BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

AUG. 14 and 21, 1936.*

I.—GENERAL; PLANT; MACHINERY.

Non-corrodible materials in the Swedish chemical industry. E. Norlin (Chem. Eng. Cong. World Power Conf., 1936, *B*9, 22 pp.).—An account is given of stainless irons and steels, Al, Pb, Cu, and Ni, and their corrosion-resistant alloys, coated and plated metals, ceramic materials and enamels, rubber coatings, synthetic resins, asphalts. Practical experience in the food, beverage, wood pulp and paper, H_2SO_4, superphosphate, and explosives industries is reviewed. D. R. H.

Gloss investigations using reflected images of a target pattern. R. S. Hunter (J. Res. Nat. Bur. Stand., 1936, **16**, 359—366).—Permanent photographic records of the gloss characteristics of a surface may be obtained. F. C. B. M.

Optics in the service of the chemical engineer. F. Löwe (Chem. Eng. Cong. World Power Conf., 1936, *M*7, 26 pp.).—The application of optical principles in the control and improvement of purity and detection of impurities is described. Applications in microscopy, photomicrography, colorimetry, polarisation, refraction, and interference are discussed for gases, H_2O, inorg. products, glass and ceramics, ores and metals, coal, oils, activated C, fibres and fabrics, sugars and jams, cellulose and paper, rubber, resins and lacquers, tanning, and fermentation. D. R. H.

Practical importance of spectroscopic microanalysis. W. Gerlach (Chem. Eng. Cong. World Power Conf., 1936, *M*6, 27 pp.).—When only small quantities of a substance are available the spectroscopic method is particularly valuable, *e.g.*, in testing for adulteration, corrosion, the effect of metals on the organism, shot wounds, in determining traces of metals in oils, foods, insulating materials, etc., and in analysing samples removed from cultural objects, steels, etc. Difficulties are described. D. R. H.

Physics of high-vacuum technology. W. Gaede (Chem. Eng. Cong. World Power Conf., 1936, *G*1, 30 pp.).—A review of the types of pump of importance in chemical industry. The measurement of very low pressures and the practical applications of high vac. are described. A. J. M.

Application of fused silica in heating processes. I. Furnaces and heated enclosures. W. L. Patrick and G. N. Peel (Ind. Chem., 1936, **12**, 221—226).—The uses of fused SiO_2 in the construction of electric and gas-fired furnaces are described. D. K. M.

Furnace atmospheres and their effects. J. W. Cobb (Gas J., 1936, **214**, 834—839; cf. B., 1936, 22).—The importance of the correct choice and control of the furnace atm., employed in such widely different processes as metal reheating and the furnacing of glazes and enamels, is discussed. H. C. M.

Reactions in the solid state. W. Jander (Z. Ver. deut. Ing., 1936, **80**, 506—510).—A review, with special reference to the importance of these reactions in the case-hardening of steel, hardening of Al alloys, roasting reactions, and the production of cement and refractories. R. B. C.

Waste-heat recovery from intermittent sources such as gases and vapours in the chemical industry. C. Rosenblad (Chem. Eng. Cong. World Power Conf., 1936, *H*6, 26 pp.).—The advantages of the recovery of waste heat from intermittent sources are indicated and illustrated by reference to flue gases and sulphate and sulphite pulp mills. An effect spiral heat exchanger is described. D. K. M.

Apparatus for the study of heat-insulating materials for use at low and high temperatures. E. Griffiths (Chem. Eng. Cong. World Power Conf., 1936, *B*6, 6 pp.).—A summary of National Physical Laboratory methods for determining the thermal conductivity, in slab form, of materials used in refrigeration, building, steam, and furnace insulation. D. R. H.

Antifreeze mixture for automobile radiators. M. Nemirovitsch (Nov. Tech. Ser. Gorno-Rudn. Prom., 1935, No. 13, 4).—A mixture of $Pr^{\beta}OH$ 65 and MeOH 35 is recommended. Ch. Abs. (*p*)

Natural and activated decolorising earths. C. L. Alexanian (Ann. Off. Nat. Comb. Liq., 1935, **10**, 1097—1127).—A review, covering the following points: geographical position and mode of formation of the natural earths; chemical constitution and physical characteristics; methods of activation and the nature of the decolorising action; laboratory evaluation and utilisation in the refining of oils etc. R. B. C.

[Boiler feed-]water treatment. L. O. Newton (Chem. Eng. Cong. World Power Conf., 1936, *L*4, 26 pp.).—For steam pressures $\not>$ 350 lb./sq. in. CaO–soda or CaO–base-exchange treatment is sufficient. For higher pressures the quality of the feed-H_2O must approach that of distilled H_2O; conditioning with NaOH and/or Na_3PO_4 or $Na_6P_6O_{18}$ is advisable, care being taken to adjust the $SO_4'' : CO_3''$ ratio to the pressure in order to prevent embrittlement. C. J.

Internal treatment of boiler water for small industrial plants. J. J. Ganucheau (Oil & Soap, 1936, **13**, 69—71).—General notes are given and routine methods outlined. E. L.

Recent methods of feed-water treatment and their place in the heat-flow of steam plants. H.

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

Riemer (Chem. Eng. Cong. World Power Conf., 1936, *L*8, 7 pp.).—Heat losses due to boiler scale are usually over-estimated and are $<$ those due to incomplete utilisation of the furnace gases, but in boilers with a high rate of steaming it is important to remove hardness, dissolved gases, and salts in conc. solution. C. J.

Principles of water conditioning. P. Hamer (Chem. Eng. Cong. World Power Cong., 1936, *L*5, 24 pp.).—A review of the methods used for the prevention of hard-scale formation and embrittlement and the reduction of corrosion to a min. The use of Na aluminate is recommended for the removal of Mg. C. J.

Heat economy and the treatment of feed-water and boiler-water in the German chemical industry. A. Splittgerber (Chem. Eng. Cong. World Power Conf., 1936, *L*13, 14 pp.).—The salt deposited in boilers can be reduced by appropriate design of the boilers, correct composition of feed-H_2O, and maintenance of a definite composition for the boiler-H_2O. The practical application of these principles is described. A. J. M.

Heat-transfer coefficients for water and steam in a surface condenser. R. M. Ferguson and J. C. Oakden (Chem. Eng. Cong. World Power Conf., 1936, *H*4, 32 pp.).—The H_2O film coeff. of heat transfer (k) has been determined for H_2O passing through brass tubes of 4 different diameters at velocities of 1—10 ft. per sec. at different H_2O temp.; they may be expressed in the form $10{,}000V_n/k = A + B(\sigma - 1) - C(\sigma - 1)^2$, in which V_n = velocity of flow, A, B, and C depend on the Reynolds no., and σ is Prandtl's no. The steam-film coeff. for the outside of the tubes has also been determined both for a single tube and for groups of tubes and the results are shown in curves. For single tubes this coeff. is greatly affected by the state of the tube surface when something approaching dropwise or film condensation may occur according to the conditions. D. K. M.

Galvanised tank corrosion on automatic water heaters. A. F. Craver (Amer. Gas J., 1936, **5**, No. 4, 29—32, 56; No. 5, 27—28).—The causes and prevention of corrosion in galvanised-steel H_2O-storage tanks are discussed. Data showing the effect of employing various metals for tank fittings are given. R. B. C.

Graphical computations for the separation of ternary mixtures by distillation. L. C. Strang and A. W. Nash (Chem. Eng. Cong. World Power Conf., 1936, *C*8, 18 pp.).—In a system of triangular co-ordinates, any point indicates the composition of a ternary mixture. By using a solid prismatic figure a series of lines representing compositions of liquids, and of vapours in equilibrium with them, for a given b.p. is projected. Using these isotherms, a construction is given for determining the vapour composition in equilibrium with the liquid composition represented by any point. By using also rectangular co-ordinates on which the operating line for the most volatile component is drawn, the no. of ideal plates for batch or continuous fractionation may be calc. An example given is the distillation of a mixture of C_6H_6, PhMe, and xylene. C. I.

Factors affecting the design of bubble-cap columns. L. C. Strang (J. Inst. Petroleum Tech., 1936, **22**, 166—176).—The greatest permissible vapour velocity (V) is limited by (*a*) entrainment, (*b*) pressure drop across the plate. For columns operating at reduced pressure, (*b*) is the controlling factor, whilst for those at or above 1 atm. V is controlled by (*a*), but tendency to foam is also important. The latter is dependent on the adsorption of solute at the gas–liquid interface. The greater plate efficiency is obtained when the more volatile component of the mixture being distilled is positively adsorbed at the interface. Other factors affecting the efficiency of columns are discussed, mainly as a summary of the literature. These include free space column velocity, vapour-uptake area (which should be as large as possible), pressure drop across the plate, design of caps and slots, and the distribution of vapour and liquid. C. C.

Influence of raised temperatures on filter efficiency. H. Rumpelt [with E. Zöllner] (Chem. Fabr., 1935, **9**, 197—200).—The results of dewatering a chalk suspension in brine agree with those to be expected from theoretical considerations, viz., reduction of η of the filtrate and alteration of the grain size of the solid with rising temp. and the resistance of the filter cake and cloth. D. R. H.

Concentration by evaporation of solutions liable to be affected by high temperatures. W. Vogelbusch (Chem. Eng. Cong. World Power Cong., 1936, *H*1, 10 pp.).—The advantages of vapour compression for evaporation at low temp., particularly where the supply of cooling-H_2O is not good, are indicated and a suitable evaporator is described. Apparatus suitable for the evaporation of such liquids as fruit juices, malt extracts, food products, etc. is described. D. K. M.

Crystallisation. J. A. Courbis (Chem. Eng. Cong. World Power Conf., 1936, *C*20, 16 pp.).—A review of industrial methods for aq. solutions (NaCl, KCl, Na_2SO_4, $NaNO_3$ + NaCl, NaCl + KCl). R. S. B.

Gaseous and liquid-phase reactions at high pressures. W. A. Bone and D. M. Newitt (Chem. Eng. Cong. World Power Conf., 1936, *G*8, 16 pp.).—Experimental apparatus for carrying out liquid- and vapour-phase reactions at pressures up to 15,000 atm. is described together with results of high pressures on NO formation in CO–O_2–N_2 explosions and on intermediate formation of O compounds in the slow combustion of hydrocarbons. E. G. H.

Maintenance of industrial chemical plant. W. G. Tydeman (Ind. Chem., 1936, **12**, 294—298, 301).—An illustrated description of the machines (lathes etc.) necessary for the repair shop of a chemical works. D. K. M.

Steam-raising with raw brown coal.—See II. **Chemical engineering problems in relation to fibres. Conical save-alls.**—See V. **Stoneware for chemical plant.**—See VIII. **Corrosion in fire extinguishers. Handling fluids at high temp. and pressures.**—See X. **Prevention of boiler scale etc.**—See XI. **Drying pigments. Plastics for chemical plant.**—See XIII. **Rubber for chemical equipment.**—See XIV. **Humidity control.**—See XIX.

Patents.

Open-hearth furnaces. "Ofag" Ofenbau A.-G., and K. von der Lahr (B.P. 447,164, 13.6.35).—A furnace fired with non-luminous gas (cold-purified coke-oven or town's gas) has a pulverised carburising agent injected into the core of the main gas current by a jet of gas at higher velocity. B. M. V.

Rotating-hearth furnaces. G. S. McLay (B.P. 447,114, 12.10.34).—The roof, side walls, and rotary hearth are all separately supported. B. M. V.

Rotary drum furnaces. E. A. Hailwood (B.P. 448,190, 18.12.34).—In a drum furnace for, *e.g.*, annealing glassware the ends of the drum also form the ends of the furnace, and one end at least is slidable on the supporting shaft to afford access to the interior. B. M. V.

Rotary-kiln plants. J. S. Fasting (B.P. 447,836, 26.11.34).—For cooling, the cooked material drops from the cylindrical kiln on to one or more rotary gas-permeable tables, and is moved thereover by inclined stationary rakes. B. M. V.

Melting furnaces. (Sir) W. G. Armstrong, Whitworth & Co. (Engineers), Ltd., and J. McKinnell (B.P. 447,128, 10.11.34).—Above a crucible (*C*) is a container (*K*) for the materials to be melted, the *K* and contents being subjected to products of combustion in absence of air for a considerable time before transfer to *C*. B. M. V.

Drying of materials. W. W. Spooner (B.P. 447,044, 10.10.34 and 4.1.35).—Plaster boards or other articles liable to dry on the surface before the centre is dry are heated by high-velocity jets of saturated steam to a temp. at which the internal liquid boils. B. M. V.

Dehydration apparatus. H. E. Oskamp (U.S.P. 2,017,728, 15.10.35. Appl., 23.1.33).—A shelf-type dryer with single fan and heater is described. B. M. V.

Regenerators for coke ovens and other furnace installations. H. Drehschmidt, Assee. of H. Koppers A.-G. (B.P. 448,030, 29.8.34. Ger., 29.8.33).—Means for providing uniform but adjustable distribution of the air or gas are described. B. M. V.

Construction of heat-regenerators. C. Otto (U.S.P. 2,018,224, 22.10.35. Appl., 20.1.34. Ger., 5.1.33).—For a horizontal type of regenerator, filling blocks and a method of placing and removing them without knocking down the side walls are described. B. M. V.

Heat exchanger. E. N. Sieder, Assr. to Foster Wheeler Corp. (U.S.P. 2,018,037, 22.10.35. Appl., 29.9.33).—In apparatus of the bundle of tubes type, the tubes are supported intermediate their ends by a no. of rods threaded between them transversely in at least two directions. B. M. V.

Manufacture of heat exchangers. Junkers & Co. G.m.b.H. (B.P. 447,891, 20.1.36. Ger., 26.1.35).—In exchangers of the type in which a tube for the inner fluid is soldered or brazed to (but not through) a sheet forming the heat-transmitting wall, the soldering is effected while the sheet is flat, and the combination is afterwards bent to form a vessel of cylindrical or other desired shape. B. M. V.

Heat-exchange apparatus. W. T. Wells, Assr. to Technicraft Eng. Corp. (U.S.P. 2,018,163, 22.10.35. Appl., 14.7.34).—In an apparatus of the bundle-of-tubes type, the tubes are tapered and ribbed or fluted, and arranged opposite ways alternately. B. M. V.

Heat-insulating materials. F. W. Seving, A. Bergqvist, and K. E. Olsson (B.P. 447,353, 18.3.35).—The use of cellulose acetate foil regularly spaced is claimed. B. M. V.

Generation of steam. Aktieb. Raméns Patenter, and T. Ramén (B.P. 447,883, 25.11.35. Swed., 30.11.34).—Ph_2O (or other liquid atm., b.p. $\nless$ 175° and $\nless$ the b.p. of the solution under treatment) is evaporated at $\ngtr$ 11 atm. pressure (preferably at quite a low gauge pressure) and is used as heat-transmitting fluid to reconcentrate solutions that have been used to absorb low-pressure steam and generate higher-pressure steam by the heat of absorption indirectly transmitted. B. M. V.

Concentrator. J. R. Walsh (U.S.P. 2,017,111, 15.10.35. Appl., 4.11.32).—An apparatus in which sludge from a boiler is collected prior to blowing down is described. B. M. V.

Pulveriser. M. Godinez (B.P. 448,152, 5.7.35).—A stationary, cylindrical shell is more than half filled with balls or other grinding media and material being ground. A cylindrical axial rotor (stout shaft) is provided with discs dividing the shell into compartments, though spaces are left around the edges for passage of material, and the lifting effect of the shaft and discs produces cascading of the charge. B. M. V.

Pulverising mills. E. L. Damant (B.P. 447,123, 9.11.34).—The feed and air pressure of an air-swept mill are regulated by a draught gauge photoelectrically controlled. B. M. V.

Grinding, cutting, pulverising, or the like treatment of materials. G. and W. Clark (B.P. 448,258, 4.12.34).—In a pulveriser, heating/cooling medium is passed through the rotor (*R*), which carries peripheral blades, and through each of the stationary blades surrounding *R*. B. M. V.

Devices for feeding powders and the like into a mixer. W. Langsdorf (B.P. 447,845, 4.2.35).—A no. of "feeding drums" (fluted rolls) are arranged radially around a common driving bevel-crown wheel, each being provided with a hopper, and the adjustment of the feed is attained by moving each roll axially on its shaft more or less under the hopper. B. M. V.

Mixing apparatus. S. L. Wyndham, and Wyndham's Liquid Coal Co., Ltd. (B.P. 447,695, 1.1.35).—Coal (*e.g.*) is delivered at a predetermined rate by a worm from a hopper and oil by a pump to an inclined rotary cylinder with internal flights or like type of mixer, all being driven by one motor. B. M. V.

Apparatus for blending materials. F. J. and J. L. Muench, Assrs. to Gen. Machine Co. (U.S.P. 2,018,082, 22.10.35. Appl., 23.7.32).—Two cones are joined base to base and rotated about an axis perpendicular to the conical axis. Means for filling and emptying are described. B. M. V.

Apparatus for separating materials of different specific gravities. H. M. Chance (U.S.P. 2,018,010, 22.10.35. Appl., 9.6.33).—The material is stratified in an oscillating trough (*T*), a stream of air being used to carry away the top stratum, but not for stratification; *T* is covered to confine the air stream to a longitudinal course concurrent with the feed. The cross-section of *T* and the cover is progressively decreased to increase the velocity of the air, and the bottom of *T* has a general downward slope, but is preferably arranged as longer horizontal and shorter vertical steps. B. M. V.

Apparatus for separating fine and coarse material particles. F. B. Lehmann (J. M. Lehmann) (B.P. 447,732, 29.1.36. Ger., 26.4.35).—All the material is entrained in a current of air which is caused to enter at a part only of an annular space surrounding a flinging wheel by which the coarse particles are flung out radially while the fine pass on with the air to a settling chamber. B. M. V.

Preparation [separation] of dry medium- and fine-grained mixtures. F. Krupp Grusonwerk A.-G. (B.P. 447,229, 28.5.35. Ger., 28.5. and 17.12.34).—An air-dressing machine is provided with a pulsating upward current of air, and the dressing surface is moved forward slowly and jerked back by means of cams. A twin machine having balanced strokes is described. B. M. V.

Air separation of diatomaceous earth milling. M. Stockton, Assr. to Dicalite Co. (U.S.P. 2,018,039, 22.10.35. Appl., 23.7.32).—The coarse and heavy particles from the first separation are cleaned in a smaller separator, the air-borne product from which is drawn into the fan of the main separator. B. M. V.

Determination of the percentage of water in wood, textiles, and other substances. P. Rother and G. Grau (U.S.P. 2,017,376, 15.10.35. Appl., 7.6.33. Ger., 13.6.32).—A material indicating change of moisture by change of colour is placed in a transparent casing and this is then sealed except for an aperture communicating with a hole formed in the material under test. B. M. V.

Mechanical testing machines for making impact tests on materials. H. Quinney and R. J. Lean (B.P. 448,130, 1.12.34).—A spring (*S*) is tensioned to an energy $>$ that necessary to fracture the test-piece (*T*), *S* is suddenly released, and the magnitude of the vibration immediately after fracture of *T* is measured, thus indicating the residual energy of *S*. B. M. V.

Determining, recording, and controlling the density, consistency, or specific gravity of fluent materials. G. S. Witham, jun. (U.S.P. 2,017,225, 15.10.35. Appl., 14.5.31).—When pulp is caused to flow under gravity or other const. force its rate of flow is a measure of its consistency. The device comprises a paddle wheel floatingly supported in and rotated by a stream of the pulp, the wheel indicating and recording depth and rate of flow and initiating controls of diluents to bring the pulp to a const. *d*. B. M. V.

Apparatus for separating liquids from solids. Stothert & Pitt, Ltd., and G. R. Beckerleg (B.P. 447,425, 22.11.34).—An endless band to which L-shaped scrapers are attached is formed of rubberised or like waterproof fabric and is formed with perforations between the scrapers to allow sand to pass through. B. M. V.

Centrifugal separator. J. F. Tholl, Assr. to Amer. Tool & Machine Co. (U.S.P. 2,018,474, 22.10.35. Appl., 21.12.32).—A fume-tight construction is described. B. M. V.

Cream separator bowl. F. C. Sandstrom, Assr. to Internat. Harvester Co. (U.S.P. 2,017,734, 15.10.35. Appl., 24.1.33).—A separator with discs and tangential cream outlets is described. B. M. V.

Arrangements in centrifugal separators for prevention of foam creation. Kone ja Silta o.y. Maskin och bro Aktieb. (B.P. 448,229, 4.12.35. Finl., 29.12.34).—The velocity of a separated fluid is converted into pressure, which is resisted by leading the fluid up an axial conduit commencing within the feed conduit. Collecting slits and channels are also described. B. M. V.

Filter. J. Brown, Assr. to Briggs & Stratton Corp. (U.S.P. 2,017,232, 15.10.35. Appl., 12.3.34).—Dirty oil or other prefilt is fed to the space between two masses of carded wool and passes through the masses in parallel. B. M. V.

Distilling and condensing apparatus. F. J. Allen (U.S.P. 2,018,049, 22.10.35. Appl., 26.3.34).—The feed liquid is sprayed into a rising current of heated vapour (*H*) and the combined vapour is divided, part being passed through a cooler to form condensate and part reheated to form *H*, which is blown back by a fan. Conc. solution is withdrawn from the bottom of the spray chamber. B. M. V.

Laboratory apparatus for use in [noxious] distilling or evaporating operations. G. Deibel (B.P. 447,894, 19.2.36).—A bottle-shaped hood of acidproof material is connected to a discharge flue and encloses a burner and pan, crucible, or the like, a sliding door of glass or mica being provided for inspection. B. M. V.

Dehydration of liquids. W. W. Kraft, Assr. to Lummus Co. (U.S.P. 2,017,067, 15.10.35. Appl., 29.4.33).—In the dehydration of a liquid (*A*), *e.g.*, EtOH, which is miscible with H_2O and forms a const.-boiling mixture therewith, the mixture of *A* and H_2O is distilled in presence of a third material (*e.g.*, C_6H_6) miscible with *A* but immiscible with H_2O and capable of forming a ternary azeotropic mixture with *A* and the H_2O. Then *A* is condensed as concentrate, the distillate vapours of the three materials are condensed in presence of sufficient H_2O to form a dil. ($<$ 20%) solution of *A* with which the C_6H_6 is substantially immiscible, the condensate layers are separated, and the condensed dil. solution is distilled. B. M. V.

Construction of bubbler-column units. S. J. Ralph, G. O. Inglis, and Aluminium Plant & Vessel Co., Ltd. (B.P. 447,800, 18.4.35).—A design of bubbler cap suitable for manufacture by pressing a not very ductile metal is described. B. M. V.

