering the charge into, *e.g.*, an arc furnace has its bottom formed of strips of metal secured together at the centre by fusible metal which melts by the residual heat of the furnace, after which the basket is lifted and the strips slide out between the charge and the wall of the furnace. (B) The bottom is formed of hinged elements, *e.g.*, strips divided by several hinges, or chains. B. M. V.

Electric heating elements. C. SYKES, W. NEEDHAM, F. W. JONES, and METROPOLITAN-VICKERS ELECTRICAL CO., LTD. (B.P. 458,048, 25.9.35).—The heater is tubular in general form (*e.g.*, a wire spiral) and is insulated by MgO from an outer metallic shell, the MgO being formed preferably by oxidation *in situ*. Previously the core is filled with incompressible, granular insulating material. B. M. V.

Manufacture of electric-resistance elements. G. C. GAUT, B. F. HUGGINS, and PLESSEY CO., LTD. (B.P. 460,895, 2.8.35).—An electrically conductive material (*e.g.*, colloidal C) is added in finely-divided form or as a suspension or dispersion to a compound (*e.g.*, Ag halide) capable of being rendered conducting by exposure to light or other electromagnetic radiation. The reduction of the latter is controlled by exposure and development to give any desired conductivity, and in any desired form by masking the strip or film on which the substances are coated. The method is especially suitable for the manufacture of logarithmically-variable resistances. B. M. V.

Electric current rectifier. S. RUBEN, Assr. to RUBEN RECTIFIER CORP. (U.S.P. 2,032,439, 3.3.36. Appl., 13.4.33).—The rectifier comprises Mg and carbonised Ni elements separated by a film of Cu_2S, with or without Se or Te. A. R. P.

Carbon brushes for electrical apparatus. MORGAN CRUCIBLE CO., LTD., R. J. PERRY, and A. E. WIGGS (B.P. 460,800, 6.11.35, 3.1. and 22.10.36).—The brush is composed of C and/or graphite, with or without incorporated metal and some material that is eliminated or shrinks during manufacture so as to leave the brush with a porous surface, the pores being disconnected or continuous throughout, as desired. B. M. V.

Flux-coated [welding] electrode. P. R. JUDY, Assr. to INDIANA STEEL & WIRE CO. (U.S.P. 2,032,322, 25.2.36. Appl., 10.4.34).—The flux coating consists of a paste containing ilmenite 10—40, felspar 10—40, Na silicate 20—60, wood flour 10—30, Fe-Mn 5—15, and gum arabic 1—5%. A. R. P.

[Low-intensity] magnetic separators. J. NEILL & CO. (SHEFFIELD), LTD., A. EDWARDS, and W. L. BOWER (B.P. 458,987, 5.7. and 2.8.35).—A no. of strips (*A*) of Ni-Al steel or other permanently magnetic material alternate with (*B*) similar but rather narrower strips of magnetisable material, both *A* and *B* being mounted edgewise on a base plate (*C*); *B* and *C* are formed together, if desired, *e.g.*, in dynamo cast steel. *A* and *B* are separated by brass strips and the upper working surface thus formed may be saw-toothed. B. M. V.

Treatment of bodies by electromagnetic radiation. C. LORENZ A.-G. (B.P. 458,534, 6.12.35. Ger., 6.12.34).—The radiating device (a dipole) is buried in a mass of dielectric material having approx. the same ε as the human body or other object to be irradiated, and the mass is preferably of parabolic or like shape with a reflecting surface outside to concentrate the radiations. B. M. V.

Electrical conductors. ALLGEM. ELEKTRICITÄTS-GES. (B.P. 457,770, 31.5.35. Ger., 31.5.34).—A cable for permanent wiring in moist places contains one or more conductors each insulated by known means, and the whole is covered with (1) crêped paper or other yielding material, (2) wires or ligatures bound so tightly as to be partly embedded in (1) and forming the earth conductor, (3) varnish or lacquer to form a seamless extensible sheath resistant to H_2O and oil. B. M. V.

Insulated electric-cable conductors. OKONITE-CALLENDER CABLE CO., INC. (B.P. 460,515, 26.6.35. U.S., 11.8.34).—A conductor having oil-impregnated, laminated insulation, but no Pb sheath, is provided with a protective covering which prevents escape of oil but permits the entry of oil at pressures >1 atm. J. S. G. T.

Manufacture of electric cables or other insulated conductors having mineral powder insulation. CONDUCTEUR ÉLECTRIQUE BLINDÉ INCOMBUSTIBLE (B.P. 458,257, 12.3.35. Fr., 12.3.34).—MgO or other dry powdered mineral is forced continuously through a die, the core being the conductor; on emergence from the first die it is coated with a plastic material (rubber or Pb) emerging from another die. B. M. V.

Electric insulation [for cables]. BRIT. THOMSON-HOUSTON CO., LTD. (B.P. 457,895, 31.7.35. U.S., 1.8.34).—The primary insulation comprises cellulosic material impregnated with a fireproofing agent (*e.g.*, urea), and an impervious coating comprises rubber (25%) and a halogenated polyphenyl compound (chlorinated Ph_2 75%, the Cl being $\nless 40\%$ of the coating). B. M. V.

Production of insulation for submarine cables. R. R. WILLIAMS and A. R. KEMP, Assrs. to WESTERN ELECTRIC CO., INC. (U.S.P. 2,031,916, 25.2.36. Appl., 28.4.33. Can., 12.2.23).—Rubber is alternately soaked and milled in H_2O at 20—30° for several days to remove H_2O-sol. constituents, and then mixed with inert fillers, accelerators, and S and vulcanised on a cable. A. R. P.

Insulating parts or members in electrical apparatus. STEATIT-MAGNESIA A.-G. (B.P. 458,078, 5.6.35. Ger., 5. and 19.6.34).—For condensers or the base caps of "tubes" a mixture of MgO or $Mg(OH)_2$ and TiO_2 is burned to cause combination. B. M. V.

Insulation of magnetic powder for mass cores, for high-frequency purposes, and the like. Brit. Thomson-Houston Co., Ltd. (B.P. 458,002, 25.3.36. Ger., 27.3.35).—The insulation is composed of amber varnish and polystyrene; the amber is dissolved without melting. B. M. V.

Electrolytic apparatus. D. J. Evans and E. C. D., Ltd. (B.P. 458,594, 22.5.35).—Bleaching or insecticide liquor is manufactured during automatic circulation of liquid from tank to cell and back, the cell comprising merely two closely adjacent graphite electrodes in a by-pass conduit to the tank. B. M. V.

Electrolytic capacitance devices. Brit. Thomson-Houston Co., Ltd. (B.P. 460,548, 27.3.36. U.S., 30.3.35).—Film-forming armatures are spaced by a porous spacer filled with a gel composed of an aq. emulsion of an alkyd resin emulsified by an org. compound containing an NH_2, *e.g.*, NH_2Ph, or a substituted NH_2, *e.g.*, $N(C_2H_4{\cdot}OH)_3$, and an ionogen, *e.g.*, H_3BO_3. J. S. G. T.

Manufacture of cells for electrolytic or electrostatic condensers or secondary batteries. R. Jahre (R. Jahre Spezialfabr. f. Kondensatoren) (B.P. 460,423, 24.7.36. Ger., 30.7.35).—A roll as used in electrolytic condensers or the like is enclosed in a metal casing which overlaps and is electrically welded on the outside of the joint, the casing itself forming one electrode of the arc. B. M. V.

Electrolytic device [condenser]. P. Robinson, Assr. to Sprague Specialties Co. (U.S.P. 2,031,793, 25.2.36. Appl., 3.8.34).—The electrolyte of an Al plate condenser comprises mixtures of glycerin and H_3BO_3 kept at const. moisture content by addition of partly decomposed sugar. A. R. P.

Preventing or reducing the development of gases in charging cells or accumulators. F. Hochwald (B.P. 457,806, 6.6.35).—The anode contains active C and the electrolyte comprises a solution of Zn halide ($ZnBr_2$) containing also compounds which are easily reduced and oxidised in a reversible manner, *e.g.*, MnO_2, NH_4 phosphomolybdate, or NH_4VO_3, absorbed in a paste of $Al(OH)_3$, with or without $KClO_3$. B. M. V.

Electric [primary] batteries. Comp. Gén. d'Electricité (B.P. 458,529, 13.11.35. Ger., 14.1.35).—A cell embodying indirect depolarisation by air comprises a positive electrode on the surface of an ammoniacal electrolyte over a floating porous diaphragm, and a depolarising layer on the electrode which is wetted by capillarity and exposed to the air. The negative electrode is a strongly electropositive metal, *e.g.*, Zn; the depolariser is a salt or oxide of Pb (insol. in the electrolyte) or Fe_2O_3 or $Fe(OH)_3$, and the diaphragm is of microporous rubber, glass wool, or spun quartz supported by a separate annular float. B. M. V.

Storage-battery electrode. H. R. Harner and M. F. Chubb, Assrs. to Eagle–Picher Lead Co. (U.S.P. 2,035,315, 24.3.36. Appl., 25.1.35).—0·025—1·00% of Na borophosphate is mixed with the Pb oxide paste to improve tenacity. B. M. V.

Electric incandescence lamps. N. V. Philips' Gloeilampenfabr. (B.P. 458,620, 2.10.35. Ger., 2.11.34).—The vol. of the bulb in c.c. is of the same order as the power taken in watts + 25; it is filled with gas (mainly Kr and/or Xe) and a reflecting screen is placed between the filament and the cap. B. M. V.

Electric incandescence lamps. Gen. Electric Co., Ltd. From Patent-Treuhand Ges. f. elektr. Glühlampen m.b.H. (B.P. 460,060, 21.10.35).—The metallic parts within the bulb, other than the filament, *e.g.*, a reflector or light screen, are composed of Ni 72, Fe ≯ 50 (25), Ti 1—10 (3)%, and C substantially nil. B. M. V.

Electric arc-discharge devices. Brit. Thomson-Houston Co., Ltd. (B.P. 460,875, 4.8.36. U.S., 6.8.35).—The lead-in connexion to a pool of vaporisable material, *e.g.*, Hg, forming the cathode, has a portion projecting through the pool, and this portion is protected from deterioration by an enclosing sleeve of arc-resisting metal, *e.g.*, W or Mo. J. S. G. T.

Luminous electric-discharge lamps. Gen. Electric Co., Ltd. From Patent-Treuhand Ges. f. elektr. Glühlampen m.b.H. (B.P. 458,603, 22.7.35. Addn. to B.P. 432,614).—In a lamp containing Hg vapour and ≮ 0·2% of Cs under high pressure, the bulb comprises SiO_2 25—40 (35) and B_2O_3 10—20 (10)%, the combined % being ≯ 50%, Al_2O_3 25—35 (30), and alkaline earths (including MgO and ZnO) 20—40% (BaO 10, CaO 15%). The temp. of operation is so high that the Cs vapour contributes materially to the light emission. B. M. V.

Manufacture of luminescent screens [for use with electric-discharge devices]. Gen. Electric Co., Ltd., Assees. of Patent-Treuhand Ges. f. elektr. Glühlampen m.b.H. (B.P. 460,756, 29.6.36. Ger., 28.6. and 28.12.35).—Luminescent material (*e.g.*, Zn silicate, mixed with ZnO or kaolin if desired) is deposited on a binder consisting of H_3PO_4 and/or one of its analogues, *e.g.*, H_3AsO_4, coating a glass surface, which is then heated to react with the acid to form a hard cement. J. S. G. T.

Manufacture of highly emissive cathodes. S. Loewe (U.S.P. 2,031,721, 25.2.36. Appl., 16.6.33. Ger., 17.7.30).—An intimate mixture of BaO and Mg powder is heated in vac. until the oxide is reduced and the excess of Mg volatilised. The resulting Ba–MgO mixture is treated with paraffin wax to coat the individual particles. The product is used for coating the cathodes of thermionic valves, the Ba being volatilised in vac. on to the cathode. A. R. P.

Thermionic electrodes adapted to be heated by an electric discharge. Gen. Electric Co., Ltd. From Patent-Treuhand Ges. f. elektr. Glühlampen m.b.H. (B.P. 460,475, 27.1.36).—A conical, porous electrode built up from wires of refractory metal, *e.g.*, W, with pores filled with thermionically emitting material, is claimed. J. S. G. T.

Electrodes for high-pressure, metallic vapour, electric-discharge tubes. W. J. Tennant. From Soc. Anon pour les Appl. de l'Electricité et des

GAZ RARES ETABL. CLAUDE–PAZ & SILVA (B.P. 459,204, 14.2.36. Addn. to B.P. 450,035; B., 1936, 939).—A ribbon of metal of the Pt or Ni group coated with emissive oxide is wound within and close to the turns of a ribbon of refractory metal, *e.g.*, Ta, also coated with emissive oxide except for the outside of its outer turn. J. S. G. T.

Electrodes of [hot-cathode] electric-discharge tubes. W. L. W. SCHALLREUTER (B.P. 459,163, 3.7.35).—A cylindrical metal shield which functions both as cathode and anode until the working temp. of the discharge tube is reached surrounds the emissive portion of the cylindrical cathode formed by pressing and then heating at about 1300° a powdered mixture, *e.g.*, of BaO (40), W carbide (20), Zr (10), and ZrO_2 (30%). J. S. G. T.

[Electrodes for] cathode-ray tubes. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 460,409, 3.6.36. Ger., 10.7.35).—Electrodes made of a steel alloy of austenitic (non-magnetic) structure, *e.g.*, Krupp V2A steel, are claimed. J. S. G. T.

Elimination of occluded gases from an enclosure [*e.g.*, electron-discharge tube]. W. J. TENNANT. From SOC. ANON. POUR LES APPL. DE L'ELECTRICITÉ ET DES GAZ RARES ETABL. CLAUDE–PAZ & SILVA (B.P. 458,462, 15.2.36).—Discharge tubes which are to be operated with an atm. at high pressure are cleaned up by heat and vac., Hg or the like being boiled outside and the vapour caused to sweep through the tube, not being condensed until it has left. B. M. V.

Photometers for measuring illumination. GEN. ELECTRIC CO., LTD., Assees. of B. LANGE (B.P. 459,277, 13.8.36. Ger., 18.9.35).—A rectifier-type, photo-electric cell is exposed below a window in the face of the galvanometer. B. M. V.

Measurement of reflexion coefficients. GEN. ELECTRIC CO., LTD., Assees. of B. LANGE (B.P. 459,278, 13.8.36. Ger., 25.11.35).—In an apparatus comprising a source of light and a photo-electric cell, a diaphragm protects the latter from diffused light and the apparatus is focussed so that the image of the source reflected from the sample is formed in the aperture of the diaphragm. B. M. V.

Apparatus for testing objects with filtered ultra-violet rays. QUARZLAMPEN GES.M.B.H. (B.P. 458,668, 15.5.35. Ger., 15.5.34).—An arc is formed between oxide electrodes in a high-pressure atm. of Hg and rare gas, and the bulb wall is of quartz or other glass which stops visible light rays. A lantern is described. B. M. V.

Fluorescent screen. FARNSWORTH TELEVISION, INC. (B.P. 460,479, 2.3.36. U.S., 13.3.35).—Zn borate, activated by heating with a Mn compound (I), *e.g.*, MnO_2, is mixed with substantially pure ZnS, applied to the screen of a cathode-ray tube, and processed at a temp. $<$ that at which ZnS combines with (I). J. S. G. T.

Leading-in wires adapted to be sealed through vitreous envelopes. GEN. ELECTRIC CO., LTD. From PATENT-TREUHAND GES. F. ELECTR. GLÜHLAMPEN M.B.H. (B.P. 459,922, 18.7.35).—The wires are of W or Mo coated, at least outside the envelope, with metal protective against oxidation, *e.g.*, Rh; if the coating extends inside it must be so thin as not to affect the thermal expansion of the wire. B. M. V.

Determination electrically of the temperature, and oxygen and carbon dioxide content of gases. A. J. M. SMITH and R. GANE (B.P. 459,181, 4.7.35).—Apparatus, designed more especially for use in gas stores for fruit, comprising a balanced Wheatstone bridge device provided with compensated leads and one or more slide wires calibrated in degrees of temp. and % of O_2 and CO_2 is claimed. Thus, *e.g.*, the apparatus may include a Shakespear differential katharometer. J. S. G. T.

Electrical purification of gases. V. BERAN (B.P. 459,408, 21.12.35. Czechoslov., 22.12.34).—The live negative electrode comprises a bundle of fine tubes or a sheet of meshwork and is suspended closely over a pool of H_2O or a wet conveyor belt forming the earthed positive electrode; the flow of gas is downwards through the negative and then horizontally along the positive electrode. B. M. V.

Electrical precipitation of suspended particles from gases. LODGE-COTTRELL, LTD. From RESEARCH CORP. of NEW YORK (B.P. 459,301, 5.7.35).—The discharge electrodes are earthed, cylindrical in form with openings through which the cleaned gas is exhausted, and provided with corona-inducing fins or the like. Preferably the gas is admitted to an annular space between the electrodes. B. M. V.

Electrically heated boiling vessels. VOIGT & HAEFFNER A.-G., and R. TRAMBAUER (B.P. 459,606, 5.9.35).

Manufacture of electrodes for electric condensers [by extrusion]. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 460,871, 15.7.36. Ger., 2.9.35).

Crematory furnaces. Thermostat. Viscosimeter.—See I. **Separating coal from impurities. Testing lubricants.**—See II. **Ketones.**—See III. **NaOH. H_2O_2. Ozoniser.**—See VII. **Glass-tank furnaces. Photoluminescent glass. Resistant glass. Firing porcelain etc. Sparking-plug insulators.**—See VIII. **Cu anodes for *X*-ray tubes. Coatings of Sn on metal articles. Welding rod. Magnetic cores. Ni–Fe alloys. Magnetic alloys. Treating alkali-metal amalgam. Alloys containing B. Au leaf. Insulated wires. Protective layers on Mg. Al.**—See X. **Photometer.**—See XXI.

XII.—FATS; OILS; WAXES.

Bacterial processing of margarine. O. PALLADINA, A. STIASHKINA, and D. JAKOVLEV (Trud. VNIIZh, 1934, No. 3, 68—74).—Aroma in acidified milk does not depend solely or even essentially on Ac_2: volatile acids from lactic fermentation may suffice. Best aroma was obtained with symbiotic cultures of *Strep. cremoris* and a Jensen aroma culture. Addition of synthetic Ac_2 lowers the organoleptic rating of the magarine. CH. ABS. (*p*)

Emulsifying agent for margarine. K. Popov (Maslob. Shir. Delo, 1935, **11**, 250—251).—Refined, deodorised sunflower-seed oil oxidised in a current of dry air (H_2SO_4) at 250° for 10 hr. is a better emulsifier than Paalsgaard oil. Ch. Abs. (*p*)

Aqueous emulsions of fats. V. Ivanova (Trud. VNIIZh, 1934, No. 3, 98—103).—In emulsifying fats, *e.g.*, sunflower-seed oil, for manufacture of margarine without milk, max. stability is obtained with fat : $H_2O = 4 : 1$. Polymerised soya-bean oil is recommended as emulsifier. The optimum temp. of emulsification is near the m.p. of the fat. Raw sunflower-seed oil may be added, but amounts >25% seriously diminish the stability of the emulsion. Ch. Abs. (*p*)

Fat from the skunk ["surilho"], *Conepatus suffocans*, Az. H. Werner (Fette u. Seifen, 1937, **44**, 19).—Two samples of fat (which is used in local medicine) from an El Salvador skunk farm had, respectively, m.p. 32°, 28°; f.p. 28·3°, 26·5°; d_4^{40} 0·9020, 0·9010; n_D^{40} 1·4612, 1·4626; dispersion (at 40°) 54·64, 54·62; acid val. 0·75, 0·75; sap. val. 193·7, 194·4; I val (Hanus) 77·5, 81·0, R.–M. val. 1·9, 2·7; Polenske val. 3·0, 4·6; Ac val. 9·2, 3·8; unsaponifiable matter 0·40, 0·44%; mean mol. wt. of fatty acids 274·5, 275·4. White mice readily ate the fats without ill effect. E. L.

Separation in refining [of fats]. A. Schmidt and O. Michailovskaja (Maslob. Shir. Delo, 1935, **11**, 255—258).—A continouus process of neutralising fats by means of the De Laval centrifugal apparatus is described. Fat and alkali solution are fed into the neutraliser and the soap stock is separated from the oil. Separation is best carried out at 85—90° with addition of H_2O or aq. NaCl. Ch. Abs. (*p*)

Determination of rate of melting of animal fats. B. Vasiliev (Maslob. Shir. Delo, 1934, **10**, No. 11, 52—54).—The time taken for a ball to fall through a column of presolidified (0°) fat when placed in a heating vessel is characteristic of the fat. Ch. Abs. (*p*)

Microchemical analysis of fats. V. Gleizin (Maslob. Shir. Delo, 1934, **10**, No. 9—10, 64—65).—Seeds are characterised by coloration produced in oil droplets by an EtOH tincture of alkannin, tests being carried out on a microscope slide. Ch. Abs. (*p*)

Rapid refractometric methods in analysis of fats and foodstuffs. W. Leithe (Österr. Chem.-Ztg., 1937, **40**, 64—67).—A review. J. D. R.

Antioxidants and autoxidation of fats. VIII. Autoxidation of oleic acid, methyl oleate, and oleyl alcohol. L. A. Hamilton and H. S. Olcott (Ind. Eng. Chem., 1937, **29**, 217—223; cf. B., 1937, 57).—The mechanism of oxidation of oleic acid (I), Me oleate (II), and oleyl alcohol (III) was studied by measuring the O_2 absorbed, H_2O and CO_2 evolved, and the I, peroxide, Kreis, Ac, acid, and sap. vals. after varying intervals. Initial reaction occurs at double linkings and (III) absorbs five whilst (I) and (II) absorb four O per mol. Otherwise vals. for (II) and (III) agree generally, but differ from those for (I). The rate of destruction of the double linking is more rapid than that of a unimol. reaction. Explanations of the results are offered. T. G. G.

Comparison of methods for determining iodine values of vegetable and animal fats. S. Juschkevitsch (Trud. VNIIZh, 1934, No. 2, 9—34).—Use of $CHCl_3$, CS_2, light petroleum, and EtOH–C_6H_6 (1 : 2) as solvents gave substantially the same results as were obtained with CCl_4 in the Wijs and Margosches and Stiepel methods. Results of Margosches' method agreed with those of Hübl and Hanus, but Wijs' method gave higher vals. Ch. Abs. (*p*)

Catalytic hydrogenation of fats. A. Zinoviev (Trud. VNIIZh, 1934, No. 3, 3—15).—As hydrogenation of fatty acids of linseed oil [$(HCO_2)_2Ni$ catalyst] proceeds, the content of isomerides of oleic acid increases to a max. and subsequently declines to zero. These acids are formed, not by shifting of double linkings, but by gradual and perhaps selective saturation of the double linkings. In the initial stages of hydrogenation acids with $\nless 2$ such linkings react first. Ch. Abs. (*p*)

Nickel formate as a catalyst in hydrogenating fats. A. Zinoviev, M. Vinogradova, and V. Ivanova (Trud. VNIIZh, 1934, No. 3, 16—23).—High activity is obtained only when the formate is decomposed in a liquid phase, *e.g.*, in an oil medium. Decomp. in an atm. of H_2 is ineffective. Catalysts containing NiC_2O_4 are examined. Ch. Abs. (*p*)

Hydrogenation of fats in presence of nickel carbonate reduced in the oil. E. Etinburg (Maslob. Shir. Delo, 1934, **10**, No. 9—10, 45—47).—The catalyst is prepared by pptn. from aq. $NiSO_4$ by Na_2CO_3, drying at 100—105°, grinding, mixing with sunflower-seed oil, and heating the mixture in presence of H_2. The CO_2 content of the Ni carbonate increases as the temp. of pptn. and drying is lowered. High catalytic activity is associated with low temp. of pptn., drying, and reduction. Ch. Abs. (*p*)

Regenerating simple nickel compounds [for hydrogenation of fats] directly in oil. A. Zinoviev, M. Vinogradova, and O. Popova (Trud. VNIIZh, 1934, No. 3, 34—39).—Reduced catalysts were prepared from $Ni(OH)_2$ after oxidation with Br, and from $NiCO_3$ suspended in oil. $NiCO_3$ yields more active catalysts than does $(HCO_2)_2Ni$. Ch. Abs. (*p*)

New fats for the soap kettle. M. J. Hausman (Soap, 1937, **13**, No. 2, 28—32, 37, 73).—Some of the less common substances capable of replacing the usual soap fats are described. L. D. G.

Naphthenic acids in soap-making. A. Duimshitz (Maslob. Shir. Delo, 1935, **11**, 260—261).—Production of the acids is described. Ch. Abs. (*p*)

Soap stock as a bleaching agent in refining fats. A. Streltzov (Maslob. Shir. Delo, 1935, 151). The colour of fats or oils is improved by addition of 8—10% of soap stock. Ch. Abs. (*p*)

Influence of various electrolytes on physical and chemical properties of sodium oleate. N. Petrova (Maslob. Shir. Delo, 1935, 142—148).—Effects of acid (HCl), alkaline (Na_2CO_3, Na_3PO_4, Na_2SiO_3), and neutral (NaCl) salts on the lathering power, γ, and emulsifying power of aq. Na oleate are recorded. Ch. Abs. (*p*)

Hydrolysis of soap in dilute aqueous solutions. B. Tiutiunnikov and N. Kasjanova (Maslob. Shir. Delo, 1935, **11**, 312—316).—The [OH′] of dil. soap solutions as used in washing is not an index of the extent of hydrolysis of the soap. Structural components of the soap solution can adsorb OH′ and fatty acids, and the recorded p_H is < that theoretically equiv. to the hydrolysed soap. Ch. Abs. (*p*)

Water-glass soap. V. Savvina (Maslob. Shir. Delo, 1935, **11**, 258—260).—Mixing curd soap with 20% of water-glass yields a good grade of 50% soap containing 9% of Na_2SiO_3. Ch. Abs. (*p*)

Soaps with solvent additions. I. H. Zilske (Seifens.-Ztg., 1937, **64**, 55—57).—Preliminary: the prep. of ox-gall and its use in some typical soap products is described. E. L.

Soap foams. Welwart (Seifens.-Ztg., 1937, **64**, 42—43).—Differences in the structure of the bubbles in the foams from Na and K soaps are very briefly indicated; the presence of Ca salts produced no notable effect. E. L.

Standard methods for the sampling and analysis of commercial soaps and soap products: revised. F. W. Smither, R. E. Divine, C. P. Long, M. L. Sheely, H. P. Trevithick, and P. H. Walker (Ind. Eng. Chem. [Anal.], 1937, **9**, 2—8).—Revised methods adopted by the American Chemical Society Committee on the Analysis of Soaps etc. are detailed and include the determination of H_2O, free alkali or acid, combined alkali, chlorides, unsaponifiable and unsaponified matter, rosin, SiO_2, phosphates, CO_2, glycerol, sugar, starch, volatile hydrocarbons, and titer of the fatty acids. E. L.

Bertram's method for determining saturated [fatty] acids. A. Lutenberg and T. Dudkina (Trud. VNIIZh, 1934, No. 2, 60—62).—The method (B., 1935, 596) is applied to analysis of saturated acids of peanut oil alone, with elaidic acid, and with saturated acids of cottonseed oil. Oxidation is preferably carried out at room temp. Saturated acids may be collected by filtration of the aq. liquid and need not be extracted with light petroleum. The modified method gives ppts. having I val. approx. zero, whereas those obtained by the original technique have an appreciable I val. (cf. B., 1935, 732). Ch. Abs. (*p*)

Economies [effected] by saponifying fatty acids with calcined soda. G. Böhm (Fette u. Seifen, 1937, **44**, 20—21).—Calculations in a typical case illustrate the saving in cost of raw materials effected by using (a slight deficiency of) calcined Na_2CO_3 to neutralise the free acids in commercial fatty acids, followed by NaOH to saponify the neutral fat present. E. L.

Elimination of scale formation in [glycerol] concentration. M. Zaliopo (Maslob. Shir. Delo, 1935, **11**, 260—261).—Addition of graphite (0·005% of the wt. of evaporated H_2O) eliminates scale formation on the pipes. Coarse-grained salt aggregates are deposited on the bottom of the evaporator. Ch. Abs. (*p*)

Hexabromide determination [of linseed oil]. F. Fritz (Fette u. Seifen, 1937, **44**, 15).—Rossmann (B., 1937, 152) omitted from his bibliography the Fritz method (B., 1930, 620; 1933, 798) for this determination, which may be modified by drawing Br (or Br–Et_2O) vapour through the material instead of adding liquid Br. E. L.

Collaborate work of the D.G.F. II. Hexabromide number. H. P. Kaufmann (Fette u. Seifen, 1937, **44**, 15—19; cf. B., 1937, 150).—Criticisms are offered (on the basis of collaborative tests) of the method proposed by the International Commission for the Study of Fats (Lucerne, 1936) and of an alternative (French) method; a modified procedure (cf. German Standard Methods) is proposed. Details are also given of a new French method (in which the bromides are calc. to a basis of 100 g. of fat), which should also be examined together with the proposals of Rossmann (B., 1937, 152) and Fritz (preceding abstract). E. L.

Bromine-binding number and stand-oil boiling. K. Meinel (Fette u. Seifen, 1937, **44**, 9—13).—Additions (>1%) of tung oil to linseed oil can be detected by means of the Br-binding no. (cf. A., 1932, 717; 1934, 753; B., 1936, 28; 1937, 256), but this figure is less sensitive in the reverse case. The steady fall in the Br-binding no. of linseed oil during heat-bodying is considered to indicate extensive shifting of isolated double linkings into the conjugated position, but no monomeric acid containing such could be isolated. No sign could be found (even on prolonged heating) of any later increase in the Br-binding no., such as would be expected if cyclisation of the type of the Diels diene synthesis were to supervene in the later stages of the bodying (except possibly during the gelation of some bodied oils on cooling), nor could any polymeric acid be identified. E. L.

Refractivity and the stand-oil problem. W. Leithe (Fette u. Seifen, 1937, **44**, 14).—It is fallacious to draw conclusions as to the chemico-structural changes occurring during the heat-bodying of linseed oil or tung oil from the observed changes (rise and fall, respectively) in n_D; the change in r_L or R_L, which takes the variations in *d* into account, should be used as a basis for comparison. r_L and R_L decrease considerably during the heat-bodying of both oils, indicating the disappearance of double linkings. E. L.

Selective sorption of organic liquids by solid films of raw linseed and stand oil. A. P. Laurie (Trans. Faraday Soc., 1937, **33**, 293—299).—When dry oil films are immersed in mixtures of liquids differing widely in refraction power, a permanent val. of *n* is obtained which is very much > or < the *n* of the film. This is attributed to selective sorption of one of the liquids (the "active liquid") by the film, yielding a surface layer with a val. of *n* intermediate between that of the film and the active liquid. Stand oil films tend to adsorb more of liquids of negative polarity and less of liquids of positive polarity than linseed oil films, this being attributed to the negative character of the oxides and peroxides formed in stand oil. With active liquids of similar constitution the ratio of the equilibrium vals. of *n* for the two oils is approx. const., EtOH diffuses into a raw linseed oil film, whilst bromonaphthalene forms a surface layer. J. W. S.

Oiticica oil. M. J. Hausman (Amer. Ink Maker, 1937, **15**, 16—19).—The development of the Brazilian industry since 1927 is reviewed, and the uses and properties of the oil are discussed. F. C. B. M.

Refractometric determination of oil in seeds. A. Ermakov (Maslob. Shir. Delo, 1935, **11**, 282—284).—The determination is made by use of α-$C_{10}H_7Br$. Ch. Abs. (*p*)

Refractometric determination of [seed] oil content. V. V. Illarionov and P. Demkovski (Maslob. Shir. Delo, 1935, 171—173).—PhCl is a suitable solvent for refractometric determinations of oil contents of seeds. Ch. Abs. (*p*)

Production of sunflower-seed oil by kneading the moistened pulp. A. Goldovski (Maslob. Shir. Delo, 1934, **10**, No. 12, 24—28).—Kneading the moistened seed improves working conditions. The optimum H_2O content is 17—18%. Heating during kneading accelerates and improves the efficiency of oil extraction. Ch. Abs. (*p*)

Production of sunflower oil. G. Vuigovski, T. Lapina, and M. Ginsburg (Maslob. Shir. Delo, 1935, **11**, 299—301).—Yields were improved by mixing the mash with 16—18% of aq. NaCl prior to heating. Ch. Abs. (*p*)

Influence of gossypol on colour of cottonseed oil. M. Podolskaja (Maslob. Shir. Delo, 1935, **11**, 128—131).—Gossypol (I) darkens the colour of the oil in proportion to its concn. in the range 0·2—0·8%. In storage, heated oil loses colour and (I). Ch. Abs. (*p*)

Change in acidity and iodine value of sunflower-seed oil on heating pulp prior to extraction. I. Kolpakov (Maslob. Shir. Delo, 1934, **10**, No. 11, 32—34).—Preheating the pulp causes a decrease in acidity and an increase in the I val. of the oil. Ch. Abs. (*p*)

Use of benzene in determining acidity of oils. I. Petriaev (Maslob. Shir. Delo, 1935, **11**, 137).—EtOH–C_6H_6 (1 : 2) is used in place of EtOH–Et_2O (1 : 4) as solvent in the method described. Ch. Abs. (*p*)

Oxidised oils as emulsifying agents. M. Bauman and I. Dvinjaninova (Maslob. Shir. Delo, 1935, **11**, 251—254).—Linseed, soya-bean, and sunflower oils, oxidised in air at 115° for 5—40 hr., had greater emulsifying power than egg yolk in margarine manufacture. The oily flavour was imparted to the product. Ch. Abs. (*p*)

Caper spurge-seed oil. B. Tiutiunnikov, A. Sobol, and V. Erschova (Maslob. Shir. Delo, 1935, **11**, 132—133).—The kernels yield 63% of a pale yellow oil, d^{20} 0·920, n^{20} 1·4698, $[\alpha]_D^{20}$ +4·25°, acid val. 9·9, sap. val. 200·3, I val. (Hübl) 82·0, Reichert–Meissl val. 2·5. The oil is too purgative for use in foodstuffs. Hydrogenation destroys optical activity but not purgative properties. The fatty acids of the oil comprise saturated acids (5·7) and acids of the oleic (90·6) and linoleic series (2·3%). The oil yields a high-grade soap. The hulls cannot be included in cattle feeds owing to the presence of a protein constituent resembling but not identical with ricin. Ch. Abs. (*p*)

Composition of seed oil of *Ailanthus glandulosa*, Desf. L. A. Michelson (J. Appl. Chem. Russ., 1936, **9**, 2050—2052).—The dry hulled seeds contain 56% of fatty oil, including 2% of phytosterol. The fatty acids are oleic 80, palmitic 9·6, linoleic 5—6, stearic 2·4%, and linolenic acid traces. R. T.

(A) **Hydrogenation of oils with nickel formate catalyst at Kazansk works.** Schtscherbakov, Koplanov, and Zolotov. (B) **Operation with nickel formate catalyst.** E. Etinburg and M. Popov. (C) **Use of nickel formate catalyst at the Voroneshsk hydrogenation works.** B. Malaeva (Maslob. Shir. Delo, 1935, **11**, 244—246, 246—247, 247—249).—Prep. of the catalyst and the process of hydrogenation are described. Ch. Abs. (*p*)

Formation of *iso*oleic acid during hydrogenation [of oils]. A. Zinoviev and N. Kuroschkina (Maslob. Shir. Delo, 1935, **11**, 308—312).—During hydrogenation of sunflower-seed oil with 0·4% Ni catalyst at 140—220° for 2 hr., there is a gradual accumulation of *iso*oleic acid (I) up to 25—30%. If (I) is formed only by partial saturation of linoleic acid (II) (at the 9 : 10-double linking) part of (II) must be converted into oleic acid and part into (I). Ch. Abs. (*p*)

Analysis of banana oil. A. R. Moss (Analyst, 1937, **62**, 32).—The oil (0·72—0·8% on dry wt. of fruit) had n_D^{40} 1·4648, I val. 82, unsaponifiable matter 14·4%, sterol (I) precipitable by digitonin 30·6% of the last-named, mean mol. wt. of fatty acids 286, I val. of fatty acids 90. (I) was probably sitosterol. E. C. S.

Cereal flours as antioxidants for fishery products. Halibut-liver and salmon oils. L. Lowen, L. Anderson, and R. W. Harrison (Ind. Eng. Chem., 1937, **29**, 151—156; cf. B., 1935, 683).—Oat and rice flours retard the development of rancidity in halibut-liver and salmon oils, but are not as effective as when used with lard and vegetable oils. A greater antioxygenic effect is obtained under milder conditions of oxidation. Vitamin-*A* is not protected appreciably by cereal flours, but does not begin to decrease until the oils have become rancid. T. G. G.

Hydrogenating fish and whale oils. F. Pinsker (Maslob. Shir. Delo, 1935, **11**, 157—159).—Best results were obtained by use of alkali-refined oils and a catalyst containing 0·33% Ni, and autoclaving at 200° for 3 hr. Active C, kieselguhr, and Cu, Fe, and Al dusts served as catalyst carriers. Ch. Abs. (*p*)

Rapid determination of iodine value by Hübl's method. A. Kliutschevitsch and A. Vischnevskaja (Maslob. Shir. Delo, 1934, **10**, No. 11, 50—52).—The reaction is accelerated without loss of accuracy by keeping the sample with reagent at 60° for 20 min. This is applicable to oils having I vals. 15—133. A stable reagent is prepared by heating for 2 hr. at 80—90°. In determining the I val. of oleic acid air should first be swept out of the reaction flask by CO_2. Ch. Abs. (*p*)

Use of activated charcoal instead of decolorising earths [in oil purification]. A. Laptev and E. Erziutova (Maslob. Shir. Delo., 1934, **10**, No. 11, 18—21).—Activated C gives better results than clays, and much smaller amounts suffice.
Ch. Abs. (*p*)

Oat flour as antioxidant. Milk-bottle cleaning. Butter. Butter fat. Goat's-milk fat. Deterioration of food fats. Determining moisture in oil seeds.—See XIX.

See also A., II, 84, **Prep. of pure linoleic and oleic acids.** 100, **Antirachitic substance from tunny-liver oil.** A., III, 104—5, **Vitamins.** 107, **Seed wax of *Simmondsia Californica*.**

Patents.

Rendering [of fats]. J. P. Harris, Assr. to Industrial Chem. Sales Co., Inc. (U.S.P. 2,035,126, 24.3.36. Appl., 8.8.32).—Addition of $\ngtr 3\%$ (0·05—0·5%) of activated C, with or without an alkaline salt, *e.g.*, $NaHCO_3$, to lard etc. before steam-rendering under pressure improves the quality of the resultant fat and the keeping properties of both fat and tankage.
E. L.

Preparation of cocoa [cacao] butter for shipment and transportation packages for use therewith. Rockwood & Co., Assees. of A. A. Singer (B.P. 458,703, 1.11.35. U.S., 1.11.34).—A carton is lined with an air-impervious sheet and the butter cast therein before sealing. B. M. V.

Apparatus for producing soap of low moisture content. Refining, Inc. (B.P. 458,600, 28.6.35. U.S., 2.7.34).—The raw materials of soap are pumped in equiv. proportion into a heated reaction vessel, *e.g.*, a pipe coil, and are converted into liquid and vapour (H_2O); the liquid is then converted into powder in a spray dryer, the proportion of vapour in the stream being held at a const. predetermined val. by a thermostat acted on both by the vapour stream and the heating gases. B. M. V.

Soap preparations. I. G. Farbenind. A.-G. (B.P. 459,040, 25.3.35. Ger., 23.3.34).—Soaps of enhanced detergent power and resistant to Ca salts include a H_2O-sol. salt of an aliphatic carboxylic acid containing an aliphatic radical ($\nless C_{10}$) linked to CO_2H through at least one atom of the group N, O, and S, but not through two or more different atoms of the group; *e.g.*, salts of laurylpropylaminoacetic acid, oleylsarcoside, or dodecylthiolacetic acid may be used. [Stat. ref.] E. L.

Cleansing preparations. J. Halden & Co., Ltd., and J. Holden (B.P. 460,839, 1.5.35).—A soap- and H_2O-free composition (for the hands etc.) which may readily be washed off with H_2O comprises a mixture of mineral or vegetable oil, petroleum jelly, or wool fat with <50% of a mixture of a higher aliphatic alcohol (C_{12}—C_{18}) with $\ngtr 10\%$ of a salt of a sulphuric ester of the alcohol; antiseptics and/or solvents may also be included. E. L.

Cleaning composition. B. M. Pitman (B.P. 460,942, 7.5.36).—A powder, paste, or tablet comprises a mixture of soap, vinegar (or dil. AcOH), one or more abrasives (powdered pumice etc.), and, if necessary, a hardening agent, *e.g.*, Portland cement.
E. L.

Cleansing [degreasing] of rigid materials. Dr. A. Wacker Ges. f. Elektrochem. Ind. G.m.b.H. (B.P. 458,374, 18.6.35. Ger., 25.2.35. Addn. to B.P. 444,818; B., 1936, 509).—The articles are sprayed with a cold emulsion as described in the prior patent, with relative movement of articles and nozzles. Solvent vapours may be present, preferably in a chamber of which the entry and exit passages are sealed by the liquids used for pre- and after-treatment.
B. M. V.

Purification of vegetable oils in order to convert them into lubricating oils. P. J. Beyer (B.P. 460,474, 23.1.36. Fr., 23.1.35).—The oil is mixed with slightly alkaline lye, treated with saline lye in order to ppt. soap etc., decanted and washed (at $\nless 15°$), and, after filtering, the last traces of H_2O are removed by centrifuging. E. L.

Castor machine oils. A. L. Blount, Assr. to Union Oil Co. of California (U.S.P. 2,031,405, 18.2.36. Appl., 22.7.33).—Castor oil containing 0·1—5 (1·5)% of a mono-lower alkyl (Bu) ether of $(\cdot CH_2\cdot OH)_2$ and 1—5% of an Al soap of stearic, palmitic, or behenic acid (4% of Al stearate) is claimed.
A. R. P.

Dehydration of water-containing or water- and oil-containing materials. Ges. zur Verwertung Fauth'scher Patente m.b.H. (B.P. 458,352, 7.7.36. Ger., 30.7.35. Addn. to B.P. 420,040; B., 1935, 109).—In the first stage of the process described in the prior patent, the material is conveyed down into and lifted up from the heat-transferring fluid by means of perforated pallets or buckets on an elevator, the lower sprocket of which is provided with scoops to lift any dirt or fish particles and transfer them to the buckets. B. M. V.

Waxing and polishing compositions. A. W. Ralston and C. W. Christensen, Assrs. to Armour & Co. (U.S.P. 2,033,544, 10.3.36. Appl., 16.5.35).—Ketones, CORR′, where R is an iso- or hetero-cyclic radical and R′ has >10 C, are claimed as waxes, alone, mixed with each other or with natural waxes, or with solvents (10—80% of ketone to give liquids, pastes, or emulsions). They are resistant to air and H_2O, and (if high-melting) to heat. 28 ketones are listed, but in general C_6H_4Ph and $C_6H_4\cdot OPh$ derivatives are preferred, and of these those with m.p. >100°, *e.g.*, p-$C_6H_4Ph\cdot CO\cdot C_{17}H_{35}$ (cf. U.S.P. 2,033,540—2 and 2,033,548; B., 1937, 328). R. S. C.

Emulsions. Solid lubricants.—See II. **Ketones. Washing etc. agents.**—See III. **Resinous NH_2-derivatives [for detergents]. Crayon.**—See XIII. **Shortenings in foodstuffs. Comminuting apparatus.**—See XIX.

XIII.—PLASTICS; RESINS; PAINTS; COATING COMPOSITIONS.

Manufacture of cellulose plastics. H. Chase (Brit. Plastics Year Book, 1937, 27—34).—A large-scale American plant is described. The methods of mixing, masticating, calendering, consolidating, and stock-forming pyroxylin and cellulose acetate plastics are detailed with illustrations. J. H. Be.

Extrusion process for thermo-setting moulding powders. P. Grodzinski (Brit. Plastics Year Book, 1937, 62—70).—Illustrated working details are given for the production of extruded mouldings. The powder is forced by a reciprocating punch through a 3-zone heated die, under hydraulic pressure (50—100 lb.). Careful temp. control (65—200°) in the zones is essential. Back-pressure is obtained by a braking device acting on the finished moulding. Lengths of 15—25 m. per hr. are the average output. The production of tubes etc. (curved or angled; with or without metal inserts) and planks (10 in. wide, and down to 3 mm. thick) is described. Standard or special PhOH– or urea–CH_2O powders are customary. J. H. Be.

Economic and engineering trends in plastics. A. F. Randolph (Chem. Met. Eng., 1937, 44, 25—28).—A general review of developments since 1933, including safety glass. J. H. Be.

Testing of urea plastics. W. Blakey (Chem. & Ind., 1937, 177—181).—The special characteristics of urea plastics are outlined. Tests on moulding powders and moulded articles are described and reference is made to differences in standard methods necessitated when testing the above compounds with plastics of other types, particularly phenolic compositions. Suggestions are made for more rational classification. J. W. Cr.

Raising the melting point of resin. P. Rufimski (Lesochim. Prom., 1935, 4, No. 2, 11—13).—Blowing the molten resin with air in presence of CoO raised the m.p. from 61° to 91° in 2 hr. and to 107° in 6 hr. There were simultaneous increases in Et_2O-insol. matter and esterification val. and decreases in acid and sap. vals. Ch. Abs. (*p*)

Shellac. A. F. Suter (J. Oil Col. Chem. Assoc., 1937, 20, 50—68).—The chemical constitution, physical properties, and uses of lac in varnishes and plastics are reviewed. F. C. B. M.

[Pine-tree] tapping trials in U.S.S.R. I. K. M. Osolin and N. A. Oustinov. **II.** M. Vissotski, **III.** L. A. Ivanov and L. N. Chaternikova (Bull. Inst. Pin, 1936, 196—203, 203—206, 245—252).—A translation and *résumé* of work published in 1934 by the Moscow Central Institute for research on forest products. Types of pine suitable for tapping, tapping methods and technique, and yields of oleoresin from different processes are given, and the quant. analysis of resins obtained from various (Russian) sources and by different methods are recorded. F. C. B. M.

Tapping Caucasian fir in Trans-Caucasia. A. J. Janson (Lesochim. Prom., 1935, 4, No. 2, 20—24).—The physical and chemical properties of the balsam of *Abies normaniana* closely resemble those of Canada balsam. Ch. Abs. (*p*)

Balsam from *Pinus insularis* and *P. merkusii*. D. R. Koolhaas and L. de Vos (Tectona, 1935, 28, 595—605).—Balsam from *P. insularis* had low turpentine (I) content, and the colophony had low acid val. and sap. residue. *P. merkusii* balsam contained more (I), and the saponification residue of the colophony was > in Sumatra colophony. Ch. Abs. (*p*)

Classification of some non-Brazilian copaiba balsams. W. Freise (Pharm. Ztg., 1937, 82, 131—133).—Balsams from many of the adjoining states of Brazil are not the true copaiba variety; they are largely adulterated with other balsams. In some states there are large stocks of *Copaifera* species, but their utilisation is as yet uneconomical. Characteristics of many so-called copaiba balsams from Columbia, Venezuela, Boyaca, Arauca, and the Paracaima territory are discussed. E. H. S.

Chemical aspects of phenol, cresol, and urea synthetic resins. G. Leysieffer (Z. Ver. deut. Ing., 1936, 80, 1507—1510).—Processes employed in the production of the resins are reviewed. R. B. C.

Synthetic [resinous] organic industrial materials. E. Sauter (Z. Ver. deut. Ing., 1937, 81, 17—22).—Data on the properties and industrial applications of various synthetic resins are tabulated. R. B. C.

Preparation of oil-soluble resins from polyhydric alcohols and polybasic acids. II. J. C. Wee (J. Chinese Chem. Soc., 1936, 4, 432—442; cf. B., 1936, 205).—Oil-sol. resins are prepared by esterifying glycerol first with saponified " pyrocastor " (castor oil heated at 295—300° in CO_2) (I) or tung oil or with linseed oil and then with $o\text{-}C_6H_4(CO)_2O$ (II), or by heating erythritol (modified prep.) with α-elæostearic acid and linseed oil or ricinoleic acid (III), (II), and PbO. That from (I) is miscible with vegetable turpentine and readily sol. in PhMe; that from linseed oil is miscible with the usual solvents except EtOH; that from (III) is miscible with Et_2O and readily sol. in the turpentine. Chemical consts. are recorded. R. S. C.

Properties of polyvinyl resins as lacquer resins. T. P. G. Shaw (Off. Digest, 1937, No. 162, 6—18).—A review. D. R. D.

Effect of alkyd resins on the tolerances [for diluents] of cellulose nitrate solvents and on the viscosities of cellulose nitrate solutions. I. C. Bogin, H. L. Wampner, and K. R. Gosselink (Paint, Oil, and Chem. Rev., 1937, 99, No. 2, 9, 12, 14, 28—29).—When added in proportion = that of the cellulose nitrate, most, but not all, alkyd resins and plasticisers reduce the tolerance of cellulose nitrate solutions to diluents, particularly if single solvents are used. The effect is minimised or reversed by using solvent mixtures containing alcohols or by adding a large excess of alkyd resin. D. R. D.

Present state of coating [paint and varnish] chemistry. F. Wilborn (Fette u. Seifen, 1937, 44, 4—6).—The applicability of old and new types of protective coatings is briefly reviewed. E. L.

Oil-saving coating compositions [vehicles]. O. Jordan (Fette u. Seifen, 1937, 44, 6—8).—The use as vehicles of synthetic resins, EL-varnish, combination lacquers, etc., which allow economy in drying oils, is reviewed.

Use of heavy spar in the paint and varnish industries. H. Wolff and G. Zeidler (Paint Var. Prod. Man., 1937, **16**, No. 2, 7—12).—Exposure tests with paints indicate that coarse particle size is desirable and the mineral is usually preferable to pptd. $BaSO_4$. CaF_2 is an undesirable impurity, but SiO_2 is less deleterious. D. R. D.

[Paint] vehicle problems. A. Kraus (Farben-Ztg., 1937, **42**, 179—180).—Modern paint vehicles are briefly discussed and a plea is made for their being confined to appropriate uses. The extension of the use of nitrocellulose vehicles is recommended. S. S. W.

Silicated paints. Anon. (Paint Var. Prod. Man., 1937, **16**, No. 1, 32—33).—The properties of paints with an aq. K or Na silicate medium are described. They are particularly suitable for use on silicate-base materials (concrete, glass, ceramics) and as heat-resisting and non-inflammable paints. D. R. D.

Mechanism of paint manufacture. D. Wait (Oil and Col. Tr. J., 1937, **91**, 499—506, 518).—The processes and plant used in paint manufacture are described. D. R. D.

Painting of wood. A. V. Blom (Paint Var. Prod. Man., 1937, **16**, No. 1, 7—11).—The mechanism of retention of H_2O by wood and its influence on adhesion are discussed. Data are given for the H_2O absorption of different kinds of wood and for oak coated with a wide range of coating compositions, when exposed to air of 95% R.H. The difference between the different coatings was small, and no sample was satisfactory when only one coat was applied. D. R. D.

Practical experience with chlorinated caoutchouc films. Schultze (Paint Var. Prod. Man., 1937, **16**, No. 1, 34—35).—The properties and uses of chlorinated rubber paints are reviewed. D. R. D.

Corrosion and paint. V. G. Jolly (Oil and Col. Tr. J., 1937, **91**, 493—497, 518).—A lecture. Theoretical and practical aspects of the prevention of rusting of Fe and steel by means of paint are discussed. D. R. D.

Use of zinc-white paints for protection of machines and apparatus in chemical works. Anon. (Paint Var. Prod. Man., 1937, **16**, No. 2, 32—34).—The use of these paints is advocated. D. R. D.

Painting galvanised iron. Accelerated exposures. L. P. Hart and C. R. Cornthwaite (Sci. Sect. Nat. Paint Var. Assoc., Inc., Jan., 1937, Circ. 527, 58—67).—One-year exposure trials, with addition of artificial sudden temp. changes, of painted galvanised-Fe panels show that max. durability was obtained when the primer coat was soft-drying; of 16 primers tested, lampblack in linseed oil was rated best. Quick- and hard-drying compositions, *e.g.*, pigmented phenol resin varnishes, gave deficient adhesion. Pre-etching the metal with the following media gave better adhesion than with aq. $CuSO_4$: aq. $NiSO_4$–K Sb tartrate, EtOH–PhMe–CCl_4–HCl, a proprietary prep. S. M.

Paints for water-tank interiors. H. N. Bassett (Railway Eng., 1935, **55**, 405—406).—Best results were obtained with a $PbCrO_4$ priming coat mixed with flexible vehicle followed by Al varnish. Ch. Abs. (*p*)

Mildew prevention [on painted surfaces]. V. H. A. Gardner, C. R. Cornthwaite, and L. P. Hart (Sci. Sect. Nat. Paint, Var. Assoc., Inc., Jan., 1937, Circ. 526, 46—57; cf. B., 1936, 649).—Red-cedar panels were coated with white-Pb paints containing (*a*) 25 toxic compounds relatively innocuous to human beings, (*b*) 11 various drying-oil mixtures, and (*c*) with 10 specially pigmented linseed oil paints. The development of mildew (photomicrographs of spores and mycelium are given) after 7 months' exposure is rated together with the extent of chalking and the general appearance. Na_2SiF_6, $o\text{-}C_6H_4(CO)_2O$, "Dowicides," and "Monsan G 2" gave excellent protection, but were not as effective as was $HgCl_2$. S. M.

Physical specifications for wall paints. Anon. (Sci. Sect. Nat. Paint, Var. Assoc., Inc., Mar., 1937, Circ. 525, 35—45).—The requirements of Federal specification TT-P-51a for oil, interior, eggshell flat finish, ready-mixed, semi-paste, light-tint, and white paints are given. S. M.

Determination of the degree of brushability of a paint. H. Wolff (Paint Var. Prod. Man., 1937, **16**, No. 1, 12—22, 35).—Mainly theoretical. Various equations correlating brushability with yield val. and turbo-viscosity are deduced. The use of the rolling-ball method (B., 1936, 1006) in determining brushability is discussed. D. R. D.

Measurement of the brightness of luminous paint. W. H. Byler (Rev. Sci. Instr., 1937, [ii], **8**, 16—20).—An accuracy of 3% is obtainable by using a blocking-layer photo-cell as photoconductor. C. W. G.

Spectrographic analysis of paint. F. H. Newington and C. D. Lawrence (Analyst, 1937, **62**, 32—34).—A series of paints containing amounts of Cu, As, and Hg varying by ±10% were burned in a graphite arc. No consistent comparative line intensity could be obtained. $<0{\cdot}05\%$ of Pb could, however, be detected after removal of org. matter by ashing. E. C. S.

Morphology of pigments. VI. Oxidation of crystalline modifications of litharge. A. V. Pamfilov, E. G. Ivantscheva, and A. A. Petrasch (J. Appl. Chem. Russ., 1936, **9**, 2030—2038).—The rate of oxidation of tetragonal is $>$ that of rhombic PbO. R. T.

Determination of the specific gravity of pigments. Anon. (Off. Digest Fed. Paint Var. Prod. Clubs, 1935, **148**, 314—315).—A calibrated Babcock flask is nearly filled with the pigment (weighed). The flask is alternately filled with paraffin and centrifuged to expel air until no loss in vol. occurs. Ch. Abs. (*p*)

Testing of printing ink vehicles. III. Anon. (Amer. Ink Maker, 1937, **15**, 21—24; cf. B., 1937, 157).—Methods are described for determining I val. (Hanus), sap. val., and livering tendencies, and for detecting tung oil, rosin, and other natural resins, rosin oil, and coumarone resins. D. R. D.

Lacquering of wood. B. Scheifele (Farben-Ztg., 1937, **42**, 207—208).—A phenol–CH_2O lacquer, hardened at room temp. in presence of a catalyst (Griffolit lacquer), compared favourably with a hard nitrocellulose lacquer and a tung oil–albertol varnish in respect of hardness, adhesion, elasticity, H_2O- and EtOH-resistance, resistance to abrasion, and inflammability. F. C. B. M.

Relation of thinners in overlapping varnish coatings. J. K. Stewart and H. L. Bewick (Ind. Eng. Chem., 1937, **29**, 167—168).—The evaporation curves, η changes, wet-edge time limits, etc. of a "25-gal." PhOH–CH_2O resin–tung oil-bodied linseed oil varnish, thinned with two different mineral spirits, were determined as described earlier (B., 1936, 894) for a "50-gal." straight tung oil varnish of similar type. Common physical characteristics at the wet-edge time-limit point are found to exist when the appropriate data are compared. S. S. W.

Organic finishes. Effect of film thickness on physical properties and exposure behaviour. A. E. Schuh and H. C. Theuerer (Ind. Eng. Chem., 1937, **29**, 182—189).—Comprehensive tests on the physical properties and durability of ester gum varnish enamels, air-drying and stoving synthetic resin varnish enamels, and nitrocellulose lacquers (the results of which are tabulated and illustrated) establish the significance of film thickness in influencing performance of finishes, but the particular nature of this influence varies with the type of finish concerned. S. S. W.

Polishing and rubbing varnishes, and cleaning and polishing agents. F. Kolke (Farben-Ztg., 1937, **42**, 153—154).—The different types of lacquers etc. (wood finishes), the practical usage of which involves a polishing operation, are described and defined. S. S. W.

Does alkali-resistance mean durability [of varnish films]? C. T. O'Connor (Paint, Oil, and Chem. Rev., 1937, **99**, No. 1, 9—10).—There is no correlation between the alkali-resistance and durability. Thus, with the series of phenolic resin varnishes investigated, the greater is the proportion of resin, the greater is their alkali-resistance, whereas, in most cases, the durability is best when the proportion of resin is not too high. D. R. D.

Testing of clear finishes. P. H. Faucett (Ind. Finishing, 1937, **13**, No. 3, 28—32, 66—72).—41 points which should be tested are listed and 7 tests are given in detail. D. R. D.