Operating fluid for hydraulic transmission. J. C. Cox, Assr. to Wagner Electric Corp. (U.S.P. 2,017,089, 15.10.35. Appl., 16.7.34).—A mixture of $1\text{-}C_{10}H_7Cl$ (4 vols.) and mineral oil (1 vol.) is claimed. B. M. V.

Purification of air and other gases by centrifuging. W. Neumann (B.P. 448,140, 11.3.35. Switz., 26.3.34).—The rotor is divided into compartments by radial partitions and the conc. dust layer leaves through slots in the inner wall to an annular space within an outer rotating wall. B. M. V.

Resolution of gaseous mixtures. M. Fränkl, Assr. to Amer. Oxythermic Corp. (U.S.P. 2,017,240, 15.10.35. Appl., 2.5.34. Ger., 9.5.33).—As a step in the resolution of air by liquefaction, fractionation, and rectification, an O_2-rich liquid at 0·5 atm. approx. is passed in continuous films in heat exchange with the ingoing gas mixture, the liquid being alternately led away from and back to the heat-exchanging surfaces. B. M. V.

Compression of corrosive gases. R. L. Hasche, Assr. to Amer. Smelting & Refining Co. (U.S.P. 2,017,408, 15.10.35. Appl., 6.11.30).—Moist SO_2, *e.g.*, is compressed in a first stage, cooled in an acidproof cooler with separation of most of the H_2O, and the gas then rendered effectively dry by reheating before the second stage of compression, conveniently by heat exchange between the exhaust and inlet gases of that stage. B. M. V.

Thermohydrometer. L. Edelmann, Assr. to E. Edelmann & Co. (U.S.P. 2,018,441, 22.10.35. Appl., 30.7.32).—A syringe hydrometer is provided with a single bulb, nozzle, and thermometer in the nozzle, but with a no. of hydrometers for different densities each in its own transparent chamber. B. M. V.

Brake linings. Small & Parkes, Ltd., and A. Kay (B.P. 448,351, 1.1.35).—The lining is formed of low-friction material at the leading end and of high-friction material at the trailing or pivot end, both portions being of impregnated asbestos in different forms. B. M. V.

[Boiler] furnaces. Smokeless Combustion Co., Ltd., W. A. Maw, and A. J. Hunt (B.P. 447,081 and 447,507, 13.12.34).

Reversing means [valves] for regenerative-furnace plant. O. Reiner (B.P. 447,837, 26.11.34. Ger., 25.11.33 and 30.10.34).

Absorption refrigerating apparatus. R. F. Bossini (B.P. 447,897, 27.8.34).

Apparatus for heating liquids. A. L. and A. Wright (B.P. 447,338, 15.11.34. Addn. to B.P. 421,690).

Controlling furnace temp.—See XI. **Gas-condensing system.**—See XVIII.

II.—FUEL; GAS; TAR; MINERAL OILS.

[Bunker] fuels. P. Woog, J. Givaudon, and R. Sigwalt (Ann. Off. nat. Comb. liq., 1936, 11, 7—92).—The characteristics desirable in bunker fuel oils and of specifications therefor are discussed. The tendency of bunker oils to deposit sediment on storage may be estimated qualitatively by placing a drop of oil at 40° on to filter-paper, washing with C_6H_6, and noting the amount and coarseness of the residue obtained. Excessive amounts of paraffin in bunker oils cause sedimentation on cooling; H_2O causes emulsification. Addition of 0·5% of stearic acid markedly decreases sedimentation. R. B. C.

Utilisation of raw brown coal for steam-raising at Yallourn. W. J. Johnson (J. Proc. Australian Chem. Inst., 1936, **3**, 147—160).—Despite its high moisture content, 64—67%, and low calorific val., 2800—3000 B.Th.U. per lb. nett wet, the fuel is being burned under H_2O-tube boilers at a high standard of efficiency. The coal, after being crushed and sized in spiked-roll crushers, is fed through a preliminary drying shaft, built alongside the face of the combustion chamber, on to a mechanically-operated step grate which is in 3 sections, each of which is given a reciprocating motion. Preheated air is supplied under the grate at 290—320°. Excessive slagging of the furnace walls at the combustion zone has been eliminated by the introduction of bauxite bricks. Methods for testing the bricks under load at high temp. and for simulated services lagging test are also described. H. C. M.

New German technical development in the use of low-grade fuels (pulverising and firing in one process). B. Krämer (Chem. Eng. Cong. World Power Conf., 1936, *D*4, 18 pp.).—The boiler furnaces described and illustrated can burn economically fuels of low heating val., *e.g.*, lignite, low-temp. coke, etc. Technical data relating to plants installed in chemical works are given. J. W. C.

Coal-friability tests. Comparative study of methods for determining the friability of coal and suggestions for tumbler and drop shatter-test methods. R. E. Gilmore, J. H. H. Nicolls, and G. P. Connell (Canada Dept. Mines, Mines Branch No. 762, 1935, 102 pp.).—Comparative friability tests were carried out on seven coals ranging from hard anthracite to friable bituminous coal by the following methods: Ottawa small-jar tumbler; A.S.T.M. (coke) drum tumbler; Stansfield box tumbler; Ottawa drum (box) tumbler; Sheffield (coke) abrasion tumbler; A.S.T.M. (coke) shatter test; Illinois shatter test. Each method placed the size stabilities of the coals in approx. the same order. Therefore, any one of them is considered suitable for determining the relative friabilities of a series of coals. The results are discussed in relation to coal breakage during handling. Shatter tests, carried out on the least, medium, and most friable of the same coals by means of the A.S.T.M. (coke) shatter test, included a study of the progressive breakage of lump coal when subjected to one, two, three, or four drops on to a concrete or Fe base. Appendices describe the proposed A.S.T.M. tumbler and drop shatter tests for coal. R. B. C.

[Relation between] bulk density, moisture content, and fineness of fine coal. R. Stuchtey (Tech. Mitt. Krupp, 1936, 4, 19—21).—The bulk *d* decreased as fineness increased. The bulk-*d* curves showed marked min., which did not occur at const. H_2O content, but moved towards higher H_2O contents as the fineness increased. The bulk *d* of fine coal, *e.g.*, briquetting coal containing 0—5% of H_2O, was dependent on the fineness and on small variations in the H_2O content. R. B. C.

Clay content of brown-coal briquettes. Its determination by a colour method and its effect on resistance of the briquettes to weathering. E. Lamprecht (Braunkohle, 1936, **35**, 53—57).—A method for detecting the presence of clay in brown-coal briquettes, or for estimating its distribution among the various sizes of brown coal for briquetting, is described. The briquette is treated at 50—60° for 24 hr. with conc. HCl containing $AlCl_3$; if clay is present gelatinous aluminosilicates are pptd. The washed ppt. is immersed in a conc. methylene-blue solution for 2½ hr., the solution filtered, and the filter-paper dried, the stain produced being compared with a colour chart obtained by subjecting clay, clay-free brown coal, pyrites, etc. to similar treatment. Experiments carried out with clayey brown coal showed that the greater % of ash was contained in the coarser particles, and that the resistance to weathering of the briquettes increased as the size of coal employed diminished. R. B. C.

Variables in a raw [coal] slack. C. W. H. Holmes (Colliery Eng., 1936, **147**, 160—164).—Average variations in the proportions of different-sized fractions, of the ash contents of the fractions, and of float-and-sink tests of the fractions, are recorded for a series of 33 samples, each of 240—400 lb., taken from a bulk of 1½-in. coal to finest dust. The variations in each particular variable, in general, increase or decrease more or less uniformly with decreasing particle size of the fractions. Reasons are discussed. R. B. C.

Apparatus for determining fusibility of coal ash. G. E. Hall and H. J. Hodsman (J.S.C.I., 1936, **55**, 151—152 T).—The finely-ground ash is formed in a brass mould into a pyramidal test-piece. Fusion is observed in an externally-heated horizontal tube supported in a furnace body made of insulating fireclay bricks and heated by a Méker burner with air-blast. The temp. of the specimen at fusion, which may be 1400° or over, may be measured optically or by a thermocouple. A reducing atm. is obtained by passing a mixture of CO_2 and coal gas through the closed tube. The air–gas mixture to the burner is controlled by means of Venturi tubes and the atm. of the tube by flow gauges.

Flue-gas heat content–calorific value–temperature diagram for fuels. W. Boie (Arch. Wärmewirts., 1936, **17**, 105—108).—A simple combustion diagram is constructed which facilitates calculation of the fuel combustion temp., the heat content of flue gases, and the heat developed for any given temp. of combustion air. A diagram for calculating the sp. heat of flue gases is also given. R. B. C.

Decomposition of calcium sulphate during laboratory carbonisation of Durham coking coal. W. S. Patterson and W. J. Metcalfe (J.S.C.I., 1936, **55**, 164—166 T).—The formation of sulphide-S and of org. S during the carbonisation of a Durham coking coal containing added $CaSO_4$ appears to be the result of independent processes. The former is associated with the action of reducing gases on the $CaSO_4$ and occurs between 750° and 1000°. At 600° no sulphide formation occurs due to the reaction $CO_2 + C = 2CO$ being slow at this temp. Org. S formation occurs in the first ½ hr. of the carbonising process, appreciably at 600° and to an increasing amount as the temp. is raised to 1000°. It is produced as a result of the activity of the coke surface and intimacy of contact attained during the plastic range.

Chemistry and physics of coking of mineral coal. F. Schuster (Chem.-Ztg., 1936, **60**, 513—515).—A review of published work. E. S. H.

Comparative investigations on fresh and stored cokes. W. Demann (Tech. Mitt. Krupp, 1936, **4**, 17—19).—Laboratory tests carried out with stored and fresh blast-furnace coke showed that weathering has little or no effect on the chemical or physical properties of coke. Large-scale tests in a blast furnace using either stored or fresh coke showed that with the former there was only a slight increase in coke consumption (referred to "pure" coke). R. B. C.

Carbon black. II. Channel process—production from natural gas of Turner Valley, Alberta. L. M. Pidgeon (Canad. J. Res., 1936, **14**, **B**, 127—137; cf. B., 1936, 225).—The effects of several factors on the yield of C obtained by burning natural gas (approx. 94% of CH_4) in a small-scale channel-process plant are described. Draughts diminish the yield by lowering the stability of the flames. A sp. channel height affords a max. yield of C (1·3 lb. per 1000 cu. ft.) containing a min. of extractable matter. 3% of H_2S in the gas does not affect the quality of the C, but diminishes the yield slightly. The rubber-reinforcing properties, methylene-blue sorption, and % of extractable matter are similar to those of commercial C blacks. J. G. A. G.

Causes of destruction of the refractory material during the process of manufacturing carbon black. I. Taranenko and L. Kuvaldina (J. Rubber Ind. U.S.S.R., 1935, **12**, 320—321).—The oil spilled on the refractory leaves ash on burning, which consists of low-melting fluxes (oxides of Fe, Ca, Mg, K, and Na). These penetrate into the pores and form an enamel which has an expansion coeff. different from that of the refractory. Fe oxide catalyses the reaction $2CO \rightleftharpoons CO_2 + C$ at 400—500° and forms a swelling around the Fe spots in the refractory. High porosity increases deterioration. It should not exceed 17—19 vol.-%. Fe oxides should be $\not>$ 1·20%. Ch. Abs. (*e*)

Practical application of the results of recent physico-chemical research in the Swiss gas industry. P. Schläpfer (Chem. Eng. Cong. World Power Conf., 1936, *E*1, 20 pp.).—The principles underlying the choice of coal and the prep. of coal and coal mixtures are reviewed. Emphasis is laid on correct operation of the ovens with regard to heat economy. Coke cooling and gas purification are discussed. J. W.

Manufacture of town gas and gas for chemical syntheses from lignite. W. Allner (Chem. Eng. Cong. World Power Conf., 1936, *E*6, 30 pp.).—It is emphasised that carbonisation processes must be adapted to suit brown coals. Various processes are discussed from this viewpoint and the correct conditions for producing town gas and "synthesis" gas dealt with. J. W.

Town gas from brown coal, lignite, or other recent coals. J. Györki (Chem. Eng. Cong. World

Power Conf., 1936, *E*9, 8 pp.).—The Kassel process is claimed to be the only practically useful one, but is of doubtful val. with coals rich in S. Processes for removing useless gas components (*e.g.*, CO_2, H_2S) are discussed. J. W.

Removal of carbon monoxide from town gas. R. Mezger (Chem. Eng. Cong. World Power Conf., 1936, *C*5, 21 pp.).—The extent to which it becomes necessary to remove CO from town gas if the final gas is to be physiologically harmless is discussed in detail, and purification down to 1% of CO is proved sufficient. The single-stage catalytic process for CO removal by oxidation with steam, according to $CO + H_2O = CO_2 + H_2$, is described. Cost and heat-balance data obtained for the Hanelov plant are analysed. Only 20% of the circulating heat is recuperated and means of securing marked improvements in the heat economy of the process are suggested. H. C. M.

Detoxification of town's gas. F. Schuster (Gas- u. Wasserfach, 1936, **79**, 450—454).—The process used at Hamelin is described. A mixture of coal gas and water-gas (freed from H_2S) is saturated with moisture, steam is added, and the gas passes through a heat exchanger to the catalyst (essentially Fe oxide ; working temp. 430°) where CO is converted into CO_2. The washed, H_2S-freed, cooled gas has the same burning properties as the previous town's gas and is distributed through the usual network. Water-gas may be generated either separately or by steaming the retorts. Improvements in plant layout and working, based on past experience, are discussed. A greater yield of better-quality coke is obtained. By-product recovery is influenced favourably, and the final gas is free from troublesome impurities (*e.g.*, resin-forming compounds, org. S) and less corrosive to the mains. J. W.

Detoxification of [town] gas. E. Graf (Gas- u. Wasserfach, 1936, **79**, 209—214).—It is considered that changes in physical properties, *i.e.*, lower *d*, lower calorific val., and increased combustion velocity, caused by replacement of CO by H_2 in town gas (*T*) by the Müller process for removing CO, giving " end gas " (*E*), do not seriously affect its performance in ordinary gas appliances. Vienna *T* and *E* are compared as to these various properties, as also are the performances of these gases in a Teclu burner and in gas-cooker burners. The lower explosive limits were 7% for *T* and 5·5% for *E*. *E* contained about 2% of CO, about 12% of CO having been exchanged for H_2 with consequent 20% lowering of *d* ; hence it required about 10% less air mixture in the burner and had a correspondingly smaller practical combustion velocity. These changes, however, are no disadvantage for ordinary use. D. M. M.

Iron oxide from waterworks for dry purification of gas. W. Schweder (Gas- u. Wasserfach, 1936, **79**, 485—487).—The purification plant at Magdeburg gasworks is briefly described. Waterworks " oxide " is found to give results comparable with those obtained with bog-Fe ore, whilst the initial cost is lower. E. G. H.

Control of oxide purification plant [for gas]. J. A. Speers (Gas J., 1936, **214**, 172—175).—New methods of evaluating oxide have been evolved with special reference to its activity (*A*), capacity (*C*), efficiency (*E*), and back-pressure (*B*). *C* is as important as *A*, since a very active oxide with a short life might lead to higher labour costs than one with lower *A* and much greater *C*. The *E* is defined as the % *E* of the Fe present assuming it is all present as Fe_2O_3 and based on the equation $Fe_2O_3 + 3H_2S = Fe_2S_3 + 3H_2O$, and is easily calc. from the Fe content and capacity of a batch of oxide. A formula is derived for calculating the probable pressure likely to be thrown by a batch of oxide. Experiment shows that almost all of the *B* is caused by the particles passing a 1/40-in. mesh sieve, and is much influenced by the bulk of the mass and the H_2O content. Results of experiments for determining optimum H_2O content are given. D. M. M.

Requisite properties of a benzol-absorbing oil. A. Jenkner (Coal Carbonisation, 1936, **2**, 70—72).—A review. Distillation range, allowable content of anthracene, $C_{10}H_8$, and phenols, η, and causes of oil thickening are considered. R. B. C.

Benzol recovery by the active charcoal process at Charlottenburg gasworks. A. Simon (Gas- u. Wasserfach, 1936, **79**, 357—362).—Results are recorded of a 75-day test on a plant operated on the " Benzorbon " process. The plant fulfilled expectations in every respect. A. B. M.

Designing of gasworks with reference to recovery of benzol. F. Plenz (Chem. Eng. Cong. World Power Conf., 1936, *C*3, 17 pp.).—The economics of benzol recovery from town gas are discussed. The active-C and oil-washing processes are described and compared. The general features of benzol-plant design and the special precautions to be taken against fire risks are discussed. Attention is drawn also to the method of increasing the yield of motor spirit by withdrawing the gases from the charge by " internal and crown suction," a process particularly suitable for horizontal chambers. H. C. M.

Production and utilisation of hydrogen from gases containing methane. V. A. Karshavin (Chem. Eng. Cong. World Power Conf., 1936, *C*17, 17 pp.).—Processes utilising conversion with steam to obtain the H_2 were investigated. In absence of catalysts the rate of reaction of CH_4 with steam is slow and becomes appreciable only at temp. $>$ 1300°. In static experiments at 700—900° the rate of reaction (as determined by the change in pressure of the system) practically ceased after 4—5 hr., even though the system was far from being in equilibrium. The reaction rate is considerably increased by the use of catalysts, especially metallic Ni, and practically complete decomp. is obtained at 800—1100°. The influence of carrier properties, [Ni], different activators, reduction conditions, and poisoning of catalysts by S compounds on the activity of Ni catalysts is also discussed. If the gas for conversion contains $\ngtr$ 0·4 g. of S per cu. m., preliminary cleaning is unnecessary and reaction can be carried out at 1000—1100°. The intermittent and continuous processes for the conversion of natural and coke-oven gases are described and compared (cf. B., 1936, 640). H. C. M.

Thermal study of mixtures of air and steam. H. Mauras (J. Usines à Gaz, 1936, **60**, 106—109).—To facilitate control over air and steam injection in mixed-gas producers, calculations have been made of the ratio wt. of steam/wt. of air as a function of air and steam temp. and final temp. of the air–steam mixture when operating with dry air and steam at 105°. Corrections to be applied when using moist air and steam slightly above or below 105° are given. R. B. C.

Use of producer gas for motor vehicles. J. K. Marais (Fuel Res. Inst. South Africa, Bull. No. 6, 1936, 40 pp.).—The relative efficiencies of petrol and producer gas as fuel for a Chevrolet 6-cylinder engine were investigated. Producer gas was supplied to the engine by a portable suction producer using as fuel either meal cobs, a mixture of cobs and charcoal, or anthracite. The results of bench and road engine tests show that there is an appreciable drop in h.p. when using producer gas in petrol engines. An appendix gives the yields and analyses of the products obtained by dry distillation of the cobs. R. B. C.

Production of water-gas and "synthesis" gas from bituminous coal. W. Schultes (Glückauf, 1936, **72**, 273—285).—An illustrated review of the development of water-gas plant and of methods available for the production, from coal or coke of "synthesis" gas, required, *e.g.*, in the Fischer process. Descriptions are given of the Strache producer and the Didier chamber oven for producing such gas directly from coal, and of the process for the catalytic conversion of water-gas with steam into "synthesis" gas containing chosen proportions of CO and H_2. Costs of production of "synthesis" gas by eight different processes are tabulated. R. B. C.

Production of high-B.Th.U. gas in a carburetted water-gas plant, with particular reference to the use of heavy oil. W. K. Beard (Proc. Amer. Gas Assoc., 1935, 768—772).—Results of experiments are recorded on the production of carburetted water-gas from heavy oil and oven coke. Gas of 1000 B.Th.U./cu. ft. could be produced at a lower cost per therm than when using gas oil, but at a considerable sacrifice of capacity. R. B. C.

Increasing the value of water-gas by means of carburetting oil, and evaluation of this oil. R. Heinze (Z. Ver. deut. Ing., 1936, **80**, 152).—The work of Schläpfer and Schaffhauser (B., 1933, 1042) is summarised. R. B. C.

Problems of control in the production of water-gas from lignite in a continuous generator. H. Müller (Chem. Eng. Cong. World Power Conf., 1936, *E*5, 19 pp.).—On account of its high reactivity coke from lignite is especially suitable for water-gas production, and this fact is utilised in the Pintsch–Hillebrand automatic water-gas generator, which is discussed in detail. J. W.

Nitric oxide in crude water-gas. W. K. Beard (Proc. Amer. Gas Assoc., 1935, 755—757).—Carburetted water-gas contains 2·1—8·5 g. of NO per 10^6 cu. ft. Formation of NO increases rapidly as the clinkering time approaches. R. B. C.

Production of reformed natural gas. B. P. Mulcahy (Proc. Amer. Gas Assoc., 1935, 780—781).—Results of experiments on the production of reformed natural gas by passing natural gas with steam through the fuel bed of a single-shell water-gas generator are recorded. R. B. C.

Carbon-black removal from gas at Louisville. L. J. Willien (Proc. Amer. Gas Assoc., 1935, 779—780).—Natural gas is passed through a bed of incandescent coke in a water-gas generator. When the reformed natural gas obtained is passed to a Cottrell electrical precipitator and a cyclone dust collector 98% of the C black is removed. R. B. C.

New developments and lampblack problems with reformed natural gas. H. B. Young (Proc. Amer. Gas Assoc., 1935, 772—777).—The formation and removal of lampblack from reformed natural gas, made by passing natural gas through a bed of incandescent coke in a water-gas generator, are studied. The employment of a coke having an ash fusion point of 1260° resulted in almost complete elimination of lampblack and fly ash from the gas. R. B. C.

Determination of lampblack, fly ash, and tar in reformed natural gas. Chicago By-Product Coke Co. (Proc. Amer. Gas Assoc., 1935, 778).—The gas is passed through a train of bottles half-filled with C_6H_6. The C_6H_6 solution is filtered through a filter-paper in a Gooch crucible (*C*) and dried for 1 hr. at 105°. The increase in wt. represents fly ash and lampblack. *C* is then ignited, the loss in wt. representing lampblack. The tar is estimated by evaporating the filtrate to dryness. R. B. C.

Gas analysis : application of exact analyses to industrial problems. B. P. Mulcahy (Amer. Gas J., 1935, **143**, No. 1, 29—31 ; No. 2, 22—24 ; No. 3, 20—21).—Factors affecting the correct sampling of gases and the accuracy of the Shepherd method of gas analysis applied to natural gas, water-gas, etc. are discussed. Tables of factors are given for facilitating calculation of the results of gas analysis with the Shepherd apparatus. R. B. C.