Application of crystallo-optical methods [of analysis] in chemical practice. M. P. Golovkov and P. K. Karpov (Trans. State Inst. Appl. Chem. U.S.S.R., 1935, No. 23, 10—13).—The bakelite sublimation formed on varnished articles is composed of cryst. trioxymethyleneamine. Ch. Abs. (*e*)

Benzine and oils from wood etc.—See II. **Ethylcellulose. Benzylmannan [for lacquers].**—See V. **Purifying $ZnSO_4$ solutions.**—See VII. **Safety glass. Fe_2O_3, Cr–Sn, Co, and Ni colours.**—See VIII. **Magnetic cores.**—See XI. **Na divinyl polymerides.**—See XIV. **Printing inks.**—See XXI. **H_2O-pipes.**—See XXIII.

See also A., I, 110, **[Reflecting powers of] white pigments.**

Patents.

Increasing slip in structureless foils composed of highly polymeric materials. Wolff & Co. Komm.-Ges. auf Akt. (B.P. 459,344, 19.5.36. Ger., 23.5.35).—Cellulose hydrate or like foils which have been treated to render them suitable for hot-sealing are rendered less likely to stick to each other by addition of $\not>0{\cdot}1\%$ of solid waxy, fatty, or soapy substances to the coating solution or lacquer. B. M. V.

Manufacture of a crayon useful as a water-colour paint. S. Yoshida (B.P. 461,109, 29.5.36. Jap., 22.7.35).—Pigmented vegetable oil and a mixture of clay, "Paranolin" (a soya-bean casein), and casein solution in aq. NH_3 are kneaded with a molten mixture of vegetable wax and beeswax; the product is then incorporated with a mixture of hydrogenated oil, NaOH, and H_2O, shaped, and dried. S. S. W.

Lacquers. Roxalin Flexible Lacquer Co., Inc. (B.P. 461,173, 10.5.35. U.S., 21.11.34).—Heat-resistant, permeable lacquers based on nitrocellulose (I) (2 pts.), a cellulose ether (II) as stabiliser against light and heat, *e.g.*, ethyl- or benzyl-cellulose [<2 pts. (<1 pt.)], and a common solvent for (I) and (II) are claimed, especially for use on tobacco pipes. S. S. W.

Coating preparations for preventing formation of mould. L. A. Madsen (B.P. 461,305, 14.1.36).—$H_2C_2O_4$ (1 pt.) and H_3BO_3 (1) are stirred well with moist slaked CaO (10 pts. by wt.) and, after the acids have interacted with the CaO, the mixture is diluted with H_2O for application to walls etc., giving a mould-resistant whitewash suitable for use in dairies, slaughterhouses, etc. S. S. W.

Dispersion of solids in liquids. E. I. Du Pont de Nemours & Co. (B.P. 458,816, 21.6.35. U.S., 15.3.35).—Deacetylated chitin or chondroitin salts (B.P. 458,839; see below) are used to disperse solids, with or without H_2O-insol. liquids, in H_2O. Such dispersions are used for impregnating, sizing, etc. various materials. The ratio of chitin salt to dispersed materials may vary greatly, but is often 5—10%. Numerous examples given include particularly pigments. R. S. C.

Chitin compounds. E. I. Du Pont de Nemours & Co. (B.P. 458,839, 21.6.35. U.S., 21.6.34).—Chitin is cleaned by hot dil. alkali, cold dil. acid, and bacteria etc. to remove protein, Ca salts, and cellulose, respectively, the exact treatment varying according to the source of the chitin. It is then heated with 5—55% aq. NaOH at $\not>150°$ until sol. in dil. AcOH. The product is a non-degraded, partly deacetylated chitin containing 0·2—0·9 (0·7—0·86 preferred) free NH_2 per glucosamine unit, the degree of deacetylation depending on the concn. of alkali and temp. used, the time of heating, and the pretreatment, particle size, and density of the chitin. η of the solution of the product in 5% AcOH is always >1 poise at 25° and varies, according to the treatment, up to several thousand poises. η of the high-viscosity solutions is reduced to $\ngtr$ a few poises by oxidising agents (*e.g.*, H_2O_2). The properties of salts of the product with 70 acids are listed. The salts (acetate preferred) give highly resistant, strong films, the properties of which may be varied by after-treatment with, *e.g.*, CH_2O, Ac_2O, etc. R. S. C.

Manufacture of compositions and coated or impregnated materials. E. I. Du Pont de Nemours & Co. (B.P. 458,813, 21.6.35. U.S., 21.6.34).—Chitin or chondroitin deacetylated until 20—90 (70—86)% of the N is present as free $\cdot NH_2$ (cf. B.P. 458,839; preceding abstract) is dissolved in an aq. acid (AcOH). The solution is used for coating straw, cellulose fibre, paper, wood flour, etc. to improve the stiffness, lustre, and resistance to laundering. 19 examples are given. E. J. B.

Manufacture of [resinous] polymerised carboxylic acids and derivatives thereof. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 460,914, 7.8.35).—Film-forming resins, sol. in org. solvents, are obtained by heating acids, $>C{:}\dot{C}\cdot\dot{C}{:}C(CN)\cdot CO_2H$, or derivatives (esters) thereof with alkali hydroxides or carbonates or an excess of an org. base ($NHEt_2$, NEt_3, piperidine). Examples are polymerisation of $CHMe{:}CH\cdot CH{:}C(CN)\cdot CO_2H$ by aq. NaOH and of *Bu α-cyano-$\Delta^{\alpha\gamma}$-hexadienoate* (prep. described), b.p. 154—156°/13 mm., by aq. Na_2CO_3 and piperidine. R. S. C.

Manufacture of [resinous] polymerisation products. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 459,720, 9.7.35).—Styrene (I) mixed with 0·5—5·0% of $CH_2{:}CH\cdot CN$ (II) or $CH_2{:}CMe\cdot CN$ is polymerised, whereby improvement is obtained over (I) polymerised alone to the extent of about 100% in impact bending strength and 10—15° in the Martens thermal stability. The polymerisation can be effected in aq. emulsion with or without accelerators (B.P. 358,534; B., 1932, 172). In an example, (I) (98) and (II) (2) are dispersed in H_2O and polymerised at 60° with H_2O_2 (30%, 2 pts.). The product when injection-moulded has impact bending strength 26 kg. per sq. cm. and Martens thermal stability of 70°. K. H. S.

Preparation of resinous amino-derivatives. H. A. Bruson, Assr. to Resinous Products & Chem. Co., Inc. (U.S.P. 2,031,557, 18.2.36. Appl., 8.12.33).—A sol., fusible PhOH–CH_2O resin is heated with an equimol. mixture of CH_2O and a strongly basic, non-aromatic, secondary amine to produce a basic resin sol. in hydrocarbons, which forms with acids salts which are useful as detergents. A. R. P.

Drying plastics etc. Casting polymerisable org. liquids. Treating plastics. Mixing etc. plastic materials.—See I. **Plastic from hydrocarbon acid sludge.**—See II. **Propionic esters. Addition products of C_2H_2 etc. Solutions of polymerisation products.**—See III. **Azo dyes for varnishes.**—See IV. **Coloured sol. cellulose. Artificial filaments etc. Cellulose sulphate. Pigmented filaments etc.**—See V. **Dyeing shaped objects.**—See VI. **Whiting. TiO_2.**—See VII. **Laminated glass. De-airing plastic substances. Abrasives.**—See VIII. **Cable insulation.**—See XI.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Isoprene and caoutchouc. XLVI. Viscosity measurements with "gel solutions" of caoutchouc and hydrocaoutchouc. H. Staudinger and N. P. Mojen (Kautschuk, 1937, **13**, 17—23; cf. B., 1936, 945).—"Gel solution" is the characteristic condition in the very viscous solutions of high polymerides with linear or fibre mols.; the dissolved mols. are completely solvated, but do not possess free mobility, as is shown by a 1% solution of eucolloidal rubber (I) with degree of polymerisation 2000 and sp. η 60. A 1% solution of hemicolloidal rubber (II) with degree of polymerisation 100 and sp. η 0·4 is a "sol solution"; its dissolved mols. move freely. The complete solvation of the solute in both cases is indicated by the equiv. alteration of the η with rise of temp. (20—60°). A formula is given relating the sp. η of gel solutions with their concn. If the proportion of solvent is insufficient to permit complete solvation, association occurs between the solute mols. A 1% solution of (I) has approx. the same η as a 20% solution of (II), but whereas the former is a typical gel solution the high η of the latter is due largely to mol. association and exhibits marked dependence on temp. Measurements of η were also made with gel solutions of three hydrocaoutchoucs of different mol. wt. in various solvents and also with a series of mesocolloidal caoutchoucs obtained by mastication of eucolloidal rubber. Mol.-wt. determination by η measurements is possible with gel solutions as well as with sol solutions. D. F. T.

Effect of addition of colloidal substances on coagulation of latex. Y. Tanaka and T. Noguchi (J. Soc. Rubber Ind. Japan, 1935, **8**, 337—344).—Electrodialysed latex coagulated when definite proportions of acids were added. Further addition of acid caused disappearance of the ppt., which reappeared when still more acid was added. Gum arabic, casein, saponin, gum tragacanth, glue, etc. acted as protective colloids and prevented pptn. Ch. Abs. (*p*)

Effect of pigment particle size on physical properties of rubber compounds. C. E. Barnett (Physics, 1936, **7**, 189—194).—By marking with squares sheets of soft vulcanised rubber containing insertions of semi-ebonite, the stresses and strains developed on stretching can be measured by the deformation of the pattern; the assumption is then made that the stresses around the small particles of compounding ingredients would be analogous. It is thus possible to investigate the effect of variation in the size and shape of the particles. An explanation is offered of the stiffening of rubber by compounding ingredients, based on the change in slope of the stress–strain curve. The relation between the average particle diameter of four samples of ZnO and the effect on the physical properties of rubber is also determined. D. F. T.

Aims of rubber compounding. I. General considerations. II. Materials for building rub-

ber compounds. III. Building up a rubber compound. IV. Electrical properties of rubber compounds. Anon. (Vanderbilt News, 1934, **4**, No. 6, 5—16, 17—30, 31—39, 40—42).—A review.
Ch. Abs. (*p*)

Mastication and rate of set-up [of rubber]. S. Buchan (Trans. Inst. Rubber Ind., 1936, **12**, 309—318).—Plastometer tests on samples of mixed rubber containing rubber 100, S 5, ZnO 4, stearic acid 2 pts., with 2 pts. of MgO, diphenylguanidine (I), mercaptobenzthiazole (II), tetramethylthiuram disulphide, or a commercial mixture of (I) with the $C_6H_3(NO_2)_2$ derivative of (II) show that at 100° or 120° the time necessary for "set-up" in the mixtures is increased by a greater degree of softness. The proneness of harder rubber to prevulcanisation during processing is due only in part to the greater heat generation, harder rubber possessing an innate tendency to start vulcanising more quickly than a softer one of the same composition. D. F. T.

Vulcanisation characteristics of mercaptobenzthiazole derivatives. M. W. Harman (Ind. Eng. Chem., 1937, **29**, 205—207).—Of 45 condensation products of mercaptobenzthiazole (I) (with and without diphenylguanidine), in a mixture of rubber 100, ZnO 5, S 3, stearic acid 0·5, 27 were at least as powerful as (I) in accelerating vulcanisation, and of these, 8 showed little or no tendency to cause "scorching." The presence of ·CO·, ·NH·, $\cdot NO_2$, ·OH, ·S·, or ·Cl in the substituent groups appears to be favourable to accelerating power, whereas $\cdot CH_2\cdot CO\cdot NH\cdot$, $\cdot CH_2\cdot CO\cdot O\cdot$, $CH_2Ph\cdot$, $C_{10}H_7\cdot CH_2$, and alkyl groups tend to give non-accelerating derivatives. The effect of any substituent varies according to its position and also to the other groups present.
D. F. T.

Resistance of thiokol and its mixtures to benzene and oil. V. N. Kartzev and P. P. Verbo (J. Rubber Ind. U.S.S.R., 1934, **11**, 319—333).—Thiokol (I) is prepared from $C_2H_4Cl_2$ and Na_2S_x. The amount of S used affects the hardness of the product. $C_2H_4S_3$ is harder than $C_2H_4S_4$. Both are stable in many org. solvents. Addition of natural rubber to (I) decreases the oil-resistance of vulcanisates. Diphenylguanidine and tetramethylthiuram disulphide are the best softeners for (I) mixtures. Mercaptobenzthiazole is not effective. ZnO is the best accelerator. Ch. Abs. (*p*)

Altax (benzthiazyl disulphide) as an accelerator of rubber vulcanisation. O. Zeide and K. Petrov (J. Rubber Ind. U.S.S.R., 1934, **11**, 401—406).—Altax is prepared by treatment of alkaline (Na_2CO_3) solutions of mercaptobenzthiazole with Cl_2. Details are given. (Cf. B., 1936, 655.)
Ch. Abs. (*p*)

Mechanism of accelerating action of benzthiazyl disulphide (Altax) [in rubber vulcanisation]. O. Zeide and K. Petrov (J. Rubber Ind. U.S.S.R., 1935, **12**, 665—670).—Liberation of free S from Altax (I) during vulcanisation is not confirmed (cf. Bruni and Romani, B., 1921, 553A). (I) is reduced to mercaptobenzthiazole (II) by H_2S, rubber hydrocarbons, or alkali. (II) in presence of ZnO and Zn soaps forms a Zn salt which is an important accelerator. Ch. Abs. (*p*)

Cold vulcanisation of rubber. W. D. Bancroft and P. A. Miller (Colloid Symp. Monog., 1934, **11**, 223—228).—The action of S_2Cl_2 on rubber in C_6H_6 gives a smooth isotherm curve which accords with the Langmuir adsorption equation. The reaction, however, is not reversible and is probably stoicheiometric, although the possibility of a "false equilibrium" being involved still remains.
Ch. Abs. (*p*)

Corrosive action of sulphur on copper during vulcanisation. S. Satake (J. Soc. Rubber Ind. Japan, 1935, **8**, 461—471).—The corrosion of a Cu plate kept in contact with rubber during vulcanisation is represented by the equation $x = Kt^n$, where x is the extent of corrosion in t hr., and K and n are consts. n is inversely $\propto$ the velocity coeff. of vulcanisation, and, in turn, is related to the temp. of vulcanisation and the kind and amount of accelerator used. $K \propto$ the vol.-% of S used in compounding. The corrosive action of combined S ($COMe_2$-insol.) is small and corrosion during vulcanisation is due to free S. Sulphides were formed in the ratio $Cu_2S : CuS = 5 : 3$, the ratio being const. and unaffected by change in % of S or accelerator used. Ch. Abs. (*p*)

Industrial significance of the vulcanisation of rubber without sulphur. T. Yamazaki and T. Okida (J. Soc. Rubber Ind. Japan, 1935, **8**, 449—460).—Methods of vulcanisation are discussed. Vulcanisation with org. polysulphides is described and the quality of the products is discussed.
Ch. Abs. (*p*)

Effect of decreasing sulphur [in vulcanised rubber] on tensile properties at 100°. Anon. (Vanderbilt News, 1934, **4**, No. 4, 4—17).—Resistance to heat and ageing increases as the total S content is lowered, max. resistance corresponding with $<0·75$% of S. Low S content is associated with good quality and high tensile strength at 100°. Ch. Abs. (*p*)

Low sulphur *versus* normal sulphur in [rubber] compounds containing various loading materials. Anon. (Vanderbilt News, 1935, **5**, No. 4, 4—20).—Mixtures containing normal amounts of S (3% of the amount of rubber) can be rendered more resistant to heat and ageing by lowering the S content, *e.g.*, to 0·5%, and using org. accelerators. Beneficial effects of low S contents in relation to scorch, bloom, vulcanisation over long range, discoloration, strength, etc. are discussed. Ch. Abs. (*p*)

Crystallisation of sulphur from rubber cements. Anon. (Vanderbilt News, 1935, **5**, No. 2, 4—6).—In rubber cements containing 16 oz. of raw rubber per gal. of naphtha and 2·5% of S (based on rubber) crystallisation of S is likely to occur. This is avoided if 0·5—1·0% of S is used, and the product shows good ageing and freedom from gelation. Ch. Abs. (*p*)

Chemistry of soft rubber vulcanisation. V. Treatment of dilute rubber solutions with sulphur chloride. B. S. Garvey, jun. (Ind. Eng. Chem., 1937, **29**, 208—212; cf. B., 1934, 512).—The effect of S_2Cl_2 on the η of dil. rubber solutions and the influence of diffused daylight, higher temp., and mechanical agitation on the η change are examined. Gelled solutions give insol. films, but ungelled solutions if evaporated shortly after addition of S_2Cl_2 yield films which are insol.; their solubility is increased if the solutions are stirred or set aside before being evaporated. These results suggest that vulcanisation involves an alteration of the structure of the rubber, the long and relatively straight mols. becoming "kinked" by *cis–trans* rearrangements, the "kinked" configuration permitting interlocking of the mols. D. F. T.

Manufacture of rubber for weather-observing balloons. N. Kamotzki (J. Rubber Ind. U.S.S.R., 1935, **12**, 657—660).—The material is made with cold-vulcanised natural rubber (Para giving best results). Ch. Abs. (*p*)

Preservation of rubber against the deteriorating action of copper compounds. V. Molodenski and N. Michailov (J. Rubber Ind. U.S.S.R., 1935, **12**, 671—676).—Active Cu compounds could not be transformed into others which did not disaggregate rubber. Incorporation of protective colloids into the mixture was satisfactory. The colloids used, *e.g.*, Na-butadiene–rubber (1 : 9), should be more strongly adsorbed by rubber than are Cu compounds. Ch. Abs. (*p*)

Softeners in [rubber] cable insulation. J. R. M. Duncan and D. McQuarrie (Trans. Inst. Rubber Ind., 1936, **12**, 291—308).—The effects of paraffin wax (I), light spindle oil, stearic acid (II), brown "substitute," and mineral rubber on milling, ease of incorporation, plasticity of the unvulcanised stock resistance to "scorching," rate of vulcanisation and mechanical ageing, and electrical qualities of the vulcanised rubber are reviewed. (I) is the most satisfactory rubber softener for cables; the danger of formation of sol. Cu salts makes (II) unacceptable. D. F. T.

Heat generation and anisotropy of rubber compounds in the flexometer. R. S. Havenhill (Physics, 1936, **7**, 179—194; cf. B., 1935, 369).—During the flexometer tests, softening in one direction (due to plastic flow) and stiffening in another (due to substantial elimination of plastic flow because of the rapidity of flexure) may occur simultaneously. Static and dynamic tests on heated specimens and stress–strain data on sections at several stages of breakdown indicate that failure arises partly from mechanical fatigue, but mainly from heat effects. With the presence of anisotropic compounding ingredients (asbestine, clay, $MgCO_3$, etc.) heat generation, breakdown time, flexing load, and vertical deflexion are functions of the shape and orientation of their particles. D. F. T.

Rubbermeter, a new hardness-testing instrument. J. R. Scott (J. Rubber Res., 1937, **6**, 1—7).—The rubbermeter consists essentially of a flat-ended steel pin which is forced back against the action of a spring when the base-plate of the instrument is pressed on a rubber surface. It measures the same characteristic as the plastometer and the durometer (which operates similarly, but has a pin with a hemispherical end) and is intermediate between these in sensitivity, the last-named being the least sensitive. D. F. T.

Swelling and solvation of rubber in different solvents. I. Williams (Ind. Eng. Chem., 1937, **29**, 172—174).—The fractional increase in η of solutions of rubber of various concns. in different solvents $\propto$ the swelling power of the solvents and is independent of their η. The increase in η is not due simply to long, filiform mols., and η is not a measure of mol. wt. Displacement of the solvent from a rubber sol by a second solvent produces the η characteristics of the latter, thereby demonstrating equilibrium between each solvent and the rubber. The η behaviour of rubber sols is probably a function of the solvation of the dispersed particles, which is influenced by the degree of oxidation of the rubber. D. F. T.

Colloid-chemical properties of sodium divinyl polymerides [synthetic rubber]. I. I. Shukov (Kolloid. Shur., 1935, **1**, No. 1, 5—25).—I. (With V. A. Komarov and V. N. Sokolnikova.) The η data for solutions of synthetic rubber (I) in C_6H_6 between 10° and 50° are compared with theoretical formulæ.

II. (With V. A. Komarov and G. A. Sibiriakova.) (I) absorbs within a few days 2—3% of O_2. The η of its solutions decreases when irradiated; after a long exposure to sunlight a gel is formed.

III. (With F. M. Simchovitsch.) The max. of swelling in PhMe is the higher the smaller the plasticity of the sample. (I) after vulcanisation with 2% of S swells $>$ the crude (I) and the more highly vulcanised products. (I) may be determined in its solutions nephelometrically after addition of EtOH.

IV. (With F. Simchovitsch, S. Talmud, and V. Nikolskaja.) (I) is gradually pptd. from C_6H_6 by EtOH; the η of C_6H_6 solutions of fractions of the ppt. decreases as pptn. progresses.

V. (With S. L. Talmud.) Adhesion, cohesion, and autohesion (= adhesion between two pieces of the same material) of (I) is $<$ that of natural rubber. J. J. B.

Composition of low-boiling fractions of rectified butadiene from synthetic rubber plants: cause of retardation at the beginning of polymerisation of butadiene in presence of metallic sodium. G. G. Koblianski, I. A. Lifschitz, L. C. Christiansen, and I. V. Rakitianski (Sint. Kautschuk, 1934, No. 4, 3—7).—The composition of the fractions is recorded. CO and C_2H_2 in rectified butadiene retard polymerisation. Ch. Abs. (*p*)

Rubber-proofing textiles.—See VI. **Chlorinated caoutchouc films.**—See XIII. **Artificial leather.**—See XV.

Patents.

Concentrating of [rubber] latex. Dunlop Rubber Co., Ltd., A. N. Ward, and G. W. Trobridge (B.P. 460,350, 28.5.36. Addn. to B.P. 454,326; B., 1936, 1168).—A process and apparatus are claimed for maintaining a rising annular film of latex of substantially uniform thickness by rotation (*e.g.*, of a vane-bearing structure inside a stationary, paraboloid containing vessel) about a vertical axis. A current of hot air is directed over the surface of the latex, to assist evaporation. D. F. T.

Concentrating aqueous rubber and like dispersions. Metallges. A.-G. (B.P. 461,216, 27.3.36. Ger., 3.4.35).—The dispersion is evaporated under reduced pressure in presence of volatile stabilisers (NH_3 or amines, *e.g.*, NH_2Me), the latter being separated from the major portion of the H_2O vapour and recovered in utilisable form. Apparatus is described. D. F. T.

Production of rubber articles from rubber dispersions. Metallges. A.-G., Assees. of Semperit Oesterr.-Amerikanische Gummiwerke A.-G. (B.P. 459,972, 19.12.35. Austr., 19.12.34).—In the production of articles from aq. dispersions containing $\geqslant$45% of rubber, the formation of films, bubbles, and foams is prevented by adding, together with oils etc., $\not>$10% of lipins or sterols or mixtures containing such compounds. D. F. T.

Increasing the viscosity of [rubber] latex mixes. A. Behr (B.P. 459,948, 14.6.35).—The stability and η of compounded natural or artificial latex are increased by adding a dissolved or emulsified, natural, saponifiable resin in a H_2O-sol. alkali silicate (Na or K) and allowing the resin and silicate to interact. D. F. T.

[Accelerators for] vulcanisation of rubber. Wingfoot Corp. (B.P. 459,733, 16.10.35. U.S., 7.2.35).—The use of mercaptals derived from 1-thiolarylenethiazoles (2 mols.) and BzCHO (1 mol.) or its nuclear substitution products (substituents claimed are NO_2, OH, alkoxyl, alkyl, halogens) alone, or in conjunction with an org. N base [$NH{:}C(NHPh)_2$], is claimed. An example is benzoylbis(benzthiazyl-1-thio)methane, prepared by interaction of Na 1-thiolbenzthiazole with $CHBzCl_2$ in $COMe_2$ at room temp. H. A. P.

Improving [the elastic modulus of] rubber compounds. New Jersey Zinc Co., Assees. of G. S. Haslam (B.P. 460,164, 22.2.36. U.S., 6.4.35).—The elastic modulus is increased by incorporating ingredients (ZnO in particular) the particles of which have been coated with 1—2 wt.-% of a proteinaceous substance (casein or glue). D. F. T.

Manufacture of bonded rubber and metal articles. R. K. Lee and W. J. McCortney, Assrs. to Chrysler Corp. (U.S.P. 2,031,720, 25.2.36. Appl., 28.9.32).—The article is sprayed with a rubber mix which is then partly cured; a further coating of rubber is applied by dipping and the composite coating completely vulcanised. A. R. P.

Machine for manufacture of [moulded] rubber products [for footwear etc.]. H. Mazzeo (B.P. 460,038, 23.7.35).

Chlorinated rubber products.—See I. **Bituminous compositions.**—See II. **Halogenobutadienes.**—See III. **Artificial leather.**—See V. **Whiting.**—See VII. **Bonded abrasives.**—See VIII. **Cable insulation.**—See XI.

XV.—LEATHER; GLUE.

Seasonal variations in [raw] lambskins [of New Zealand], with special reference to the sudoriferous glands. P. White and F. G. Caughley (J. Soc. Leather Trades Chem., 1937, **21**, 64—68; cf. B., 1935, 1058).—The leather-producing quality of the skins is impaired by the enlargement of the sudoriferous glands due to the increased demand for perspiration in the summer months. D. W.

Bacterial stains on sweated sheepskins. E. C. Line (J. Soc. Leather Trades Chem., 1937, **21**, 53—55).—Dark stains on the flesh side of sheepskins dewoolled by the sweating process have been traced to *B. pyocyaneus.* The trouble is obviated by soaking the raw skins for several hr. in a 1 : 1 (vol.) mixture of aq. $NaHSO_3$ (2%) and 0·2*N*-HCl. D. W.

Effect of moulds on Bakauan bark [*Rhizophora* spp.] and tanning liquors. F. M. Yenko, L. Baens, and F. B. Serrano (Philippine J. Sci., 1936, **60**, 241—249).—Bakauan bark becomes infected with *Aspergillus niger* and *Penicillium glaucum* during its transportation from the swamps to the extract factory. The tannin content of the bark is reduced by 5·15% after 4 months' growth thereon of *A. niger*, but the non-tan content is also reduced and the "purity" of the extract thereof is slightly increased. Bark infusions containing $\not>$5% of tannin are attacked by *A. niger* only, and infusions containing 2% of tannin are attacked by *P. glaucum* after prolonged exposure. The colour of leather tanned with these different extracts is not affected by the mould growths. D. W.

Effect of different methods of liming [of raw hides] on the quality of the finished [vegetable-tanned sole] leather. G. Rezabek (J. Soc. Leather Trades Chem., 1937, **21**, 68—79).—Pieces of pelt were limed with (*a*) $Ca(OH)_2$–Na_2S, (*b*) $Ca(OH)_2$–As_2S_3, and (*c*) $Ca(OH)_2$–Na_2S–$CaCl_2$, respectively, tanned, and analysed. The coeff. of turgescence of the limed pelt and the tensile strengths of the finished leather were in the following diminishing order of treatment: (*a*), (*b*), (*c*). Min. degree of tannage was obtained with leather from pelt limed with (*b*). The yield of leather and the stretch were unaffected by the method of liming. Max. resistance to wear and H_2O were shown by pelts limed with (*c*). D. W.

Probable error in the measurement of the tensile strength of [vegetable-tanned] heavy leather. J. Beek, jun. (J. Amer. Leather Chem. Assoc., 1937, **32**, 4—12).—The probable error from measurements on the bend portion of steer hides is estimated to be 265 lb./sq. in. ±2% from data obtained with 236 sets of six test-samples. D. W.

Preparation of a soft leather substitute. D. I. Grafov (Kosh.-Obuvn. Prom., 1935, **14**, 400—402).—The material was prepared from rubber 100, light petroleum 175—200, leather waste (or vegetable fibres 120, lampblack 20, ZnO 10, S 2, tirazh 2, pine tar or petrolatum 6 pts. The mixture is rolled with a fabric through heated cylinders.

Ch. Abs. (*p*)

Substituting rubber cements with aqueous latex dispersions in the preparation of artificial leather. P. Pavlovitsch, V. Sudakov, and Z. Schtschekin (Kosh.-Obuvn. Prom., 1935, **14**, 404—406).—A mixture comprising smoked sheet rubber 100, gasoline 200, oleic acid 8, 25% aq. NH_3 20, casein 20, S 8, ZnO 10, kaptax 2 pts., thiuram 1 pt., with a suitable amount of H_2O, forms a stable emulsion when diluted with $\not>$50 pts. of H_2O. A leather substitute was obtained from rubber 100, resin 19, oleic acid 5, wheat flour 15, glue 5, kaolin 10, and S 5 pts.
Ch. Abs. (*p*)

Direct and indirect methods of determining the isoelectric point. II. Isoelectric points of different sorts of gelatin. I. T. Petrov and A. G. Pasinski (J. Phys. Chem. Russ., 1936, **8**, 24—34).—"Anomalous" gelatin (isoelectric point p_H 6·5—8, instead of 4·7—5·0) obtained by acid treatment of pig skin has been compared with two samples of ordinary gelatin. Differences are observed in isoelectric points as determined by opacity (p_H 6), in the Ag-binding capacity, and in the acid–alkali titration curves. Alkalis and buffer mixtures convert the anomalous form into the normal variety. Dissociation consts. corresponding with the acid and basic groups of the normal and anomalous forms have been derived from the titration curves. E. R.

Turbidimetric titration of gelatin suspensions. J. F. Morse (Analyst, 1937, **62**, 11—18).—Suspensions of gelatin (I) are made by dissolving 6 g. of (I) in 100 ml. of H_2O at 40° and adding 200 ml. of cold H_2O. The turbidity : p_H relation is followed by photoelectrical determination of the intensity of light, filtered through a Wratten No. 49 (C4) filter, transmitted by the suspension. The p_H of max. turbidity is independent of λ. Commercial (I) prepared from $Ca(OH)_2$- and acid-treated stocks had max. turbidity at p_H 4·9 and 7—8, respectively. Two distinct max. were not obtained with mixtures of the two types of (I). E. C. S.

Glue and glueing. IV—VI. K. Nakajima and S. Sakurada (J. Soc. Chem. Ind. Japan, 1936, **39**, 443—446B; cf. B., 1936, 1114).—Results on the measurement of the adhesive strength of plywood are given. Vals. are found to differ according to the method of making the test-pieces. Conditions of testing are discussed. The relation between the smoothness of the veneer surface and the quality of the plywood, and suggested improvements in the methods for making veneer and plywood, are discussed. T. W. P.

Leaching.—See I. **Determining moisture in leather.**—See V. **Moisture absorption of salts and glucose.**—See VII. **Ultra-violet radiation.**—See XI. **Taxonomy and parasites.**—See XXIII.

Patents.

Depilation and bating of hides and a bate [therefor]. L. Wallerstein and J. Pfannmuller, Assrs. to Wallerstein Co., Inc. (U.S.P. 2,033,163, 10.3.36. Appl., 25.5.32. Renewed 8.6.35).—A smooth grain is given to leather by incorporation of $<1\%$ (0·5—0·1%) of an amide (urea, NH_2Ac, NHPhAc) in the bating bath or by washing in a non-putrifying amide solution after bating. Bating mixtures containing amide are also claimed, *e.g.*, (*a*) urea 15, U.S.P. pancreatin 10, inert 75%, or (*b*) urea 20, NHPhAc 10, NH_4Cl 60, dried pancreas gland 1—10, and inert 1—10 pts. R. S. C.

Production of medium for removal of hair or wool. O. Grünwald and E. E. Weiss (B.P. 460,517, 28.6.35).—A H_2O-miscible liquid, consisting of EtOH, a vegetable oil, *e.g.*, rape, and insufficient alkali (KOH) to saponify the oil, is added to the usual alkaline liming paste (Na_2S, CaO, NaCl, and H_2O), to protect the pelts. F. R. E.

Manufacture of tanning agents. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 460,772, 30.7.35. Addn. to B.P. 411,390; B., 1934, 727).—Sol. tanning agents, which give pale leather of improved fastness to light and high fullness, are obtained by condensing a sol. salt of a mono- or poly-hydric mono- or poly-sulphonalkylphenol with NH_3 or (aliphatic) base and CH_2O (or, *e.g.*, CH_2Cl_2 or $OH\cdot CH_2\cdot O\cdot SO_2Na$), best in presence of a base [NaOH, $Ca(OH)_2$, Na_2CO_3, NaOAc, etc.] in H_2O at 80—110°. Examples cite use of ω-sulphomethyldihydroxydiphenylsulphone [from $(4\text{-}OH\cdot C_6H_4)_2SO_2$, 30% CH_2O, and Na_2SO_3], NH_3, and NH_2Bu^a at 100°. The acidity of the product is adjusted after the condensation. R. S. C.

Production of leather product. B. H. Bower (U.S.P. 2,032,250, 25.2.36. Appl., 14.11.35).—The leather is soaked in an emulsion of lanoline 7, oleic acid 1, $N(C_2H_4\cdot OH)_3$ 0·25, glycerin 12, honey 2, perfume 1, and H_2O 78%. A. R. P.

[Mechanical] dehairing of hides. M. Martens and A. van Osselaer (B.P. 460,283, 18.7.35. Belg., 18.7.34).

Processing of leather. G. M. Argabrite (B.P. 460,437, 21.6.35. U.S., 8.12.34).—See U.S.P. 1,992,138; B., 1935, 1106.

Dyes for leather.—See IV. **Book-binding material.**—**Artificial leather. Leather substitute.**—See V.

XVI.—AGRICULTURE.

Formation of structure in soil. III. Mechanism of the swelling of soil. D. I. Sideri (Soil Sci., 1937, **43**, 43—49; cf. B., 1937, 268).—Absorption of H_2O and swelling of soils are controlled by the structure of the surface layer of oriented particles. The stability of groupings and the compactness of the particles at the interface solid phase–air are important factors. Disruption of the surface orientation leads to disintegration of the particles. The above is discussed in relation to soil morphology.
A. G. P.

Chemical and physical changes in soil colloids with advancing development in Illinois soils. R. H. Bray (Soil Sci., 1937, **43**, 1—14).—Progressive changes in the % of bases, exchange capacity, and SiO_2/R_2O_3 ratio of the coarse and superfine colloids are examined in a series of soil profiles representing successive stages of development. A. G. P.

Neutralisation curves of the colloids of soils representative of the great soil groups. M. S. Anderson and H. G. Byers (U.S. Dept. Agric. Tech. Bull., 1936, No. 542, 38 pp.).—The composition of the colloids of different soil types is examined. High SiO_2/R_2O_3 ratios in electrodialysed colloids are associated with p_H 2·5—3·0, and low ratios with p_H 3·5—4·5. The form of neutralisation curves of the colloids with NaOH is characteristic of soil type. Colloidal org. matter in soils exhibits marked acidic properties which tend to mask the properties of inorg. colloids. The intensity of acid properties of bentonite colloids is $>$ that of inorg. soil colloids and $<$ that of colloidal humus. Relations between titration curves and fertility of soils are discussed. A. G. P.

Electric charge of soil particles. G. K. Davuidov (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1934, No. 18, 333—340).—The electrokinetic potential of soils (measurement described) is indicative of the stability of the colloids, and closely related to the degree of dispersion. Absorption of $Na^{\cdot}$ increases and of $Ca^{\cdot\cdot}$ and $H^{\cdot}$ decreases the charge. Ch. Abs. (*p*)

Accuracy of a soil thermograph. G. A. Mail (Soil Sci., 1937, **43**, 27—30).—Under certain conditions thermograph readings may show an error of 3°. The temp. gradient in the surface-4 in. of soil may be very sharp and the size of the bulb may become a source of error. Improvements in design are suggested. A. G. P.

Apparatus for measurement of shrinkage coefficient of soils. B. N. Singh and P. B. Mathur (Soil Sci., 1937, **43**, 37—41).—A gas-volumetric apparatus for determining shrinkage is described. A. G. P.

Rapid method for determining soil moisture. E. M. Emmert (Soil Sci., 1936, **43**, 31—36).—The process, suitable for large nos. of samples from one kind of soil, consists in measuring the heat evolved on mixing the sample with conc. H_2SO_4. A standard moisture–heat evolution curve is prepared with a series of samples artificially moistened to different extents. A. G. P.

Use of moisture equivalent as an index of texture for soil-survey purposes. J. K. Taylor (J. Australian Inst. Agric. Sci., 1936, **2**, 171—172).—The moisture equiv. and clay content of neutral surface soils are sufficiently closely related to permit the use of the equiv. as an index of texture. The relationship is less uniform in subsurface soils and very indefinite in deeper subsoils. A. G. P.

Evaporating power of air and humidity of soil. H. Geslin (Compt. rend., 1936, **203**, 1095—1097).—A method of predicting the quantity of reserve H_2O in soil at any given time is discussed. A. J. E. W.

Index characterising the dryness factor in agronomy. J. Servy (Compt. rend., 1936, **203**, 1097—1100).—The derivation of a quantity characteristic of a given type of soil under given climatic conditions, and indicating its power to retain reserve H_2O, is discussed. A. J. E. W.

Effects of carbon dioxide on decomposition of organic matter and accumulation of nitrates in soil. F. B. Smith, P. E. Brown, and H. C. Millar (Soil Sci., 1937, **43**, 15—25).—Artificially increased $[CO_2]$ in soil retarded the decomp. of org. matter, the effect persisting for 4 months and being greater in soils treated with oat straw than in untreated controls. Nitrification was increased by treatment with aq. but not gaseous CO_2. The action is ascribed to dissolution of mineral matter required by the bacteria. A. G. P.

Effect of fertilisation on replaceable bases in soil. H. F. Murphy (Proc. Oklahoma Acad. Sci., 1935, **15**, 41—43).—Continuous use (10 years) of $NaNO_3$ or kainit increased the active Na in surface soils, lowered the Ca/Na ratio, and caused deterioration of physical condition. Ch. Abs. (*p*)

Suitability of ordinary methods of determining adsorbable phosphates in analysis of alkaline soils. T. L. Salkind (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1934, No. 18, 323—332).—Denigès' reaction and also Arrhenius' method can be used in soils containing Cl' and SO_4'', but CO_3'' interferes. Zsigmondy's method is suitable for soils containing CO_3''. Ch. Abs. (*p*)

Selenium occurrence in certain soils in the United States, with a discussion of related topics. Report II. H. G. Byers (U.S. Dept. Agric. Tech. Bull., 1936, No. 530, 78 pp.; cf. B., 1935, 1010).—Considerable areas of soil contain sufficient Se to produce toxic vegetation. The toxicity of plants growing in such areas varies with the species and within the same species on different soils of similar Se content. Irrigation with under-drainage diminishes the Se in soil. If irrigation H_2O contains SO_4'' the Se content of plants is also lowered. The amount of Se in soil is related to the nature of the parent material. Intake of Se by individual plant species is not $\propto$ the Se content of the soil, but is regulated by the proportions of SO_4'' and other soil constituents present. A. G. P.

Methods of determining nutrient values of soil and their value in practical agriculture. R. Thun (Bied. Zentr., 1935, **A**, **6**, 161—176).—A review. A. G. P.

Sub-irrigation method of supplying nutrient solutions to plants growing under commercial and experimental conditions. R. B. Withrow and J. P. Biebel (J. Agric. Res., 1936, **53**, 693—701).—Apparatus for sand-culture work is described. A. G. P.

Effect of liming on the absorbability of iron and aluminium phosphates [in soil]. T. L. Salkind (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1934, No. 18, 171—189).—Liming increases the absorbability of Al and Fe phosphates. Ch. Abs. (*p*)

Melamine of possible plant-food value. W. Scholl, R. O. E. Davis, B. E. Brown, and F. R. Reid (Ind. Eng. Chem., 1937, **29**, 202—205).—Melamine (I) is obtained in 80% yield by autoclaving dicyanodiamide (II) with NH_3 at 150°. The product similarly obtained from (II) with $(NH_4)_2CO_3$, CO_2, and H_2O contained 75% of (I) and 25% of guanidine carbonate. Nitrification of (I) in soil was extremely slow. The nitrate, but not the sulphate nor phosphate, of (I) was an effective source of N for millet. A. G. P.

Manuring with carbon dioxide in greenhouses. M. Mann and H. Schanderl (Gartenbauwiss., 1934, **8**, 497—514; Bied. Zentr., 1936, **A**, **6**, 264).—Conditions influencing the effects of increasing CO_2 contents of glasshouses are examined. A. G. P.

Orchard fertiliser requirements. A. G. Strickland (J. Australian Inst. Agric. Sci., 1936, **2**, 148—150).—Plot trials and injection methods for determining fertiliser requirements are discussed. A. G. P.

Effect of poultry on the chemical composition of herbage and soil. A. W. Ling and W. R. Muir (J. Min. Agric., 1937, **43**, 1056—1067).—Folding poultry on grassland increases the crude protein, SiO_2-free ash, and P contents of the herbage. The Ca content may vary in either direction. The soil shows an increase in available P and (on acid soils) an increase in CaO requirement. Changes in available K are smaller and less uniform. A. G. P.

Report of Imperial Agriculturist. Agricultural Section, Pusa. VI. Field experiments. A. Singh (Sci. Repts. Imp. Inst. Agric. Res. Pusa, [1934—5], 1936, 21—32).—Fertiliser and green-manuring trials are recorded. A. G. P.

Report of Imperial Agricultural Chemist. B. V. Nath (Sci. Repts. Imp. Inst. Agric. Res. Pusa, [1934—5], 1936, 104—111).—The lag between the ammonification and nitrification of $CaCN_2$ in certain soils is not related to $p_{\rm H}$ or to deficiency of the requisite organisms. The soils contained H_2O-insol. substances toxic to nitrifying bacteria. The N of wheat grain increased and the P decreased with increasing applications of $(NH_4)_2SO_4$. Application of P fertilisers increased the P and lowered the N contents of grain. Superphosphate did not penetrate >4 in. below the level of placement. No relation was apparent between citric acid solubility of various phosphates and the manurial action. A. G. P.

Preparation of phosphorus–nitrogen fertilisers based on urea–ammonia liquor. L. Berlin and L. Goritzkaja (J. Chem. Ind. Russ., 1936, **13**, 1398—1405).—The product obtained by adding urea–NH_3 liquor (I) to double superphosphate, to a total N content of 14·5% (urea-N 7·5%), does not deteriorate when stored in open containers for 4 months. The assimilable P content of fertilisers prepared analogously from simple superphosphate (P_2O_5 20%) falls when the total N content is $>6·5\%$, but satisfactory products containing 12% N may be obtained by adding a mixture of (I) and NH_4NO_3 to the superphosphate. Loss of NH_3 from $NH_4H_2PO_4$ (II) does not occur during drying at 100°, whilst a 1 : 1 mixture of (II) and $(NH_4)_2HPO_4$ (III) loses 5% of its NH_3 after 3 hr. at 100°, but not at 60°. (III) loses 25% of its NH_3 after 3 hr. at 60°. R. T.

Hygroscopicity and deterioration of complex fertilisers. G. I. Gorschtein and J. F. Dishevski (J. Chem. Ind. Russ., 1936, **13**, 1413—1417).—The hygroscopicity of NH_4NO_3 (I) is unaffected by mixing or fusing with $CaCO_3$, but the products do not tend to cake to the same extent as finely-cryst. (I). Coarsely-granular (I) does not, however, differ in this respect from the above mixtures. The relative hygroscopicity of different products varies irregularly with atm. R.H. R. T.

Determination of potassium in mixed fertilisers. W. Lepper (Z. anal. Chem., 1937, **108**, 1—7).—The material is dissolved in dil. HCl, and SO_4'' is pptd. from the boiling solution as $BaSO_4$. NH_4 salts are removed by evaporation in presence of HNO_3, and K then determined directly as $KClO_4$. J. S. A.

Soil reaction as a factor in plant growth. A. V. Peterburgski (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1934, No. 18, 223—283).—Ca in soils counteracts the effects of low $p_{\rm H}$ on plant growth. Acid fertilisers lower crop yields on acid soils of low Ca content, but have no ill-effects on Ca-rich soils. Ch. Abs. (*p*)

Field trials with fibre pots. W. J. Youden and P. W. Zimmerman (Contr. Boyce Thompson Inst., 1936, **8**, 317—331).—The efficiency of various pots for starting tomato plants was in the (increasing) order: wood cellulose, flats, fibre, clay, fibre pots soaked in 1% aq. $NaNO_3$ (as judged by final yields in the field). A. G. P.

Inducement of fruit development by growth-promoting chemicals. F. G. Gustafson (Proc. Nat. Acad. Sci., 1936, **22**, 628—636).—Application of indolyl-acetic, -propionic, and -butyric acid and of phenylacetic acid to the cut style of unpollinate flowers induced growth of ovaries for some time. In some cases mature, but seedless, fruits were obtained. A. G. P.

Increasing flax yields by stimulation. A. Djemkina (Lein u. Hanf, 1934, **5**, 25—27; Bied. Zentr., 1935, **A**, **6**, 252).—Treatment of flax seed with $MnSO_4$ accelerated germination and increased yields. A. G. P.

Absorption of phosphoric acid by plants from soils saturated with various cations. G. K. Davuidov (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1934, No. 18, 155—169; cf. B., 1932, 523).—Absorbed $Ca^{\cdot\cdot}$ improves the absorption of PO_4''', but the latter is not adversely affected by additions of small amounts of $Na^{\cdot}$ or $H^{\cdot}$ to the soil. The significance of the electric charge on soil particles in the effect of fertilisers on absorbed cations is indicated. Ch. Abs. (*p*)

Action of composite fertilisers on sugar beet. D. N. Puzikov (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1934, No. 18, 49—81).—Soil $p_{\rm H}$ influences the action of NH_4-containing fertilisers more than that of NO_3' fertilisers. Inclusion of K and Na in NH_4 fertiliser mixtures improves the action in acid soils. Ch. Abs. (*p*)

Juice of navel oranges in relation to soil fertilisation. A. R. C. Haas (Calif. Citrog., 1935, **20**, 160, 172—173).—N fertilisers slightly increase the N content of the juice. K and P fertilisers produce no corresponding effect. K_2SO_4, superphosphate, and farmyard manure did not increase the S content of the juice. Pulp contains twice as much Ca as Mg. Inorg. P in pulp was highest from trees receiving $NaNO_3$ only. K comprised approx. 50% of the ash of juice. CH. ABS. (*p*)

Influence of commercial fertilisers, potassium iodide, and soil acidity on the iodine content of certain vegetables. W. B. MACK and E. P. BRASHER (J. Agric. Res., 1936, **53**, 789—800).—The I content of potatoes, tomatoes, and sweet maize was unaffected by use of fertiliser mixtures containing Chilean $NaNO_3$. Application of KI (2·4 kg. per acre) increased the I content, but injured green beans, and slightly increased the yield and I content of turnips, especially on limed soils. In soils untreated with KI, the I content of turnips, but not of beans, increased with soil acidity. The action of KI on crops is limited to the season of application. A. G. P.

Growth and carbohydrate supply of the tea plant after pruning. F. R. TUBBS (J. Pomology, 1937, **14**, 317—346).—The effect of different methods of pruning on the subsequent growth of tea plants and on the occurrence of die-back is related to changes in the carbohydrate level of roots due to removal of leaves. Different responses to pruning of plants grown at different altitudes are similarly explained. A. G. P.

Manurial effects of guano on rice plants. C. ICHIKAWA (J. Agric. Chem. Soc. Japan, 1937, **13**, 41—45).—Utilisation of $(NH_4)_2SO_4$ is slightly better than that of guano by rice plants grown in pots. R. M. M. O.

Preserving the natural colour of green plants. G. W. BLAYDES (Science, 1937, **85**, 126—127).—Addition of $CuSO_4$ to CH_2O–AcOH–EtOH solutions and to Transeau's algal preservative maintains an almost normal green colour in most chlorophyll-bearing plants. L. S. T.

Insecticidal properties of some East African plants. II. *Mundulea suberosa*, Benth. R. R. LE G. WORSLEY (Ann. Appl. Biol., 1936, **23**, 311—328; cf. B., 1935, 167).—The bark of *M. suberosa* is as toxic to insects as derris root containing 5·4% of rotenone. A. G. P.

Insecticidal action of acid lead arsenate on larvæ of Japanese beetle in different types of soil. W. E. FLEMING, F. E. BAKER, and L. KOBLITSKY (J. Agric. Res., 1936, **53**, 771—779).—The toxicity of acid Pb arsenate (I) to beetles burrowing through poisoned soil or feeding on roots in such soil is influenced by certain soil properties. The efficiency of (I) is high in soils containing much sol. PO_4''' and $Ca^{\cdot\cdot}$ and low when the sol. Mg content is high. Soil acidity favours toxicity of (I), although the presence of radicals causing acidity is probably more influential than the actual p_H. Sol. Cl', Mn, NO_3', NH_3, and K are of minor importance in this respect. A. G. P.

Adhesives for sulphur dusts. W. W. YOTHERS and R. L. MILLER (Citrus Ind., 1935, **16**, No. 2, 22—23).—Glue, gum tragacanth, and, especially, blood-albumin (I) increased the adhesiveness of S dusts on citrus. S–(I) dusts adhered almost as well as did CaO–S. CH. ABS. (*p*)

Mosaic and other diseases of sugar cane. Report of Imperial Mycologist. L. D. GALLOWAY (Sci. Repts. Imp. Inst. Agric. Res., Pusa, [1934—5], 1936, 131—140). A. G. P.

Control of corky-pit of apples in New Zealand. J. D. ATKINSON (New Zealand J. Sci. Tech., 1936, **18**, 381—390).—Application of H_3BO_3 or borax to soil markedly lowered the incidence of corky-pit, which is regarded as a nutritional disease. A. G. P.

Orange-worm control. A. J. BASINGER and A. M. BOYCE (Calif. Citrog., 1935, **20**, 158, 178—179).—*Argyrotænia citrana* is controlled by dusting trees in June—Aug. with a mixture containing $BaSiF_6$ or $Na_3(K_3)SiF_6$ 50, fibre talc. 45, and refined mineral oil ($\eta = 70$) 5%, at the rate of 1 lb. per tree. Spraying with Na_3SiF_6 (I) (3 lb. per 100 gals.), using blood-albumin as an adhesive spreader, also gave good results. Incorporation of (I) with oil emulsions permitted simultaneous control of *A. citrana* and black scale. CH. ABS. (*p*)

Life history and control of cabbage aphis, *Brevicoryne brassicæ*, L. F. R. PETHERBRIDGE and J. E. M. MELLOR (Ann. Appl. Biol., 1936, **23**, 329—341).—Control measures should be directed towards preventing the aphides passing from old to newly-planted plants. Nicotine sprays or dusts are recommended. A. G. P.

Chocolate-spot disease of broad and field beans. A. R. WILSON (J. Min. Agric., 1937, **43**, 1047—1049).—Infestation occurs only when a film of moisture covers the plants, and is favoured by deficiency of K and P in soil. A. G. P.

NH_4NO_3 [in mixtures].—See VII. **Determining rotenone in *Derris* root.**—See XX.

See also A., II, 112, **Synthetic plant-growth hormones.** A., III, 100, **Tobacco mosaic virus.** 105, **Stimulation of growth of soya-bean seeds by *X*-rays.**

PATENTS.

Fertilising materials. E. H. WENZEL (U.S.P. 2,035,286, 24.3.36. Appl., 17.12.32).—Fibrous material (a diluent, to aid distribution) is comminuted, dehydrated, mixed with animal excrement, and the mixture is moistened and dehydrated. B. M. V.

Seed disinfectant compositions. SCHERING-KAHLBAUM A.-G. (B.P. 459,318, 30.9.35. Ger., 28.9.34).—Mixtures of the compounds (1—2%) described in B.P. 459,462 (B., 1937, 393) with a diluent are claimed as fungicides and seed dressings. R. S. C.

Seed grain disinfection. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 460,521, 25.7.35).—Hydroxyphenylhydrazines and their derivatives, used moist, dry, or in H_2O (0·2—0·3%), are disinfectants efficient against all seed fungi. Preps. are described containing 4 : 2- and 4 : 3-$OH{\cdot}C_6H_3Cl{\cdot}NH{\cdot}NH{\cdot}SO_3Na$, acetone- and salicylaldehyde-*p*-hydroxyphenylhydrazone, *p*-$OH{\cdot}C_6H_4{\cdot}NH{\cdot}NH{\cdot}SO_3K$, *p*-

$OH{\cdot}C_6H_4{\cdot}NH{\cdot}NH_2$, and 4 : 3 : 5-$OH{\cdot}C_6H_2MeCl{\cdot}NH{\cdot}NH{\cdot}SO_3K$. Emulsifying (1—10), wetting (0·3—3), stabilising ($\not>$10), and dust-binding agents (hygroscopic salts) (1—2%) may be added. R. S. C.

Manufacture of insecticidal products from pyrethrum flowers. E. W. Fawcett, and Imperial Chem. Industries, Ltd. (B.P. 459,541, 10.7.35).—Short-path distillation at 10^{-2}—10^{-6} mm. of pyrethrum flowers or extracts therefrom alone or in presence of a non-volatile oil (Apiezon J) gives less coloured resins of high insecticidal power. R. S. C.

Emulsions.—See III. **Alkali polysulphide preps.**—See VII. **Electrolytic apparatus** [**for insecticides**].—See XI.

XVII.—SUGARS; STARCHES; GUMS.

Use of the hand refractometer in estimating the maturity of cane. S. Duncan (Agric. J. Brit. Guiana, 1936, **7**, 168—171; Internat. Sugar J., 1937, **39**, 70).—A review of the literature shows that the use of the hand refractometer offers the most promising field method yet proposed. One authority states that the sample for examination should be taken by puncturing the stalks at about the middle (breast high) to give an average of the whole cane. As regards the no. of stalks for examination, the selection is recommended of one cane of apparently an average degree of purity from one stool in each acre of the field. J. P. O.

Treatment of frozen sugar beet. N. E. Loginov, S. I. Korolkov, and V. I. Miropolski (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1934, **20**, 3—22).—Deterioration of frozen beet is largely due to formation of reducing substances. Yields and quality of fresh and frozen beet are compared. Ch. Abs. (*p*)

Chemical control [**of cane-sugar factories**]. E. Haddon (Bull. Assoc. Chim. Sucr., 1936, **53**, 782—784).—Calculations of efficiency of extraction are shown. J. H. L.

Thermal balance in sugar factories. L. M. Baeta Neves (Rev. Chim. Ind., 1936, **5**, 476—482).—The amount of heat required to effect a typical extraction of sugar cane is calc. and compared with that available from the combustion of the residues. F. R. G.

Influence of filtration on viscosity of beet-factory products. A. Náhunek (Z. Zuckerind. Czechoslov., 1936, **61**, 102—104; Internat. Sugar J., 1937, **39**, 75).—Laboratory-scale tests show that the η of raw or refined sugar syrups (at 50—66° Brix) does not alter as the result of filtration through paper, kieselguhr, or activated C whether conducted at 20° or at 80°. J. P. O.

Bagasse dust as filter-aid for vacuum filters. L. J. Rhodes (Internat. Sugar J., 1937, **39**, 79).—Fine bagasse when well mixed with cane-juice settlings greatly improves the efficiency of equipment of the Oliver–Campbell and Goslin–Wright types. "Rotex" or "Vibrex" sifters having screens of 8—12-mesh gauze are used for obtaining the dust, which comes through at the rate of about 16 lb. per sq. ft. of sifting surface per hr. About 19% is obtained from bagasse of average composition. J. P. O.

Invert sugar content of raw [**beet-sugar**] **juice and its influence on the quality of the purified juice.** O. Spengler, S. Böttger, and W. Dörfeldt (Z. Wirts. Zuckerind., 1936, **86**, 695—714; cf. B., 1935, 920).—Diffusion juice treated with 0—0·5% of invert sugar was limed under various conditions, and the colour and composition of the corresponding evaporated thick juices were compared. The thick juices were also heated for 4 hr. at 90° and $p_{\rm H}$ 9·6, this giving a valuable indication of the further darkening to be expected during boiling and crystallisation. With raw juices containing 0·130, 0·282, and 0·442% of invert sugar, limed under standard conditions (2% of CaO added at 80° and this temp. kept for 10 min.), 100, 96, and 91·8%, respectively, of the invert sugar was destroyed up to the thick-juice stage. The colours of the thick juices were 12·1°, 32·9°, and 80° Stammer per 100 Pol., and became 21·3°, 70·5°, and 250° St. after 4 hr. heating at 90°. Each increment of invert sugar in the raw juice caused a proportional fall in the natural alkalinity of the purified thin juice, and an increase in the ash of the thick juice, 1 pt. of invert sugar destroyed producing 0·15—0·2 pt. of ash. The darkening of thick juices on continued heating varied with the quantity of invert sugar still present, and this could be reduced by increased severity of liming conditions (90° instead of 80°, 15 instead of 10 min., or 3 instead of 2% of CaO). Adding the CaO before heating the raw juice, instead of to the hot juice, assisted destruction of invert sugar, and very greatly lessened the colour of the resulting thick juice and the darkening caused by further heating. J. H. L.

Fractional liming and double-heating process [**for cane-juice clarification**] **at Caymanas, Jamaica.** J. G. Davies (Internat. Sugar J., 1937, **39**, 67).—Factory experience with this process (B., 1936, 1119) confirmed its superiority over the usual cold-liming method using 50% and more POJ 2878 cane. Settling took place in ½ hr., whereas with cold-liming it was unsatisfactory after 2 hr. Comparative purity rises were 2·49 and 1·58, and tons of cane/hr. 27·2 and 20·0. The reduced CaO consumption claimed in the original paper was not realised, as the canes crushed were rapidly becoming over-ripe at the time of grinding, but during that time no more CaO was required, as was the case with the cold-liming process. J. P. O.

Cane-juice tempering [**with milk-of-lime**]. C. W. Waddell (Internat. Sugar J., 1937, **39**, 68—69).—Apparatus is described and illustrated by means of which the amount of milk-of-CaO (I) required for tempering any given juice is delivered by the adjustment of a handscrew, after which any change in the flow of juice coming from the mills automatically changes the vol. of (I) delivered in the same proportion. Thus variations due to irregular juice flow from the crushing plant are eliminated. J. P. O.