Development and present position of methods of determination of naphthalene in gases and fuels. W. Dellmeier (Chem.-Ztg., 1936, **60**, 449—450).—Attention is directed to recent improvements in the methods of determination (cf. B., 1935, 341, 580, 885). A. B. M.

Technique of measurement of gas compressed into cylinders. R. Mezger and T. Payer (Gas- u. Wasserfach, 1936, **79**, 113—120, 133—137, 418—424).—Calculation of the quantity of gas in cylinders from the vol., temp., and pressure by means of the simple gas laws leads to errors which may be considerable, *e.g.*, $>$ 5% in the case of town's gas. Data and curves are given from which the quantity can be determined accurately for a sewage-clarification gas (CH_4 73·5, CO_2 25·3, O_2 and N_2 1·2%) and a town's gas. A. B. M.

Production and treatment of road tar in Great Britain. W. E. Cone and W. J. Chadder (Chem. Eng. Cong. World Power Conf., 1936, *C*6, 12 pp.).—A review. H. C. M.

Viscosity of road tars. II. J. G. Mitchell and A. R. Lee (J.S.C.I., 1936, **55**, 167 t).—The logarithmic temp. coeff. as defined (B., 1936, 50) is shown to be simply related to the time-susceptibility of tar in respect of temp. and the relation may be employed to calculate the change of η for a small change of temp. When tars of equal η at the same temp. are compared the logarithmic temp. coeff. $\propto$ time-susceptibility of these tars in respect of η at that temp.

Determination of acid value of dark-coloured tars. E. P. CHERASKOVA and L. A. VEISSBRUTH (J. Rubber Ind. U.S.S.R., 1935, **12**, 267—268).—A 1—4-g. sample is dissolved in a 1 : 1 C_6H_6–EtOH mixture. The mixture should be previously neutralised, using alkali-blue 6B (0·8 g. per litre of mixture) as indicator. The sample is titrated with 0·5*N*-KOH in EtOH. CH. ABS. (*e*)

Methods of detecting and separating sulphur compounds in bituminous and brown-coal tars, petroleum, and their derivatives. F. SCHMELING (Braunkohlenarch., 1936, No. 45, 15—34).—A review. R. B. C.

Automatic tar dehydrator. A. H. ZANE (Proc. Amer. Gas Assoc., 1935, 757—759).—Tar emulsion from a carburetted water-gas plant is heated under pressure at 130°, the flow being regulated to maintain a const. temp. A pressure of 125 lb./sq. ft. at the discharge end of the pump and of 25 lb./sq. ft. at the relief valve is maintained. The tar is flashed into a distilling column from which emerges a product containing 1—2% of H_2O. R. B. C.

Development of an intermediate-scale plant for high-pressure hydrogenation of tar and tar distillates. J. G. KING and J. F. SHAW (Chem. Eng. Cong. World Power Conf., 1936, *G*4, 36 pp.).—An account is given of the development of the plant at the Fuel Research Station. E. G. H.

Dissolution of asphaltic deposits under pressure. A. MAILLARD (Ann. Off. nat. Comb. liq., 1936, **11**, 151—152).—An apparatus for carrying out $CHCl_3$ extraction of pptd. residue in used lubricating oil under pressure is described. R. B. C.

Lump of asphalt from Ur. R. J. FORBES (J. Inst. Petroleum Tech., 1936, **22**, 180—184).—The sample contained 39·5 wt.-% of matter sol. in C_5H_5N, $CHCl_3$, and C_6H_6, 37% of insol. org. matter, and 23·5% of mineral matter. It is probably a native asphalt common in seepages on the right bank of the Euphrates. C. C.

Reduction of carbon dioxide to higher hydrocarbons at atmospheric pressure with catalysts of the iron group. H. KÜSTER (Brennstoff-Chem., 1936, **17**, 221—228 ; cf. B., 1936, 676).—CO_2 can be reduced to liquid hydrocarbons and wax in one stage by the use of suitable catalysts, *e.g.*, 5Fe + 5Co + 0·5Cu + 1% K_2CO_3. With the latter a yield of 8·7 c.c. of liquid hydrocarbons per cu. m. of $CO_2 : 3H_2$ mixture was obtained at 215°. The product was similar to that obtained by the Fischer–Tropsch benzine synthesis ; it is probable that the CO_2 is reduced to CO and then this is converted into hydrocarbons. The relative reducing, hydrogenating, and polymerising activities of the catalyst can be controlled by varying the proportions of the components, and by impregnating it with varying amounts of K_2CO_3. A. B. M.

Determination of fluorescence of mineral oils. II. F. EVERS (Oel u. Kohle, 1936, **12**, 457—458 ; cf. B., 1935, 1032).—Using the Zeiss photometer, a CdS glass as standard covered a λ range closer to that of both fresh and aged mineral oils than the standard U glass provided by Zeiss. E. G. H.

Restricted treatment of benzols with sulphuric acid before stabilisation with gum inhibitors. W. H. HOFFERT, G. CLAXTON, and E. G. HANCOCK (Gas J., 1936, **214**, 103—105, 167—171).—The requirements of any refining process for benzol are outlined and the use of a mild acid treatment as a preliminary to stabilisation with gum inhibitors is advocated as the simplest and cheapest reagent for removing thiophen S. Experiments to determine the optimum conditions as to quantity and concn. of H_2SO_4 necessary to ensure the removal of C_5H_5N bases and thiophen without attacking the unsaturated hydrocarbons which are stabilised by inhibitors show that for any particular benzol the yield obtainable bears a definite relation to the quantity of thiophen removed and is independent of the amount and concn. of acid necessary to cause this removal. D. M. M.

Examination of benzol produced by the Still process. LICHTI (Oel u. Kohle, 1936, **12**, 459—461).—Tables are given showing the distillation range of the crude product freed from $C_{10}H_8$, phenols, and C_5H_5N bases, and the *d*, ε, and composition of the various fractions. The combined fractions contained unsaturateds 15·5, aromatics 71·8, naphthenes 6·6, and paraffins 6·6%. E. G. H.

Chemical constituents of gasoline separated in A.P.I. project. F. D. ROSSINI (Oil and Gas J., 1935, **33**, No. 52, 61, 62, 64—66, 73).—A *résumé*. CH. ABS. (*e*)

Influence of electrolytes on the type of petroleum emulsions and the conditions of their destruction. R. M. ABRAMOVITSCH-DVORETZKAJA (Azer. Neft. Choz., 1935, No. 2, 100—109).—Tartar's results are valid for emulsions formed with Na soaps of naphthenic acids (cf. A., 1929, 506). Under the influence of NaOH and Na_2SO_4 the latter give oil-in-H_2O as well as H_2O-in-oil emulsions. Soaps of acids of low mol. wt. give an inversion at higher electrolyte concn. than do acids of higher mol. wt. Gas-oil and cylinder-oil distillates yield both types of emulsion. Lowering of temp. promotes the formation of H_2O-in-oil emulsion. De-emulsifiers may have different actions on the various types of emulsion. CH. ABS. (*e*)

Ethyl alcohol as motor spirit. FRITZWEILER (Z. Spiritusind., 1936, **59**, 172, 174—175, 179—180, 182—183).—The properties of EtOH are discussed insofar as they affect its use as a propellant, either alone or in blends with other materials. The development of the use in Germany of EtOH in blends with liquids including Et_2O, benzine, benzol, and MeOH is discussed for the period 1921—1936 inclusive, the composition of the blends at different periods being indicated and the increasing use of EtOH for this purpose shown. Numerous methods for the large-scale manufacture of abs. EtOH are discussed in some detail, as is also the method of blending. The required German specifications for power alcohol are listed and the methods of testing described. I. A. P.

Necessary alterations in motor spirit composition in consequence of increased methyl alcohol content. K. R. DIETRICH and W. LOHRENGEL (Oel u. Kohle, 1936, **12**, 455—457).—The mixed alcohol supplied to motor spirit distributors since June 1, 1936, contains a max. of 20% of MeOH instead of 15% as formerly. To reduce the sensitivity of the MeOH–petrol blend to H_2O it must now contain a min. of 11% instead of 10% of the mixed alcohol. Curves are given showing the min. temp. to which MeOH–petrol blends with varying H_2O content remain homogeneous. The advantages from this viewpoint of adding benzol are stressed. E. G. H.

Effect of lead tetraethyl [in fuel]. F. R. BANKS (J. Roy. Aëro. Soc., 1934, **38**, 309—372).—A comprehensive review. Corrosion of the engine when idle is due to Pb oxybromide and condensed H_2O. To avoid attack, engine parts should be well covered by a film of mineral lubricant. A deposit of $PbBr_2$ and some $PbSO_4$ form on the spark-plug insulator. CH. ABS. (*e*)

Testing the inflammability of Diesel fuels in bombs. E. KAULIN, M. NEIMAN, and A. SERBINOV (Tech. Phys. U.S.S.R., 1936, **3**, 3—15).—Measurements of the lag in ignition (*L*) for cetene–mesitylene mixtures and for 6 oils at 400—600°/$\ngtr$ 30 atm. are recorded. At 525°/21 atm. *L* changed from 4 to 10 millisec. when the cetene content was changed from 30 to 80%. A cetene scale, based on the bomb tests, is described. H. J. E.

Influence of temperature on inflammation limits of combustible vapours in air. M. BRIAND (Ann. Off. nat. Comb. liq., 1935, **10**, 1129—1185).—The limits of inflammability (*I*) in air of vapours of the following pure compounds, viz., C_6H_6 (I), PhMe, *cyclo*hexane (II), *cyclo*hexene (III), *iso*pentane, C_6H_{14}, C_7H_{16}, C_8H_{18}, MeOH (IV), EtOH (V), PrOH, and $COMe_2$ have been determined as a function of the temp. by means of the Yannaquis apparatus (A., 1931, 572). In general, for all the substances investigated, the limits of *I* were found to vary linearly with the temp. over the temp. range in which the influence of slow oxidation was not appreciable. A study was made of the influence of H_2O vapour on the *I* limits in air of EtOH, the % mixtures which would completely inflame being determined. At 150° a mixture of EtOH, H_2O vapour, and air, containing 80·5% of H_2O, still propagated flame. Le Chatelier's law relating to the *I* limits in air of complex gas mixtures was verified on the following binary and ternary mixtures with air, viz., (*a*) (II)-(V), (*b*) (I)-(V), (*c*) (I)-(III), (*d*) (I)-(IV)-(V), and (*e*) (I)-(II)-(V). Only the lower limit of concn. at which the mixture inflamed was determined. The accord between calc. and observed vals. was good, all the graphs being linear for the temp. range covered. The same linear relation was observed in the case of various petrols and petrol blends, *e.g.*, a 4 : 1 mixture of petrol and C_6H_6. R. B. C.

Determining the practical value of motor fuels by means of the "synthetic index." M. SERRUYS (Génie Civil, 1936, **108**, 280—282).—The h.p. developed in the same engine by the fuel under test and by a standard fuel is measured; in each case throttling is adjusted to give very feeble knocking, and carburation is regulated to produce a definite % of CO in the exhaust gases. The ratio of the powers × 100 gives the "synthetic index," which is claimed to be a more reliable criterion of motor fuel quality than the C_8H_{18} no. R. B. C.

Examination of the combustion process in internal-combustion engines. M. BRUTZKUS (Ann. Off. Nat. Comb. liq., 1935, **10**, 141—142; cf. B, 1935, 133). R. B. C.

Action of chlorine and bromine on medicinal liquid paraffin. F. ANDRÉ and A. MAUREL (Ann. Off. Nat. Comb. liq., 1935, **10**, 807—817).—Chlorination of liquid paraffin yielded a product containing practically the theoretical amount of Cl necessary to form a Cl-substitution derivative. A yellowish-green, odourless, and tasteless oil denser and more viscous than the original was obtained. Bromination was more difficult; only 2/3 of the theoretical amount of Br to give a Br-derivative could be introduced. Attempts to accelerate Br substitution with various metals, *e.g.*, Al, Mg, and Cu, were unsuccessful. A viscous, brown liquid was obtained which, on keeping, deposited a powder, which redissolved on shaking at 30—35°. The powder contained 33·5% Br, corresponding to a replacement of two H atoms in a substance of mean mol. wt. 380. It is concluded that certain hydrocarbons present in medicinal paraffin are more amenable to halogenation than others. R. B. C.

Preparation of hydroxy-acids from solar oils. A. K. PLISOV, V. P. GOLENDEEV, and A. I. ZELTZBURG (J. Appl. Chem. Russ., 1936, **9**, 841—845).—A mixture of solar oil with Ca naphthenate and air is passed through an Fe tube at 115—120°. R. T.

Application of ethylene dichloride in the dewaxing of highly viscous oils. D. GOLDBERG, I. ABEZGAUZ, and L. MARGOLIS (Azer. Neft. Choz., 1935, No. 3, 74—81).—Solid hydrocarbons dissolve unsatisfactorily in *s*-$C_2H_4Cl_2$ (I) below 25°. The higher is the paraffin content of an oil, the higher is its separation temp. (I) cannot be used for dewaxing because, owing to its selective properties, certain hydrocarbons are transferred to the petrolatum and the yield of dewaxed oil is lowered and the η index decreased. The higher (I) homologues are suitable solvents for dewaxing. Refining with H_2SO_4 and clay is carried out as the last stage. CH. ABS. (*e*)

[Oxidation of] transformer oils. L. S. ORNSTEIN, C. JANSSEN, sen., D. T. J. TER HORST, C. KRIJGSMAN, and G. H. FREDERIK (Proc. K. Akad. Wetensch. Amsterdam, 1936, **39**, 566—573).—The oxidation, which leads to sludge and acid formation, is a unimol. reaction. The energy of activation for the oxidation is a characteristic const. for the oil. The curves representing the rate of oxidation after varying pretreatments as a function of the inverse temp. of oxidation are linear, and have a single point of intersection. The oil should not be raised to a temp. > that at this intersection. The oxidation is a chain reaction. H. J. E.

Tin compounds in lubricants. E. W. J. MARDLES (Petroleum, 1936, **32**, No. 24; Motorenbetr., **9**, 6).—About 1% of an oil-sol. Sn compound, *e.g.*, Sn soap of fatty or naphthenic acid, $SnPh_4$, or $Sn(C_{10}H_7)_4$, inhibits oxidation and prolongs the life of oil in an internal-combustion engine. Colloidal Sn or SnO_2 is useful in bearing lubricants. G. H. C.

Manufacture of thick greases. W. Maass (Petroleum, 1936, **32**, No. 24, 1—8).—Lubricant greases are made by mixing 12—15% of fatty acids from animal or vegetable fat with mineral oil, usually of $\eta = 3 - 5$ Engler at 20°, heating to 120°, and stirring in enough milk-of-CaO to neutralise the acid. Excess H_2O evaporates. Dyes, scents, and pigments (*e.g.*, 1% of ZnO) may be added. Plant, process, and standard methods of testing are described. G. H. C.

Viscosimetrical inspection of lubricating oil in service. L. Steiner (Engineering, 1936, **141**, 659—660).—The change in the η–temp. curve of lubricating oil during service is suggested as a means for following the ageing of the oil. The application of the Steiner instrument (B., 1934, 656) for determining η is described. C. C.

Reactions at high pressures. Separating ternary mixtures.—See I. **Analysis of gaseous olefines. MeOH from coal.**—See III. **Refractories for carbonising industries.**—See VIII. **Welded pressure vessels for petroleum industry.**—See X. **Oil-resisting rubber.**—See XIV. **Disposal of gaseous effluents.**—See XXIII.

Patents.

Briquetting of finely-divided fuels. O. Reynard and F. F. Tapping (B.P. 446,761, 8.11.34).—The fuel is mixed with a bituminous binder, *e.g.*, 5—7½% of pitch of m.p. 70—85° made from tar and H_2SO_4, or 3—5% of petroleum asphalt, and with 1½—3½% of a H_2O-in-oil dispersion made by mixing a petroleum or coal-tar oil with a solution of an org. colloid, *e.g.*, powdered cereal, in presence of a small quantity of alkali, and adding thereto a saturated solution of a salt, *e.g.*, $(NH_4)_2SO_4$, and the mixture is heated and briquetted. A. B. M.

Manufacture of solid fuel briquettes. G. Komarek and W. J. Chapman, Assrs. to Komarek–Greaves & Co. (U.S.P. 2,017,402, 15.10.35. Appl., 3.8.33).—Manufacture with smokeless binders, *e.g.*, carbohydrates and gluten, is described. B. M. V.

Distillation of coal. A. A. Roberts and J. E. Hackford (B.P. 446,412 and 446,616—7, [a] 26.7.34, [b, c] 26.7.34).—(a) Bituminous coal containing $> 50\%$ of fixed C, mixed with $\not> 2$ wt.-% of a B compound with b.p. $> 400°$, with or without $\not> 2$ wt.-% of a sol. salt of a strong mineral acid, *e.g.*, NaCl, is subjected to high- or low-temp. carbonisation in the usual manner. Easily-ignited coke is claimed as a product. (b) Bituminous coal containing $> 50\%$ of free C is treated with a fluxing agent in quantity sufficient to sinter, but insufficient to flux, one or more of its ash-forming constituents and $\not> 2\%$. The coal is then distilled in the ordinary way. (c) Bituminous coal with $> 50\%$ of free C is mixed prior to distillation with $\not> 2$ wt.-% of a sol. salt of a non-oxidising strong acid and a univalent base, *e.g.*, NaCl, with or without addition of a borate. D. M. M.

Chamber ovens. Dr. C. Otto & Co. Ges.m.b.H. (B.P. 447,815, 25.6.35. Ger., 6.10.34).—Vertical ducts having an oblong cross-section with the greater dimension in the longitudinal direction of the oven chamber are formed in the charge. Mandrels suitable for forming the ducts are described. A. B. M.

Coke ovens. A. H. Thwaite (B.P. 447,937, 23.2.35).—Combustion gases are passed in direct contact with the material to be coked. Under the coking chambers (*C*) are a lowermost flue for combustion from which the heating gases pass at the end remote from the burner into an intermediate distributing flue having distributed communications into the side of the *C* at the bottom; from the top of the *C* similar outlet ports communicate with a collecting flue for the mixture of new coal gas and used products of combustion, the former being not greatly diluted with the latter. B. M. V.

Production of non-structural activated carbon. J. C. Morrell (B.P. 446,892, 1.8.34).—A mixture of finely-divided carbonaceous material, *e.g.*, petroleum coke, hardwood charcoal, and an aq. emulsion of a hydrocarbon binder which chars on heating, *e.g.*, wood- or coal-tar pitch, is carbonised without being subjected to a compression treatment, and activated. A. B. M.

Continuous gas-making process. C. B. Hillhouse, Assr. to S. R. Hillhouse (U.S.P. 2,007,860, 9.7.35. Appl., 30.7.32).—A gas generator comprises two vertical cylindrical chambers which open into each other along a vertical passage. Into one, the combustion chamber (*C*), fuel oil and air are introduced tangentially, while into the other, the gasification chamber (*G*), oil or carbonaceous fuel and steam are introduced in similar manner. The chambers are so designed that whereas heat can pass freely from *C* to *G*, no substantial mixing occurs of the gases produced in *C* and *G*, respectively. Provision is made for preheating the steam injected into *G* by means of the combustion gases in *C*. A. B. M.

Manufacture of water-gas. C. B. Hillhouse, Assr. to S. R. Hillhouse (U.S.P. 2,010,634, 6.8.35. Appl., 28.12.31).—A ring-shaped zone of combustion (*Z*) is maintained centrally in the gas generator (*G*) by fuel and air supplied to a burner in the bottom thereof. The combustion gases are withdrawn by suction down through the hollow core of *Z*. A mixture of preheated steam and pulverised or finely-atomised fuel is injected tangentially into the space between *Z* and the walls of *G*, and is thereby gasified. The fuel and steam follow a helical path and the water-gas produced is withdrawn through tangential outlets at the bottom of *G*. A. B. M.

Water-gas carburettor. C. H. Hughes, Assr. to Semet-Solvay Eng. Corp. (U.S.P. 2,007,200, 9.7.35. Appl., 25.11.31).—The carburettor (*C*) comprises a refractory-lined chamber in the upper part of which is a refractory dome with a central opening (*O*). The inlet flue to *C* enters the space above *O* tangentially so that the blast gases and secondary air entering *C* during the blast period follow a spiral path and are efficiently mixed. The water-gas produced during the "run" follows a similar path and is carburetted by the introduction of oil through a central spray. When crude oil is used the part of *C* just below the dome is devoid of chequerbrick. A. B. M.

Coke-oven gas by-product recovery. J. Becker, Assr. to Koppers Co. of Delaware (U.S.P. 2,010,003, 6.8.35. Appl., 9.12.33).—The gas is sprayed with NH_3 liquor as it leaves the carbonising chambers and, after removal of the hot condensates and while still at a temp. above the H_2O-vapour dew point, is passed through an electrostatic tar precipitator, thereby recovering a $C_{10}H_8$-free tar (I). The gas is then subjected to a primary cooling and washing treatment by direct contact with NH_3 liquor, thereby removing $C_{10}H_8$ and residual tar oils, scrubbed with (I) to remove residual $C_{10}H_8$ and further cool it, treated to recover NH_3, and indirectly cooled. A. B. M.

Distillation of tar. J. V. Meigs, Assr. to Barrett Co. (U.S.P. 2,007,656, 9.7.35. Appl., 14.2.29).—Tar is distilled by bringing it in intimate contact with the hot blast gases from a water-gas plant. A. B. M.

Electrically heated boilers for heating tar and tar bitumen compounds. J. Molyneux, F. Williams, H. H. Dewhurst, F. Hoon, and G. S. Molyneux (B.P. 447,789, 7.2.35).—Heating elements comprising resistances in ducts and cross-tubes are described. B. M. V.

Preparation of pitch. H. D. Elkington. From Ges. f. Teerverwertung m.b.H. (B.P. 447,861, 23.7.35).—Coal tars, tar oils, or tar residues, freed if necessary from low-boiling oils, are treated with air, ozonised air, or other O_2-containing gases, at 350—420°. Hard pitches are produced. A. B. M.

Cutting back pitch in two stages. S. P. Miller, Assr. to Barrett Co. (U.S.P. 2,007,378, 9.7.35. Appl., 31.7.29).—A partly distilled tar is distilled to give a high-m.p. pitch by bringing it in intimate contact with hot coal-distillation gases. The resulting vapours are scrubbed with tar to remove entrained particles of pitch etc.; part of this tar, which is thereby partly distilled, is further distilled as above described, and the remainder is continuously blended with the hot pitch produced. The product is then blended in a second stage with a hydrocarbon flux to give a pitch of desired properties. A. B. M.