Boiling up the clarified [**beet**] **juice.** V. Staněk and P. Pavlas (Z. Zuckerind. Czechoslov., 1936, **60**, 379—386, 397—404, 405—407; Internat. Sugar J., 1937, **39**, 72—73).—Boiling up the carbonatated juice has as its object the decomp. of carbonates and carbamates, thus diminishing the amount of incrustation in the evaporator. In practice, the max. CO_2 elimination (53%) is obtained by boiling in open reheaters so as to superheat the juice slightly in relatively thin layers, later allowing it to expand into another vessel. Boiling in open vessels, with or without induced circulation, gave less satisfactory results. J. P. O.

Use of active carbon in the sugar industry. S. I. Korolkov (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1934, No. 20, 79—82).—A review. Ch. Abs. (*p*)

Addition of active carbon to sugar juice before evaporation. S. I. Korolkov, G. K. Virskaja, and N. A. Krivorutschko (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1934, No. 20, 90—112).—The amount of C used is 0·4% of the wt. of the sugar treated. Formation of molasses is thereby decreased. Ch. Abs. (*p*)

Composition of the sugar-juice evaporator-effect vapours and condensates. P. Pavlas (Z. Zuckerind. Czechoslov., 1936, **61**, 57—64, 65—72; Internat. Sugar J., 1937, **39**, 74).—In quadruple vac. evaporation, most of the NH_3 and CO_2 present in the juices is gradually evolved in the first, second, and third effects, though a little is still evolved in the last, where air also is largely eliminated. On the other hand, in pressure evaporation, using a triple apparatus with concentrator, the air evolved is present mostly in the vapours from the third effect and from the concentrator. NH_3 and CO_2 gradually increase from the first to the last effect. J. P. O.

Influence of evaporation under pressure on yield of molasses. B. A. Ljasko and G. V. Schtepan (Sovet. Sach., 1936, **3**, 30; Internat. Sugar J., 1937, **59**, 75).—It is concluded from factory experiments that the Geischtoft system of evaporation under pressure favours caramelisation of the juice, diminishes the effect of clarification, and increases loss of sugar in the molasses. Molasses of acid reaction, in spite of the alkalinity of the thick-juice having been normal, was obtained. J. P. O.

Testing evaporating plant [in sugar factories]. H. Claassen (Z. Wirts. Zuckerind., 1936, **86**, 715—727).—Satisfactory efficiency tests on evaporators require determination of heat-transmission vals.; the factors which influence these vals. are discussed. A method of routine testing is recommended suitable for the normal factory staff. The quantity of steam condensed in each stage of the evaporator is determined indirectly, from measurements of the total quantity of steam supplied to the first stage and the *d* of the juice passing from each stage to the next. Probable errors of the method are estimated at $<10\%$, which is small compared with the effects of incrustation and uncondensable gases. J. H. L.

Instantaneous indication of the presence of juice in returned boiler feed-waters [in beet-sugar factories]. A. Rousseau (Bull. Assoc. Chim. Sucr., 1936, **53**, 777—782).—An a.-c. electrical circuit, with relay to a lamp or bell, indicates any considerable fall in resistance of the H_2O returned from evaporators, below that ≡ the small quantity of NH_3 normally present. Under the most unfavourable conditions 0·4% of sugar in the returned H_2O would be indicated. J. H. L.

Determination of colloids in sugar-beet products. S. J. Korolkov (Bull. Assoc. Chim. Sucr., 1936, **53**, 764—776).—Dumanski's method is simplified and applied to beet juices, syrups, and molasses, diluted if necessary to about 12° Brix, centrifuged or filtered through filter-paper, and adjusted to p_H 4·5 with 0·1*N*-HCl. 5 c.c. treated with 30 c.c. of 96% EtOH are heated for 15 min. in a bath at 90°, and the ppt. is washed with EtOH until the washings give no α-$C_{10}H_7$·OH reaction for sugar and then weighed. The ash content of the product is about 6—10%. The method showed in diffusion juice 0·6, in second carbonatation juice 0·2, in syrup 0·8, and in exhausted molasses 4·4% of colloids. J. H. L.

Determination of sucrose in molasses. E. Haddon (Bull. Assoc. Chim. Sucr., 1936, **53**, 785—786).—Variations in the glucose/fructose ratio in cane molasses vitiate the method of Guézé (B., 1936, 469). The author has found the following method satisfactory. 121 c.c. of a solution containing 20 g. of the molasses per 100 c.c. are boiled with 2 g. of $Ba(OH)_2$ for 20 min. under reflux, cooled, neutralised with glacial AcOH, made up to 200 c.c., defecated with dry basic Pb acetate, and filtered. Of the filtrate 100 c.c. are treated with 5 c.c. of 50% NH_3, made up to 110 c.c., and filtered. Of the filtrate 50 c.c. are neutralised with AcOH and, after addition of 2·5 c.c. in excess, made up to 55 c.c. and filtered. The polarimetric reading, multiplied by 2·6, gives % sucrose in the molasses. J. H. L.

Determination of ash [conductometrically] in cane molasses. L. Sattler and F. W. Zerban (Internat. Sugar J., 1937, **39**, 66).—Results given by the proposed Lever–Mazumder method (cf. B., 1936, 1120) for the determination of the total ash by means of a single conductance measurement cannot be compared with those obtained by the general formula of Lorge *et al.* (cf. B., 1932, 1100) requiring four conductance measurements, since the latter was established to predict the sol. ash only. Quite a different formula is required for the total ash. Moreover, as Davies has pointed out (B., 1934, 163), whilst it is possible to calculate a fairly reliable regression equation from the simple ash and conductivity data alone, in all cases the highest val. of the correlation coeff. is obtained when all four conductivity readings are included. To reduce the labour involved, however, the κ val. itself may be employed as a control figure to furnish an empirical equiv. of the salt content, but not of the ash content. J. P. O.

Reducing power of sugars. D. Sidersky (Bull. Assoc. Chim. Sucr., 1936, **53**, 756—763).—A short account is given of recent work by Spengler and his colleagues (cf. B., 1936, 1225). J. H. L.

Bacterial purity of refined sugar [presence of "yeast-growth stimulants"]. H. H. Hall and L. H. James (Facts about Sugar, 1936, **31**, 222—223;

Internat. Sugar J., 1937, **39**, 71).—In the examination of the biological quality of white sugar destined for canning operations, the yeast crop obtained appears to be dependent on substances present in the sugar, designated "yeast-growth stimulants." Thus, on carrying out yeast-propagation tests with about 200 samples of white sugars, the counts gave multiples from 1 to 30. The stimulating substances are sol. in 80% EtOH, contain N, are entirely org., and are not destroyed by autoclaving. They are mainly located at or near the crystal surface in sugars. J. P. O.

Effect of time on the iodometric method of sugar analysis. H. S. Miller (Ind. Eng. Chem. [Anal.], 1937, **9**, 37—38).—In the Kline–Acree method for determination of aldoses (A., 1930, 1560), glucose (I) requires 8 and lactose (II) 15 min. for complete oxidation (longer times of reaction cause over-oxidation); a 1 : 1 mixture of (I) and (II) is oxidised even more slowly than (II) alone, but addition of 1 pt. of sucrose to 1 pt. of the mixture induced complete oxidation within 5 min. and over-oxidation in 15 min. E. L.

Jerusalem artichoke. L. N. Aizenberg (Sovet Sach., 1935, No. 1, 4—47).—The artichokes grown in Ukraine contain reducing sugars after inversion 13·6—14·8, fructose 13·1—13·3, non-N extractives 16·5—16·8%. Ch. Abs. (*p*)

Four years' working of wood saccharification at Tornesch. Fritzweiler and Rockstroh (Z. Spiritusind., 1936, **59**, 229—230).—Progress has been made with the Scholler process. A much improved percolator, of 50 cu. m. capacity, withstands the very severe conditions tolerably well. A special fermentation process has been worked out, in which the wort is kept in motion and made to follow a definite path through the vats; 8 cu. m. of wort can be completely fermented in 24 hr. per cu. m. of vat space, about 1/32 of the space required for fermentation at rest. The yeast maintains its vigour well, and the added food requirements are small. 100 tons of wood yield 60 tons of half-moist lignin, as by-product, which has about 1/3 of the calorific val. of hard coal and is successfully used as fuel in the factory, no more economic use having yet been found for it. Since 1934 the yield of EtOH has increased from <200 to about 215 litres per ton of wood. J. H. L.

Formation of black deposits on the plant of potato-starch factories. W. Kröner (Z. Spiritusind., 1937, **60**, 39, 45).—The hard, black deposit appearing on sieves etc. in certain potato-starch factories contained approx. 50% of protein and high proportions of ash materials, fibre, and H_2O. It appears to be produced by the action of Fe, contained in unsuitable process-H_2O, on the protein of the potato sap, especially in presence of O_2. The possibility of removal and prevention of such deposits is discussed, the importance of removal of Fe from the H_2O being stressed. Other materials also may, however, contribute to the deposit formation. I. A. P.

Soluble starch: its properties, with recommended supplementary procedure for determining suitability for use in the Lintner determination. S. R. Snider and D. A. Coleman (Cereal Chem., 1937, **14**, 1—17).—The starch is the most important source of error in the Lintner determination of diastatic power. Ideally it should have p_H 4·6, give a clear, opalescent solution with no sediment on keeping or buffering, be absolutely susceptible to diastase, have a low ash content, and contain no phosphate, reducing substances, or erythrodextrin. Of 3 commercial, 4 commercial-indicator, and 5 specially prepared starches, none approached the ideal; the A.S.B.C. and A.O.A.C. specifications are much too severe. The p_H could always be brought within the required limits by buffering. Acidity determinations by titration are unreliable; the best indicator is bromocresol-green. The dextrin content, appreciable in all samples, can be estimated by the red colour of erythrodextrin with I. The erythrodextrin iodide index should be $\ngtr 10$. E. A. F.

Starch acidity. H. Tryller (Z. Spiritusind., 1936, **59**, 231).—Polemical against Mayrhofer (cf. B., 1936, 38). Starch acidity depends, not on P content, but on the degree of saturation of the PO_4 groups. J. H. L.

Leaching. Conditions in evaporators.—See I. **Moisture absorption of glucose.**—See VII. **Bagasse in glass-making.**—See VIII. **Sugar beet.**—See XVI. **Prep. of baker's yeast. Molasses fermentation.**—See XVIII. **Panary fermentation. Determining reducing sugars in flour.**—See XIX.

Patents.

Clarification of sugar-cane juices. F. R. Fortier, Assr. to F. G. Campbell (U.S.P. 2,027,422, 14.1.36. Appl., 7.9.34. Cuba, 4.9.34).—Raw juices from the later mill units (secondary juices) are limed and heated to $\nless 100°$, and then, without separation of suspended ppt., cooled rapidly to 90° or below and strained through the bagasse mat in the later mill units. They may then be mixed with primary juice (from the first mill units) prior to its clarification. The process is continuous. J. H. L.

Treatment of solutions having a colloidal and/or crystalloidal character and in particular sugar juices and residual liquors. E. J. Hugel (B.P. 451,728, 6.8.35. Fr., 4.8.34).—Raw sugar juices are treated with hydrosols of S and C together or separately, *e.g.*, with 30—350 g. per 1000 litres, and, after heating to 70—75°, limed to p_H 12, carbonated or otherwise adjusted to p_H 8, reheated, filtered, and evaporated. The prep. of the S hydrosol from $Na_2S_2O_3$ and H_2SO_4 is described, and that of the C hydrosol by means of an arc between C electrodes in an aq. liquid containing a stabiliser. J. H. L.

Vacuum pans for boiling sugar, and like purposes. C. McNeil (B.P. 458,882, 15.11.35).—The pan is provided with a tubular agitator which is supplied with heating medium (and supported) by a double-concentric tubular shaft. B. M. V.

Concentration of syrups and like liquids. J. A. Rio (B.P. 458,963, 21.1.36).—The liquid is poured continuously in a thin layer over a surface maintained sufficiently above the b.p. to produce "calefaction," the surface being trumpet-shaped with the axis vertical. The feed liquid may be preheated by the leaving concentrate. B. M. V.

Treatment of [sugar] massecuite. R. Haddan. From Western States Machine Co. (B.P. 455,554, 22.3.35).—The trough which receives massecuite from the crystallisers and delivers it to the centrifuges is provided with one or more sets of revolving hot-H_2O coils to warm the massecuite. J. H. L.

Centrifuging of sugar or similar substances for separation of syrup. R. Haddan. From Western States Machine Co. (B.P. 459,682, 28.11.35).—Driving means for a suspended gyratory centrifuge is described. B. M. V.

Recovery of sugar [from beet molasses]. F. H. Rogers. From Spreckels Sugar Co. (B.P. 453,420, 10.1.35. Cf. B.P. 443,662; B., 1936, 1226).—In a modification of the Steffen process, cold molasses solution and CaO are mixed in a reaction chamber, from which the mixture is drawn off into a secondary mixing chamber forming part of a closed circuit containing also a grinding device (colloid mill or gear pump) to break up the insol. CaO–sugar coating formed on the CaO particles. From this circuit the mixture passes to a filter, and without any further treatment of the filtrate saccharate $\equiv >99\%$ of the sugar in the molasses is obtained. J. H. L.

Manufacture of sugar [glucose]. J. M. Widmer, Assr. to Penick & Ford, Ltd., Inc. (U.S.P. 2,032,160, 25.2.36. Appl., 4.4.32).—In a continuous process of crystallisation, described with reference to glucose hydrate, nearly finished massecuite circulates repeatedly through a crystalliser circuit at controlled rate and temp. At one point of the circuit a relatively small proportion of uncryst. supersaturated syrup together with a small quantity of seed is introduced, and at another point remote from the first a corresponding quantity of massecuite is withdrawn as finished, and centrifuged. J. H. L.

(A) Production, (B) crystallisation, of dextrose. Internat. Patents Development Co. (B.P. 456,590 and 457,449, 24.5.35. U.S., [A] 17.4.35, [B] 1.4.35).—In the process of B.P. 232,160 (B., 1925, 935), (A) instead of a proportion of one massecuite being left in the crystalliser to serve as "foots" for the next, the necessary amount of solid phase is supplied in the form of purged but not dried glucose from the centrifuges, preferably from a massecuite of lower purity than the one to be produced; (B) crystallisation is shortened by stirring and cooling more rapidly during the early stages. J. H. L.

Sugar refining. H. F. Bomonti, Assr. to Bomonti & Co., Ltd. (U.S.P. 2,015,375, 24.9.35. Appl., 16.5.33).—By pptg. $AlCl_3$ solutions with $Na_2Al_2O_4$ until the reaction is about p_H 7·5, washing out part of the NaCl, if desired, and adjusting to p_H 4·7—5·2, a clarifying agent containing colloidal Al oxychloride, $[Al(OH)_3]_x[Al(OH)_2^{\cdot} + Cl']_z$, is obtained having a flocculating action on negatively charged colloids. In white cane-sugar manufacture, about 0·15—0·25% (on sugar) is used twice, first on remelt liquors from which final white sugar is afterwards obtained, and second on defecated raw juice which then yields a greyish-white sugar for remelting. J. H. L.

Manufacture of non-caking granular sugar. Nat. Sugar Refining Co., Assees. of R. Whymper (B.P. 455,062, 24.9.35. U.S., 25.7.35).—Crude syrup is highly conc. and then subdivided and cooled so as to solidify in the form of porous granules of fairly uniform size (= screen mesh 3·33—0·295 mm.) consisting of very fine crystals. As the adherent mother-syrup is distributed throughout the interior of the granules, these are not sensibly moist, and the product is non-caking and suitable for table use. The granules may be formed by cooling and extruding the syrup through holes of suitable size. J. H. L.

Apparatus for cooling granulated sugar and eliminating sugar dust therefrom. G. J. Daley (U.S.P. 2,033,416, 10.3.36. Appl., 30.10.33).—The sugar is conveyed up an elevator, down a tower with baffles, and up a second elevator to screen boxes and collecting bins. A minor stream of air passes up the first elevator and a major stream down the second and up the tower, the combined streams and sugar dust being drawn through a cyclone (the settled product from which is considered marketable) and up a scrubbing tower in which it meets sprays of H_2O which is recirculated many times until it becomes sugar solution conc. enough for reprocessing. B. M. V.

Recovery of non-sugars from saccharine materials. G. T. Reich (U.S.P. [A] 2,022,093 and [B] 2,031,670, [A] 26.11.35, [B] 25.2.36. Appl., [A] 14.7.32, [B] 23.5.32).—(A) Molasses (1000 gals.) is thinned with H_2O (600 gals.) and mixed with $Pr^{\beta}OH$ (400 gals.). K and other inorg. salts which separate are recovered, and further $Pr^{\beta}OH$ may be added to produce a separation into two layers, one of which contains most of the remaining non-sugars. (B) Molasses (1000 gals.) thinned with H_2O (500 gals.) is treated with NH_4 salts [40—100 lb. of $(NH_4)_2SO_4$] and EtOH (1000—3000 gals.). K and other inorg. salts which separate are recovered, and org. non-sugars may be pptd. by further addition of EtOH. NH_3 and EtOH are recovered. J. H. L.

Polymerisation of monosaccharides. E. Färber, Assr. to N. V. Internat. Suiker en Alcohol Co., Internat. Sugar & Alcohol Co. "Isaco" (U.S.P. 2,027,904, 14.1.36. Appl., 6.2.34. Ger., 16.2.33).—Non-fermentable polysaccharides are produced by heating monoses with minute quantities of free mineral acid at 120—180°. Particulars are given for glucose and xylose. J. H. L.

Manufacture of starch. Merco Centrifugal Separator Co., Ltd., A. Peltzer, and A. Peltzer, jun. (B.P. 455,158, 29.6.35).—In wet starch manufacture from maize etc., tabling is replaced by the use of centrifugal separators (U.S.P. 1,923,455 and 1,945,786; B., 1935, 120). This operation precedes fine screening and, by removing much fibre, simplifies the latter process. It also separates the gluten in a relatively conc. form. A scheme of working is described. J. H. L.

Purifying liquids.—See I.

XVIII.—FERMENTATION INDUSTRIES.

Biochemical distinctions between barley varieties. J. A. Shellenberger and C. H. Bailey (Cereal Chem., 1936, **13**, 631—655).—Eight varieties of barley, grown at two stations over 3 years, were compared, with particular regard to properties affecting malting quality. Differences in imbibition rate were small. Acrospire growth classification varied widely with both season and variety. The diastatic activity of barley and of malt was correlated when measured by the Lintner method, but not when the Blish–Sandstedt method was used, and did not differ with variety. Resistance of the starch to enzyme action increased on malting; it was not related to variety. E. A. F.

Report of Malt Analysis Standardisation Committee. D. A. Coleman (Cereal Chem., 1936, **13**, 669—674).—Collaborative analyses of barley malt by the A.S.B.C. method gave satisfactorily concordant results, except for diastatic activity. Analyses of corn flakes by variants of the A.O.A.C. method give concordant results. Results for rice varied widely, owing to differences in method; workers using the A.O.A.C. method agreed fairly well. E. A. F.

Mechanical examination of malt. E. Rothenbach and K. Silbereisen (Woch. Brau., 1937, **54**, 57—59).—The longitudinal corn-cutter possesses the advantage over the transverse cutter of Grobecker that it allows detection of glassy-tipped corns. The former yields in most cases similar results to the Diaphanoscope, but its use is simpler, and, moreover, it can be applied to dark malts. Using the longitudinal cutter, it is proposed to derive an expression for mealiness from % of mealy corns +½% of half-glassy +¾% of glassy-tipped. Results of 100—96%, 96—92%, 92—88%, 88—84%, and <84% would correspond with fine, good, satisfactory, deficient, and bad mealiness, respectively. I. A. P.

Determination of the germinative capacity of kilned malt. P. Kolbach, K. G. Schulz, and G. Kunisch (Woch. Brau., 1937, **54**, 49—55).—In the method recommended, undamaged malt corns are shaken with a seed disinfectant ("Uspulun-Nassbeize," *U*) in the dry form (0·045 g. per 400 corns), and then placed on a layer of sand which has been 70% saturated with H_2O; the tests occupy 7 days at 18—20°. Various other methods for combatting the mould growth during the germination period are described and discussed; the use of *U* as described gave the best results for this purpose. I. A. P.

Preparation of baker's yeast. E. Rosenbaum (Z. Unters. Lebensm., 1936, **72**, 331—351).—The prep. of cultures on a commercial scale and the treatment of the molasses are described. E. C. S.

Influence of malt husk on mashing and on wort and beer. R. Rehberg (Woch. Brau., 1937, **54**, 9—15, 17—22, 25—28, 36—39).—Brews made from husk-freed malt have been compared with brews made when the normal and twice the normal amounts of husk were present. Husk tannin caused no increase in the amount of coagulable N, but husk materials increased the wort coloration and the cloudiness of cooled and filtered worts. The husk yielded large amounts of buffer substances to wort, including notably PO_4''' and SiO_2; although there was no change in the wort p_H, an increase in the p_H of the beer was produced. The husk materials stimulated the enzymic changes during mashing, as was reflected in increased extract, dissolution of nitrogenous materials, and proteolysis; the effect was probably due to a catalytic action of the inorg. constituents. The husk also increased the concn. of inorg. constituents in beer and led to the development of inferior taste and odour, though it is emphasised that husk carries malt-aroma substances. Differences in biological stability with and without use of husk could not be observed, nor could it be shown that husk exerted any favourable influence on cold-sensitivity. I. A. P.

Coagulable and cold-sensitive proteins [of beer and wort]. B. D. Hartong (Woch. Brau., 1937, **54**, 33—36).—A method is described whereby, with the aid of $(NH_4)_2SO_4$, a reversibly, cold-sensitive, non-coagulable protein and cold-stable, coagulable albumin may be separated from wort and beer. Accordingly, methods for the direct determination of cold-sensitivity are suggested. From the results obtained, and from a review of the literature, it appears that this property is due to the native barley globulin (globulin salt) and may be a varietal characteristic of barley. Cold-sensitivity is the result of a coacervation process (gradual coalescence of ultramicroscopic droplets), the associated dehydration being favoured by cooling and reversed on again raising the temp. The nature of the coacervating micelle is discussed, together with the effect of denaturation in gradually rendering cold-sensitivity irreversible. I. A. P.

Drawing off beer in absence of air. G. Chabot (Petit J. Brasseur, 1936, **44**, 1099; Woch. Brau., 1937, **54**, 55).—Using a named technical plant, racking under CO_2 instead of air, the favourable effect of this procedure on the palate-fullness, taste, and bitterness of the beer is noted, whilst the beer failed to develop the "bready" taste and odour which appeared in the air-drawn beer after 10 days at 25—30°. A further difference appeared in the fact that the beer drawn under CO_2 showed but little decrease on storage in the amounts of gases not absorbed by NaOH, which remained at 0·5—1 c.c. per 1/3-litre bottle. A similar bottle of fresh air-drawn beer contained 10—20 c.c. of non-absorbable gases; this val. decreased markedly on storage, the resultant oxidation of beer constituents adversely affecting the properties of taste and stability. I. A. P.

Large-scale clarification of wines. L. G. Saywell (Wines and Vines, 1935, **16**, No. 4, 10—11).—Use of bentonite is examined: its action is improved by heating wine to 49—60°. Removal of Fe is increased by pretreatment with activated C (0·25—2 lb. per 1000 gals.) and aëration followed by bentonite. Ch. Abs. (*p*)

Tannin [in wines]. M. V. Cruess (Wines and Vines, 1935, **16**, No. 1, 5—7).—White wines contain only small amounts of tannin (I) and as a result are subject to bacterial diseases. Flavour of red wines is largely due to (I) (chiefly œnotannin). In fining, the gelatin : (I) ratio is approx. 1 : 1. Max. (I) content for red wine is 0·3%. In industrially useful proportions (I) does not inhibit growth of wild yeasts, but considerably retards that of tourne. CH. ABS. (*p*)

Complete balance sheet and distribution of ionisable substances contained in wines. E. BREMOND (Bull. Soc. chim., 1937, [v], 4, 296—305).—Complete analyses of wines are given and the ratios of free to combined org. acids calc. E. S. H.

Acid content of whisky : variation with age and dilution. S. T. SCHICKTANZ and A. D. ETIENNE (Ind. Eng. Chem., 1937, **29**, 157—159).—The relative displacements of successive titration curves (glass electrode) for a whisky of increasing age allow prediction of the conditions and environment of storage. The dissociation of the acids present in whisky and also in a synthetic " whisky " (1 litre of 100-proof EtOH + 0·5 ml. of glacial AcOH) is governed by the [EtOH], and is markedly affected by dilution with distilled H_2O or with 50% or 95% EtOH. Varying alcoholic concns. alter the relation between p_H etc. and indicator characteristics as compared with simple acid-H_2O systems, but data obtained after dilution can be used for comparative purposes. I. A. P.

Refractometric determination of fusel oil in brandy. W. LEITHE (Z. Unters. Lebensm., 1936, **72**, 351—354).—The brandy is freed from esters, distilled, adjusted to 30 vol.-% of EtOH, treated with $(NH_4)_2SO_4$, and shaken with 1-$C_{10}H_7Cl$ (I). At the same time an equal vol. of 30 vol.-% EtOH is similarly treated. In each case the change in *n* of the (I) layer is determined, and the % of fusel oil calc. therefrom by means of factors which are given for the Abbé, Pulfrich, and dipping refractometers. E. C. S.

Loss of alcohol by evaporation during fermentation of molasses. H. POHL (Chem. Listy, 1937, **31**, 60—66).—The loss of EtOH amounts to 1·22% during fermentation in closed vats, and to 1·95% in open ones. R. T.

Ultra-violet radiation.—See XI. **Wood saccharification.**—See XVII. **Flour and yeast proteinases. Potato distilleries.**—See XIX.

See also A., III, 92, **Purifying β-*N*-acetylglucosaminidase.** 98, **Prep. of highly active alcohol apodehydrogenase from yeast. Citric acid fermentation.**

PATENTS.

Treatment of oak wood for use in ageing spirituous liquors. E. T. KREBS and W. H. MATHER (B.P. 460,717, 2.8.35).—Oak chips etc., after roasting to a light brown colour, are percolated with a 0·5% solution of $MgCl_2$ and/or a 0·05% solution of $CaCl_2$ at 30—40°, and the drained material is thereafter treated with an emulsin solution for a prescribed period. After repetition of these treatments and maceration with 0·25% AcOH solution, the wood residue is mixed with acorn meal and the mixture stored in a moist state for 2—4 days. The drained product is macerated with raw spirit (twice, 1 + 24 hr.), this yielding, after draining and storing for approx. 30 days, a superior aged liquor. The wood treatment described activates the cryptogam spores contained in the oak, the resultant growths providing aminosuccinamide etc. which contribute to the body of the liquor, whilst the fruit- and flower-odour acids of the oak are developed fully and tannin compounds are dissociated, which, in presence of alcohols, facilitates esterification and aldehydation. I. A. P.

[Manufacture of lactic acid by] fermentation process. A. S. SCHULTZ, G. W. KIRBY, and C. N. FREY, Assrs. to STANDARD BRANDS, INC. (U.S.P. 2,032,443, 3.3.36. Appl., 26.9.34).—Molasses is fermented with *Bac. Delbrücki* at 55°, the p_H being kept at <3·8 by the NH_3 formed by enzymic reaction between the urease in the mash and added urea. A. R. P.

[Beer] filter [for bung of casks]. E. W. BARNETT (B.P. 458,876, 22.10.35).

Bacterial milk products.—See XIX.

XIX.—FOODS.

Mechanical viscosity of wheat flour. G. ISSOGLIO (Atti V Congr. Naz. Chim., 1936, **14**, 758—762).—A method is described for measuring the mechanical η of a flour dough subjected to a stretching force, *S*; η is defined as the ratio of *S* to the increase in length of the dough sample per unit time. η affords a convenient measure of the suitability of a dough for the baking of bread. O. J. W.

Identification and measurement of factors governing diastasis in wheat flour. R. M. SANDSTEDT, M. J. BLISH, D. K. MECHAM, and C. E. BODE (Cereal Chem., 1937, **14**, 17—34).—Diastasis measurements over a long period, preferably by the manometric method, show the rate to depend on the conversion of available starch by β-amylase and on the formation of available from non-available starch by another enzyme, not identified. The amylase used was extracted with 5% NaCl solution, H_2O extraction being incomplete. E. A. F.

Pelshenke test and baking value [of wheats]. P. NOTTIN and A. DARON (Bull. Assoc. Chim. Sucr., 1936, **53**, 739—749).—In the Pelshenke test, 5 g. of the finely-ground whole wheat are kneaded to a ball with 3 c.c. of distilled H_2O containing 0·25 g. of yeast. The ball is at once placed in H_2O at 32°; it sinks at first, rises after about 12—17 min., and later breaks up suddenly and the larger fragments sink. The time between initial immersion and break-up is a measure of baking val. Lacoudre has recommended that the test should be made in quadruplicate, in parallel with tests on a standard wheat; the results are affected by fineness of grinding and personal manipulation in kneading. From the present study the author concludes that the primary cause of the break-up is the H_2O-absorptive power of the dough, which is the only factor in baking val. measurable by mechanical laboratory methods. The yeast accelerates the break-up, but to unequal extents, as shown by differences in the times required for the balls to rise to the surface; only when these times are equal do the break-up times correspond closely with baking vals.

The author proposes to eliminate the irregular fermentation effect by omitting the yeast and placing the immersed balls on a grill in the H_2O; they do not rise, but after a time break up and fall through the grill. The time required for this is longer than the break-up time in the Pelshenke test, but it is a better indication of baking val. J. H. L.

Pelshenke test and the value of wheats. R. Broquet (Bull. Soc. Chim. Sucr., 1936, **53**, 750—755; cf. preceding abstract).—Application to about 1000 samples indicates the usefulness of the test. Pelshenke classified samples giving break-up times of <25, 25—30, 30—38, 38—55, and >55 min., respectively, as bad, tolerable, good, very good, and "force." These vals. are considered applicable to 1934 wheats, but subtraction of 7 from all the figures would accord better with 1935 wheats. Occasionally balls from bad samples do not rise, and those from exceptionally good samples may break up at the surface to a fine suspension. With wheats which have been stored under bad conditions or heated the test may indicate too good a quality. J. H. L.

Selenium and cystine content of some partial hydrolysis products of gluten from toxic wheat. D. B. Jones, M. J. Horn, and C. E. F. Gersdorff (Cereal Chem., 1937, **14**, 130—134).—With the object of concentrating the Se in toxic wheat, the gluten was partly hydrolysed with pepsin. Of four fractions (*A*—*D*) obtained, *B* contained $>$ half the Se present, but *A* and *C* none. The Se was further conc. by removing aminodicarboxylic acids from *B*. Cystine was present mainly in *D* and lacking in the fractions free from Se. E. A. F.

Oat flour as an antioxidant. F. N. Peters, jun., and S. Musher (Ind. Eng. Chem., 1937, **29**, 146—150; cf. B., 1936, 1004).—The effect of intimate mixing with oat and maize flours on rancidification of lard, cottonseed oil, and castor oil is recorded. Potato chips, salted nuts, roasted coffee beans, and fatty fish may be treated by dusting, or, in the case of salted fish, by mixing oat flour with the brine. Some protection is afforded by wrapping perishable material in materials coated with oat flour. The peroxide content of lard so kept is compared with that of lard kept in untreated packages. E. C. S.

Report of Committee on testing rye flour. L. H. Bailey (Cereal Chem., 1936, **13**, 770—772).—There is some correlation between ash and baking quality and between colour and flavour. Colour standards are needed. E. A. F.

Report of 1935—6 Committee on testing biscuit and cracker flours. W. Reiman (Cereal Chem., 1936, **13**, 755—769).—The bread-baking test is a reliable means of classifying the flours. Of other tests applied, η gives the best indication of relative strength. E. A. F.

Report of 1935—6 Committee on testing pie flours. C. B. Kress (Cereal Chem., 1936, **13**, 731—735).—Three flours were subjected to chemical, η, shortening, and baking tests. η is of particular val. The recommendations of the 1934—5 Committee are confirmed. E. A. F.

Report of the 1934—5 Committee on methods of testing self-raising flours. H. G. Walter (Cereal Chem., 1936, **13**, 721—723).—Scoring was changed by defining flavour more closely and providing penalties. Collaborators agreed in placing three flours but differed in scores; closer standardisation is needed. E. A. F.

Report of Subcommittee on viscosity [of flour]. E. G. Bayfield (Cereal Chem., 1936, **13**, 773—788).—Modifications of the tentative method are proposed. Mixing of the flour and H_2O is better done by shaking in a flask than by a pestle and mortar. Protein artificially diluted with starch gives different results from the natural mixture in the wheat berry. E. A. F.

Detection of sulphur dioxide in flour. L. Reimers (Cereal Chem., 1937, **14**, 129—130).—Samples of suspected and standard flour are prepared as for the Pekar test, dipped in KI-starch solution, and exposed to a low concn. of Cl_2 in air. I liberated is reduced by SO_2 if present. E. A. F.

Ashing of cereal products. L. H. Bailey (Cereal Chem., 1937, **14**, 120—128).—Methods of ashing flour and other cereal products are reviewed. Of several rapid methods tested, a modification of the A.A.C.C. $Mg(OAc)_2$ (I) method was most satisfactory. 3 g. of flour are moistened with 3 c.c. of 6 g./litre alcoholic (I) and ignited at 700° for $\frac{3}{4}$ hr. 2 g. of bran require 3 times as much solution and twice as long heating. E. A. F.

Preparation of standard solutions for protein testing. W. O. Whitcomb (Cereal Chem., 1936, **13**, 718—720).—NaOH and H_2SO_4 solutions are made up with an accuracy of 0·2% by mixing weighed quantities of H_2O and conc. stock solutions. E. A. F.

Changes of leucosin, gliadin, and glutenin under action of flour and yeast proteinases. A. V. Blagovestschenski and M. P. Yurgenson (Cereal Chem., 1937, **14**, 103—107; cf. A., 1936, 244).—The proteolytic action of the natural mixture of enzymes from wheat flour or yeast is similar, but different from that of pure proteinase from either source. The increase in NH_2-N is large in the first case but negligible in the second, from which it is concluded that the first stage in proteolysis is a disaggregation without production of free $\cdot NH_2$ and $\cdot CO_2H$. Glutenin is the most resistant to proteolytic enzymes, and leucosin the least. E. A. F.

Refractometric methods of determining diastatic activity of flour. E. Munz and C. H. Bailey (Cereal Chem., 1937, **14**, 85—96).—In Molin's refractometric method of measuring flour hydrolysis a flour : H_2O ratio between 1 : 4 and 1 : 6 is the most favourable. Hydrolysis is checked by a citrate buffer more than by lactic acid at the same p_H or by the natural electrolytes of flour. $n_D \propto$ % maltose at 62—63°. A procedure giving reproducible results is described. E. A. F.

Collaborative study of the Blish–Sandstedt, Schoorl, and Bertrand methods for determining reducing sugars in flour diastatic-activity measurements. C. F. Davis (Cereal Chem., 1937, 14, 74—85).—The three methods are about equally satisfactory. A slight adjustment of the tables in the higher sugar levels would make the vals. more comparable. The Blish-Sandstedt method has the lowest experimental error and the Bertrand the highest, but the Schoorl method is preferred on account of greater uniformity between laboratory results and greater differentiation between flours. E. A. F.

Report of Committee on methods of analysis [of breadmaking materials]. B. Sullivan (Cereal Chem., 1936, **13**, 772).—Further investigation is recommended on laboratory milling, H_2O content of wheat, proteolytic activity of flour, and bread ingredients other than flour. E. A. F.

Oven spring of dough as influenced by sugar, salt, and yeast. W. O. Whitcomb (Cereal Chem., 1936, **13**, 698—702).—Seven flours of varying chemical characteristics differed widely in the relation of oven spring to the quantities of sugar, NaCl, and yeast used. Oven spring is not related to sugar content at the time of baking and does not necessarily increase with yeast content. 1—2% of NaCl was needed. E. A. F.

Effect of chemical flour improvers on proteolytic action in relation to the gas-retaining capacity of fermenting doughs. J. T. Flohil (Cereal Chem., 1936, **13**, 675—689).—The effect of improvers on baking quality is at least partly due to their inhibition of the action of proteolytic enzymes. Papain and an extract of malted wheat flour produced similar adverse effects in baking tests and disintegrated gluten in a test-tube. These effects were counteracted by improvers; over-treatment produces a tough dough. Proteolytic activity was measured by the flow on keeping of a ball of gluten from a dough that had been kept for 4 hr. It is reduced by moist heat. The proteolytic enzyme is present mainly in the germ, which contains the equiv. of 0·14% of papain. E. A. F.

Effect of sucrose and maltose on acid and gas production in doughs. J. H. Lanning (Cereal Chem., 1936, **13**, 690—697).—The p_H falls more rapidly in doughs containing sucrose (I) than in those containing maltose (II). Osazone tests at 1-hr. intervals, on doughs fermented with two different types of yeast, showed that (I) was fermented in preference to (II). E. A. F.

Effect of pressure on rate of gas production in yeast fermentation [of flour]. R. M. Sandstedt and M. J. Blish (Cereal Chem., 1936, **13**, 789—790).—Dough fermentation in a "pressuremeter" was not significantly affected by releasing the pressure several times during fermentation. E. A. F.

Effect of milk solids on fermentation reactions. O. Skovholt and C. H. Bailey (Cereal Chem., 1937, **14**, 108—120).—No effect of milk solids on proteolytic activity was detected, but this may be due to inadequacy of the methods used. Diastatic activity is retarded in non-buffered suspensions owing to increased p_H; buffered suspensions showed no effect. If sufficient sugar is present milk solids accelerate gas production. This appears to be due to stimulation of zymase activity owing to increased p_H. Anamolous results obtained with some flours are ascribed to the effect of milling on starch susceptibility. E. A. F.

Panary fermentation. H. Colin and H. Belval (Bull. Assoc. Chim. Sucr., 1936, **53**, 729—739).—Some new data for the contents of sugars in various cereal corns are given. In the ripe wheat corn the endosperm contains non-reducing levosin (I) and sucrose (II), the embryo (II) and raffinose (*e.g.*, 4% of the embryo wt.), and the husk (II), and 0·1—0·2% of reducing sugar is present throughout. The contents of sugars in wheat flour depend on the removal of husk and embryo in milling; (I) predominates, and (II) is usually 0·2—0·3%. In a mixture of wheat flour with 60% of 1·5% salt solution and 1% of pressed yeast, kept at 30°, (II) (0·2%) disappeared in about ½ hr., (I) (0·6%) diminished to 0·3% in 4 hr., hexoses increased from 0·1% to 0·2—0·3% in ½—1 hr. and then diminished, and maltose increased from nil to 0·7—1% in 2 hr. and diminished to 0·4% in the next 2 hr.; 0·9% of EtOH (on flour) was produced in 4 hr. J. H. L.

General course of panary alcoholic fermentation. R. Guillemet and C. Schell (Bull. Soc. Chim. biol., 1936, **18**, 1803—1816).—The course of gas production during panary fermentation depends on the nature of the yeast used, on the composition of the fermentable sugars of the dough, and on the fermentation activators of the flour. A method is described for determination of the total fermentation power of flour. P. W. C.

Size of baking pan in experimental baking. C. F. Davis (Cereal Chem., 1937, **14**, 35—48).—The relation of the height of the dough to that of the pan affects markedly the external loaf characteristics and should be standardised. E. A. F.

Baking quality of [wheat] flour as affected by certain enzyme actions. III. Purified amylase and the relative proteolytic activity of amylolytic agents. J. W. Read and L. W. Haas (Cereal Chem., 1937, **14**, 58—73; cf. B., 1936, 344).—Purification of amylase (I) by fractional pptn. intensified the proteolytic power to the same extent as the amylolytic. Baking tests with the purified (I) show improvements, which are attributed to proteolytic activity. Proteinase (II) or a (II) activator, if not in excessive quantity, improves the baking quality, especially of bucky doughs. Saccharogenic and proteolytic powers of the purified (I) preps. are given. E. A. F.

Report of 1935—6 Committee on experimental baking test. C. O. Swanson (Cereal Chem., 1936, **13**, 724—727).—Results of baking tests disagree because the test is required to determine both the character of the flour and the baking method best suited to it. The baking test should be varied in accordance with the predetermined protein content, flour yield, and diastatic and mechanical properties. E. A. F.

Present status of "standard" A.A.C.C. baking test. M. J. Blish (Cereal Chem., 1936, **13**, 728—730).—There can be no "standard" baking test without the compulsory use of uniform mechanised equipment. E. A. F.

Report of United States Department of Agriculture Bread-Flavour Committee. F. B. King, D. A. Coleman, and J. A. LeClerc (Cereal Chem., 1937, **14**, 49—58).—Trained and untrained judges agreed in preferring hard red spring wheat, 95% patent flour, a rich formula, and fresh bread. Small differences were not detected. E. A. F.

Report of 1935—6 Committee on cake-baking tests and self-raising flours. L. D. Whiting (Cereal Chem., 1936, **13**, 736—745).—It is recommended that only fresh or frozen albumin be used in the cake-baking test. The use of type photographs would reduce variations in scoring. Too great variations in scoring identical self-raising flours indicate a need for better-defined standards. E. A. F.

Standardisation of egg-white in the A.A.C.C. white-cake formula for testing soft wheat flours. W. E. Stokes and L. K. Track (Cereal Chem., 1936, **13**, 746—752).—Cakes made with frozen egg-whites approximate more nearly to those made with fresh whites than do those made with dried albumin. Frozen whites give more uniform results than fresh. E. A. F.

Cake-making quality of eggs as related to some factors in egg production. F. B. King, E. F. Whiteman, and W. G. Rose (Cereal Chem., 1936, **13**, 703—711).—Batters and cakes made with eggs from seven groups of hens, differently fed, were tested for p_H and d (batter), sp. vol., tensile strength, compressibility, and elasticity (cakes). These factors were related among themselves, but were apparently unconnected with the physical and chemical properties of the eggs. The absence of relation between p_H and CO_2 content of egg-white was confirmed. E. A. F.

Factors affecting the basic cake formula. H. R. Fisher (Cereal Chem., 1936, **13**, 753—754).—Three hydrogenated shortenings differed widely in the d and consistency of the batter and the quality of the cakes made from them. Standardisation is needed. E. A. F.

Fat of goat's milk. A. Chollet and A. Camus (Lait, 1937, **17**, 135—141).—The following range of consts. for the genuine milk fat was found: sap. val. 234—238, I val. 17—27, Reichert–Meissl (R.–M.) no. 14—20, Polenske (P.) no. 6—8, R.–M./P. ratio, 36–43, Planchon index 12—18, Crismer index 40—42. The examination of Camembert cheese fat in the light of the above consts. is discussed. The R.–M./P. ratio of cheese fat falls to 27—30 with 25%, and to 21—23 with 50%, admixture of cow's milk with goat's milk for cheese making. W. L. D.

Bacteriological investigations on milk-separator slime. H. Kliewe and H. Herwig (Arch. Hyg. Bakt., 1936, **117**, 179—186).—The yield of separator slime at Giessen milk depôts averaged 0·33 g. per litre. The bacterial count was 50—90 × 10^6 per ml., that for the pasteurised milk being 15—72 × 10^3 per ml. (ratio of slime count to milk count = 4000). The slime from pasteurised milk was in most cases free from pathogenic, but often contained coliform, organisms. W. L. D.

Heat transfer in plate heaters for milk. W. Fritz and U. Mennicke (Arch. Wärmewirts., 1937, **18**, 25—28).—A plate heater used for pasteurising milk is described. Experimental heat-transfer data are compared with those calc. by using various formulæ proposed for fluid flow in tubes. Kraussold's formula gives the closest agreement. R. B. C.

Detection of neutralised milk. M. R. Baetslé (Lait, 1937, **17**, 141—147).—10 ml. of milk are ashed and PO_4''' is pptd. either as $Ca_3(PO_4)_2$ or as $MgNH_4PO_4$. The Na in filtrate + washings (conc. to 5 ml.) is pptd. as the Na Mg U acetate (Na = wt. of ppt. × 0·01495). Average milk (10 ml.) gives 0·28 g. of ppt., but addition of 0·5 g. of Na_2CO_3 per litre gives 0·43 and of 1·0 g. per litre 0·57 g. of ppt. The method does not allow for variation in the Na content of milk. W. L. D.

Detection of pectin in milk products. E. Letzig (Z. Unters. Lebensm., 1936, **72**, 312—319).—Pectin in milk and cream is detected by the abnormally high η of the serum. In "quark" and cheese η of the serum may in any case be high, and pectin is detected by determination of η before and after treatment with pectase. E. C. S.

Improvement of metallic surfaces for milk and food manufacture by the use of aluminium and its alloys. W. Hahn (Milch. Zentr., 1937, **66**, 24—26).—The advantages of using Al sheets and castings for fabricating milk and for food-processing and manufacturing plant are discussed. Some results of work on the treatment of the Al surface to give greater stability to corrosion are given. W. L. D.

Packing of [dried] milk products. T. Baumgärtel (Milch. Zentr., 1936, **65**, 361—369).—A review of the properties of materials, mainly of the paper or pulp type, lately introduced as packaging material. W. L. D.

Problems of milk distribution. J. T. Quinton (J. Roy. San. Inst., 1937, **57**, 478—483).—Regulations governing the production of milk are described. Grades of milk are discussed. W. L. D.

Milk-bottle cleaning. E. O. Rounsfell (Dairy Ind., 1937, **2**, 66—67).—The nature of the residue on milk bottles, the choice of a detergent, the val. and modification of NaOH, and the bactericidal aspect of the use of detergents are discussed. W. L. D.

New detergent for milk bottles. Anon. (Milk Ind., 1937, **17**, No. 8, 47—48).—To avoid bloom on milk bottles by the action of NaOH, addition of small amounts of $(NaPO_3)_6$ to caustic alkali protects glass and forms sol., non-scaling complexes with the $CaCO_3$ and $MgCO_3$ of hard H_2O. Bacteriological and scale-prevention tests are described. W. L. D.

Sterilisation of bottled and canned cream. Anon. (Dairy Ind., 1937, **2**, 55—57).—Difficulties encountered in cream sterilisation are outlined. Examples of time–temp. sterilising combinations for different wts. of cans and bottles are given. W. L. D.

Laboratory control in ice-cream manufacture. L. E. Humphriss (Dairy Ind., 1937, **2**, 81—83).—The chemical and bacteriological control of the ingredients are described. The determination of η and γ, the control of overrun, and the examination of refrigerating liquids are discussed. W. L. D.

Ice-cream defects. C. D. Dahle (Dairy Ind., 1937, **2**, 77—78).—Defects in flavour, body, and texture, and methods to overcome them, are described. W. L. D.

Separation of serum in coffee cream. L. H. Burgwald and J. L. Mooney (Milk Dealer, 1937, **26**, No. 4, 40—42, 54—62).—Excessive separation of serum in pasteurised coffee cream is favoured by a low pasteurisation temp., a low temp. of separation of cream from milk, high creaming temp., excess of Ca salts, and agitation of cream at warm temp. The amount of separation is decreased by the use of high pasteurisation temp., which also reduces the sol. $Ca^{\cdot\cdot}$, a high temp. of cream separation from milk, and a low creaming temp. W. L. D.

Effect on the constants of butter [fat] of feeding a cow with coconut meal [and kohlrabi]. S. Schmidt-Nielsen and A. Astal (Kong. Norske Vidensk. Selsk. Forh., 1936, **9**, No. 15, 54—57).—Butter fat from a cow fed on a diet rich (about 56%) in kohlrabi showed high Polenske (3·7) and sap. vals. (240·3), which were scarcely affected by administering coconut meal (about 10·4%) in place of barley and other oilseed meal, although this change in the food lowered the Reichert–Meissl val. (from 32·4 to 26·3), the *B* val. (from 53·5 to 28—29), and the I val. (from 29·1 to 23·2) within 16 days. The *A* val. fell from 11·4 to 9·55. On withdrawing the meal, the figures fairly soon returned to normal. On subsequently replacing the kohlrabi with A.I.V. fodder, a butter fat having sap. val. 233, Reichert–Meissl val. 25·4, Polenske val. 2·8, *B* val. 30·6, and I val. 32·0 was obtained. E. L.

Surface and tallowy flavours of butter. F. W. Bouska (Food Ind., 1935, **7**, 381).—Surface oxidation producing " surface " or tallowy flavours is accelerated by O_2, Fe, Cu, low acidity, and high storage temp. Ch. Abs. (*p*)

Surface flavour in butter. W. H. Sproule and F. W. Hamilton (Canad. Dairy & Ice Cream J., 1937, **16**, No. 2, 19—21).—Cheesy or putrid surface flavour is due to *B. fluorescens liquefaciens* working in conjunction with other types present in contaminated H_2O supplies. Treatment of the H_2O used for butter washing either by filtration or chlorination (5—10 p.p.m. of Cl_2) overcomes the problem. W. L. D.

Surface moulding of butter. T. R. Vernon (Dairy Ind., 1937, **2**, 63—65).—Moulds causing surface discoloration are described. The mode of contamination and methods of control are discussed. W. L. D.

Storage of butter at 0°. S. Shepard and H. C. Olson (Nat. Butter and Cheese J., 1935, **26**, No. 18, 18—22).—Bacterial nos. in salted butter decrease and those of fresh butter increase at 0°. Flavour of salted butter deteriorated more slowly than that of fresh butter under these conditions. Ch. Abs. (*p*)

Keeping quality of butter. O. R. Overman (Nat. Butter and Cheese J., 1936, **27**, No. 24, 6—7).—Investigations on 36 butters showed that chemical and physical data and induction periods and rates of butter fat oxidation are not correlative with keeping quality. The type of neutraliser used to lower cream acidity to a standard level had no effect on keeping quality. Sweet cream butter stored better than that from cream ripened with starter, and butter from low-acid creams stored better than that from high-acid creams. Over-neutralisation gave low storage qualities. On the whole, unsalted butter kept better than salted. W. L. D.

Butter of good keeping quality. J. A. Nelson (Nat. Butter and Cheese J., 1936, **27**, No. 23, 36—37).—Creamery equipment, handling of the cream, pasteurisation after neutralisation to p_H 6·7—6·8, churning, and care after churning so as to obtain butter of low yeast and mould count and of good keeping quality are described. W. L. D.

Aluminium foil as butter wrapping material. R. Görnandt (Milch. Zentr., 1937, **66**, 26—28).—Butter wrapped in Al foil and exposed to direct sunlight and to diffused light at room and cold temp. preserved its taste and colour better than the same sample of butter wrapped in vegetable parchment. Other advantages of metal-foil packings are discussed. W. L. D.

Effect of silage on quality of dairy products. S. Bjerre (Vort Landbeng, 1934, **53**, 155—157, 169—171; Bied. Zentr., 1935, **A**, **6**, 216—217).—Feeding silage produced deeper-coloured milk and harder butter. The I val. of Danish butter fat varies between 30·4 (Dec.) and 40·0 (Aug.). The suitability of a ration may be judged by its influence on the I val. of the butter. A. G. P.

Dairy bacteriology. IV. Types of bacteria in milk and its products. J. G. Davis (Dairy Ind., 1937, **2**, 59—62).—The classification into groups and the description of bacteria found in milk etc. are given. W. L. D.

Analyses of dairy products. W. L. Davies (Dairy Ind., 1937, **2**, 49—54).—Presumptive standards of composition are tabulated and the val. of quick methods of analysis in the manufacture of milk products is discussed. Various empirical and accurate methods are described. W. L. D.

Cheese from pasteurised milk. S. L. Tuckey (Nat. Butter and Cheese J., 1936, **27**, No. 23, 22—26).—Pasteurisation of milk for Cheddar cheese-making produces greater uniformity of quality, but a longer ripening period is required for flavour development. W. L. D.

Chemical causes of deterioration of food fats. K. Täufel (Z. Unters. Lebensm., 1936, **72**, 287—299).—A review. E. C. S.

Production of caffeine-free coffee. W. Roselius (Chem.-Ztg., 1937, **61**, 153—155).—A review.

Rapid differentiation of ordinary and caffein-free coffee. C. Griebel (Z. Unters. Lebensm., 1936, **72**, 354; cf. B., 1936, 1066).—An arithmetical error is corr. E. C. S.

Coffee staling unpreventable. R. O. Bengis (Food Ind., 1935, **7**, 490).—Oil from freshly roasted coffee contained substances imparting the odour and flavour. These substances are complex, volatile, and easily oxidised. Oil from stale coffee is rancid in flavour, and absorbed less O_2 than that from fresh samples. O_2 absorption continues slowly in vac.-filled and sealed tins. Ch. Abs. (*p*)

Standardisation of products of animal origin. J. S. Fernandes (Bol. Min. Agric. Brasil., 1936, **25**, 81—90).—Definitions and specifications are given. L. A. O'N.

Fish as food. A. G. van Veen (Geneesk. Tijds. Nederl.-Ind., 1936, **76**, 1230—1259).—The vitamin-*A*, -B_1, and -B_2 and protein contents of various types of fish food used in the East Indies are studied. The vitamin contents are usually high, but are completely destroyed by salting and drying, which leaves the protein content unchanged. S. C.

Physiological importance in nutrition of methods of preparation of foodstuffs. II. Influence of roasting of various vegetables. B. Bleyer, W. Diemair, F. Fischler, and K. Täufel [with F. Arnold] (Biochem. Z., 1936, **289**, 27—37; cf. A., 1936, 1415).—Roasting of plant foodstuffs liberates an amount of histamine-like bases (I), the amount of which is the greater the richer is the vegetable material in protein, and is the smaller the higher is the roasting temp. due to pyrogenic decomp. (I) was detected colorimetrically and by the biological test on guinea-pigs' intestines. The mechanism of formation of (I) is discussed and the liberation on roasting potato starch with ovalbumin, gelatin, histidine, and lecithin is investigated. P. W. C.

Storage of pollen from cultivated fruit trees. B. R. Nebel and M. L. Ruttle (J. Pomology, 1937, **14**, 347—359).—Temp. and humidity conditions suitable for storage are examined. A. G. P.

Removal of lead, arsenic, and fluorine [spray] residues [from apples]. E. Smith and A. L. Ryall (Idaho State Hort. Assoc. 39th Ann. Conv., 1934, 35—40).—Removal of Pb following simple Pb arsenate (I) sprays was unsatisfactory if the residue at harvest was 0·511 grain per lb., but satisfactory if it was 0·173 grain per lb. When early (I) spray was followed by nicotine–oil, corresponding vals. were 0·327 and 0·075 grain per lb. No cleaning process was satisfactory when cryolite–oil was used throughout the season. Acid washes removed As from fruit sprayed with Ca or Mn arsenate (II)–oil. Na silicate was unsuitable for removal of (II). Wetting agents were more effective than was oil when used in conjunction with acid in flood-type machines. Light mineral oil was superior to medium oil or kerosene emulsions in these machines. H_2SO_4 and HCl were equally effective in removing F residues. Ch. Abs. (*p*)

Chemical characteristics of New Zealand grapefruit. J. B. Hyatt (New Zealand J. Sci. Tech., 1936, **18**, 409—418).—The ratio total sol. solids (Brix)/acid in the juice increases as palatability improves and should be $\nless 5$ for table fruit. The sugar/acid ratio is a better index of quality. The pectin content of the fruit remains sufficiently high throughout the season for marmalade manufacture. The vitamin-*C* content is similar to that of grapefruit from other sources. A. G. P.

Acetylene *versus* ethylene for degreening citrus fruit. J. R. Winston (Citrus Ind., 1935, **16**, No. 9, 3, 7, 19; cf. B., 1935, 378).—At the same concn. C_2H_2 was slower in action than was C_2H_4, but its use was followed by slower decay and less likelihood of scald in the stored fruit. Both gases impaired keeping quality. Ch. Abs. (*p*)

Refrigerated gas-storage of fruit. F. Kidd and C. West (J. Pomology, 1937, **14**, 299—316).—A review of recent work. A. G. P.

Food fumigation with ethylene oxide. R. S. McBride (Food Ind., 1935, 7, 370—372).—Conditions suitable for fumigation with $(CH_2)_2O$–CO_2 (1 : 9) are described. Costs are recorded. Ch. Abs. (*p*)

Fumigating foods with hydrogen cyanide gas. O. T. Lorenz (Food Ind., 1935, 7, 474—476).—Indian meal moth, Mediterranean flour moth, and fig moth were controlled by use of 8 oz. of HCN per 480 cu. ft. in 2 hr. HCN absorbed by dates and other food was unsufficient to involve risk to health. Ch. Abs. (*p*)

Scheme for separation and determination of metallic impurities in foodstuffs. J. H. Hamence (Analyst, 1937, **62**, 18—23).—A solution is prepared by combustion with H_2SO_4 or by cooling and dissolving in aq. HCl. Bi, Pb, Zn, and Cu are pptd. with H_2S at p_H 8 in presence of $FeSO_4$, Sn remaining in solution. Pb and Bi are pptd. from the aq. HNO_3 solution of the sulphides by excess of aq. NH_3 in presence of $(NH_4)_2SO_4$, Cu and Zn remaining in solution. The metals are determined, in the fractions so obtained, by existing methods. E. C. S.

Comparison of nutritive values of hazel-nut twigs and rye straw for milch cows and sheep. P. Rauschenbach (Arb. Moskau. Zoötechn. Inst., 1934, **1**, 79—84; Bied. Zentr., 1935, **A**, **6**, 196).—No harmful effects on milk quality were attributable to feeding the twigs in a mixed ration. Electro-heating improved the digestibility of rye straw but not of twigs. A. G. P.

Nutritive value of soya-bean silage. W. Liebscher and K. Liebscher (Landeskult. Wien, 1934, **1**, 214—217; Bied. Zentr., 1935, **A**, **6**, 199).—Feeding-trials with sheep are recorded. The starch equiv. of the material (26% of dry matter) is 11·1, or 13·1 if amides are included as energy sources. The digestible crude and true protein vals. were 3·12 and 1·02% respectively. A. G. P.

Hay from Jerusalem artichoke as a fodder. M. Anischenko (Probleme der Tierzucht, 1934, **5**, 131—132; Bied. Zentr., 1935, **A**, **6**, 196).—Analyses and nutrient vals. are recorded. The fodder had no ill effects on milk yields. A. G. P.