Treatment of hydrocarbon oils and bituminous materials. A. Fisher, Assr. to Universal Oil Products Co. (U.S.P. 2,010,357, 6.8.35. Appl., 21.2.30).—A mixture of clay and H_2O is agitated with hydrocarbon oil and to the mixture $ZnCl_2$ is added. Powdered bituminous coal is then mixed in and the mixture cracked. D. K. M.

Apparatus for clay-treating oils. L. Mellersh-Jackson. From H. F. and H. N. Langlois (Langlois Bros.) (B.P. 447,139, 12.12.34).—The supply tank (*T*) for the mixture is open to the atm. From *T* it is led through a heated conduit to a filter (*F*), whence the oil passes to a separator for vapour and oil maintained under partial vac. which is controlled by the temp. just before *F*, filtering being stopped if the temp. is too low. B. M. V.

(A) **Treatment of mineral oil products.** (B) **Manufacture of partial oxidation products.** J. H. James, Assr. to C. P. Byrnes (U.S.P. 2,010,085—6, 6.8.35).—Appl., [A] 28.10.25, [B] 27.7.34).—(A) A cracked petroleum product is partly oxidised by air at 230—400° (cf. U.S.P. 1,759,620; B., 1930, 1101). The product is fractionated to give distillates with boiling range of $\ngtr$ 225°, suitable for motor spirit, and of 225—300°, which may be cracked, and also a residue which may be used for grease manufacture. (B) A stream of hydrocarbon oil in a finely-divided state and a regulated quantity of air is passed at a suitable rate through a screen of catalyst, *e.g.*, UO_2, MoO_3, at a reaction temp. below red heat. D. K. M.

Partial oxidation of hydrocarbons. S. P. Burke and C. F. Fryling, Assrs. to Doherty Res. Co. (U.S.P. 2,018,994, 29.10.35. Appl., 13.4.29).—Intermediate oxidation products are produced from a gas containing hydrocarbons by mixing the gas and air or other O_2-containing gas, both suitably preheated, with a small amount of a lower alkyl ether and heating together under high pressure to reaction temp., rapidly cooling, and separating the products. D. M. M.

Treatment of hydrocarbon oils. V. Ipatieff, Assr. to Universal Oil Products Co. (U.S.P. 2,018,066, 22.10.35. Appl., 7.3.35).—Normally gaseous olefines are polymerised by catalysing in presence of a solid H_3PO_4 catalyst, sufficient steam being added to the gas to prevent loss of H_2O from the catalyst. D. M. M.

Production of cracked gasoline having low gum content. N. V. Nieuwe Octrooi Maats. (B.P. 446,711, 6.6.35. Holl., 17.7.34).—In the rectification of the products obtained by cracking hydrocarbon oil according to B.P. 367,728 (B., 1932, 458), the conditions in the rectifier (*R*) are so maintained by the introduction of a cooling gas that the gasoline if liquid would be vaporised at 55° below its b.p. at atm. pressure, whereby the greater portion of the gum-forming constituents would remain in the liquid in *R*. D. K. M.

Elimination of impurities from gasoline. R. B. Day, Assr. to Universal Oil Products Co. (U.S.P. 2,001,185, 14.5.35. Appl., 21.2.31).—The S and gum-forming substances of gasoline are removed by bubbling the vapour, steam, and HCl through a solution of a chloride of a metal forming a sulphide sol. in aq. HCl, *e.g.*, $ZnCl_2$, containing a chloride or oxide of a metal the sulphide of which is insol. in aq. HCl, *e.g.*, CuO or $CuCl_2$. D. K. M.

Treatment of [hydrocarbon] oils. R. K. Stratford, Assr. to Standard Oil Development Co. (U.S.P. 2,007,114, 2.7.35. Appl., 24.3.30).—Gas oil, *e.g.*, is extracted with PhOH. After separation, PhOH is removed from the oil by fractional distillation and the oil is cracked. This pretreatment reduces corrosion in the cracking plant and renders acid treatment of the product unnecessary. D. K. M.

Petroleum product. D. R. Stevens and W. A. Gruse, Assrs. to Gulf Refining Co. (U.S.P. 2,001,634, 14.5.35. Appl., 1.12.31).—The content of gum-forming constituents of petroleum distillate is reduced by treatment with $AlCl_3$ (0·2—5·0%) and an aromatic phenolic compound (equimol. with $AlCl_3$), *e.g.*, PhOH, at 65—480°/0—3500 lb. per sq. in., with only small polymerisation and sludge losses. D. K. M.

Removal of naphthenic acids from hydrocarbon oils. F. M. Rogers, Assr. to Standard Oil Co. (U.S.P. 2,007,146, 2.7.35. Appl., 12.12.28).—The oil vapours, *e.g.*, those from the flash drum in cracking operations, are bubbled through molten NaOH in a plate-cap tower. D. K. M.

Extraction of mineral oils. J. S. Withers. From M. B. Miller & Co., Inc. (B.P. 445,942, 22.10.34).—Mineral oil containing naphthenic and paraffinic constituents is refined by joint treatment with a paraffinic and naphthenic solvent, the latter composed primarily of commercial cresylic acid (I) or a wood-tar acid (II); an additional amount of PhOH is added to (I) or (II) to permit separation of the mixture into layers at 10—32·2°. D. M. M.

Conversion of solid carbonaceous materials into liquid hydrocarbons by hydrogenation under pressure and in presence of catalysts. Comp. des Mines de Vicoigne, Noeux, & Drocourt (B.P. 447,930, 29.1.35. Fr., 10.10.34).—Hydrogenation is effected at $\not>$ 420° under pressures of $\not>$ 100 kg./sq. cm., in presence of 0·1—1% of Na or K compounds containing other metals such as Al, Fe, Sn, etc. in the mol., *e.g.*, Na aluminate. A. B. M.

Catalyst, and its production and use. J. D. Zieley, Assr. to Amarel Corp. (U.S.P. 2,017,226, 15.10.35. Appl., 25.5.32).—Mariel asphalt residues are claimed as catalysts for the hydrogenation of hydrocarbon oils. B. M. V.

Motor fuel. J. F. T. Berliner, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,010,005, 6.8.35. Appl., 6.4.32).—The fuel consists of MeOH (60—75), by-products of MeOH synthesis, boiling range 133—200° (24—10), hydrocarbon boiling in the gasoline range, *e.g.*, C_6H_6 (12—5), and vegetable oil, *e.g.*, castor ($\not>$ 15 vol.-%). D. K. M.

Treatment of motor fuel. J. C. Morrell and C. G. Dryer, Assrs. to Universal Oil Products Co. (U.S.P. 2,010,029, 6.8.35. Appl., 11.1.32).—Deterioration of cracked gasoline containing gum-forming substances is reduced by addition of a coal-tar fraction (0·01—2%) of boiling range 200—325°. D. K. M.

(a, c, d) **Production of lubricating oils.** (b) **Treatment of oil.** (a—d) U. B. Bray and C. E. Swift, Assrs. to Union Oil Co. of California (U.S.P. 2,006,093—5 and 2,006,098, 25.6.35. Appl., [a] 23.2.32, [b] 12.6.34, [c] 2.10.33, [d] 26.1.35).—(a) Crude oil containing asphalt (*A*) is treated first with a light petroleum or liquid C_3H_8 fraction to remove part of *A*, and then with SO_2 or other selective solvent to remove non-paraffinoid oil and the remainder of *A*. (b) Crude oil containing *A*, such as California naphthene-base crude, is treated under pressure with a liquefied, normally gaseous hydrocarbon, *e.g.*, C_3H_8, and the solution freed from *A* is then treated with, *e.g.*, SO_2 to remove non-paraffinoid oils. The solutions are separated and the paraffinoid fraction is chilled and wax and solvent are removed in known manner. (c) Hydrocarbon oil containing wax and *A* is first freed from *A* by dissolution under pressure in a liquefied, normally gaseous hydrocarbon (*H*), chilled by partial vaporisation of *H*, whereby wax is separated, and the residue, still dissolved in *H*, is treated with SO_2. The fractions are separated and the oil solution in *H* is treated with H_2SO_4. (d) Lubricating oil is produced from an oil containing *A* and wax by first dissolving, under pressure, in a light normally gaseous solvent, *e.g.*, C_3H_8, in which the *A* alone is insol., removing *A*, and then treating with a heavier solvent such as naphtha to remove wax and other impurities. The mixture may be cooled by releasing the pressure and allowing the light solvent to evaporate. The oil may be treated chemically, *e.g.*, with H_2SO_4, at any desired stage after removal of *A*. D. M. M.

Treatment of oil [to produce lubricating oil]. U. B. Bray and C. E. Swift, Assrs. to Union Oil Co. of California (U.S.P. 2,006,097, 25.6.35. Appl., 12.6.34).—Hydrocarbon oil is mixed with a liquid in which asphalt (*A*) is insol., *e.g.*, C_3H_8, and chilled by partial evaporation. The pptd. *A* is separated, and after further chilling by evaporation the oil is extracted with a solvent for the non-paraffinoids, *e.g.*, liquid SO_2, and the extract is removed. Further chilling is brought about by vaporisation and the wax pptd. is removed by filtration. The liquid is now treated with H_2SO_4 and after removal of the sludge is filtered through clay, any solvent present being removed by steam-distillation, leaving an oil of low η-temp. susceptibility. D. K. M.

Production of mineral lubricating oils. Deuts. Gasolin A.-G. (B.P. 445,731, 31.12.34. Ger., 4.1.34).—Mineral lubricating oils with little or no paraffin wax content are treated below —2° with relatively large quantities of H_2SO_4; the resulting oils are claimed to be more stable to ageing and to require less fuller's earth in the subsequent treatment than usual. Oils are diluted with low-boiling petroleum hydrocarbons before treatment, if required, to attain the desired fluidity. D. M. M.

Manufacture of hydrocarbon products [lubricants]. E. Ayres and H. G. Smith, Assrs. to Gulf Refining Co. (U.S.P. 2,019,037, 29.10.35. Appl., 10.3.32).—Relatively high-boiling petroleum stock and a lower-boiling petroleum stock are mixed together at $<$ 150° with anhyd. $AlCl_3$ in presence of added HCl for the required time, the sludge is settled out, and the oil treated with H_2SO_4, mixed with clay, and filtered, giving a high yield of good lubricating oil. D. M. M.

Treatment of lubricating oils. E. Ayres and H. G. Smith, Assrs. to Gulf Refining Co. (U.S.P. 2,010,387, 6.8.35. Appl., 11.8.32).—Lubricating oil is treated with an alkyl, alkylene, or aryl mono- or polyhalide in presence of $AlCl_3$ at 65—150°. The sludge is separated and the oil, which has an increased η index, low colour, and low C residue, is sweetened and purified by treatment either with clay and $Ca(OH)_2$ or with acid. D. K. M.

Reclaiming used lubricating oils. F. G. Baender (B.P. 448,009, 16.5.35).—The used oil is treated with H_2SO_4 and the sludge removed. The oil is then neutralised, *e.g.*, with $Ca(OH)_2$, mixed with fuller's earth (I), heated in a still under pressure to a temp. at which the moisture in it vaporises, *e.g.*, 175°, and the pressure released. The oil may then be heated to a higher temp., *e.g.*, 290°, under pressure and then the pressure released to vaporise light hydrocarbons. After cooling, the (I) is separated from the oil by filtration. D. K. M.

Wax emulsion [for paper]. A. H. FRENCH, Assr. to A. E. STALEY MANUFG. Co. (U.S.P. 2,009,488, 30.7.35. Appl., 30.7.32).—A H_2O emulsion of wheat-oil soap is mixed with boiled starch, and melted wax is stirred into the mixture. The proportions of these ingredients are 10, 15, and 75%, respectively. D. A. C.

[Continuous] acetylene gas generating apparatus. CARBIC, LTD., and H. THEM (B.P. 447,369, 8.11.35).

Continuous contact-dehydration process [for petroleum emulsions]. H. F. FISHER, Assr. to PETROLEUM RECTIFYING CO. OF CALIFORNIA (U.S.P. 2,018,302, 22.10.35. Appl., 8.6.31).

Mixing apparatus [for coal and oil]. Coke-oven regenerators.—See I. **$C_6H_6Cl_6$.**—See III. **Road material.**—See IX. **Insulation for gas-pipes etc.**—See XI. **Black paint. Rubber–pitch mixtures.**—See XIII. **Rubber plasticiser.**—See XIV.

III.—ORGANIC INTERMEDIATES.

Chemical method for analysis of gaseous olefines and its application in practice. R. WINBLADH (Ing. Vetensk. Akad. Handl. No. 138, 1936, 144 pp.).—Chemical methods have been elaborated for the identification and determination of C_2H_4, C_3H_6, and the butylenes in gaseous mixtures, which depend on the production of cryst. derivatives by condensation between the olefine dibromides and S compounds, *e.g.*, $SH\cdot CH_2\cdot CO_2H$ (I) and its anilide, PhSH, $NH_2\cdot CS\cdot OEt$, and $Na_2S_2O_3$. C_2H_4 was determined by shaking the mixed olefine dibromides, after preliminary distillation in a vac. to remove high-boiling material, with aq. Na sodio-thioglycollate, whereby only $C_2H_4Cl_2$ dissolves, and weighing the ethylenebisthioglycollic acid obtained. The remaining dibromides were fractionated in a vac. and the fractions b.p. $<$ 44°/15 mm. and 44—55°/15 mm. treated with alcoholic (I) and NaOH, the gas evolved being divided into two parts, one part being shaken with 63% H_2SO_4 to remove *iso*butylene, which was determined by treating the acid solution with HgO and decomposing the ppt. with KI and HCl, and the other treated with acidified KBr–$KBrO_3$ and the Br absorption determined. These figures together with the Br content of the fractions allow the composition to be calc. The process is tedious, requiring 2—3 days, and is applicable only to gases containing small amounts of olefines. In a gas mixture containing approx. equal amounts of the gaseous olefines, C_2H_4 and *iso*butylene were determined with $<$ 1% error, but the remaining olefines showed an error of 4·5—5·5%. Petroleum cracking gases and coal, wood, and shale distillation gases were examined by the method in conjunction with the Podbielniak method. R. B. C.

Determination of alcohol in unrectified butadiene. I. A. LIVSCHITZ and V. G. NAZAROV (Sintet Kautschuk, 1934, **3**, No. 3, 38—41).—The material is cooled to 0° and treated 3—5 times with 75 c.c. of 10% aq. NaCl. The resulting salt solution is treated with 50—60 c.c. of 50% KOH and boiled for 30—40 min. MeCHO forms resin and the EtOH is distilled off up to 99° and determined by the sp.-gr. method. CH. ABS. (*e*)

Synthesis of methyl alcohol from coal. T. EGUCHI (Chem. Eng. Cong. World Power Conf., 1936, *G*6, 18 pp.).—The theory and practical application in Japan of the MeOH synthesis are described. Approx. 45 gals. of refined MeOH are obtained from 1 ton of coal. E. G. H.

Modern methods of preparing absolute alcohol. R. FRITZWEILER and K. R. DIETRICH (Chem. Eng. Cong. World Power Conf., 1936, *C*4, 24 pp.).—EtOH can be dehydrated by azeotropic processes such as those using C_6H_6, or by chemical processes using Ca, mixtures of NaOAc and AcOH, or $CaSO_4$. The advantages and disadvantages of each are discussed. E. G. H.

Ether and rectification plants. I. G. SACHEIM (Voln. Chim., 1933, No. 6, 9—15; Chem. Zentr., 1934, ii, 1200).—Measures for the prevention of the formation of acid-containing ethers are suggested. Various modifications of plant and procedure are described. CH. ABS. (*r*)

Explosions arising from di*iso*propyl ether. G. T. MORGAN and R. H. PICKARD (Chem. and Ind., 1936, 421—422).—Details of two explosions, due to presence of peroxide, are described. Subsequent experiments demonstrated the violently explosive character of peroxide formed in Pr^{β}_2O on keeping. E. A. R.

Application of the Bunte burette to the determination of acetaldehyde in gas mixtures. L. SULIMA (Sintet. Kautschuk, 1935, **4**, No. 4, 35—36).—Hg is used in place of H_2O-seals. The reagent is 2*N*-NH_2OH,HCl in saturated aq. NaCl. The HCl formed is titrated with NaOH. CH. ABS. (*e*)

Purification of trinitrotoluene by sodium sulphite. J. BARBIÈRE (Mém. Poudres, 1934–5, **26**, 294—302).—Purification causes an actual loss of the α-isomeride, but part of this may be recovered if at the end of the reaction the liquid is diluted immediately without acidification. The conditions for ensuring min. loss are a max. time of 1 hr. for sulphiting, a temp. $<$ 40°, and immediate dilution of the liquor with an equal vol. of H_2O. Concns. of the Na_2CO_3 varying between 3% and 13% have little effect on the loss. W. J. W.

Applications of high pressure in the synthesis of organic compounds. G. T. MORGAN [with R. TAYLOR, D. V. N. HARDY, D. D. PRATT, (Miss) J. STEWART, J. T. VERYARD, and F. H. BURSTALL] (Chem. Eng. Cong. World Power Conf., 1936, *G*3, 22 pp.).—Work in this field carried out at the Chemical Research Laboratory, Teddington, since 1926 is summarised. E. G. H.

Auto-oxidation and antioxidants. J. M. BUTLER (J. New Zealand Inst. Chem., 1936, **1**, 26—30).—A review. J. S. A.

Reactions at high pressures. Separating ternary mixtures.—See I. **Reducing CO_2 to higher hydrocarbons. OH-acids from solar oils. Determining $C_{10}H_8$ in gases &c.**—See II. **Electro-org. preps.**—See XI.

PATENTS.

Manufacture of formaldehyde concentrates. DEUTS. GOLD- U. SILBER-SCHEIDEANSTALT VORM. ROESSLER (B.P. 447,050, 5.11.34. Ger., 17.11.33).—H_2O-sol.

pastes or solid products are obtained by concn. of CH_2O solutions containing $\not>$ 0·1 (wt.-)% of HCO_2H.
A. W. B.

Separation of propyl ether from mixtures of the same with propyl alcohol. Coutts & Co., and F. Johnson. From I. G. Farbenind. A.-G. (B.P. 444,117, 1.10.34).—The mixtures are distilled in presence of sufficient H_2O to give a const.-boiling min. mixture, $Pr_2O : H_2O = 9 : 1$, of b.p. 73—74°. Towards the end of the removal of Pr_2O addition or return of H_2O is stopped and Pr_2O is separated from the distillate. The distillation vessel contains pure PrOH. A. W. B.

Production of benzene hexachloride. H. P. Stephenson and A. L. Curtis (B.P. 447,058, 7.11.34).—Distillates (I) of b.p. 75—90° from heat-treatment at carbonising temp. of coal and oil mixtures are chlorinated in presence of H_2O; 620 g. of (I) yield 220 g. of $C_6H_6Cl_6$. A. W. B.

Manufacture of halogen derivatives of unsaturated sterols. A. G. Bloxam. From Soc. Chem. Ind. in Basle (B.P. 447,212, 29.12.34).—Halogenation in the ring only is effected by treatment of solutions of polyunsaturated sterols (I), *e.g.*, stigmasterol, or preferably mixtures of (I) with mono-unsaturated sterols at room temp. with H halides. A. W. B.

Manufacture of 3 : 5 : 8 : 10-tetra-aroylpyrenes. Soc. Chem. Ind. in Basle, Assees. of R. Scholl and K. Meyer (B.P. 447,096, 11.7.35. Switz., 11.7.34).—Pyrene is aroylated, *e.g.*, with carboxylic halides of the C_6H_6 series (BzCl), in presence of a salt, *e.g.*, $FeCl_3$, and in an inert solvent. A. W. B.

[$C_{10}H_8$ from] coke-oven gas.—See II. **Lactic acid.**—See XVIII.

IV.—DYESTUFFS.

Manufacture of acid dyes [of the triarylmethane series]. I. G. Farbenind. A.-G. (B.P. 438,426, 11.5.34. Ger., 11.5.33).—A 4-halogeno- or 4-sulpho-benzaldehyde is condensed with 2 mols. of a 2-alkyl- or 2-aryl-indole, having position 3 free, or an *N*-alkyl or *N*-aryl derivative thereof; the product is sulphonated, oxidised, and condensed with a primary alkoxyarylamine, whereby the 4-halogen or $4-SO_3H$ is replaced by NHAr. Examples are: 4-chloro- or 4-sulpho-benzaldehyde with 1-phenyl-2-methylindole or its sulphonic acid or 1 : 2-dimethylindole, sulphonated, oxidised, and condensed with *p*-phenetidine or *p*-anisidine (blue on wool or silk). C. H.

Manufacture of [green] acid dyes [of the triarylmethane series]. I. G. Farbenind. A.-G. (B.P. 438,437, 16.5.34. Ger., 17.5.33).—A 4-halogeno- or 4-alkoxy-benzophenone (or the corresponding dichloride), free from N and having no halogen or alkoxyl in position 4′, is condensed with a 2-substituted indole having position 3 free, the halogen or alkoxyl is replaced by an arylamino-group, and the product is sulphonated; or sulphonation may be effected before arylamination. Examples are: 4-chloro-2′ : 5′-dimethyldiphenyldichloromethane with 2-phenyl-1-methyl- or -1 : 4 : 7-trimethyl-indole, then with $p-NH_2\cdot C_6H_4\cdot OEt$ (or ·OMe), and sulphonated; 4-methoxydiphenyldichloromethane with 2-phenyl-1-methylindolesulphonic acid, then with $p-NH_2\cdot C_6H_4\cdot OEt$ and then disulphonated. C. H.

Manufacture of dyes of the triarylmethane series. I. G. Farbenind. A.-G. (B.P. 439,200, 1.6.34. Ger., 3.6.33).—A replaceable group (halogen, alkoxyl, SO_3H, or NO_2) *para* to the carbinol C atom in a triarylmethane dye is made to react with an *o*- or *p*-arylenediamine or its *N*-monoacyl derivative. Examples are: dye from *p*-sulphobenzaldehyde and sulphobenzylethyl-*m*-toluidine, with $o-C_6H_4(NH_2)_2$ (blue on wool or silk), *p*-aminoacetanilide, or 1 : 2-naphthylenediamine-5-sulphonic acid. C. H.