Determining hull content of castor-bean meal. M. Sokolova and Z. Korpus (Trud. VNIIZh, 1934, No. 2, 77—81).—The customary aq. NH_3 process is inapplicable to this meal. The sample is heated with aq. NaOH (*d* 1·007) at 45°; this suspends or dissolves all but the hulls, which can then be separated. Ch. Abs. (*p*)

Determination of moisture in oil seeds. Tzonev and Kochanevski (Maslob. Shir. Delo, 1934, No. 2, 22—23).—A conductivity method is described. Ch. Abs. (*p*)

Rapid determination of moisture in oil seeds and cake. S. Kozlov (Trud. VNIIZh, 1934, No. 2, 63—69).—A modified Dean and Stark method is described. Kerosene, b.p. 250—300°, is used as the heating medium. Ch. Abs. (*p*)

Use of castor cake for pig-feeding. E. Petrosjan and V. Ponomarev (Schweinezucht, 1934, **4**, 33; Bied. Zentr., 1935, **A**, **6**, 200).—Cooking the cake for 1—2 hr. removed the toxic principle. The product was then suitable for feeding young pigs. A. G. P.

Lucerne meal and green lucerne for pig-feeding. J. Jespersen and F. H. Petersen (Beretn. Forsøgslab. Kopenhagen, 1935, No. 161; Bied. Zentr., 1936, **A**, **6**, 212).—Replacement of cereal by green lucerne in pig feeds (to make 4—12% of the ration) improved growth and lowered the total food consumption without affecting slaughter-house loss or firmness of carcase fat. Bacon quality was improved. A. G. P.

Relation of the carotene content of certain feed materials to their vitamin-*A* potency. G. S. Fraps, R. Treichler, and A. R. Kemmerer (J. Agric. Res., 1936, **53**, 713—716).—The vitamin-*A* potency of lucerne and of peanut hay was substantially the same whether measured in terms of Sherman units or of carotene content. A. G. P.

Composition and feeding value of heather at different periods of the year. B. Thomas (J. Min. Agric., 1937, **43**, 1050—1055).—Analyses of samples drawn over the period June—January are recorded. Crude protein is max. in June and declines subsequently, although even in January vals. are not markedly low. With increasing time after burning (3—7 years) vals. decrease somewhat, but the autumn decline becomes much less marked. Crude fibre shows small seasonal variations, and vals. tend to reach min. in January. A. G. P.

Effect of storage on vitamin-*A* content of lucerne hay. M. C. Smith (J. Agric. Res., 1936, **53**, 681—684).—Lucerne hay stored from Aug. to Dec. lost 50% of its vitamin-*A*. Further losses ceased during the winter, but recommenced with rising spring temp. After 1 year the -*A* content was 25% of its original val. A. G. P.

Silage. E. F. Möller (Arch. exp. Path. Pharm., 1936, **184**, 90—91).—The optimum temp. for strains of *Bacterium acetylcholini* isolated from mixed maize and sunflower silage was 30—35°. Strains with lower optimum temp. were not detected. P. W. C.

Peptisation of hemp proteins by sodium salicylate. A. P. Saltschinkin (Kolloid. Shurn., 1936, **2**, 157—161).—Flour of hemp seeds is twice warmed with an equal wt. of 7—8% Na salicylate. The yield of globulin is about 28% of the total protein. J. J. B.

Influence of feeding-stuffs on colour etc. of flesh of cattle. V. Steensberg (Beretn. Forsøgslab. Kopenhagen, 1935, No. 159; Bied. Zentr., 1936, **A**, **6**, 212).—Grass, clover, lucerne, and Fe-rich foods tended to produce darker flesh. Swedes produced more yellow fat than did turnips or potatoes; grass, clover, and lucerne still further increased the colour of the fat. The colour of both flesh and fat tended to become darker with age. A. G. P.

Manuring with calcium cyanamide and risk of injury to grazing animals. W. Makkus and W. Hundhammer (Deuts. landw. Presse, **62**, 126; Bied. Zentr., 1935, **A**, **6**, 209—210).—No injury was apparent. A. G. P.

Feeding castor cake to poultry. I. T. Masliev and N. A. Rogov (Probleme der Tierzucht, 1934, **6**, 140—142; Bied. Zentr., 1935, **A**, **6**, 195).—Castor cake in amounts $\ngtr 10\%$ of the ration had no toxic effects on hens and caused only a small decrease in the no. of eggs laid. A. G. P.

Substitution of potato flakes for crushed grain for laying hens. Wettlegehoff Metgethen (Kartoffel, 1934, **14**, 122—124; Bied. Zentr., 1935, **A**, **6**, 198).—The substitution had no ill effects on health or egg yield. A. G. P.

Preparation of fodder protein, in the form of dried wash, in agricultural potato distilleries and potato-drying plants. E. Lühder (Z. Spiritusind., 1937, **60**, 43—44, 46).—The possibility of enriching the wash at the expense of EtOH yield is shown. Processes for drying distillery wash are indicated, with special reference to the filtration process of Lampe, whereby 75% of the wash-protein remains in the residue, this residue only being dried. The application of such a process to distillery plants of varying size is discussed, and the advantages of co-operation with potato-drying plants are shown. I. A. P.

Lanital.—See V. **Corrosion problems [and foodstuffs].**—See X. **Ultra-violet radiation.**—See XI. **Margarine. Analysis of foods. Aq. emulsions of fats. Antioxidants for fish oils.**—See XII. **Jerusalem artichokes.**—See XVII. **Barley varieties. Prep. of baker's yeast.**—See XVIII. **Lecithin and lutein from eggs.**—See XX.

See also A., III, 97, **Activity of proteinases in flour.** 104—5, **Vitamins.** 107, **Nutritive val. of papaya.**

Patents.

Manufacture of baked goods [bread]. A. Schultz and C. N. Frey, Assrs. to Standard Brands, Inc. (U.S.P. 2,032,442, 3.3.36. Appl., 23.12.33).—The crust of bread is improved by baking in a steam atm. containing a small amount of NH_3. A. R. P.

Bread cooling and treating. J. O. Farrer. From W. L. Fleisher (B.P. 459,829, 16.5.36).—The bread is cooled to 50—60°/1 atm., at which point the cell walls are strong enough to resist vac.; cooling to 32° is continued under a 28-in. vac., and during this period material such as vitamins may be introduced by hypodermic syringes. B. M. V.

Shortening [in foodstuffs]. Industrial Patents Corp., Assees. of L. C. Brown, D. P. Grettie, and R. C. Newton (B.P. 458,581—2, 5.3.35. U.S., [A] 20.9.34, [B] 30.11.34. Addns. to B.P. 413,343;

B., 1934, 906).—Mono- and/or di-acid glycerides for improving the creaming qualities of shortening, as claimed previously, are preferably prepared from hydrogenated soya-bean or sesamé oil. The additions (5%) then serve also to improve the resistance of the shortenings to rancidity. [Stat. refs.] E. B. H.

Drying of milk, milk products, and milk mixtures. Cow & Gate, Ltd., W. R. B. St. J. Gates, and J. Tavroges (B.P. 460,588, 31.7.35).—Certain milk products (*e.g.*, whey) do not dry readily on roller dryers. Addition of protein (I) (casein) in amounts such that the final product contains $\nless 25\%$ of (I) simplifies the drying process. E. B. H.

Bacterial milk products. L. K. Mobley (B.P. 460,972, 6.8.35. U.S., 4.8.34).—A fermented milk of low acidity is prepared by inoculating milk, containing 1% of added whole-milk powder and 0·5% of gelatin, with 7% of a mixed culture containing *Lactobacillus acidophilus* and *Streptococcus thermophilus*, incubating for 4 hr. at 40°, and storing for 24 hr. in an ice box. The organisms used are acclimatised to 40° separately and then propagated as a mixed culture. E. B. H.

Milk-pasteurising assembly. C. F. Vining (U.S.P. 2,035,732, 31.3.36. Appl., 12.3.34).—The arm of an agitator is electrically bonded to the container to prevent electrolytic currents passing through the milk. B. M. V.

Pasteurising of cream. R. C. Simonds (U.S.P. 2,035,842, 31.3.36. Appl., 18.7.33).—Cream is passed in a relatively shallow layer along a perforated false bottom of a vessel, and steam at suitably graded temp. is blown through the perforations under such conditions of back-pressure in the vessel that the jets are broken up before they reach the upper surface of the cream. B. M. V.

Manufacture of ice cream and similar comestible products. H. J. Fitzpatrick. From Enkes Naaml. Venn. (B.P. 457,717, 14.12.35).—Ice cream is frozen by the evaporation of NH_3 or other liquid which is supplied at a temp. > f.p., *e.g.*, at room temp. When the ice cream reaches a certain plasticity the conduit to the exhaustion means is closed and more liquid NH_3 allowed to enter, thus slightly raising the wall temp. B. M. V.

Manufacture of articles of food or confectionery. J. W. Todd, and Rowntree & Co., Ltd. (B.P. 459,582—3, 11.7.35).—The products consist of a fatty medium, molten above 32°, *e.g.*, cacao butter, containing cocoa, sugar, milk, etc., *e.g.*, chocolate, given a cellular structure by incorporating air bubbles in the melted mix, and setting it off by chilling it under reduced pressure, the bubbles expanding to give discrete spherical cavities. Nuts, raisins, etc. may also be included. E. B. H.

(A) **Comminuting apparatus.** (B) **Comminuting and washing flesh.** Ges. zur Verwertung Fauth'scher Patente m.b.H. (B.P. 458,975—6, 20.3.36. Ger., [A, B] 20.3.35 and [A] 7.12.35).—(A) For bones, blubber, or flesh of whales, also hard oil-containing fruits, a no. of circular-saw discs are assembled with distance pieces on a shaft, about 1 blade in every 6 being of larger diameter than the rest; the teeth of the smaller blades are also staggered a fraction ($\frac{1}{5}$) of a pitch. The co-acting stationary knives are radial and are situated at the lower part of a feed hopper. (B) Apparatus is claimed. B. M. V.

Solid seasoning composition containing lecithin. C. L. Griffith and L. A. Hall, Assrs. to Griffith Labs., Inc. (U.S.P. 2,032,612, 3.3.36. Appl., 16.6.34).—The use of lecithin and (*a*) mild alkali [MgO, $CaCO_3$, $Mg(OH)_2$], (*b*) free amine [commercial $N(C_2H_4{\cdot}OH)_3$], or (*c*) buffer salt (strong base, weak acid) is proposed to reduce bleaching in oleoresins of capsicum–essential oils–salt mixtures. E. B. H.

Drying of coffee beans. J. and H. Bueb (B.P. 460,697, 6.7.36. Ger., 4.3.36).—The beans, spread in a single layer on screens, are dried by the sun or by hot air, and turned at intervals. E. B. H.

Preparation of soya beans for consumption. A. H. Stevens. From A. E. Staley Manufg. Co. (B.P. 460,811, 23.12.35).—The H_2O content is increased to $\nless 20\%$ and the beans are heated for a short time at approx. 160°. Drying is completed at $\ngtr 100^\circ$. E. B. H.

Drying or conditioning apparatus [for tea]. Brooke Bond & Co., Ltd. From F. Walker (B.P. 460,891, 31.7.35).

Spray dryer. Aërating cake mixtures etc. Emulsification [of mayonnaise]. Treating liquids [albumin etc.]. Determining p_H [of milk etc.]. Sediment detection [in milk]. Separators.—See I. **Determining temp. and content of O_2 and CO_2 [in gas stoves for fruit].**—See XI. **Cacao butter. Dehydrating materials.**—See XII.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Pyroxylin and pharmaceutical collodions. H. Berry and L. G. Goodwin (Pharm. J., 1937, **138**, 193).—The B.-P. standards are discussed. It is recommended that an upper limit for the η of 3% solutions of pyroxylin in $COMe_2$ be fixed at 7 poises. The η falls quickly when pyroxylin is boiled with H_2O and the following procedure is suggested for the prep. of standard samples (11·8—12·2% N; 3% solution in $COMe_2$, $\eta >3$ poises): 10 g. of absorbent cotton are immersed in a mixture of 100 ml. each of HNO_3 and H_2SO_4 at room temp. and, after puddling for 10 min. (at 10—15°), the mixture is kept for 50 min. The product is removed, pressed, drained, and thrown into 5 litres of H_2O. After washing free from acid it is boiled for 3 periods of 1 hr. with changes of H_2O and then rinsed, drained, and dried. E. H. S.

Scientific methods of manufacture in the preparation of biological medicaments. A. Kuhn (Chem.-Ztg., 1937, **61**, 125—128).—A descriptive account. E. A. H. R.

Ambergris. S. Schmidt-Nielsen and A. Flood (Kong. Norske Vidensk. Selsk., Forh., 1936, **9**, No. 2, 5—8).—A specimen of ambergris (I) found near Torget Is. showed evenly white-speckled surfaces on fracture with no sign of rings or other well-defined macro-structure. The specimen did not comply with ordinary pharmaceutical requirements as regards appearance or odour and yielded only 0·65% of a not unpleasant-smelling oil on steam-distillation. Various portions contained 1·5—5% of EtOH-insol. matter (a brown powder containing remains of crustacea, Cu, N, P, and Ca). The remaining EtOH-sol. matter (from which an impure cryst. *substance* could be isolated) had n^{50} 1·5011, acid val. 1·1, sap. val. 17·1, I val. (Hübl) 125, Ac val. 12·1, C 83·03%, H 12·07%, N 0·05%, P nil. E. L.

History of the synthetic camphor industry in the United States. Anon. (Bull. Inst. Pin, 1936, 207—210).—World consumption and export figures are given for the period 1931—5. F. C. B. M.

Determination of rotenone in *Derris* root. C. D. V. Georgi and G. L. Teik (Malay. Agric. J., 1937, **25**, 23).—When the crude rotenone–CCl_4 complex obtained in this determination is triturated with EtOH, the amount of rotenone (I) recovered is stated to be 6% low owing to loss of (I) in the EtOH (determined polarimetrically). R. S. C.

Lecithin and lutein extracts of eggs for hypodermic use. G. Vita and L. Bragaloni (J. Pharm. Chim., 1936, [viii], **24**, 558—563).—A method of EtOH extraction, avoiding excessive temp., is described. R. F. P.

Determination of small quantities of nicotine by a silicotungstic acid micro-method. J. R. Spies (Ind. Eng. Chem. [Anal.], 1937, **9**, 46—47).—A micro-method (accuracy ±0·002 mg. on 0·1—0·5 mg.) employing pptn. as the silicotungstate (cf. Chapin, B., 1911, 1182) is described; on the microscale it is necessary to apply a correction for the solubility of nicotine in the acid solution (cf. A., 1937, I, 128). The ppt. should be ignited at 650°. E. L.

New machines for extraction of essential oils of acid fruits. P. Leone (Atti V Congr. Naz. Chim., 1936, **14**, 772—777).—Suitable plant is described. O. J. W.

Theory of distillation as applied to essential oils. X. Practical considerations. II. A. L. Bloomfield (Perf. Essent. Oil Rec., 1937, **28**, 59—63; cf. B., 1937, 287).—The technical production and fractionation of essential oils is discussed. E. H. S.

Toxicity of chelidonium oil, and its removal. B. Tiutiunnikov, A. Sobol, and J. Trotzki (Ukrain. Chem. J., 1936, **11**, 415—423).—The toxicity of the oil is due to an optically active resinous substance, destroyed by heating at 300° for 20 min., or by hydrogenation at 180°, and extracted by MeOH. R. T.

Standardisation of odour and flavour. Suggested plan. B. Heath (Perf. Essent. Oil Rec., 1937, **28**, 52—54).—A complete system for the classification of odours in terms of chemical substances is recommended, in which all pure odorous compounds are arranged in a few groups of similarity and then into sub-groups. A standard procedure for the examination of flavour and odour is discussed. E. H. S.

Skunk fat. Caper spurge-seed oil.—See XII.

See also A., I, 118, **Chemistry of sterols and sex hormones.** A., II, 82, **Determination of EtOH. Green-tea oil.** 88, **Poly-membered, cyclic amines.** 90, ***N*-Methylamides of fatty acids.** 98, **Pentenyl-, hexenyl-, and heptenyl-resorcinols.** 99, **Tetrahydronaphthalene derivatives with basic side-chains.** 100, **Antirachitic substances from tunny-liver oil. α-Follicular hormone.** 105, **Corticosterone.** 109, **Sulphonic acids of terpenes etc.** 112, **Synthetic plant-growth hormones.** 118, **Detection of barbituric acids.** 123, **Nupercaine analogues.** 125—7, **Alkaloids.** 130, **Microdetermination of menthol, menthone, and menthyl ester and of oil of *Mentha*. Detection of barbiturates.** A., III, 86, **Testing therapeutic sera. Purifying diphtheria etc. toxins and antitoxins. Standardising typhoid and paratyphoid vaccines. Purifying tuberculin.** 100, **Tobacco mosaic virus.** 102, **Isolation of pregnandiol. Colorimetric determination of sex hormones.** 104—5, **Vitamins.**

Patents.

Treatment and preservation of blood for medicinal purposes. J. S. Wilson (B.P. 459,951, 18.6.35).—Blood, withdrawn from an animal under conditions maintained as sterile as is possible, is defibrinated, sterilised, chilled at ≯17°, and then mixed with a preservative, *e.g.*, EtOH. Flavouring and/or colouring agents, or tonic substances, *e.g.*, Fe NH_4 citrate, may be added. E. H. S.

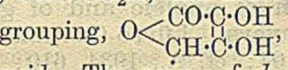
Substances adapted to decrease blood-pressure. E. L. W. Byrne. From C. L. Holtman (B.P. 460,137, 15.4.35).—Urine, or a suitable fraction, is boiled, previous to, during, or after treatment by concn. or separation methods normally used for recovering hormones that are insol. in the solvents used for extracting lipins from urine or the like; *e.g.*, urine is boiled, evaporated, and the residue, after washing with Et_2O and EtOH, is dissolved in H_2O and treated with MeOH. The ppt. is separated, washed with Et_2O, and dried. E. H. S.

Manufacture of a stable product therapeutically useful in relation to bleeding. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 460,193, 19.7. and 4.12.35).—The brains or spinal cords of mammals (preferably calves) are comminuted, triturated with sand, and extracted with a ≯10% solution of a salt [*e.g.*, NaCl, Na_2SO_4, $(NH_4)_2SO_4$, Na_2HPO_4, or $CaCl_2$] or a solution of a H_2O-miscible solvent (*e.g.*, 50% MeOH or EtOH). The extract is sterilised and evaporated in vac. Prior to evaporation the coagulable protein may be pptd. by heating to 80° or addition of a H_2O-miscible solvent or conc. salt solution. Treatment of the extract with a larger amount of a H_2O-miscible solvent (MeOH, $COMe_2$, dioxan, C_5H_5N) ppts. the active principle as well as the protein; the former is extracted from the ppt. by H_2O or a solution of a H_2O-miscible solvent; this conc. pure extract is then distilled in vac. and sterilised. The products are used to stop bleeding. R. S. C.

Manufacture of tissue-selective or specific healing agents. O. Kestner (B.P. 460,630, 29.7.35. Ger., 27.7.34).—The tissues or organs of animals which, preferably, have been completely bled and washed out with physiological saline to eliminate species-sp. bodies, are disintegrated, *e.g.*, by slicing in the frozen condition, and the broken cellular matter is extracted with a saline solution. The extract is clarified and injected into an animal of different species, from which a serum is obtained in the usual manner. E. H. S.

Manufacture of medicated smoking goods. G. BOSCHÁN and C. FENYÖ (B.P. 459,942, 15.4.35. Hung., 14.4.34).—Leaves of plants other than tobacco, *e.g.*, mulberry, raspberry, freed from injurious substances, are coated with a sugar syrup in which is incorporated the active medicament, and then the leaves are converted into products suitable for smoking. E. H. S.

Manufacture of ascorbic acids. B. HELFERICH (B.P. 460,586, 30.7.35. Ger., 30.7.34).—Aldose sugars or aldononitriles or the Ac derivatives of the latter with esters, $CHO{\cdot}CO_2R$, and KCN give compounds with the grouping, $O<\begin{matrix}CO{\cdot}C{\cdot}OH\\ \| \\ \underset{\cdot}{C}H{\cdot}C{\cdot}OH\end{matrix}$, characteristic of ascorbic acid. The prep. of *d*-glucoheptoascorbic, $[\alpha]_D^{20}$ +4·4°, *d*-, m.p. 183—185°, $[\alpha]_D^{20}$ −40·2° in MeOH, and *l*-ascorbic acid, m.p. 189—190°, $[\alpha]_D^{20}$ +49° in MeOH, is described. R. S. C.



Separation of hydroxy-compounds of the *cyclo*pentanopolyhydrophenanthrene series. SCHERING–KAHLBAUM A.-G. (B.P. 459,759, 19.3.36. Ger., 19.3.35).—The use of saponins [digitonin (I)] as a selective precipitant (in EtOH) is claimed. *E.g.*, a solution of the mixed ketones, m.p. 130—136° (1·8), from male urine in 96% EtOH (50) is treated with (I) (10) in 96% EtOH (400 pts.); the ppt. on decomp. by boiling with xylene gives dehydroandosterone (II) (0·78 pt.), m.p. 146—148°, whilst the solution contains androsterone (III), m.p. 178° [excess of (I) is removed by adding Et_2O and extracting with H_2O]. Other examples describe the separation of *cis*- and *trans*-androstanediol [by (I)], and of (II) and (III) (by solanin). H. A. P.

Isomerisation of $\Delta^{5:6}$-dehydroandrosterone and compounds derived therefrom. A. G. BLOXAM. From SOC. CHEM. IND. IN BASLE (B.P. 460,610, 8.11.35).—*trans*-$\Delta^{5:6}$-Dehydroandrosterone and dry HCl–EtOH at 0° give the *hydrochloride*, m.p. 156·5—157°, converted by hot KOAc–EtOH into trans-$\Delta^{4:5}$-*dehydroandrosterone*, m.p. 129—130°. $\Delta^{5:6}$-Androstene-3 : 17-diol gives (NaOAc) the $\Delta^{4:5}$-*isomeride*, m.p. 158°. Analogous compounds and their derivatives are similarly isomerised. R. S. C.

Local anæsthetics. J. REGNIER (B.P. 460,629, 29.7.35. U.S., 3.8.34).—Formates, acetates, benzoates, and salicylates of anæsthetics of the cocaine type, particularly p-$NH_2{\cdot}C_6H_4{\cdot}CO{\cdot}O{\cdot}C_2H_4{\cdot}NMe_2$, at p_H 4 have improved penetrating power and anæsthetic power > that of the hydrochloride and withstand sterilisation better. They are prepared from the base and acid or the hydrochloride and K or Mg acetate, etc. R. S. C.

Organic mercury compounds. SCHERING–KAHLBAUM A.-G. (B.P. 459,462, 30.9.35. Ger., 29.9.34).—Hg salts, ethylenic compounds, and chloral (I) or bromal (preferably as hydrate) in an alcoholic solvent, ROH, give smoothly salts, $CHal_3{\cdot}CH(OR){\cdot}\underset{\cdot}{C}{\cdot}\overset{\cdot}{\underset{\cdot}{C}}{\cdot}HgX$. In the absence of a solvent salts with R = H are formed. The chloral semi-acetal may be used. Thus, passage of C_2H_4 into molten (I) (41·3) and $Hg(OAc)_2$ (15·9 g.) gives β-β′-*trichloro-α′-hydroxyethoxyethylmercuriacetate.* Passage of C_2H_4 into (I) (294), HgO (264), and $Hg(OAc)_2$ (256) in EtOH (92 g.) gives β-β′-*trichloro-α′-ethoxyethylmercuriacetate*; the corresponding nitrate is similarly prepared. $CCl_3{\cdot}CH(OH){\cdot}OMe$ [from (I) (294) and MeOH (64)], $Hg(OAc)_2$ (318), and HgO (236 pts.) give β-β′-*trichloro-α′-methoxyethylmercuriacetate.* Similar reactions afford β-β′-*trichloro-α′*-iso*prop*-, -n-*but*-, and -iso*amyl-oxyethyl*-, β-β′-*tribromo-α′-ethoxyethyl*-, β-β′-*trichloro-α′-ethoxy*-n-*propyl*-, and 2-β-*trichloro-α-ethoxy*cyclo*hexyl-mercuriacetate.* R. S. C.

Preparation of organic derivatives of antimony. G. M. DYSON, A. RENSHAW, and PARKE, DAVIS & CO. (B.P. 458,487, 17.6.35).—Aromatic stibinic acids containing a thiocarb-imido- or -amido-group are prepared by interaction of an aminoarylstibinic acid with a thiocarbonyl halide or with an arylthiocarbimide substituted by an (acid) salt-forming group (which may be AsO_3H_2). *E.g.*, interaction of aq. m-$NH_2{\cdot}C_6H_4{\cdot}SbO_3K_2$ with 1 : 3 : 5-$CO_2Me{\cdot}C_6H_3(NCS)_2$ followed by acidification gives the corresponding *bisthiocarbamide*, the *urea* salt of which is used for injection. Other examples are: 4- and 3-*carboxy*-s-*diphenylthiocarbamide-4′-stibinic acids*, s-*diphenylthiocarbamide*-4 : 4′-*distibinic acid*, 4-*arsino*-, 4-*hydroxy*-, and 4-*sulpho*-s-*diphenylthioamide-4′-stibinic acids*, and p-*thiocarbimidophenylstibinic acid* (p-$NH_2{\cdot}C_6H_4{\cdot}SbO_3H_2$ with $CSCl_2$ in 2N-HCl). H_2O-sol. salts of these acids can be made approx. neutral and when injected against kala azar and other parasitic infections are said to possess high activity and low toxicity. H. A. P.

Preparation of metal compounds of water-soluble keratin splitting [hydrolysis] products. R. VON WÜLFING and E. MÖLLER (J. A. WÜLFING) (B.P. 459,747, 30.1.36. Ger., 16.2.35).—Keratins (*e.g.*, human hair) are hydrolysed by inorg. acids (25% aq. HCl) until sol. or almost completely sol. in H_2O, preferably dialysed (without neutralisation), evaporated at low temp./vac. [after neutralisation with $Ba(OH)_2$ or $BaCO_3$ if H_2SO_4 is used for hydrolysis], and are treated with salts of Au, Ag, Hg, Pb, Bi, or Sb, sufficient in quantity to give a compound containing $\nless$5% Ag or its equiv. of other metal. The Bi salt ppts. immediately; the other salts are pptd. by EtOH or similar org. solvents after neutralisation with alkali (neutralisation is unnecessary in the case of Pb). The Au compounds are claimed to have a chemotherapeutic index of 1 : 100—400 (recurrent infection in white mice) and to be effective against streptococci and pneumococci. H. A. P.

Alkaloid of ergot. WELLCOME FOUNDATION, LTD., S. SMITH, and G. M. TIMMIS (B.P. 460,387, 27.12.35).—The isolation from ergot of a phenolic alkaloid, decomp. about 228°, $[\alpha]_{5461}^{20}$ +522°, $[\alpha]_D^{20}$ +420° in $CHCl_3$, is described (see A., 1936, 351). R. S. C.

(A) Production of hydroxyethyl*apo*quinine. (B) Cinchona alkaloid derivative. (A) C. L. Butler and L. H. Cretcher, (B) L. H. Cretcher, W. L. Nelson, C. L. Butler, and A. G. Renfrew, (A, B) Assrs. to Mellon Inst. of Industrial Res. (U.S.P. [A] 2,033,679 and [B] 2,033,514, 10.3.36. Appl., [A] 27.2.34, [B] 19.3.34).—A hydroxyethylating reagent, *e.g.*, $CH_2Cl\cdot CH_2\cdot OH$ (reaction described), $(OH\cdot C_2H_4)_2SO_4$, p-$C_6H_4Me\cdot SO_3\cdot C_2H_4\cdot OH$, etc., with the Na or K salt of the alkaloid in EtOH gives the β-*hydroxyethyl ether* of (A) *apo*quinine [*dihydrochloride*, m.p. about 228° (decomp.)] and (B) cinchona alkaloids generally containing a phenolic OH. (A, B) The prep. of *apo*quinine is modified. (B) Dihydrocupreine $CH_2\cdot CH_2\cdot OH$ ether, m.p. 105—112°, $[\alpha]_D^{23}$ −132·1° in EtOH [dihydrochloride, m.p. 234° (decomp.), $[\alpha]_D^{23}$ −128·5° in EtOH], gives a *benzoate* (*sulphate*, m.p. 228°, [α] −103·4° in H_2O). The compounds have therapeutic val. and low toxicity. R. S. C.

(A) *apo*Cupreine and *apo*cupreine derivatives. (B) Purification of *apo*cupreine. (A) L. H. Cretcher, C. L. Butler, and A. G. Renfrew, (B) B. L. Souther, C. L. Butler, and L. H. Cretcher, (A, B) Assrs. to Mellon Inst. of Industrial Res. (U.S.P. [A] 2,033,515 and [B] 2,033,555, 10.3.36. Appl., [A] 21.11.34, [B] 16.5.35).—(A) *apo*Cupreine (modified prep.) yields, best by crystallisation of the monohydrochloride, amorphous α-, decomp. 180—190°, $[\alpha]_D$ −215° (mono-, $[\alpha]_D$ −163°, and *di-hydrochloride*, $[\alpha]_D$ −223°; *Et ether dihydrochloride*, $[\alpha]_D$ −236° to −237°), and β-apo*cupreine*, decomp. 180—190°, $[\alpha]_D$ −196° to −197° (*mono-*, $[\alpha]_D$ −148°, and *di-hydrochloride*, $[\alpha]_D$ −205°), and gives an Et ether dihydrochloride, $[\alpha]_D$ −183° to −230°. (B) Crude *apo*cupreine is purified by pptn. of the impurities by Et_2O from its solution in EtOH and then has $[\alpha]_D$ −203° to −204°. It is probably a 1 : 1 mol. compound of the α- and β-substances. All [α] are in abs. EtOH. R. S. C.

[Enteric] coating for medical compound. H. L. Marriott. From Kelp-Ol Labs., Inc. (B.P. 461,317, 8.8.35).—See U.S.P. 2,011,587; B., 1936, 813.

Anæsthetics.—See III. **Seasoning composition.**—See XIX.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Mode of action of red and infra-red sensitisers. R. Mecke and G. Semerano (Z. wiss. Phot., 1937, **36**, 25—32).—Tests have been made with pinacyanol, rubrocyanine, and allocyanine (neocyanine); in neutral solution, even in the dark, these dyes ppt. Ag + Ag halide from $AgNO_3$ solution, quant. analysis showing that 1 mol. of Ag is pptd. per mol. of dye. In alkaline solution, however, further Ag is formed, perhaps due to saturation of the two double linkings in the polymethine chain. Dye solution shaken with AgCl is immediately adsorbed, but no reduction takes place in the dark; in the light, the dye is gradually decomposed (dissolution of the AgCl in aq. NH_3 restores remaining dye to solution for colorimetric determination) and Ag + Ag halide is pptd. as before. Thus the carbocyanine dyes show strong reducing power, and reproduction of photographic processes *in vitro* shows that the sensitising action of the dyes is a photochemical reaction of an unfast dye. The results are discussed in relation to the structural formulæ, especially the quinonoid N. J. L.

New synthetic [photographic ripening] retarding agent. A. Steigmann (Phot. Ind., 1937, **35**, 104).—"Retardamide" (I), a new *compound* of unknown constitution, shows a high power of retarding crystallisation (and hence ripening) in photographic emulsions on adding, *e.g.*, a 2% solution together with or after the second gelatin addition. (I) gives albumin reactions, without foaming; it also gives a ppt. with $AgNO_3$, sol. in acid or aq. NH_3, and shows a strong IN_3 reaction. (I) is prepared by heating H_2O 50 c.c., $CS(NH_2)_2$ 2 g., $CH_2Cl\cdot CO_2H$ 6 g., NaOH 6·5 g., and formalin 8 c.c. until a brown solution and flakes are formed; the ppt. is filtered off, dissolved in 50 c.c. of H_2O, and repptd. with $COMe_2$. J. L.

Isolation of nucleic and of grains in photographic layers. Lüppo-Cramer (Kolloid-Z., 1937, **78**, 100—104; cf. A., 1934, 610; B., 1935, 607).—Treatment of the latent image with acid and a developing agent, especially when the latter has been aged for a few days in a closed vessel, results in isolation of the nuclei, in consequence of which they become very susceptible to the action of oxidising or bromiding reagents. Certain dyes have a similar effect. The latter also produce isolation of AgBr grains by displacing gelatin from them, as a result of which plates so treated become heavily fogged on development. F. L. U.

Application of tartaric acid to preparation of blue-print paper. A. I. Stanischevski (Zavod. Lab., 1936, 5, 1141).—Paper is treated with a solution containing 15 ml. of 47% $FeCl_3$ solution, 100 g. of tartaric acid, 120 ml. of 20% aq. NH_3, 500 ml. of 10% $K_3Fe(CN)_6$, and 600 ml. of H_2O. R. T.

Stability of motion-picture films as determined by accelerated ageing. J. R. Hill and C. G. Weber (J. Res. Nat. Bur. Stand., 1936, **17**, 871—881).—The effect of ageing at 100° for several days has been studied on flexibility, wt., p_H when dissolved in $COMe_2$ and H_2O, Cu no., and η in $COMe_2$ solution of cellulose acetate (I) and nitrate (II) films. The stability of (I) is much > that of (II). (I) showed no change in p_H, but (II) became acid on ageing. η for (I) decreased by 2 and 9% after heating at 100° for 72 hr. and 30 days, respectively, whereas η for (II) decreased by 35 and 95%. (I) retained 50% of its folding-endurance after 150 days, as compared with complete loss of endurance by (II) in 10 days. Dry air has no effect on gelatin emulsions of (I), but with 95% R.H. some softening occurred and, with (II), discoloration. R. S. B.

Natural colour photographs and printing inks. W. Kühn (Farben-Chem., 1937, **8**, 45—48).—Photometric reflexion graphs obtained with red, blue, and green (I.G. 36, 62, 74, respectively) filters in three-colour, one-exposure cameras (Jos-Pé, Agfa, and Bermpohl) show that modern filters satisfactorily cover the visible spectrum in well-defined λ ranges. Similar curves for a series of trichromatic inks show that the yellow and red absorptions correspond with theoretical requirements, but available blue colours are deficient. S. M.

Chromatone: new method of making three-colour paper prints. C. Butement (Brit. J. Phot., 1937, **84**, 113—114).—Prints are made from a set of separation negatives on to stripping bromide paper. After development and fixing, the emulsions will float off their bases; after washing, each image is toned its appropriate colour, and they are then squeegeed down in turn on to white gelatin-coated paper, in register, and dried. Working details and formulæ of suitable toners are described. J. L.

Copying with the subtractive three-layer colour process. F. Leiber (Phot. Ind., 1937, **35**, 136—142).—The colour-rendering of the new Agfacolor film is examined by tests with single-colour filters; the absorption curves of the individual layers after exposure and development are also given. Whilst the first tests show apparently poor results, the film is still very good for pictorial purposes. The film yields reversal images which cannot be copied; the problem of copying is discussed. J. L.

Titration of gelatin suspensions.—See XV.

See also A., I, 110, **Photosensitising activity of white pigments.** 145, **Blackening of plates under influence of positive ions.** A., II, 121 and 124, **Cyanine dyes.** 122, **Optical sensitisers.**

Patents.

Sensitising photographic emulsions. J. D. Kendall (B.P. [A] 456,362 and [B] 456,419, 8.5.35).—(A) Bases, of which cyanine and pinaflavol dyes are the quaternary salts, possess strong sensitising properties, which differ from those of the salts. The 13 examples of sensitisers for AgCl and AgBr emulsions described include bases the salts of which belong to the pinaflavol, carbocyanine, and various simple cyanine types. *E.g.* 1-p-*dimethylaminostyrylbenzthiazole* (sensitising AgCl to 5600 A. with max. at 4800 A.), 2-(γ-2′-*quinolylpropenylidene*)-1 : 3 : 3-*trimethyl*-2 : 3-*dihydroindole* (sensitising Ag iodobromide to 7000 A. with max. at 6200 A.), and 1-(2′-*quinolylmethylene*-2-*methyl*-1 : 2-*dihydrobenzthiazole* (sensitising AgCl to 5900 A. with max. at 5200 A., or to 5600 A. with max. at 4700 A. and 5150 A., and AgBr to 5600 A. with max. at 4800 A. and 5100 A.). (B) The same applies to bases corresponding with the quaternary salts of B.P. 447,038 and 447,109 (B., 1936, 782), in which one or more $\colon CH\cdot$ groups linking the nuclei of cyanine or pinaflavol dyes have been replaced by one or more N atoms. The 14 examples described include 2 : 2′-*dithiazolylformamidine* (sensitising AgCl to 4550 A. with max. at 4220 A.), 2-p-*dimethylaminobenzylideneamino*-β-*naphthathiazole* (sensitising AgCl to 5400 A. with max. at 4500 A.), 2-(1′-*benzthiazolylimino*)-1-*methyl*-1 : 2-*dihydroquinoline* (sensitising AgCl to 4900 A. with max. at 4400 A.), and 2-(β-1′-*benzthiazolyliminoethylidene*)-1 : 3 : 3-*trimethyl*-2 : 3-*dihydroindole* (sensitising AgCl to 5300 A. with max. at 5000 A.). F. M. H.

Photographic developers. W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 459,665, 12.7.35).—The use as developers of aliphatic or heterocyclic compounds containing the group $\cdot CO\cdot CH(NH_2)\cdot$ or $\cdot C(OH)\colon C(NH_2)\cdot$ in which the N may be substituted (by acyl, alkyl, etc.), *e.g.*, $NH_2\cdot CHAc\cdot CO_2Et$, $NHBz\cdot CHAc\cdot CO_2Et$, aminopyrazolones, 3-aminophthalhydrazide, 3-amino-2-imino-4-ketotetrahydrothiophen, and α-aminotetronic acid, is claimed. In absence of > small quantities of sulphites coloured images may be formed; *e.g.*, the use of a solution of 4-amino-1-*p*-chlorophenyl-3-methyl-5-pyrazolone (5), Na_2SO_3 (5), and KBr (0·5) in H_2O (1000 pts.) gives a yellow print. H. A. P.

Photographic developers. F. E. E. Stockelbach (B.P. 460,481, 10.3.36).—Relatively stable, non-staining developers are prepared with the use of an alkyl-substituted pyrogallol containing three free OH groups, preferably the Et, Et_2, or Bu^{γ} derivative (I). (I) (m.p. 138—139·2°) is prepared by condensing pyrogallol with $Bu^{\gamma}OH$ by means of $ZnCl_2$, shaking out and crystallising from PhMe, and purifying by vac.-distillation. The new developers have high reduction potentials. J. L.

(A) **Photographic development.** (B) **Colour photography.** W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 460,580 and 460,599, [A] 29.7.35, [B] 27.7.35).—(A) The use as developers of *N*-hydroxyalkyl-*p*-phenylenediamines, *e.g.*, $p\text{-}NH_2\cdot C_6H_4\cdot N(CH_2\cdot CH_2\cdot OH)_2$, $2:1:5\text{-}NH_2\cdot C_6H_3Me\cdot NBu\cdot[CH_2]_2\cdot OH$ (?), $p\text{-}NH_2\cdot C_6H_4\cdot NEt\cdot[CH_2]_2\cdot OH$, is claimed. Coloured images are produced by addition of substances capable of forming dyes with the oxidation products of the developer, *e.g.*, dibromo-*o*-cresol. (B) Addition to the development bath in colour photography of *iso*oxazolones, *e.g.*, phenyl- or phenylenebis-*iso*oxazolone, is claimed to give red to blue-violet pictures. H. A. P.

Photographic printing. W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 460,653, 29.5.35).—For the production of coloured prints on multi-layer film, one intermediate film only is employed, on which the original component-colour negatives are first printed. This intermediate film may be a lenticular film or a multi-layer film used in conjunction with a multi-colour screen. Various methods of application of the methods are described. J. L.

[Transmission] photometer. A. Goudsmit and W. H. Summerson (U.S.P. 2,035,649, 31.3.36. Appl., 1.6.35).—Light from a single source is split into two beams by a prism and the beams pass downwards through fixed hollow plungers which are submerged less or more in cups of standard and sample (*e.g.*, turbid) liquids until the transmissions are equal, as indicated by photoelectric cells in the bottom of the cups. B. M. V.

Apparatus for photographic [daylight] development [of *X*-ray film-packs]. W. W. Groves. From I. G. Farbenind. A.-G. (B.P. 460,597, 1.8.35).

Photoluminescent glass.—See VIII.

XXII.—EXPLOSIVES; MATCHES.

Detonation of ammonium nitrate. P. Laffitte and A. Parisot (Compt. rend., 1936, **203**, 1516—

1518).—Pure NH_4NO_3 (I) cannot be completely detonated by Hg fulminate; addition of 1·5—2% of Mg, Al, or an aromatic NO_2-derivative gives complete detonation. Detonation velocities for mixtures of (I) with four other explosives are given; the extrapolated velocity for (I) is 1400—1500 m./sec. A. J. E. W.

Interferometric determination of potassium nitrate in black powder. V. Öhman and G. Laurent (Z. anal. Chem., 1936, **107**, 409—411).—7·5 g. of powder are extracted with boiling H_2O, and the solution is made up to 100 c.c. The solution so obtained is compared interferometrically with a standard aq. solution (5 g. of KNO_3 per 100 c.c.). J. S. A.

Application of the Lécorché–Jovinet test to the examination of modern powders containing centralite. M. Tonegutti and E. Brandimarte (Atti V Congr. Naz. Chim., 1936, **14**, 916—924).—The Lécorché–Jovinet test (cf. B., 1928, 656) is very satisfactory for investigating the keeping properties of smokeless powders containing centralite. O. J. W.

Stabilising power of various compounds compared by means of the tests of Taliani and of Thomas. M. Tonegutti (Atti V Congr. Naz. Chim., 1936, **14**, 899—915; cf. B., 1935, 288).—The stabilising action of various org. substances used in the manufacture of smokeless powders on nitrocellulose and nitroglycerol has been compared by means of these two tests. The Taliani test often gives contradictory results and is considered to be unsatisfactory. O. J. W.

Heat of explosion of pentaerythritol tetranitrate and of trimethylenetrinitroamine. M. Tonegutti (Atti V Congr. Naz. Chim., 1936, **14**, 887—898).—The heats of explosion of the two substances are 1466 and 1370 kg.-cal. per kg., respectively (referred to H_2O formed as liquid), compared with 875 kg.-cal. for $C_6H_2Me(NO_2)_3$. O. J. W.

Classification of permitted explosives. W. Payman (Colliery Eng., 1937, **14**, 21—23, 40—42).—The types and compositions of the various British explosives available are given. R. B. C.

Changes in the steel of guns eroded by firing. E. Piantanida (Atti V Congr. Naz. Chim., 1936, **14**, 831—846).—Photomicrographic investigation of the bore surfaces of two naval guns which had been eroded by firing showed that no chemical changes, *e.g.*, formation of carbides and nitrides, had occurred. The only change was the formation of a surface layer of martensite, which can be removed by suitable heating. O. J. W.

Comparative investigation of some mustard gas reactions. H. L. Ligtenberg (Pharm. Weekblad, 1937, **74**, 185—197).—A comparison is made of the reactions of mustard gas with NaI in presence of $CuSO_4$, $AuCl_3$ solution, H_2SeO_3 in H_2SO_4, $KMnO_4$, Me-red, and Sudan-red papers. The $AuCl_3$ reaction is most sensitive and is sp. A modified apparatus for use in the field (cf. B., 1937, 91) is described. S. C.

Reaction with gold chloride on mustard gas. D. H. Wester (Chem. Weekblad, 1937, **34**, 77).—The Obermiller $AuCl_3$ test for mustard gas (cf. B., 1937, 91) is three times more sensitive than the Dräger–Schroeter test. S. C.

Decontamination of streets and spaces contaminated with mustard gas. H. J. van Giffen and W. A. van Bronkhurst (Pharm. Weekblad, 1937, **74**, 102—116).—Methods using oxidising agents [bleaching powder, Caporit, chloroamines, various proprietary products, $KMnO_4$], H_2O, burning, and absorption are detailed. S. C.

Stability control of nitrocelluloses.—See V. **Explosion hazards with NH_4NO_3.**—See VII. **Pyroxylin and collodions.**—See XX.

See also A., I, 137, **Binary systems containing glyceryl trinitrate, and esters of nitric acid.**

Patents.

Priming mixtures. J. and J. Doerfer (U.S.P. 2,035,597, 31.3.36. Appl., 22.3.33).—A priming mixture for small arms comprises $KClO_3$ 48—53·3, $K_4Fe(CN)_6$ 36—33·3, and abrasive (glass) 16—13·3%, the residue being anticorrosive. B. M. V.

Gelatinous or semi-gelatinous blasting explosives. V. H. Williams, B. W. Foster, and Imperial Chem. Industries, Ltd. (B.P. 460,576, 26.7.35).—To improve the plasticity, as well as the safety when the explosives are used in fiery mines, 2—6% of a clay, *e.g.*, china clay or bentonite, with an absorbent capacity for nitroglycerin of about 60% may be incorporated in the composition without detriment to the O_2 val. of the product. W. J. W.

Container for [nitroglycerin] explosives. C. O. Rison, Assr. to Indian Territory Illuminating Oil Co. (U.S.P. 2,031,505, 18.2.36. Appl., 15.11.33).—The container is made of layers of paper bonded with a neutral or alkaline bakelite resin. A. R. P.

Centrifuge for nitration processes.—See I. **Storing explosive liquids.**—See II. **Gas masks.**—See XXIII.

XXIII.—SANITATION; WATER PURIFICATION.

Accident prevention in the chemical industry. Rheinfels (Chem. Fabr., 1937, **10**, 63—68).—A summary is given of a publication of the Berufsgenossenschaft der chemischen Industrie, in which numerous accidents are classified and discussed. Amongst occurrences mentioned is an explosion in a chimney stack of a H_2S–air mixture, and reference is made to the effect of a trace of Cl_2 in causing spontaneous decomp. of molten NH_4NO_3. C. I.

Atmospheric pollution. C. M. Opie (J. Roy. San. Inst., 1937, **57**, 437—447).—A review of the present position is made. W. L. D.

Thermoelectric method for determining [atmospheric] humidity. W. Bachmann (Arch. Hyg. Bakt., 1936, **117**, 139—143).—The current generated between a " dry " and a " wet " element is measured and the vals. at different air temp. and abs. humidity are used to calculate the R.H. W. L. D.

Tables and calculations for air conditioning. E. Kuster and H. Meixner (Arch. Hyg. Bakt., 1936, **117**, 158—178).—Tables, nomograms, and methods of calculation are given for the conditioning of the atm. of rooms at different temp. and R.H. W. L. D.

Rapid determination of lead in the atmosphere. G. C. Harrold, S. F. Meek, and F. R. Holden (J. Ind. Hyg., 1936, **18**, 724—732).—The colorimetric method employing diphenylthiocarbazone as reagent may be used for the rapid determination of 0·005—0·15 mg. of Pb with an accuracy of <3%. A. L.

Photo-electrical estimation of Konimeter dust spots. W. H. Walton (J. Ind. Hyg., 1936, **18**, 689—698).—The apparatus is described and allows the determination of 3 times the max. no. of particles that can be counted. For dusts of similar particle size the ratio of the light absorbed to the no. of particles is const. and independent of the nature of the material. A. L.

Extraction of hydrocyanic acid from the air of fumigated rooms. G. I. Voinilovitsch and L. K. Achrap (J. Appl. Chem. Russ., 1936, **9**, 1790—1799).—Neutral aq. $FeSO_4$ does not absorb HCN, but quant. absorption may be effected in alkaline $FeSO_4$ solutions. Milk-of-CaO absorbs 97% of the HCN. By passing HCN through saturated aq. NaOH, a solution containing up to 30% of NaCN may be obtained.

Disinfectants of the phenol series. H. Wentzel (Chem.-Ztg., 1937, **61**, 207—208).—A review.

Toxicity of thiocyanates. D. F. Murphy (Soap, 1937, **13**, No. 2, 96—98).—A review of existing data regarding the toxicity of Lethane 384 (*n*-butylcarbitol thiocyanate; cf. A., 1936, 890) indicates that this compound can be employed in insecticides without danger to human beings. L. D. G.

Packaging fly sprays in cans. R. V. Wilson (Soap, 1937, **13**, No. 2, 94—95; cf. B., 1936, 254).—Chemical and biological tests on pyrethrum fly sprays stored in differing types of commercial cans showed absence of deterioration during the periods of test (7 months at room temp. and 4 months at 36·7°, respectively). L. D. G.

Rat extermination. E. Savino (Folia biol., 1934, 168—172).—$BaCO_3$ is superior to sulphide-free As_2O_3. Best results in fumigation were obtained with KNO_3 30, S 42, sawdust 18, and sand 6. Ch. Abs. (*p*)

Taxonomy and biology of parasites of fur-bearing animals and methods of combating them. A. K. Schpringoltz-Schmidt (Bull. Far East. Branch Acad. Sci. U.S.S.R., 1935, **12**, 69—74).—Best control of *Trichodectidæ* spp. was obtained by dusting twice with $C_{10}H_8$ at 8—9-day intervals. Ch. Abs. (*p*)

Refuse collection and disposal. C. R. Moss (J. Roy. San. Inst., 1937, **57**, 448—456).—Methods of collection are enumerated and the merits of various forms of disposal are discussed. W. L. D.

Modern sewage purification. J. Smit (Chem. Weekblad, 1937, **34**, 139—146).—An account is given of modern tendencies in the treatment of sewage, particularly as regards the use of chemical as distinct from biological methods. S. C.

Symposium on chemical methods of treating sewage. (A) **British practice.** J. H. Garner. (B) **American practice.** H. H. Hendon. (C) **German practice.** K. Imhoff (Inst. Chem. Eng., Advance proof, Feb., 1937, 3—14, 15—27, 28).—(A) The rapid growth and subsequent decline of chemical pptn. for the present-day reliance on biological processes is reviewed. The use of chemicals for special sewage problems (*e.g.*, deodorisation and prevention of septicity by Cl_2, pptn. for difficult domestic sewage, CaO for sewage containing acid fermenting (brewery) wastes, and wool-grease separation) is discussed.

(B) Present rapid growth of chemical pptn. has a definite but limited place in sewage treatment (as an adjunct to simple sedimentation, in overloaded plants, seasonally, and for treatment of industrial wastes), and is not likely to displace the biological processes.

(C) Chemical pptn. followed the English practice and has now been generally abandoned except where biological methods are of little use, due to trade wastes, and where used seasonally to improve the effluent by simple sedimentation. O. M.

Determination of hardness of water after Blacher, and determination of calcium and magnesium. N. Gusev (Hydrochem. Mat., 1936, **9**, 25—33).—100 c.c. are freed from CO_3'' by titration with 0·1*N*-acid, using Me-red as indicator. Alcoholic alkali and then acid are added nearly to the neutral point, using phenolphthalein. 0·1*N*-K palmitate is then added until a deep pink is obtained which does not vanish in 1 min. The method is applied to determining Ca and Mg separately. (Cf. B., 1937, 92, 192.) R. S. B.

Determination of carbonate hardness [in water]. J. Bitskei (Z. anal. Chem., 1937, **108**, 18—21).—CO_2 is expelled by evaporating the H_2O to dryness with NaCl + H_3BO_3, using 0·2 g. of H_3BO_3 for each 5 c.c. of 0·1*N*-acid required for the final titration. The residue is dissolved in hot H_2O and titrated with 0·1*N*-HCl (to Me-red). J. S. A.

Estimation of correctness of water analysis results. P. Kaschinski (Hydrochem. Mat., 1936, **9**, 34—50).—A discussion of the errors in H_2O analysis. R. S. B.

[Removal of carbon dioxide from water by] the Magno process. (A) Magno-Werk. (B) L. Kaatz and H. E. Richter (Gas- u. Wasserfach, 1937, **80**, 107—109; cf. B., 1936, 910).—(A) The makers of "magno-mass" state that Kaatz and Richter's estimate of the comparative costs of their product and of $Ca(OH)_2$ (I) for removal of CO_2 from H_2O is unfair as the working efficiency of (I) is only 75% and prep. costs are not included. Further that "Magno-mass" also assists filtration and Fe removal.

(B) Kaatz and Richter state that the working efficiency of (I) is 85%, dispute statements as to market price of both materials, and doubt whether it is possible, as claimed, to ignite dolomite so as completely to decompose $MgCO_3$ without partial decomp. of $CaCO_3$. C. I.

Elimination of iron from water. S. S. Mindlin and P. J. Zeldovitsch (J. Chem. Ind. Russ., 1936, **13**, 1347—1349).—Fe is not pptd. at $p_H < 6$. The velocity of sedimentation, V, of $Fe(OH)_3$ (I) is at a max. at p_H 6·0—6·4; at higher p_H the suspended (I) is efficiently removed by filtration through sand. The nature of the alkali used for pptn. is immaterial. At $p_H < 6{\cdot}4$ the val. of V is unaffected by varying $[Al(OH)_3]$, but at p_H 6·4—7·0 $V \propto [Al(OH)_3]$. R. T.

Electro-osmotic purification of water. S. S. Baliasni (Mem. Inst. Chem. All-Ukrain. Acad. Sci., 1934, **1**, 119—123).—Small Fe–Si anodes with large concentric cylindrical cathodes and a silicate diaphragm are used. Ch. Abs. (*p*)

Chemical control of bathing-pool waters. G. Issoglio (Atti V Congr. Naz. Chim., 1936, **14**, 762—772).—The determination of active Cl (both free and combined) in the chlorinated waters is described. To obtain good disinfection the concn. of free active Cl should be maintained at about 0·2 mg. per litre and that of total active Cl about 0·5 mg. A pre-treatment of the H_2O with $Al_2(SO_4)_3$ and aq. NH_3 followed by filtration is desirable. O. J. W.

New materials for domestic water-pipes. H. Rodiek (Gas- u. Wasserfach, 1937, **80**, 88—91).—The most promising are steel (with protecting coatings on the internal surface), porcelain, glass, and artificial resin. A. R. Pe.

Ni alloys in H_2O-power plants.—See X. **Ultraviolet radiation.**—See XI. **Paints for H_2O-tank interiors.**—See XIII. **Decontamination of streets.** See XXII.

See also A., I, 148, **Iodometric determination of SO_4'' in natural waters. Determination of NH_3 in sea-H_2O.** 149, **Determination of Mg in natural waters.**

PATENTS.

Fumigant composition. H. Schrader and E. Bossert, Assrs. to Union Carbide & Carbon Corp. (U.S.P. 2,037,439, 14.4.36. Appl., 6.9.29. Ger., 11.9.28).—A non-inflammable fumigant is claimed consisting of alkylene (C_2H_4 or C_3H_6) oxides dissolved in liquid CO_2 under pressure. D. M. M.

Apparatus for detecting the presence of mercury vapour or other impurities in the atmosphere. Brit. Thomson-Houston Co., Ltd. (B.P. 460,835, 1.10.36. U.S., 1.10.35).—A film sensitised with Se and S is utilised, the sensivity being variable with the temp. The temp. is raised, the film illuminated, and the air thermo-siphonically circulated by an electric lamp at the base of a chimney-like device. B. M. V.

Absorbent material [for gas masks etc.]. J. Finn, jun., Assr. to E. D. Bullard Co. (U.S.P. 2,033,698, 3.10.36. Appl., 5.6.33).—The absorbent capacity of shredded redwood bark, bagasse, tan bark, etc. for toxic gases is improved by impregnation with an acid and/or an acid salt (50% H_2SO_4, $NaHSO_4$) for alkaline gases, or a base (aq. NaOH etc.) for acid gases, and drying at about 120°. Natural hæmatin, hæmatoxylin, etc. may also be added as logwood or tan bark extract with a non-corrosive reducing agent ($SnCl_2$). E. J. B.

Gas masks. C. F. Lumb (B.P. 458,403, 13.6.35).—The mask itself is a bag of regenerated cellulose (or derivative); the neck seal is an inflatable tube. B. M. V.

Settling tanks for sewage and the like. A. F. Burgess. From Link-Belt Co. (B.P. 460,568—9, 23.4.35).—(A) A scraper–conveyor operates radially on the bottom of a circular tank and rotates as a whole about the axis, conveying the sludge to suitable sumps, whence it may be removed through underground pipes or by a suction pipe attached to the conveyor frame. (B) The sumps are guarded by a grating rotating with the conveyor frame. B. M. V.

Plant for treating sewage and like liquids. Dorr Co., Inc. (B.P. 459,755, 12.3.36. U.S., 12.3.35).—A pair of clarifiers is arranged for parallel or series operation at will, a mechanical impelling and agitating device (construction described) being provided either before both clarifiers or between the two. B. M. V.

Clarifying of liquids and thickening of sludge or pulp, especially with reference to disposal of sewage. Dorr–Oliver Co., Ltd., and R. C. Gibbs (B.P. 457,756, 1.3.35).—Prior to entering a thickener in an undisturbed horizontal stream the sewage is subjected to admixture with a flocculating agent followed by gentle agitation by paddles. The thickener bottom is provided with a central well in which final thickening takes place, aided by rakes of the paling type. B. M. V.

Apparatus for digestion of sewage sludge and like organic matter. Dorr–Oliver Co., Ltd., and R. C. Gibbs (B.P. 458,177, 12.3.35).—The agitator is of the picket-fence type and is constructed of tubes carrying heating medium, the supply and exhaust pipes for which are carried by a central pier. On this pier (which is surrounded by an annular floating cover) is also the mechanism for rotation. B. M. V.

Treatment of sewage. H. J. Darcey (U.S.P. 2,034,460, 17.3.36. Appl., 18.7.32).—Finely-divided Fe is treated with Cl_2–H_2O and the reaction product immediately mixed into the sewage. Previous or subsequent treatment may comprise addition of NH_3 equiv. to the H_2S present, and a final treatment with HOCl is recommended. B. M. V.

[Coloured] deodorant blocks for disinfecting water-closets, basins, and the like and for other purposes. South Bank Chem. Co., Ltd., and A. J. Caddick (B.P. 460,041, 27.7.35).

Settling tanks. Filtering H_2O.—See I.