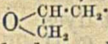
Manufacture of monoazo dyes. I. G. Farbenind. A.-G. (B.P. 438,129, 9.5.34. Addn. to B.P. 424,354; B., 1934, 717).—A diazo compound of the type used in the prior patent, but free from alkoxyl groups, is coupled with a 1-acylamino- or 1-acylalkylamino-8-naphthol-6-sulphonic acid. Examples are: 4-benzbutylamidoaniline or 4-amino-*N*-acetyldiphenylamine → 1-acetamido- or 1-acetethylamido-8-naphthol-6-sulphonic acid (red). C. H.

Manufacture of monoazo dyes. I. G. Farbenind. A.-G. (B.P. 438,406, 9.5.34. Addn. to B.P. 424,355; B., 1934, 717).—An aminodiaryl ether, $NH_2\cdot C_6H_4\cdot OAr$, in which the C_6H_4 may carry a SO_3H group, is diazotised and coupled with a 1-acylamino-8-naphthol-6-sulphonic acid. C. H.

Manufacture of *o*-[hydr]oxyazo dyes. I. G. Farbenind. A.-G. (B.P. 438,131, 10.5.34. Ger., 10.5.33).—An *o*-aminophenol having position 6 free and no SO_3H substituent is diazotised and coupled with a 1-arylamino-8-naphtholmonosulphonic acid to give metachrome-greens; *e.g.*, *o*-aminophenol → phenyl-S-acid. C. H.

Manufacture of *o*-aminoazo dyes. I. G. Farbenind. A.-G. (B.P. 438,445, 18.5.34. Ger., 18.5.33).—*o*-Nitroazo dyes in which the NO_2 is present in the diazo component are reduced with Fe^{II} salts in alkaline medium. Examples are reduction products from: *o*-nitroaniline-4-sulphonic acid → $\beta-C_{10}H_7\cdot OH$, $\beta-C_{10}H_7\cdot NH_2$, or 1-phenyl-3-methyl-5-pyrazolone; $o-NH_2\cdot C_6H_4\cdot NO_2$ (I) → N.W.-acid, γ-acid, H-acid, Laurent acid, or acetyl-γ-acid; (I) → H-acid ← NH_2Ph. C. H.

Manufacture of mordant disazo dyes. Durand & Huguenin A.-G. (B.P. 438,314, 4.3.35. Ger., 5.3.34).—2 : 5-Dialkoxyanilines are used as middle components for mordant disazo dyes. Examples are: 4-chloroaniline-3-sulphonic acid → 2 : 5-dimethoxyaniline (I) → salicylic acid (II) (chrome-printed on cotton, reddish-brown); *p*-nitroaniline-3-sulphonic acid → (I) → (II) (violet-brown). C. H.

Vat dye compositions. E. I. Du Pont de Nemours & Co. (B.P. 438,523, 14.5.34. U.S., 12.5.33).—There is added to vat dye printing pastes etc. an epihydrinamine, NHRE, NHE_2, or $NHE\cdot R'\cdot NHE$, or its salt (E =  $O<^{CH\cdot CH_2\cdot}_{CH_2}$, R′ = alkylene, R = H, alkyl (including hydroxyalkyl), aralkyl, or aryl carrying SO_3H or CO_2H. Examples are reaction products from epichlorohydrin and NH_3, NH_2Me, $NH_2\cdot CH_2\cdot CH_2\cdot OH$, $C_2H_4(NH_2)_2$, glucamine, or anthranilic acid. C. H.

Vat dye compositions. Nat. Aniline & Chem. Co., Inc., Assees. of J. G. Kern (B.P. 439,114, 25.5.34. U.S., 26.5.33).—There is incorporated, especially in dry vat dye powders, a salt of an acid inorg. ester of an aliphatic alcohol $< C_6$ which may carry as substituent an inorg. group or an org. group attached by an inorg. atom. Examples are Bu^aSO_4Na, $NHBu^a\cdot CH_2\cdot CH_2\cdot O\cdot SO_4Na$, $EtSO_4Na$, $Pr^\beta SO_4Na$, $EtO\cdot CH_2\cdot CH_2\cdot SO_4Na$, Na glycerophosphate, Na 3-nitro-*p*-tolyloxyethyl sulphate, and $N(C_6H_{11})(C_2H_4\cdot OH)(C_2H_4\cdot SO_4Na)$. C. H.

Manufacture of bromination products of vat dyes [of the anthraquinone series]. Soc. Chem. Ind. in Basle (B.P. 439,406, 2.5.35. Switz., 19.5. and 14.7.34).—Bromination of *iso*dibenzanthrone, pyranthrone, indanthrone, and other anthraquinone vat dyes is effected in $PhNO_2$ etc. in presence of $ZnCl_2$, $ZnBr_2$, or ZnI_2. C. H.

[Manufacture of] indanthrene-blue. W. M. Murch, Assr. to Dow Chem. Co. (U.S.P. 1,990,954, 12.2.35. Appl., 13.2.33).—An aq. slurry of β-aminoanthraquinone is added to fused NaOH and/or KOH at 220—245° in presence of an oxidant ($NaClO_3$ or $NaNO_3$). C. H.

Manufacture of vat dyes [of the benzanthrone series]. Soc. Chem. Ind. in Basle (B.P. 439,279, 5.6.35. Switz., 5.6.34).—8-(3′-Benzanthronylamino)-benzanthrone is fused with caustic alkali (NaOH, KOH, NaOEt, etc.) at 150—170° to give a navy-blue vat dye, condensation taking place between 2 mols. at 4 : 4 and 3 : 3 positions, and in each mol. at 9 : 4′ positions. The products become greener on halogenation. C. H.

Manufacture of [carbazolated] vat dyes of the anthraquinone series. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 437,598, 25.4.34).—The products obtained by replacement of reactive halogen in a halogenated anthraquinoneacridone [8 : 9-phthaloylacridone] by an α-aminoaroylaminoanthraquinone residue, suitable *ortho*-positions being unsubstituted, are treated with anhyd. acid condensing agents (H_2SO_4, weak oleum, $ClSO_3H$ or $AlCl_3$), and if necessary subsequently oxidised. Examples are : product from 1 : 4-dichloro-8 : 9-phthaloylacridone and 1-amino-5-benzamidoanthraquinone (I), heated at 50° with $ClSO_3H$ (reddish-brown) ; product from corresponding 1 : 3-dichloroacridone and 1-amino-4-benzamidoanthraquinone, with H_2SO_4 at 75° (brownish-red) ; product from 3-bromo-9 : 10-phthaloyl-*lin*-naphthacridone and (I), with H_2SO_4 at 70° (yellowish-brown). C. H.

Manufacture of [carbazolated] vat dyes [of the phthaloylacridone series]. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 439,180, 28.5.34).—A 4-α-anthraquinonylamino-8 : 9-phthaloylacridone with suitable free positions is carbazolated by heating with $AlCl_3$, $FeCl_3$, etc. in $PhNO_2$, *e.g.*, at 80°, and if necessary oxidised. Examples are the carbazolation of products of the condensation of 4-chloro-8 : 9-phthaloylacridones, carrying in position 1 Cl, Me, MeO, or H, with 1-amino-, 5-chloro-1-amino-, 1-amino-4-methoxy-, or 1 : 5-diaminoanthraquinones. The carbazoles are brown vat dyes. C. H.

Erratum. The last three lines on p. 537, col. 2, should end with g, 2, and t, respectively.

V.—FIBRES ; TEXTILES ; CELLULOSE ; PAPER.

Chemical-engineering problems in relation to the coarser textile fibres : jute, coir, and sisal. S. G. Barker (Chem. Eng. Cong. World Power Conf., 1936, *B*7, 34 pp.).—A review. A. G.

Action of halogens [iodine] on wool. R. Haller and F. W. Holl (Textilber., 1936, **17**, 493—495).—Wool is more reactive towards I than Br and Cl, and when steeped at room temp. in aq. solutions containing (per litre) 1·191, 9·17, and 12·93 g. of I wool absorbs up to 13·6, 38·1, and 44·7% of I, of which 6·5% (on the wool) is chemically combined. Data and curves are given to show the rates of I absorption when wool is steeped in aq. I solutions of various concns. ; the chemically combined I is determined by removing absorbed I with boiling H_2O and then weighing the dried residual yellow wool. It is concluded, contrary to vom Hove (B., 1935, 95), that I does not attack the tyrosine nucleus of wool. The I absorption from non-aq. solutions is irregular ; it is small from C_6H_6, PhMe, and CS_2, larger from MeCl, and large from EtOH solutions. A. J. H.

Steaming of crêpe yarns. J. Brandwood (Silk & Rayon, 1936, **10**, 426—427).—Bobbins or cheeses of yarn are placed in a closed chamber (described), which is then almost completely exhausted of air before admission of steam at > the b.p. of H_2O under the existing vac. conditions ; wrapping of the yarn packages with cloth before steaming is unnecessary. The H_2O content of the yarn is increased from 2·5 to 15·0%, as desired. A. J. H.

Modifications of cellulose. S. M. Neale (Amer. Dyestuff Rep., 1936, **25**, 287—289).—Existing knowledge and theories are reviewed. A. J. H.

Determination of lignin. I. Factors affecting the determination by the fuming hydrochloric acid method. M. J. Goss and M. Phillips. **II. Comparison of the modified fuming hydrochloric acid method and other methods commonly used.** M. Phillips and M. J. Goss (J. Assoc. Off. Agric. Chem., 1936, **19**, 341—350, 350—356).—I. A modified procedure is described (cf. B., 1932, 618).

II. The % of lignin in spruce wood and wheat straw, as determined by 4 methods, was progressively decreased by extraction of the material with $EtOH-C_6H_6$; with $EtOH-C_6H_6$ and hot H_2O successively ; and with $EtOH-C_6H_6$, hot H_2O, and 1% aq. HCl successively. The decrease was most marked with the 72% H_2SO_4 method (cf. B., 1932, 593), and least with the fuming HCl method, which is probably the most trustworthy. E. C. S.

Dissolution of chemically modified cotton cellulose in alkaline solutions. II. Comparison of the solvent action of solutions of lithium, sodium, potassium, and tetramethylammonium hydroxides. G. F. Davidson (J. Text. Inst., 1936, **27**, T 112—130 ; cf. B., 1934, 713).—Aq. LiOH and NMe_4OH (I) behave qualitatively like aq. NaOH, but their solvent powers are different in the order LiOH < NaOH < (I) at 15° and (I) < LiOH < NaOH at 0° and −5° ; they all have sharp max. of solvent power at concns. of 2—3*N*. The solvent power of (I), unlike that of the metallic hydroxides, increases with increasing concn. after a min. at 3·25*N* at 15°. Aq. KOH has much less solvent power, is much less affected by temp., and has two max. Regenerated cellulose and modified mercerised cotton have only one max. of solubility in aq. KOH. Addition of sulphates to 3*N*-NaOH diminishes the solvent power in the order Li $<$ Na $<$ K. If NaOH is progressively replaced by LiOH the solvent power passes through a max., but if replaced by KOH it shows a steady fall. The solubility of a modified cotton is but little affected by the presence of a second modified cotton. A. G.

Disintegration and dissolution of cellulose in concentrated solutions of salts. D. J. Gerritsen (Chem. Weekblad, 1936, **33**, 405—406).—Filter-paper is swollen and, if stirred or shaken, disintegrated by conc. aq. solutions of any salt yielding highly hydrated ions. The temp. at which this occurs for solutions, half saturated at 20°, of various salts is recorded. The swelling action decreases in the order $Ca(CNS)_2 > CaI_2 > CaBr_2 > Ca(NO_3)_2 = LiBr = ZnCl_2 > Mg(ClO_4)_2 > MgCl_2$. $Mg(NO_3)_2$, $Sr(NO_3)_2$, $Ba(NO_3)_2$, $CaCl_2$, and NH_4Cl have little or no action under these conditions. D. R. D.

Chemical processes in the preparation of straw-cellulose. R. S. Hilpert and A. Wolter (Angew. Chem., 1936, **49**, 231—235).—Straw was treated with Na_2CO_3, NaOH, Na_2SO_3, and NaOH + Na_2S, and the composition of the cellulose (I) and the lye studied. It is concluded that action of alkali does not merely effect separation of sol. and insol. products, but results in breakdown of large complexes. Na_2SO_3 yields a (I) showing a high lignin val., which, in absence of appreciable amounts of the material in straw (cf. A., 1935, 344), is explicable only if " lignin " arises by the action of acids. Straw-(I) obtained by the action of Na_2CO_3 has a higher tensile strength than that from the usual NaOH treatment. F. C. B. M.

Theory of the action of conical save-alls. H. Arledter (Papier-Fabr., 1936, **34**, 185—191, 196—198).—The mechanism of settling in conical save-alls, and particularly in the Arledter cone, is discussed. D. A. C.

Origin of carbon dioxide in sulphite [pulp] cooking. O. Routala and A. Parpola (Suomen Kem., 1936, **9**, B, 18).—CO_2 formed during cooking is largely derived from hexosans and pentosans. The amount produced is greater when a high-Ca than when a low-Ca sulphite liquor is used. A. G. P.

Bleaching [of pulp]. J. D. Rue (Paper Trade J., 1936, **102**, TAPPI Sect., 289—292).—A brief survey of recent advances, and a discussion of the relative importance of such factors as temp., consistency, p_H, agitation, etc. H. A. H.

Structure of paper-pulp fibres. W. Seifriz and C. W. Hock (Paper Trade J., 1936, **102**, TAPPI Sect., 250—252).—Micro-dissection of unbeaten and heavily beaten bleached sulphite pulp indicates that the striated structure of the fibrous cellulose, as seen with both light- and dark-field illumination, is a real property, and not due merely to surface irregularities or diffraction phenomena. The diam. of the primary fibril is estimated to be about 1·4 μ, and that of the secondary fibril to be 0·1—0·3 μ. Micro-dissection cannot yield any evidence regarding the presence of an interfibrillar cementing material. H. A. H.

Recent developments in the technology of lithographic papers. R. F. Reed (Paper Trade J., 1936, **102**, TAPPI Sect., 293—295).—Chemical wood papers for multicolour offset lithography should be made with a min. of beating, since well-beaten papers exhibit dimensional changes much more markedly with changes in moisture content. A fairly large directional difference in formation of the paper is desirable. Temp. control of the printing room is just as important as const. R.H. Paper best maintains its dimensions during printing if its initial moisture content is 0·5—1·0% above the min. equilibrium moisture content of the press-room atm. H. A. H.

Titanium pigments in papermaking. W. R. Willets (Paper Trade J., 1936, **102**, TAPPI Sect., 247—249).—A summary of recent progress. H. A. H.

Revision of methods for measuring the strength of paper. F. T. Carson (Paper Trade J., 1936, **102**, TAPPI Sect., 253—256).—The proposed TAPPI modifications for tensile and bursting strength tests of paper (B., 1936, 186) are criticised. Other limits of time during which the sample is under stress are suggested. H. A. H.

Fuzz in newsprint production. O. M. Mohn (Paper Ind., 1936, **18**, 194).—The importance of careful drying is emphasised. H. A. H.

Erratum.—On p. 635, col. 2, line 23 should read " The decolorisation of the (I) $\propto$ the content. . . ."

Waste-heat recovery from intermittent sources. Evaporation at low temp. with waste heat.—See I. **Fe-free Al salts [for paper].**—See VII. **Yeast from sulphite waste liquor.**—See XVIII. **Nitrocelluloses. Stability of nitrocotton.** See XXII.

Patents.

Treatment of bast fibre. L. Nordmann (U.S.P. 2,009,944, 30.7.35. Appl., 14.9.32. Ger., 21.9.21).—Flax straw (or other bast fibre plants) is partly disintegrated, and introduced in the air-dry condition into a perforated drum revolving in a chamber, where it is first dried by warm air, and subjected to a current of cool ionised air for about 1 hr. The incrustants can then be mechanically separated from the fibrous material. D. A. C.

Mechanically separating the mucin from the fibrous material in mechanical wood pulp or other fibre-containing mixture. W., H., and H. Voith (J. M. Voith) (B.P. 447,260, 13.8.34. Ger., 12.8.33 and 8.8.34).—The apparatus comprises a rotary screen having imperforate portions at which zones the pulp is diluted and scrubbed by pressure-H_2O. B. M. V.

Manufacture of wool-like artificial fibres. Zellstoff-fabr. Waldhof, and W. Claus (B.P. 447,812, 20.6.35. Ger., 30.1.35).—Freshly coagulated filaments pptd. in a bath operated under normal undisturbed conditions are removed therefrom while still plastic, and subjected to the action of an eddying gaseous medium (apparatus claimed), cut into staple form, and hardened. F. R. E.

Manufacture of vulcanised fibre. J. K. Anthony, Assr. to H. B. Fay (U.S.P. 2,008,432, 16.7.35. Appl., 29.8.31).—Fibrous cellulose sheet material is treated with a hydrating agent (conc. aq. $ZnCl_2$) and suitably supported while the internal mechanical cockling strains are eliminated by rendering the fibrous structure amorphous without destroying the gross contour. The material is then allowed to set and finally washed with H_2O. F. R. E.

Separating-sheet material. H. L. Thompson, Assr. to Nashua River Paper Co. (U.S.P. 2,017,449, 15.10.35. Appl., 3.5.33).—Flexible fibrous material is coated with an aq. solution containing 140 pts. by wt. of Na silicate, 15 pts. of glycerin, and a little wax emulsion. B. M. V.

Drying and converting cellulose into derivatives thereof. W. H. Kenety, Assr. to Cellovis, Inc. (U.S.P. 2,008,021, 16.7.35. Appl., 29.3.32).—Unbeaten, non-mercerised, H_2O-wet cellulose fibres are treated with a dehydrating liquid (EtOH) to replace H_2O, filtered to form a mat, and this is dried and shredded to a loose fluffy mass suitable for esterification etc. F. R. E.

Production of transparent materials [films, foils, plastic masses] from benzylcellulose. L. S. E. Ellis. From Soc. des Usines Chim. Rhône-Poulenc (B.P. 447,783, 20.12.34).—A small quantity (≯ 0·1%) of Cu as an inorg. or org. compound (sulphate, acetate, acetoacetate derivative) insufficient to cause substantial discoloration, is added to purified benzylcellulose. The product possesses increased resistance to light and heat. F. R. E.

Manufacture of paper. W. and M. Schwarz, and F. and E. Zschimmer (Zschimmer & Schwarz Chem. Fabr. Dölaw) (B.P. 448,611, 30.12.35. Switz., 31.12.34).—A mixture of an alkaline-earth salt of a fatty acid and a partly saponified resin is added to the pulp stock. The mixture should be free from alkali-metal salts. D. A. C.

Manufacture of [greaseproof or glassine] paper. G. L. Bidwell, Assr. to Riegel Paper Corp. (U.S.P. 2,011,609, 20.8.35. Appl., 21.2.33).—The paper (H_2O content on the paper-machine approx. 70%) is impregnated with molten wax by passing through a size-press (*S*); it is then dried to about 60% of H_2O and passed through a second *S* containing a plasticiser (aq. solution of glycerin, cerelose, and Na_2SiO_3) and finally dried and calendered. D. A. C.

Manufacture of carbon paper. I. Burgmer (B.P. 448,578, 4.4.35. Ger., 10.4.34).—The colouring material is applied to the paper in the solid state by crushing and spreading it on to the paper by a series of rollers. Paper of relatively low strength may be used. D. A. C.

Decalcomania prints and papers. J. Maclaurin (B.P. 447,230, 4.6.35).—Reagents [*e.g.*, $Fe(NO_3)_3$ + phenolphthalein] having strong identifying colour reactions, but without action on the adhesive, are incorporated in the backing sheet and/or adhesive of decalcomania paper. The identifying colour is produced by subsequent addition to the paper of suitable reagents (*e.g.*, KCNS and NaOH). D. A. C.

Production of [crêped] textile yarns and fabrics. H. Dreyfus (B.P. 448,621, 7.12.34).

Heat-insulating materials. Determining moisture in textiles etc.—See I. **Wax emulsion.**—See II. **Plaster board.**—See IX.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Bleaching plushes and velvets—silk and rayon mixture fabrics. C. F. Eftonham (Silk J., 1935, **12**, No. 134, 23—24).—H_2O_2, mixed with a little NH_3 or Na silicate, is principally used. This bath is tested for alkalinity and raised to 40°. SO_2 or $NaHSO_3$ in cold solution may also be used, in which case there is no danger of saponification of the rayon. $Na_2S_2O_4$ is used for tussah silks. Ch. Abs. (*e*)

Dyeing in Japan. H. Leopold (Text. Colorist, 1936, **58**, 407—408, 418).—Commercial developments are described. A. J. H.

Imitation embroidery linens. C. Garrett (Text. Colorist, 1936, **58**, 413).—Dyeing and finishing methods are described for cotton fabrics made with slub yarns to imitate linen fabrics. Beetling is essential to obtain the correct finish. A. J. H.

[Fastness of dyed] cotton material in acid cross-dyeing. G. H. Worme (Text. Colorist, 1936, **58**, 371—375, 422).—Data are given relating to the behaviour of dyeings on cotton of numerous specified azoic (I), direct (ordinary and Fixanol-treated), Benzo Fast Copper (I.G.), vat (II), basic (III) (on a Katanol mordant and also after-treated with Katanol), S, and mineral dyes when present with wool being dyed with acid and chrome dyes. Only (I), (II), (III) (*e.g.*, Me-violet-2B and Victoria-blue B), Prussian-blue, and mineral khaki have satisfactory fastness. A. J. H.

Increasing dyeing fastness [on textiles]. Anon. (Silk & Rayon, 1936, **10**, 462, 464).—Recent processes and chemical auxiliaries are reviewed. A. J. H.

Faults in goods knitted from mercerised [cotton yarns]. J. Pinte (Rev. gén. Mat. Col., 1935, **39**, 472—480).—Changes in the dye affinity, tensile strength, and lustre of cotton yarn as produced by variations of the conditions of concn., temp., time, and tension during mercerisation with aq. NaOH were measured. Unequal stretching of the yarn during mercerisation contributes most to subsequent uneven dyeing of the knitted material, especially when the stretching is such as to leave the yarn about 2% longer than the original length; this irregularity is more apparent in dark than in light shades. In large-scale mercerisation, irregularities of stretching were traced to unequal lengths of the cotton skeins before mercerisation, and unequal contact with the aq. NaOH. Uneven thickness of the yarn as produced by irregularities in stretching during mercerisation contributes inappreciably to uneven appearance of the knitted goods. Irregularities of mercerisation are revealed more prominently in warp- than in circular-knitted fabrics. A. J. H.

Moiré effects on rayon fabrics. G. S. Ranshaw (Silk & Rayon, 1936, **10**, 464, 466).—Processes for producing a "moiré" finish by pressing (calendering) two ribbed fabrics together face-to-face or by embossing (engraved steel bowl) are described. A. J. H.

New starch treatments for sizing and finishing. Anon. (Text. Merc. & Argus, 1936, **94**, 551).—Methods for solubilising starch (without simultaneous formation of appreciable amounts of dextrin and glucose) with NaOCl and NaOBr are described. A. J. H.

Determination of aluminium [for textile purposes]. Anon. (Text. Colorist, 1936, **58**, 394).—Old and new methods are described. A. J. H.

Bleaching pulp.—See V. **Stainless steel for textile-treatment plant.**—See X.

Patents.

Dyeing with vat dyes. J. Y. Johnson. From I. G. Farbenind. A.-G. (B.P. 436,942, 15.3.34).—There is added to the vat an alkali-stable, non-aromatic, basic-reacting compound containing N^{III} or N^{V} and $\nless$ 1 open-chain hydrocarbon or substituted hydrocarbon group $> C_5$, *e.g.*, dodecyltriethylenetetramine hydrobromide, or $C_{12}H_{25}\cdot NMe_3Br$ (or its reaction product with methyl-lauryltaurine), or the product of $(CH_2)_2O$ with $C_{12}H_{25}\cdot NH\cdot C_2H_4\cdot OH$ or with $C_{18}H_{37}\cdot NH_2$. It is advantageous to add also a dispersing agent, *e.g.*, sulphonated oleylethylaniline or highly sulphonated castor oil. Level through dyeings are obtained. C. H.

Manufacture of [brown to black] dyes [by oxidation] on cellulosic fibres. I. G. Farbenind. A.-G. (B.P. 438,047, 10.5.34. Ger., 10.5.33).—The material is printed or slop-padded with an α-$C_{10}H_7\cdot OH$ having a free 2-position, an alkaline reagent, and an oxidant ; the colour is developed by steaming in a Mather–Platt. Examples are 1 : 5-, 1 : 4-, 1 : 8-, 1 : 7-dihydroxynaphthalenes, or 1 : 5-dihydroxynaphthalene and 5 : 8-dihydroxy-1 : 4-naphthaquinone. C. H.

Dyeing and printing of vegetable or artificial textile materials. J. Y. Johnson. From I. G. Farbenind. A.-G. (B.P. 438,508, 12.3.34).—Non-basic dyes containing $\nless$ 1 SO_3H or CO_2H are used in presence of a H_2O-sol., non-sulphonated, org. compound, which forms a salt with the dye and contains $\nless$ 1 group $> C_5$ and $\nless$ 1 basic-reacting As^{V}, Sb^{V}, P^{V}, or Si^{IV} atom ; preferably a protective colloid is present. Suitable compounds are $PEt_3(C_{12}H_{25})Br$ and $SMeEt(C_{16}H_{33})OH$. C. H.

Printing or padding of native or regenerated cellulose fibres or animal fibres. Soc. Chem. Ind. in Basle (B.P. 437,977, 4.7.34. Switz., 8.7.33).—There is added to the printing colour or discharge paste *p*-toluenesulphonamide or other assistant of formula $R(SO_2\cdot NHR')_n$ or $R(SO_2\cdot NR'_2)_n$, where R = alkyl, Ph, or $C_{10}H_7$, $R' = H$ or an org. group free from CO_2H groups, $n = 1$, 2, or 3, the substance not being a dye. C. H.

Printing of fabric [on one face only]. A. M. Schwarzschild (B.P. 446,592, 10.12.24. Ger., 14.11.34).—A double or 2-ply fabric constructed with two fibres having different dyeing properties so that one fibre forms one face and the second fibre the other is used (*e.g.*, silk + cotton, viscose + acetate rayons, viscose rayon + wool). Printing is effected with a paste containing dyes having an affinity for the fibre in the face of the fabric to which it is applied, but not for the other fibre ; penetration of the pattern to the under-side of the fabric is thereby avoided. A. J. H.

[Thread-]dressing composition. H. H. Freund, Assr. to Du Pont Rayon Co. (U.S.P. 2,017,242, 15.10.35. Appl., 1.6.32).—A non-aq. composition comprises mineral oil (approx. 75), animal or vegetable oil (olive) (20), kerosene (3), and a phosphatide (lecithin) (2%). B. M. V.

Production of non-inflammable and non-hygroscopic fibrous material. Brit. Thomson-Houston Co., Ltd. (B.P. 446,379, 21.6.35. Ger., 25.6.34).—Cotton, linen, etc. materials used for electrical insulation purposes are impregnated with an EtOH solution of neutral or feebly acid urea phosphates and a difficultly combustible natural or synthetic resin [*e.g.*, PhOH–, urea–, or $CS(NH_2)_2$–CH_2O condensation products] and then dried and the resin rendered insol. by heat. A. J. H.

Waterproof material made of fibrous cellulose for floor coverings etc. A. Benda (B.P. 446,552, 21.3.35. Czechoslov., 21.3.34 and 5.3.35).—Strips or boards of chemical or mechanical pulp or half-stuff are grooved (to give flexibility), dried, and then waterproofed by coating with tar, asphalt, resins, etc. A. J. H.

Production of effects on filaments, yarns, straws, or the like, or fabrics containing such materials. Brit. Celanese, Ltd., J. Allan, and J. A. Wainwright (B.P. 447,540, 17.10.34).—Materials composed of org. derivatives of cellulose (I) are treated with a suspension of a finely-divided effect material (powdered metal) in a bonding solution, composed of a film-forming substance (cellulose acetate, polymerised vinyl acetate) dissolved in a medium containing 25—50% of a volatile solvent for (I), a non-solvent for (I), and a plasticiser. F. R. E.

Preparation of cops of rayon for dyeing or analogous fluid treatment. J. Brandwood (B.P. 448,785, 13.12.34).

Automatic control of washing or dyeing machines. S. H. Ribbans and W. F. Fordham (B.P. 447,359, 16.8. and 30.10.35).

Rubber essence.—See XIV.

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

Use of nitrous gases for intensive manufacture of sulphuric acid. V. N. Shulz (Chem. Eng. Cong. World Power Conf., 1936, *L*10, 13 pp.).—The development of the manufacture of H_2SO_4 by the tower process in U.R.S.S. is described ; an output of 1·875 kg. (calc. as 100% H_2SO_4, *d* 1·65) is now obtained per cu. m. per hr., with a HNO_3 loss of 8 kg. per (metric) ton. L. C. M.

Vanadium catalysts for sulphuric acid production. G. K. Boreskov (Trans. VI Mendeleev Congr. Theor. Appl. Chem. [1932], 1935, **2**, Pt. I, 159—166).—The catalyst " POV " is a zeolite-like combination containing V_2O_5, SnO_2, BaO, and K_2O. The velocity of oxidation of $SO_2 \propto [SO_2]$ and $[SO_3]^{-\frac{1}{2}}$. The velocity coeff. falls quickly below 440° owing to formation of V sulphoxide. The catalyst is less readily poisoned than are Pt catalysts. Ch. Abs. (*e*)

Nomograph for calculation of mixtures of oleum and sulphuric acid. O. S. Davis (Chem. Met. Eng., 1936, **43**, 150).—A chart is given for calculating the ratios of oleum and H_2SO_4 of different concns. that must be mixed to produce acid of a required concn. D. K. M.

Gas balance of the ammonia synthesis. V. N. Golovanov (Trans. VI Mendeleev Congr. Theor. Appl., Chem. [1932], 1935, **2**, Pt. I, 195—202).—A discussion of factors influencing the cycle. Ch. Abs. (*e*)

Apparatus used for ammonia synthesis, criticised from a technological point of view. K. F. Pavlov (Trans. VI Mendeleev Congr. Theor. Appl. Chem. [1932], 1935, **2**, Pt. I, 174—194).—A discussion. Ch. Abs. (*e*)

Extraction of potash from sunflower ash. P. A. Senokosov (J. Appl. Chem. Russ., 1936, **9**, 889—894).—The chief difficulty in extraction of K_2CO_3 from the ash lies in the presence of colloidal products (residual org. constituents and silicoaluminates). The time required for extraction is halved by moistening the ash to a H_2O content of 22·7%, and drying in a current of air after 14 hr.; under these conditions irreversible coagulation of a considerable part of the colloids takes place. R. T.

Separation of alkali-metal chlorides, sulphates, and nitrates by flotation. S. A. Kuzin (J. Appl. Chem. Russ., 1936, **9**, 819—833).—Flotation of NaCl or KCl from their conc. aq. solutions in presence of oleic acid (I) is at a max. at p_H 7—8; with octoic acid the optimum p_H is 6—8·5. In solutions saturated with respect to both KCl and NaCl, the flotability (*F*) of NaCl is increased from 80% to 90%, whilst *F* of KCl is reduced to zero, at p_H 4—11. Similar, although less marked, effects are obtained for separation of $NaNO_3$ from KNO_3. 100% flotation of NaCl from solutions containing $NaNO_3$ is obtained with low concns. of (I) or (II) in presence of $Pb(NO_3)_2$ (III); a similar effect is found for KCl-KNO_3 mixtures. The *F* of KNO_3 falls to zero in presence of 40% NaCl. Complete separation of $NaNO_3$ from KCl in conc. solutions was not successful, although in presence of (III) the concentrate contained considerably more KCl than the tailings. 96% flotation of K_2SO_4 is obtained, using (I) or (II), from solutions also containing KCl, at p_H 3·8—6·5; in presence of NaCl the *F* of K_2SO_4 falls practically to zero, at p_H 6. Depression of *F* of K salts in presence of Na is ascribed to the action of Na soaps. R. T.

What the meat packer looks for in salt. C. R. Moulton (Food Ind., 1935, **7**, 167—168).—Alkaline salt favours, and acid salt inhibits, bacteria causing hide damage. Rock salt is usually sufficiently acid for curing. Mg and Ca salts are without effect on curing. Ch. Abs. (*p*)

Decomposition of raw phosphate with sulphuric acid. I, II. H. Lehrecke (Chem.-Ztg., 1936, **60**, 493—496, 516—517).—A lecture. E. S. H.

Composition and properties of superphosphate. IV. Free acids in fresh superphosphate. W. L. Hill and K. C. Beeson (J. Assoc. Off. Agric. Chem., 1936, **19**, 328—338; cf. B., 1935, 723).—An equation is given relating the total free acid to free H_3PO_4 and the predominant free F acid, which is probably HF. Methods of determination are discussed, and the changes due to ageing and the influence of temp. of curing are shown in graphs. E. C. S.

Analysis of superphosphates by precipitation of ammonium phosphomolybdate. H. Terlet and A. Briau (Ann. Falsif., 1936, **29**, 287; cf. B., 1936, 191).—The authors' method is slightly modified to prevent pptn. of sulphomolybdates. E. C. S.

Granular [calcium] carbide and its characteristics. K. Hibi (Chem. Eng. Cong. World Power Conf., 1936, *L*7, 19 pp.).—Molten CaC_2 is atomised with gas under high pressure, granules 1—5 mm. diam. being obtained; the product is suitable for the manufacture of $CaCN_2$, and its use in high-pressure C_2H_2 generators is discussed. Surface efflorescence occurs on storage, and the hydrated layer prevents further absorption of H_2O. L. C. M.

Oceans of raw material for magnesium compounds. P. D. V. Manning (Chem. Met. Eng., 1936, **43**, 116—120).—Sea-H_2O containing Mg$\equiv$2·2 g. of MgO per litre is chlorinated and treated with $Ca(OH)_2$ to ppt. $CaCO_3$. After sedimentation and filtration $Mg(OH)_2$ is pptd. with specially prepared milk-of-CaO. The ppt. is thickened, washed with H_2O, and collected on a special automatic intermittent filter. $Mg(OH)_2$ is made into a slurry and carbonated with flue gas, and the Mg carbonate filtered on an Oliver filter, yielding a cake containing 85% of H_2O. This is dried in a thermostatically controlled spray dryer. Corrosion problems are solved by the use of wood, monel metal, high-SiO_2 cement, glyptal lacquers, and rubber. Eight varieties of Mg carbonates are produced. D. K. M.

Alums and aluminium sulphate. J. B. Umhau (U.S. Bur. Mines, Inf. Circ. 6882, April, 1936, 32 pp.).—The raw materials and methods of manufacture, properties, and uses of the products are described, with statistics. D. K. M.

Electrolytic method of removing small quantities of iron from solutions of aluminium salts. W. Palmaer (Chem. Eng. Cong. World Power Conf., 1936, *D*10, 8 pp.).—Fe present in $Al_2(SO_4)_3$,aq. prepared by acting on clay with H_2SO_4 can largely be removed by electrolysis with a Hg cathode, the Hg being kept in rapid circulation and the Fe removed therefrom by regeneration externally. The product is utilised in the paper industry. After ignition the resulting Al_2O_3 contains approx. 0·05% Fe and hence may replace bauxite in the technical Al cell. J. W. C.

The iodine combine: its connexions with the Chili nitrate industry. L. M. Bernard (Chim. et Ind., 1936, **35**, 527—532). E. H. B.

Substitute for pyrogallol in gas analysis. T. Zikeev (Novo. Tekh., Seri. Gorno-Rud. Prom., 1935, No. 11, 12).—A solution of $Na_2S_2O_4$ (20), KOH (10), and H_2O (70 pts.) is used. Ch. Abs. (*e*)

Reactions at high pressures. Crystallisation.—See I. **Decomp. of $CaSO_4$ during coal carbonisation. H_2 from gases containing CH_4.**—See II. **Horizontal revolving [pyrites] kiln.**—See X. **Cr and TiO_2 pigments. Drying pigments.**—See XIII. **Conc. phosphate fertilisers.**—See XVI. **Determining halides in photographic materials.**—See XXI.

Patents.

Packing of acid sulphates and the like compounds. L. Löwenstein (U.S.P. 2,020,072, 5.11.35. Appl., 29.6.34. Ger., 1.9.30).—Acid sulphates and the like capable of destroying paper bags on storage are safely packed by enclosing the paper container in an outer carton containing an alkali carbonate or bicarbonate completely surrounding the inner carton. D. M. M.

Oiling of calcium cyanamide. R. I. Blackburn. From Bayerische Stickstoff-Werke A.-G. (B.P. 448,309, 6.8.35).—Oiling is effected immediately after nitrogenation and grinding, while the temp. is about 100°, so as to prevent formation of lumps and promote the coating with oil. Residual CaC_2 may be removed by adding H_2O simultaneously with the oil, the drum being cooled, if necessary, to avoid a rise in temp. above 100°. W. J. W.

Machine for making chemical [artificial] asbestos. C. C. Whittier (U.S.P. 2,018,478, 22.10.35. Appl., 16.1.33).—Fused material of suitable composition is allowed to fall in a thin stream axially and vertically through a chamber around the walls of which a temp.-adjusting flame is kept whirling ; the product is then drawn into filaments, *e.g.*, by the draught generated by and the air layer entrained on the surface of a roller rotating with a peripheral speed of 3000—6000 ft. per min. B. M. V.

Recovery of carbon dioxide from a gas mixture. C. H. Vosburgh, Assr. to H. W. Cole (U.S.P. 2,017,779, 15.10.35. Appl., 18.4.31).—CO_2 is conc., to a purity suitable for beverages, refrigeration, etc., by absorption (after scrubbing with H_2O) in about 3 masses of activated C or other adsorbent of diminishing size, used alternately with 3 other masses and regenerated by steam. B. M. V.

Apparatus for measuring the acidity of gases. South Metropolitan Gas Co., and H. D. Greenwood (B.P. 448,234, 17.1.36).—A standard oxidising and absorbing solution (H_2O_2) is passed in contact with a sample of the plant gases containing SO_2 and oxides of N, both fluids flowing at a const. rate, and the conductivity of the solution after the absorption is determined in a cell containing Pt plates. B. M. V.

Compressing corrosive gases.—See I. **Fertiliser.**—See XVI.

VIII.—GLASS ; CERAMICS.

Stoneware in chemical plant construction. A. Hickman, G. N. Hodson, and W. E. Spiers (Chem. Eng. Cong. World Power Conf., 1936, *B*3, 20 pp.).—The development of modern stoneware, its properties, correct use, and future possibilities are discussed. The correct method of installation of a stoneware tank is described in detail. The difference in physical properties (*e.g.*, thermal expansion and conductivity etc.) of stoneware and metal must be taken into account when the two materials are installed in conjunction. J. A. S.

Refractories for use in carbonising furnaces. A. T. Green and F. H. Clews (Chem. Eng. Cong. World Power Conf., 1936, *B*2, 37 pp.).—The following subjects are discussed : life and causes of failure of retort settings, the physical changes in SiO_2 in relation to the use of SiO_2 refractories, the " under-load " softening of SiO_2–Al_2O_3 refractories, the action on refractories of gases containing H_2O, carbonaceous and Fe compounds, and alkali chlorides, slag attack and spalling in vertical retorts, and jointing cements. J. A. S.

Testing and effect of reducing gases on grog bricks for blast furnaces. Y. Tadokoro (Chem. Eng. Cong. World Power Conf., 1936, *B*8, 16 pp.).—A comprehensive investigation of the properties of 30 Japanese refractories suitable for blast-furnace use is described. The disintegration of a brick by CO was most pronounced at 700°, but appeared to be independent of the Fe_2O_3 content. J. A. S.

New Canadian refractories and their applications. F. E. Lathe (Chem. Eng. Cong. World Power Conf., 1936, *B*1, 19 pp.).—Newly developed applications of Grenville (Canada) dolomite are described. Refractories consisting essentially of SiO_2, CaO, and MgO (up to 78%) were stabilised by the use of such agents as Fe_2O_3, Cr_2O_3, etc. and maintaining a CaO/SiO_2 ratio of 1·4—4·0. Refractories of this type are suitable for rotary cement kilns etc. A highly-spalling, resistant refractory consisting of 30% of coarse chromite + 70% of fine MgO–CaO material is suitable for cement kilns and limekilns, steel, Cu, and Ni furnaces. Corresponding plastic and air-setting refractories and an acid refractory cement were developed. J. A. S.

Red hearts in firebrick and fireclay shapes. C. M. Dodd and S. R. B. Cooke (Amer. Refr. Inst. Tech. Bull., 1935, No. 56, 8 pp.).—If C is allowed to remain in ferruginous clay until a good red heat is reached, reduction of Fe is inevitable and it cannot be reoxidised. Red core is due to a reddish-brown film on the surface of the clay grains. On analysis these spots show some form of Fe. Ch. Abs. (*e*)

Furnace atm. Fused SiO_2 in furnaces. Reactions in the solid state.—See I. **Refractories in C black manufacture.**—See II.

Patents.

Glass-tank furnaces and manufacture of glass therein. Hartford Empire Co., Assees. of V. Mulholland (B.P. 447,228, 18.5.35. U.S., 13.6.34).—The melting (1), refining (2), and tempering (3) zones are separated by weirs ; (1) and (2) are provided with separate sources of heat, that in (1) being more intense at the point most remote from the feed so that convection stirring is obtained. Transverse circulation is minimised by the use of non-conducting side walls, but in (2) transverse convection currents are encouraged by the application of max. heat along a central line. B. M. V.

Frosting of glass bulbs (A) for incandescence lamps, (B) in gradation. Y. Sakakura (U.S.P. 2,017,733 and 2,018,422, [A] 15.10.33, [B] 22.10.33. Appl., [A] 5.5.33, [B] 29.8.32).—(A) The bulb is coated internally with an aq. solution containing (per litre) 200 g. each of an alkali silicate and Na_2CO_3 and baked at 350°. (B) The bulb is filled with $NaHF_2$ solution and dipped to a varied extent in a heat-transmitting bath which is heated from the bottom. B. M. V.

Safety glass. Brit. Celanese, Ltd. (B.P. 448,209, 3.9.35. U.S., 28.9.34).—The sheet comprises glass (*G*), a cellulose ester (*C*) (preferably the acetate, 0·002—0·015 in. thick), artificial resin (*R*), *C* and *G* again, and is subjected to heat and pressure. The acid radical of *R* contains a vinyl or substituted vinyl group, *R* being preferably Et acrylate which, before polymerisation, can be marked with the finger nail. B. M. V.

Manufacture of ceramic-like articles. N. V. Maats. tot Beheer en Exploit. van Octrooien (B.P. 448,293, 8.4.35. Fr., 11.4.34. Addn. to 428,329 ; B., 1935,631).—Articles prepared by the prior process are sintered at a high temp. in order to increase their strength and *d.* J. A. S.

Treatment of glazed ceramic ware. W. McCoy (U.S.P. 2,017,318, 15.10.35. Appl., 6.10.31).—Crazing of tiles etc. when in position on cement walls etc. is stopped by impregnating either the tiles after firing or the cement backing with an inorg. deliquescent compound, *e.g.*, $BaCl_2$, $BaCO_3$, $MgCl_2$, $CaCl_2$, $SnCl_2$, HCl, HNO_3, $H_2C_2O_4$, AcOH, picric acid. B. M. V.

Production of moulds, particularly for use in dentistry. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 447,478, 12.11.34).—The investment comprises (1) a ceramic material hardenable by burning, (2) Al_2O_3, MgO, ZnO, or other compound which will react with H_3PO_4 to form a new compound hardenable at room temp., and (3) a solution of a phosphoric acid or an ester thereof. B. M. V.

Production of magnesia refractories. Harbison-Walker Refractories Co., Assees. of F. A. Harvey and R. E. Birch (B.P. 448,276, 22.12.34. U.S., 4.1.34).—Granular MgO (with a minor proportion of " chrome " if desired) is bonded by 5—35% of natural or artificial forsterite ($2MgO,SiO_2$), which remains as a cryst. bond even up to 1600°. [Stat. ref.] B. M. V.

Manufacture of grinding and polishing bodies. Deuts. Gold- u. Silber-Scheideanstalt vorm. Roessler (B.P. 448,102, 22.10.34. Ger., 7.11.33).—A mixture of abrasive grains and heat-hardenable resin is arranged to be gas-evolving by addition, if necessary, of another substance. The article is formed by cooking in a mould, the upper part of which is gas-permeable, under conditions to remain permeated with cavities. B. M. V.

Manufacture of artificial grindstones for pulp grinding. R. C. Benner, Assr. to Carborundum Co. (U.S.P. 2,017,228, 15.10.35. Appl., 14.11.34. Can., 1.6.31).—The stones are formed of SiO_2 and $Ca(OH)_2$, the former consisting of a mixture of several specified sizes. B. M. V.

Preparation of abrasive or polishing tools. H. P. Mills, Assr. to Bakelite Corp. (U.S.P. 2,008,723, 23.7.35. Appl., 26.4.32. Ger., 13.5.31).—Grains of an abrasive, *e.g.*, emery, are wetted with a liquid phenol–aldehyde resin containing a free phenol (I) ; an agent, *e.g.*, $(CH_2)_6N_4$, furfuraldehyde, is added to combine with (I) together with a solid, heat-hardenable phenol–aldehyde resin, and the whole is moulded and heated. S. M.

Coating of abrasive grains. Carborundum Co. (B.P. 448,342, 5.12.34. U.S., 16.12.33).—Non-adherent, bond-covered grains are prepared by coating them with bonding material (*e.g.*, synthetic resin) and suspending in a fluid medium (air or liquid, according to the type of bond) until the bond has hardened. The bond may be of the type which hardens by evaporation of a solvent, by chilling, by the action of heat, or by oxidation. J. A. S.

Granule-coated webs. Carborundum Co. (B.P. 447,615, 21.11.34. U.S., 22.11.33).—An unctuous material, *e.g.*, mica, graphite, or Al powder, is incorporated to prevent adhesion of particles of the material being sandpapered. B. M. V.

Processes and plants for artificial drying of ceramic products, and in particular of tiles and bricks. J. B. Monnier (B.P. 448,675, 30.12.35. Fr., 17.1.35).

Rotary-drum furnaces.—See I. **Synthetic balsam [for safety glass etc.].**—See XIII.

IX.—BUILDING MATERIALS.

Weathering of buildings. T. McLachlan (Chem. & Ind., 1935, 1100).—Blackening of stone may result from growth of fungus later fossilised in $CaSO_4$ by symbiotic action. Corrosion of stone, brick, and cement has a biological explanation. E. H. B.

Synthetic and natural antitermitic substances. V. M. Trikojus (J. Proc. Australian Chem. Inst., 1935, **2**, 171—176).—Cellulose blocks were exposed to termites after treatment with 1% of compounds related to citronellic acid which occur in resistant woods. Blocks treated with β-butyl-Δ^{β}-hexenoic acid showed slight attack. No attack occurred on blocks treated with γ-methyl-Δ^{β}-nonenoic acid, *d*- or *l*-citronellic acid, or *d*-dihydrocitronellic acid. Ch. Abs. (*e*)

Composition of veined and normal beechwood. L. Tanner (Suomen Kem., 1936, **25**, B, 17).—Ash, dry matter, and sugar contents are higher in veined wood. A disturbed metabolism is indicated in the latter. A. G. P.

Wood substances. IV. Constituents of deciduous woods from the river region of Jalu-Kang, Antung. K. Nishida, R. Miyama, and H. Hashima (J. Cellulose Inst., Tokyo, 1936, **12**, 27—29 ; cf. B., 1936, 456).—The physical and chemical properties of a no. of indigenous woods are listed. H. A. H.

Methods of applying wood preservatives. I. Non-pressure methods. J. Bryan (Forest Prod. Res. Rec., 1936, No. 9, 17 pp.).—Recommendations are made for the most efficient methods of applying preservatives by surface treatment, steeping, and open-tank treatment. Non-aq. liquids such as creosote are mainly dealt with. In the hot-and-cold, open-tank process, timber is immersed in cold creosote, which is then heated to approx. 200°, and allowed to cool with the timber submerged. This cycle is repeated until required degree of penetration is obtained. E. A. R.

Reactions in the solid state. Testing heat-insulating materials.—See I. **Road tar.**—See II. **Refractories.**—See VIII.

Patents.

Road-surfacing material. J. E. Moody (U.S.P. 2,017,632, 15.10.35. Appl., 30.1.33).—Dry hard aggregate is mixed with hard asphalt with violent agitation at temp. above the m.p., the mixture is cooled with agitation until the coating on the particles has set, a softer asphalt is added, and violent agitation repeated to convert the mixture into a fluffy aërated mass, at which point a powdered filler is added. B. M. V.

Composition for manufacture of artificial stone. C. H. Hagopian (U.S.P. 2,018,355, 22.10.35. Appl., 1.12.33).—An aq. solution of $MgSO_4$, H_2SO_4, $MgCl_2$, $Cr_2(SO_4)_3$, K_2SO_4, and MgF_2 is mixed with casein, a hydrous silicate, calcined $MgCO_3$, borax, an inert substance, and a waterproofing agent (tung oil), to form a plastery mass. B. M. V.

Manufacture of light-weight aggregates. C. W. Bowyer (U.S.P. 2,017,889, 22.10.35. Appl., 29.7.32).—" Rock sponge " is manufactured by spraying a stream of molten blast-furnace slag with just sufficient H_2O under high pressure to solidify the slag after allowing time for the occluded gases to expand the slag without allowing them to escape. The strength of this material is increased by fritting and agitating with a small proportion of a cindery fuel until the surface alone is glazed and the C burned away. Additional strength (but with increased *d*) may be attained by admixture prior to fritting of $\ngtr 1 : 1$ of ordinary granulated slag. B. M. V.

Manufacture of vermiculite bonded material. J. Keeth, Assr. to Universal Insulation Co. (U.S.P. 2,017,904, 22.10.35. Appl., 4.5.32).—" Jefferisite " is exfoliated by heating and grinding, the product (*V*) is mixed with comminuted vegetable fibre (*F*), and the mixture (*M*) dehydrated for transport and storage. Prior to use *M* can be re-hydrated with recovery of plasticity, *V* being the binder and *F* the filler.

B. M. V.

Apparatus for drying wood. V. Lacasse and E. Coolen (B.P. 447,752 and Addn. B.P. 447,806, 23.10.34. Ger., 24.10.33).—(a) The timber is heated in a sealed chamber and suction applied as evenly as possible. (b) Automatic mutual control between the heating medium and vac. pump is described. A compartment for impregnation of the dry timber with microbicide vapour is added. B. M. V.

Manufacture of plaster board. Jointless Walls & Ceilings, Ltd., E. F. MacTaggart, and O. Margetson (B.P. 447,541, 20.8.34).—In the prep. of 2-, 3-, or 4-ply material, the plaster is spread dry and moistened afterwards. B. M. V.

[Concrete-bitumen] road surfaces. A. Ryner (B.P. 448,112, 28.11.34).

Determining moisture in wood etc. Drying of materials [plaster boards].—See I. **Floor coverings.**—See VI. **Treating glazed ceramic ware.**—See VIII.

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

Probable development of the profiles of blast furnaces. E. Cotel (Rev. Mét., 1936, 33, 253—257).—Advantages of furnaces of the double-cone type and those having straight walls are compared. It is claimed that the latter type would allow a decrease in height for the same tonnage, and would cut down to a large extent the formation of blast-furnace dust. W. P. R.

Oxygen-enriched blast for blast furnaces. M. Paschke (Z. Ver. deut. Ing., 1936, 80, 218—219).—A review. R. B. C.

High-frequency furnaces in steel works. D. F. Campbell (Rev. Mét., 1936, 33, 247—252).—A general description. W. P. R.

Smelting of low-grade German iron ores. H. Röckling (Z. Ver. deut. Ing., 1936, 80, 293—295).—Results of direct smelting of these ores in the blast furnace without previous enrichment are given. Good steel may be obtained by employing a furnace slag containing $< 45\%$ of CaO and $> 31\%$ of SiO_2. The working of acid ores without the usual CaO-rich slags makes addition of Mn ore in the charge for Bessemer pig Fe uneconomical, because of the large amount of slag produced. The resulting high S content of the pig can be reduced to safe limits by treatment with soda. Special precautions are necessary when operating the Bessemer converter on account of the high Si content of the Fe.

R. B. C.

Oxidation of open-hearth slags and their formation during furnace operations. G. Husson (Rev. Mét., 1936, 33, 237—242).—The FeO content of an open-hearth slag may be considered to consist of free FeO and fixed FeO. The former is available for oxidation of the molten steel. It is suggested that a Fe^{II} silicate more acid than SiO_2,FeO will be deoxidising, and one more basic will oxidise the steel. The formation of slags in the initial stages of melting is determined chiefly by the fusibility curves of the FeO–SiO_2–CaO system. W. P. R.

Desulphurisation of pig iron and the general laws governing the desulphurisation of iron. H. Wentrup (Iron & Steel Inst., Carnegie Schol. Mem., 1935, 24, 103—166).—Starting from practical observations of the desulphurisation of pig Fe the author proceeds to a statement of the laws governing the desulphurisation of Fe in general. Attention is paid to the dissolution of S in slags, diminution of the power of Fe to dissolve S, formation of insol. sulphides, and desulphurisation by combinations of these processes. An explanation is offered of the effects of C, Si, and P associated with Mn in the Fe and of temp. on desulphurisation; it is indicated that the elimination of S depends on the presence of C, Si, and P and on the cooling of the Fe. E. H. B.

Distribution of sulphur between metal and slag in the basic and acid processes of steel manufacture. E. Maurer and W. Bischof (Iron & Steel Inst., May, 1936. Advance copy, 17 pp; cf. B., 1935, 951).—Measurements of the S distribution show that Mn and CaO are favourable to desulphurisation (*D*) and SiO_2, H_3PO_4, and P unfavourable. At higher temp. *D* is considerably improved. E. H. B.

Ternary system FeO–MnO–SiO_2. W. R. Maddocks (Iron & Steel Inst., Carnegie Schol. Mem., 1935, 24, 51—68).—Thermal analysis indicates a eutectic at FeO 50, MnO 20, SiO_2 30%, melting at 1170°. Solid phases are identified by *n* measurements and a ternary diagram is produced, the applications of which to acid open-hearth slags and the deoxidation of steel are indicated.

E. H. B.

Behaviour of five cast irons in relation to creep and growth of elevated temperatures. H. J. Tapsell, M. L. Becker, and C. G. Conway (Iron & Steel Inst., May, 1936. Advance copy, 27 pp.).—Study has been made of the creep and growth (of unstressed material) and the microstructural changes on heating of ordinary cast Fe (*A*), Ni–Cr cast Fe (Ni 0·67, Cr 0·34%) (*B*), Silal (Si 5·72%) (*C*), Nicrosilal (Si 4·43—5·84, Ni 18·67—

17·72, Cr 2·56—2·10%) (*D*), and Niresist (Ni 16·56, Cr 3·30, Cu 7·30%) (*E*). *A* and *B* retain useful strength at 538°, but rates of creep and growth are, in the as-cast material, too high for steam-plant materials. Heat-treatment at 650° reduces flow and growth by prior graphitisation of the pearlitic cementite. *C* has a low combined-C content and is more resistant to creep and growth at 538°. The austenitic constituent of *D* is unstable at 538° and 450° and the creep and growth are consequently rapid at these temp. The austenite of *E* is, however, stable and growth and creep at 450° and 538° are slow. At 850° *D* is somewhat superior to *E* as regards growth and creep and also forms a thinner and more protective scale. E. H. B.

Work of the Heterogeneity of Steel Ingots Committee. W. H. Hatfield (Iron & Steel Inst., Spec. Rept. No. 12, 1936, 43 pp. ; cf. B., 1935, 994).—A summary of the work carried out during the period 1924—1936 and a brief outline of the proposed research programme. E. H. B.

Mechanical properties of steels at high temperatures. M. Ros and A. Eichinger (Rev. Mét., 1936, **33**, 221—230).—Methods usually employed for creep tests on steels are described. The importance of microstructural changes such as the martensite → pearlite change during the course of testing at 500—600° is discussed. W. P. R.

Embrittlement of high-tensile alloy steels at elevated temperatures. W. E. Goodrich (Iron & Steel Inst., May, 1936. Advance copy, 17 pp.).—The effects of soaking at 200° and 450° for varying periods up to 2400 hr. of 27 high-tensile alloy steels have shown that mildly alloyed steels with Cr 0·6% and Mo 0·5% have the greatest resistance to embrittlement. Mo appears to have an inhibiting effect, and the greater are the Cr and Ni contents the greater must be the Mo content to make the steel resistant. Embrittlement was not influenced either by an applied tensile stress of 11 tons per sq. in. or by a permanent strain of 5·0%. Soaking for 2400 hr. at 450° did not markedly influence the hardness, but steels of similar composition were embrittled to a smaller extent if tempered at high temp. W. P. R.

Plasticity and rupture of steels at elevated temperatures. A. Portevin (Chim. et Ind., 1936, **35**, 525—526).—Rise of temp. simultaneously affects recrystallisation, η, diffusion, pptn., and coalescence. The influence of these factors on creep phenomena is discussed. E. H. B.

Internal stresses and their effect on the fatigue-resistance of spring steels. M. L. Becker and C. E. Phillips (Iron & Steel Inst., May, 1936. Advance copy, 16 pp.).—A max. compressive stress near the surface of quenched steels of 24 tons per sq. in. may be present in untempered, case-hardened, 5% Ni steels. Similar high compressive stresses can be induced in spring steels by quenching from the tempering temp., and such temper-stressing markedly improves the fatigue-resistance (*F*) of the springs. The high *F* of scragged spring-steel plates is probably due to the residual compressive stress near the tension surfaces. W. P. R.

Effect of surface conditions on fatigue-resistance of steels. G. A. Hankins, M. L. Becker, and H. R. Mills (Iron & Steel Inst., May, 1936. Advance copy, 27 pp.; cf. B., 1935, 634).—The effect of surface irregularities, caused by forging and rolling, in conjunction with surface decarburisation is dealt with. A semi-circular surface notch $\frac{1}{9}$ mm. radius reduces the fatigue-resistance (*F*) by $\frac{1}{2}$, but in presence of surface decarburisation *F* is reduced to $\frac{1}{3}$. A surface crack, however, has far greater effect than surface decarburisation. Recarburisation does not improve the *F* of Si–Mn and Cr–V steels, but does so in the case of plain-C and low-Cr steels. The effect of surface irregularities and decarburisation is not very noticeable in rolled mild-steel plate, but the *F* of unmachined, high-tensile steel forgings is much lower than the intrinsic val. of the material. W. P. R.

Influence of varying degrees of cold-rolling and annealing temperatures on properties of mild-steel sheets. I. Influence of cold-rolling and subsequent annealing temperatures on the Erichsen values and crystal structure of thin mild-steel sheets. C. A. Edwards, D. C. Phillips, and W. H. E. Cullick. **II. Effects of varying degrees of cold-rolling and annealing temperatures on properties of motor-car body sheets.** C. A. Edwards, D. L. Phillips, and C. R. Pipe (Iron and Steel Inst., May, 1936. Advance copy, 67 pp.).—I. Two classes of materials, viz., (*A*) basic steel with low S and P contents, and (*B*) acid steel with high S and P contents, have been investigated. Excessive crystal growth occurs if box-annealed *A* is cold-rolled 10% and then annealed at 700—800°. There is no sp. temp. range in which cold-rolling effects are removed in box-annealed *A*. For higher amounts of cold-rolling more complete softening occurs at 550—650°. For normalised *A* small initial grain size causes 20—30% reduction by cold-rolling to have the same effect as 40—50% reduction of box-annealed sheets. It is shown that even the impure acid steel *B* can be given excellent properties by heavy cold-rolling up to 100%, followed by annealing at 650°.

II. Steel sheet annealed below 900° after 5—15% cold-rolling is in an unsatisfactory condition. Presence of large ferrite grains causes excessive roughening of the surface if the steel is strained beyond the elastic limit. Presence of coarse ferrite grains may be indicated by low elastic limit and yield point, which increase as the grain size decreases. Material heavily cold-rolled and annealed at 650° has the highest ductility vals. and probably has as satisfactory drawing or pressing properties as steel sheet fully annealed at 950°. W. P. R.

Load-deflection fatigue test. Application to steels. J. W. Cuthbertson (Iron & Steel Inst., Carnegie Schol. Mem., 1935, **24**, 1—50).—A crit. investigation of the application of rapid fatigue testing to steel. With standardised conditions of test reliable vals. are obtained from room temp. up to 300°. E. H. B.

Speeding up the cementation of iron by means of metals. K. P. Bunin (Domez, 1935, No. 3, 33—35).—An Fe sample was heated for 3 hr. 40 min. in a bed of Fe–P at 970°. In a second test the temp. was varied intermittently from 880° to 970°. Presence of Fe in the bed accelerated diffusion of P into the sample in both cases. The intermittent-temp. method gave a 70% deeper diffusion than the const.-temp. method. Ch. Abs. (*e*)

Electrical resistivity of Faraday steels ; gas analysis and new phenomena on remelting in the radiation furnace. C. Benedicks (Iron & Steel Inst., May, 1936. Advance copy, 20 pp.).—The resistivity of 19 steels (prepared by Faraday) containing small proportions of Au, Ag, Pt, Rh, Cu, and Ni in addition to the normal constituents agree well with calc. vals. The gas contents of the steels have been measured in the radiation furnace ; H_2 and N_2 contents are normal, but the O_2 content is rather high. E. H. B.

High-tensile steels for structural purposes. J. Brunner (J. Soc. Western Eng., 1935, **40**, 103—108).—The results of physical tests on a low-C Cr–Si–Cu–P steel, a medium-C high-Mn–Si–Cu steel, and a medium-C Mn–Cr steel are tabulated. Ch. Abs. (*e*)

Forgings for the handling of fluids at high temperatures and pressures. H. H. Burton, W. H. Hatfield, and T. M. Service (Chem. Eng. Cong. World Power Conf., 1936, *A*1, 32 pp.).—An account is given of the requirements for steel tubes and vessels to be used at high temp. and pressures, the methods of manufacture of these articles, and the properties of the steels generally used. Alloy steels are being increasingly employed. Recent work on embrittlement and creep is reviewed. C. E. H.

Heat-, rust-, and acid-resisting steels. W. H. Hatfield (Chem. Eng. Cong. World Power Conf., 1936, *A*2, 33 pp.).—A comprehensive review of the chemical, physical, and mechanical properties, constitution, applications, and manipulation of these types of steels is given. C. E. H.

Stainless and acid-resisting steels [for textile-treatment plant]. Anon. (Silk & Rayon, 1936, **10**, 272—274, 467—468).—Full data are given relating to the composition of various Cr–Ni steels and their physical and chemical-resistant properties. A. J. H.

Cold-rolled non-corrosive steels of the austenite type. G. V. Akimov, F. F. Tschimuschin, and S. A. Vruzevitsch (Vestn. Metall., 1933, **13**, No. 9, 59—71).—Changes in the mechanical properties of steels (C 0·15—0·26, Cr 14·7—19·7, Ni 6·8—8·4%) in relation to the degree of rolling during cold-rolling with intermediate chilling were followed. Increase in the no. of chillings increased the ductility but not the tenacity. Cold-rolling will yield a non-corrosive steel with a max. strength of 150 kg./sq. mm. and an extensibility of $>$ 8%. The structure consists of deformed austenite with separation of uniformly distributed carbide. Ch. Abs. (*e*)

Transformations of austenite. S. S. Schteinberg (Ann. Sect. Anal. Phys.-Chim., 1936, **8**, 269—282).—A discussion. R. T.

Corrosion. T. M. Service (J. West Scot. Iron Steel Inst., 1935, **42**, 53—60).—A discussion. Differential aëration is held to be largely responsible for corrosion. Ch. Abs. (*e*)

Organic inhibitors of corrosion. C. A. Mann (Electrochem. Soc., Preprint, April, 1936, **69**, 354—366).—Tests were made on mild-steel samples at 25°, using org. substances containing N, O, and S. Increasing length of chain always increases effectiveness. The action of the amines is in the order *tert.* $>$ *sec.* $>$ primary. Certain aliphatic and aromatic ketones were used, but effectiveness was limited by low solubility. COPhMe gives 96% effectiveness in concn. of 0·25%. $n\text{-}C_5H_{11}\cdot SH$ is a very effective inhibitor. The % effectiveness plotted against concn. reaches a const. val. before 100% inhibition occurs. The adsorption of positive ions from the inhibitor on cathodic areas of metal is explained ; the structure of the ion determines its packing in the layer, and this controls the penetrability to $[H^{\cdot}]$. D. C. J.

Inhibitors in pickling. E. Jimeno, I. Grifoll, and F. R. Morral (Electrochem. Soc., Preprint, April, 1936, **69**, 367—375).—Of a no. of inhibitors examined at room temp. and at 72°, soot, Turkey-red oil, and glue are much the most effective. Experiments with a small Fe cathode showed the development of a cathodic overvoltage due to inhibitor with no corresponding anodic overvoltage, and this supports the view that action is due to adsorption on cathodic areas of the metal surface. D. C. J.

Factors influencing the rate of attack of mild steels by typical weak acid media. T. P. Hoar and D. Havenhand (Iron & Steel Inst., May, 1936. Advance copy, 27 pp.).—In citric acid and citrate buffers corrosion (*C*) of mild steel decreases as p_H rises from 1·98 to 4·89. In the more acid solutions *C* is accelerated by S in the metal or solution, owing to stimulation of the anodic process. *C* is retarded by Sn and Cd ions, which remove sol. sulphide, and by Cu in the metal. Massive cementite in the steel accelerates *C* by assisting the cathodic process. In less acid solutions these effects are less marked, and the supply of O_2 becomes important. Steel for use under conditions of acid *C*, *e.g.*, the steel base of tinplate, should be rimming steel with a Cu content $>$ twice the S content. E. H. B.

Corrosion of iron and steel. (Sir) R. A. Hadfield and S. A. Main (J. Inst. Civil Eng., June, 1936, No. 7, Paper No. 4989, 1—126).—The work of the Institution's Committee on the Deterioration of Structures Exposed to Sea-Action is reported. The materials used consisted of wrought Fe, charcoal Fe, and ingot Fe, mild and medium C steel and special alloy steels with Cu, Ni, and Cr, and two cast irons. They were exposed to the action of sea-H_2O—intermittently and continuously immersed—and to marine atm. at Auckland, Plymouth, Colombo, and Halifax. A statistical presentation of the results of 5 years' exposure is given. Although sea-H_2O attack appears to be somewhat indiscriminate, specimens from which rolling scale had been removed before exposure were more seriously corroded, the effect of scale being especially evident in its protection against pitting. A surprising conclusion of the work is that little advantage is gained by using highly alloyed steels in totally submerged positions. W. P. R.

Corrosion of steel in shipbuilding. W. E. J. Lewis (J. West Scot. Iron Steel Inst., 1935, **42**, 61—66).—A review. Ch. Abs. (*e*)

Effect of composition on corrosion probability of iron and steel. R. B. Mears (Iron & Steel Inst., Carnegie Schol. Mem., 1935, **24**, 69—85).—Continuous scale coatings give low probability figures, but loose, scratched, or imperfect scales give higher vals. Sulphide inclusions increase the corrosion probability. There is fairly close correlation between S, Mn, and C contents with the corrosion probability, but the influence of Si, P, and Cu is less marked. E. H. B.

Corrosion of lead alloy-coated steel cylinders used as fire extinguishers. W. L. Hewlett (Chem. & Ind., 1935, 1094—1095).—Corrosion of Pb-Sn-coated steel in aq. $NaHCO_3$, with or without saponin (*S*) and liquorice powder, was studied by e.m.f. measurements. Org. acids, *e.g.*, those formed from *S*, initiate corrosion at uncoated areas. Na_3PO_4 (1 oz./gal.) is an effective inhibitor. E. H. B.

Punctiform corrosion in the pickling of steel "Enersh 6." L. V. Sergeev (Vestn. Metall., 1934, **14**, No. 2, 91—98).—Punctiform corrosion appears on the band surface of the steel (Fe 70, Cr 20, Ni 8%), during pickling with $HCl-HNO_3$ baths, after consumption of the free HNO_3. It is increased by cold-working and by raising the bath temp. Ch. Abs. (*e*)

The drop test [for corrosion]. U. R. Evans (Rev. Mét., 1936, **33**, 217—220).—The drop test, which consists in placing a drop of liquid on a metal surface, has provided means by which the mechanism of corrosion and protection against corrosion can be studied. It can distinguish between inhibitors of the cathodic and those of the anodic reactions. The idea of the probability of corrosion was first imposed by experiments using the drop test. W. P. R.

Determination of small amounts of chromium in wrought iron with diphenylcarbazide. P. K. Kutschinski and N. V. Kalmuikova (Zavod. Lab., 1932, No. 7, 30—41).—A 0·2-g. sample is dissolved in 10 c.c. of 10% H_2SO_4, 8—10 drops of HNO_3 (*d* 1·4) are added, and oxides of N are expelled by boiling. 2 c.c. of 0·6% $AgNO_3$ and 2 c.c. of 15% $(NH_4)_2S_2O_8$ are added, and the solution is boiled to destroy excess persulphate, 4 c.c. of 0·2% NaCl being then added. After the disappearance of the MnO_4' colour, 15—20 c.c. of cold H_2O are added and the solution is cooled rapidly. $Fe(OH)_3$ is pptd. with 40 c.c. of 75% Na_2CO_3, and the whole made up to 100 c.c. and filtered. To 50 c.c. of the filtrate 20 c.c. of dil. (1 : 3) H_2SO_4 and 5 c.c. of 0·1% diphenylcarbazide are added, and the vol. is made up to 100 c.c. The colour is matched against that from known amounts of $K_2Cr_2O_7$. The method is quicker than that of Agnew (B., 1931, 297). Ch. Abs. (*e*)

Horizontal revolving kiln. H. J. Bush (Ind. Chem., 1936, **12**, 266—269).—An illustrated description is given of a horizontal revolving kiln for roasting pyrites etc. features of which are : special feeding device, arrangement for gastight joint at gas-outlet end, and air-inlet nozzles extending to the centre of the kiln and arranged at intervals longitudinally. The exit gases contain 9—10% of SO_2, and there is no excessive size reduction of the ore during its passage through the kiln. Its operation compares very favourably with that of multishelf roasting furnaces. D. K. M.

Recrystallisation of copper–zinc alloys with zinc contents up to 7%. A. Kitaigorodski (Tech. Phys. U.S.S.R., 1936, **3**, 39—50).—The recrystallisation temp. (*T*) is a max. for 2% of Zn. P has no influence on the form of the curve for the variation of *T* with composition. 0·02% of Cu_2O lowers *T* for Cu by 80—100°. In presence of Zn the reaction $Cu_2O + Zn = ZnO + 2Cu$ occurs. The effect of Cu_2O on Cu increases as the size of the Cu_2O grains decreases. H. J. E.

Refining silicon bronzes and brasses. A. P. Smirjagin (Tzvet. Met., 1934, No. 2, 87—103).—Fluxes consisting of $S + K_2SO_4$, Na_2SO_4, or $CaSO_4$ removed Al and some Fe, but increased the S, which could not be removed by subsequent treatment with Na_2CO_3; $SiO_2 + Na_2CO_3$ and $SiO_2 + CuO$ fluxes did not remove the Fe. The coalescence method of removing Fe was developed. When Zn is added to the system Cu–Si–Fe the m.p. of the alloy is lowered and a solid phase, rich in Fe, separates. The optimum temp. is 1055—1065°. About 70% of the Fe can be removed, but it is difficult to obtain $<0·8\%$ Fe in the final product. Ch. Abs. (*e*)

Beryllium-(cobalt-)copper alloys. F. G. Benford (Gen. Elec. Rev., 1935, **38**, 297—299).—Addition of 2·5% of Be to Cu gives an alloy with a tensile strength $>$ that of ordinary C steel, a hardness like that of chilled cast Fe, and an elongation = that of mild steel. The electrical conductivity is 25% of that of Cu. Addition of Co reduces the amount of Be necessary to confer these properties. The electrical conductivity of the ternary alloy is 50% of that of Cu and it is stable at higher temp. than the 2·5% Be alloy. It may be softened by quenching to facilitate mechanical working and then hardened by heat-treatment. Ch. Abs. (*e*)

Relation between upper critical points and copper content in bearing metals. A. A. Botschvar and V. P. Archipov (Tzvet. Met., 1934, **9**, No. 1, 131—134).—In an alloy containing Sn 85 and Sb 12%, change in Cu from 3 to 7% raised the crit. point (*C*) from 330° to 405°. With Sn 16, Sb 16, Pb 66% increase in Cu from 1·3 to 3% raised *C* from 400° to 510°. In a Sn 42, Sb 14, Pb 40% alloy increase in the Cu from 3 to 7% raised *C* from 415° to 510°. Ch. Abs. (*e*)

Preparation of "Mischzinn" [tin–lead–antimony alloy]. A. Göldner (Chem.-Ztg., 1936, **60**, 496—497).—The production of an alloy containing Sn 54·4, Pb 41·9, and Sb 3·6%, for the manufacture of solders by mixing with excess of Sn or Pb, is described. E. S. H.

Tantalum carbide in hard alloys. L. P. Molikov and A. V. Chochlova (Redk. Met.,1935, **4**, No. 1, 10—23). —Ta or Ta_2O_5, heated for 2·5 hr. at 1600° with C, gave a carbide containing 6·2—6·9% C and with a lattice parameter of 4·41—4·43 A. The solubility of TaC in the TaC–Co is 6%. At 35% TaC a eutectic (m.p. 1445°) is formed. TaC is sol. in Ni up to 20%. Alloys of TaC with a binder of 63% Fe and 37% Mo were superior to those with a Co or Ni binder. Ch. Abs. (*e*)

A hard alloy, Elwotite. I. Golub (Vestn. Metall., 1933, **13**, No. 8, 65—69).—The alloy (*d* 8·7—9, Rockwell hardness 88—91) is a W–Ti carbide (Ti $\not>$ 30%). Ch. Abs. (*e*)

Thermal transformations in alloys. G. Z. Nesselschtraus (Ann. Sect. Anal. Phys.-Chim., 1936, **8**, 151—173).—Methods for the control of metallurgical processes are discussed. R. T.

Nature of intermetallic phases of variable composition. N. V. Ageev (Ann. Sect. Anal. Phys.-Chim., 1936, **8**, 175—200).—A classification of alloys is suggested. R. T.

Flow of alloys, in connexion with Maxwell's relaxation theory. S. I. Gubkin (Ann. Sect. Anal. Phys.-Chim., 1936, **8**, 291—304).—Apparatus for determining the resistance to deformation of alloys is described, and the results obtained for Cu, brass, and duralumin are discussed, with reference to Maxwell's relaxation theory. R. T.

Metals and alloys used in the construction of chemical plant. J. A. Lee (Chem. Eng. Cong. World Power Conf., 1936, *B*11, 30 pp.).—The applications of ferrous and non-ferrous metals and alloys in the chemical industry are reviewed. C. E. H.

Reheating feeder heads of ingots and castings by electric arc. L. Granger (Rev. Mét., 1936, **33**, 243).—15—25% of the ingot wt. may be saved by maintaining the ingot heads molten by means of an electric arc. W. P. R.

Construction of welded pressure vessels for the petroleum industry. R. K. Hopkins (Chem. Eng. Cong. World Power Conf., 1936, *G*7, 13 pp.).—The requirements of the petroleum industry for vessels fabricated by the covered-electrode arc-welding process are discussed. For low-temp. processes, *e.g.*, dewaxing, steel containing Ni 2·25 and Si 0·15—0·25% is used; for temp. $\ngtr$ 350° C steel of firebox quality; for higher temp. Si-killed C or Mo steels. The use of bimetal plate for resisting corrosion is discussed. D. K. M.

Principles of oxyacetylene welding of austenitic manganese hard steels. H. Butschholtz (Russko-german. Vest. Nauk., 1933, No. 12, 11—14).—A review of conditions for welding steel with C 0·9—1·3, Mn 10—14%. Ch. Abs. (*e*)

Properties of deposits of low-carbon steel in arc-welding. M. Okada (Chem. Eng. Cong. World Power Conf., 1936, *D*8, 16 pp.).—A no. of observations are reported on the effect of heating conditions and composition of the weld metal on the structure and properties of the weld. The temp. distribution during welding is deduced mathematically. Mn and Si have a beneficial effect on the mechanical and magnetic properties. C. E. H.

Effect of soldering and other heat-treatment on orthodontic alloys. R. L. Coleman (Int. J. Orthod. Dentistry Children, 1933, **19**, 1238—1253).—The alloys studied had (1) Au 63·0, Ag 12·0, Cu 20·0, Pb 2·0, Zn 3·0%; (2) Au 62·0, Ag 8·5 Cu 11·0 Pt 11·5, Pd 5·5, Zn 1·5%; (3) Ag 39·1, Cu 16·7, Pd 44·2; (4) Au 55·0, Ag 7·0, Cu 11·0, Pt 18·0, Pd 7·5, Zn 1·5%. Hardness data and mechanical properties are recorded. The max. hardness in (1) and (2) was obtained by heating at 315° and 430° respectively. Ch. Abs. (*e*)

Fatigue of seams welded with electrodes having a chalk or a LIM covering. S. K. Svegintzev (Vestn. Metall., 1933, **13**, No. 10, 18—22).—Comparative data for fatigue of butt-welded seams are recorded. The composition of the LIM covering was MnO_2 64·6, Fe_2O_3 21·5, $CaCO_3$ 13, and Al_2O_3 1%. It gives seams with breaking strength approx. 1·5 times $>$ those for $CaCO_3$. Ch. Abs. (*e*)

Notched-bar toughness of fusion welds at low and high temperatures. W. Kleinefenn (Iron & Steel Inst., Carnegie Schol. Mem., 1935, **24**, 87—102).—Notched-bar impact vals. of welded steel fillets made with covered electrodes do not decrease rapidly with fall in temp. except below room temp. This is the most favourable position of the steep part of the curve. Electric welds made with bare electrodes and also autogenous welds yield less desirable curves. Normalising of autogenous welds produces a favourable effect on the impact val. and refines the grain; these effects do not occur on normalising electrical welds. Alloying elements increase impact vals., especially at high temp. E. H. B.

Applications of *X*-rays to the study of the annealing of commercial and refined aluminium. J. J. Trillat (Chem. Eng. Cong. World Power Conf., 1936, *B*12, 19 pp.).—The recrystallising temp. of refined Al (99·993%) is 20—30° $<$ that of commercial Al (99·0%). Very pure Al (99·9986%) recrystallises at a much lower temp. and very rapidly. The effects of Fe and Si as impurities are similar, but with the latter recrystallisation occurs more easily. C. E. H.

Correct and faulty treatment of aluminium plant. H. Röhrig (Chem. Eng. Cong. World Power Conf., 1936, *B*10, 15 pp.).—The chemical, physical, and mechanical properties of Al and its alloys are reviewed from the viewpoint of the requirements of the chemical industry. Recommendations are made for the fabrication, cleaning, and surface protection of Al plant. C. E. H.

Special silumins. G. G. Urazov and I. P. Nishar-adze (Ann. Sect. Anal. Phys.-Chim., 1936, **8**, 201—254).—Alloys containing Al 76—86, Si 10—20, and Cu 4% are heated at 500°, cooled in H_2O, and maintained at 150° during 24 hr. The products so obtained have high mechanical strength, and are particularly suitable for castings. R. T.

Physico-chemical nature and properties of alloys of the type of lautal. G. G. Urazov and G. M. Zamoruev (Ann. Sect. Anal. Phys.-Chim., 1936, **8**, 255—267).—Variations in hardness of Al alloys containing Cu 4—4·86, Si 1·4—2, and Fe 0·44—0·7%, with duration of heating at 100—195°, are recorded. In all cases max. hardness is attained after 40 hr. at 145°, the hardest alloy being that containing Cu 4·86, Si 1·4, and Fe 0·61%. R. T.

Heat-treatment of cold-rolled duralumin. E. F. Bachmetiev (Trans. Centr. Aero-Hydrodynam. Inst. U.S.S.R., 1933, No. 150, 31 pp.).—The heated metal was cold-rolled to produce varying degrees of deformation and then subjected to thermal treatment. The recrystallisation pattern showed an axis of orientation which was either in the direction of the cold-rolling texture or in a different direction, depending on the thermal treatment. In spite of the irregular orientation of the crystal units, recrystallisation may have occurred throughout the specimen. The anisotropy of the material after quenching is the chief factor increasing the depth of tempering. Duralumin with a tensile strength of 48 kg./sq. mm. and an extensibility of 20% was obtained. Ch. Abs. (*e*)

Determination of specific pressures in the pressing of metals, as a method of physico-chemical analysis. N. A. Bobrov (Ann. Sect. Anal. Phys.-Chim., 1936, **8**, 305—329).—The sp. deformation pressure (*P*) of duralumin (I), Al, and Mg varies with the degree of deformation attained. Curves connecting *P* with Cu content of (I) are recorded. Conditions of determining *P* are specified, and its val. and industrial applications are pointed out. R. T.

Endurance limits of aluminium alloys. R. Irmann (Rev. Mét., 1936, **33**, 231—236).—Al alloys have no definite endurance limit as do ferrous alloys, and it is necessary to carry out a large no. of stress reversals—of the order of 100×10^6—before a safe limit can be used for design purposes. The effect of structure, methods of casting and rolling, segregation, and corrosion on the fatigue-resisting properties is discussed. W. P. R.

Alkaline plating baths containing ethanolamines. I. Copper plating from triethanolamine solutions. C. J. Brockman and A. L. Brewer (Electrochem. Soc., Preprint, April, 1936, **69**, 39—44 ; cf. B., 1936, 458, 551).—Comparisons are made between a solution containing $CuSO_4,5H_2O$ 15 g., $Na_2C_2O_4$ 10 g., $N(C_2H_4{\cdot}OH)_3$ 22 c.c. per litre, and other solutions. The new solution does not plate Cu on Fe by displacement, and at 0·4 amp./sq. dm. and 2 volts gives in 70 sec. a firm strike plate suitable for subsequent treatment with an acid $CuSO_4$ bath. C. R. H.

Anodic oxidation of aluminium and its industrial application. A. Miyata (Chem. Eng. Cong. World Power Conf., 1936, *D*7, 17 pp.).—The technique of anodising and waterproofing of the oxide deposit by treatment with superheated steam is discussed. A.c. superposed on d.c. reduces basis-metal pitting. J. W. C.

Need for general systematic tests for metal coatings. G. Buchner (Chem.-Ztg., 1936, **60**, 497—498).—A discussion. E. S. H.

Recovery of bismuth and other valuable elements from electrolytic lead slimes. N. Z. Singalovski and E. P. Bogomilskaja (Redk. Met., 1935, **4**, No. 1, 24—30).—Air-dried slimes (Pb 50, Bi 16, Sb 7, F 11, Ag 1·24%) were roasted at 340—370° with $CaCl_2$. The Pb, Ag, and small amounts of Cu in the sinter were extracted with conc. aq. $CaCl_2$, and Ag was pptd. with Na_2S. Bi was dissolved from the Bi–Sb residue with HNO_3 (*d* 1·2). Approx. 94—98% of the Pb, Bi, and Ag was recovered. Ch. Abs. (*e*)

Production of aluminium–silicon alloys, directly in commercial electrolytic cells. A. I. Sheleznov and B. N. Maximenko (Legk. Met., 1935, **4**, No. 2, 32—46).—Silicoaluminium (I) (Si 77, Fe 1·5%) was added directly to the Hall cell to produce alloys with up to 20% Si. The Al reduced by the cell was unchanged. (I) should be added in small proportions of 30—40 kg. from 14 to 2 hr. before tapping the cell. The composition of the electrolyte should be corr. by adding AlF_3. Ch. Abs. (*e*)

Production of magnesium by the electrolysis of its oxide in a solution of fluorides. V. P. Pavlov and V. E. Ivanova (Legk. Met., 1935, **4**, No. 3, 21—30).—The solubility of MgO in the systems BaF_2–MgF_2–NaF and CaF_2–MgF_2–NaF is $\ngtr 0{\cdot}2\%$. For the electrolysis of MgO the proportion of MgF_2 in the electrolyte must suffice to form the compounds BaF_2,MgF_2 and NaF,MgF_2, as otherwise Na will be deposited. Electrolysis of Mg from these solutions is difficult because of the frequent occurrence of the anode effect. Ch. Abs. (*e*)

Spectro-analysis. Furnace atm. Reactions in the solid state. Non-corrodible materials. Corrosion of H_2O tanks.—See I. **Grog bricks for blast furnaces. Refractories.**—See VIII. **Electric furnaces [for alloys].**—See XI. **Corrosion of metals in maize processing.**—See XIX. **Tap-H_2O pipes.**—See XXIII.

Patents.

Metallurgical furnace. P. B. Tonnar (U.S.P. 2,017,480, 15.10.35. Appl., 17.8.32).—In an open-hearth regenerative furnace the downtakes are used exclusively for exhaust gases and the inlet ports on each side of the exhaust flues are arranged to alter the direction of the ingoing air as desired. B. M. V.

Furnaces for obtaining volatile metals. N. Lebedenko and J. Elian (B.P. 447,745, 21.8.34. Ger., 21.8.33).—A shaft furnace has two independently heated reduction chambers concentrically arranged so that ZnO (*e.g.*) is reduced by CO in one and the CO_2 reduced to CO in the other at a higher temp. by means of carbonaceous matter. The walls of the chambers are of different materials of different coeffs. of expansion, and a recuperator jacket may surround all. B. M. V.

Distillation of powdered [metallic] material. Magnesium Products, Inc. (B.P. 447,759, 19.11.34. U.S., 8.1.34).—Zn or Mg powder is moved upwards into a zone where it is heated to above its b.p. by downward radiant heat from an electrical resistor in an indifferent atm. and, if desired, under partial vac. The unvolatilised material spilled over the edge of the delivery mouth of the first chamber may be re-treated in a second chamber. B. M. V.

Heat-treatment of metals. W. J. Millar, J. C. Howard, and Electric Resistance Furnace Co., Ltd. (B.P. 448,008, 13.5.35).—A protective atm. is formed by combustion of town's or producer gas or oil with air limited so as to be only just insufficient to convert the whole of the " max." (? total) S content of the fuel into SO_2, a trace of H_2S remaining ; the gas is then passed (preferably after cooling) over Fe oxide and/or Cu to remove H_2S and CS_2 without affecting the SO_2. B. M. V.

Welding of cast iron. H. E. Potts. From T. R. Haglund (B.P. 447,130, 12.11.34).—The welding rod comprises a steel [C $\ngtr 0{\cdot}05$, Ti and/or Zr 1—10 (Fe + Ti + Zr $\nless$ 95%), Si 0·2—4·0%] and a slag-forming material including graphite. Welding is effected without preheating of the cast Fe. B. M. V.

Electroplating plant. Langbein-Pfanhauser-Werke A.-G. (B.P. 447,587, 25.7.35. Ger., 1.3.35).—Cr-plating of unwired articles is effected in a drum provided with internal conveying flights and with automatic feed devices coupled thereto. B. M. V.

Apparatus for use in electrodeposition of metals. W. Y. Newland and G. E. Duke (B.P. 447,418, 17.11.34).—An electric immersion heater, which may also form an anode, is described. B. M. V.

Loaded conductor.—See XI. **Rubber-metal joints. Rubber-coated metal.**—See XIV.

XI.—ELECTROTECHNICS.

Improvements of electric furnaces with crossed conduits. J. Kuntziger (Rev. Mét., 1936, **33**, 244—246).—Electric furnaces in which molten alloys are refined by superheating them in long crossed channels of small diam. by means of heavy currents are described. W. P. R.

Induction heating in the chemical industry. C. E. Daniels (Chem. Eng. Cong. World Power Conf., 1936, *H*8, 11 pp.).—Normal frequencies (25—60 ~ per sec.) are used for heating magnetic materials, but by the use of high frequencies (480—60,000 ~ per sec.) any material with $\kappa \nless$ that of C may be heated satisfactorily. Empirical rules for the design of normal-frequency installations and details of a no. of such installations are given. D. K. M.

Electrical pasteurisation of liquids. A. H. W. Aten (Chem. Eng. Cong. World Power Conf., 1936, *D*6, 9 pp.).—An apparatus for pasteurisation by the passage of a 3-phase current is described. The process may be applied to milk without affecting taste, and with a 99% reduction in the bacteria content. J. W. C.

M–Z rectifier in electrochemical practice. Turkuletz (J. Appl. Chem. Russ., 1936, **9**, 965—968).—The advantages of Cu oxide rectifiers are pointed out. R. T.

Electrolytic water treatment for prevention of corrosion and boiler scale, especially in hot-water systems. T. C. Thomsen (Chem. Eng. Cong. World Power Conf., 1936, *D*2, 8 pp.).—The process described is applicable to the protection of both hot- and cold-H_2O installations. Small plants are rated at about 9 watts and consume 4 kg. of Al anode material annually. J. W. C.

Electro-organic chemical preparations. S. Swann, jun. (Electrochem. Soc., Preprint, April, 1936, **69**, 387—437).—A review of the literature, presented in tabular form, including only preps. giving good yields. D. C. J.

Economic control of dry-cell manufacture. F. J. Kirkman (Electrochem. Soc., Preprint, April, 1936, **69**, 439—452).—An account of statistical methods enabling engineers to set up criteria of quality and limits of variability. D. C. J.

Spectro-analysis. Fused SiO_2 in furnaces.—See I. **Oxidation of transformer oils.**—See II. **Removing Fe from Al salts.**—See VII. **High-frequency furnaces for steel. Reheating feeder heads of ingots. Welded pressure vessels. Steels for arc-welding. Fusing welding. Annealing Al. Cu-plating. Anodic oxidation of Al. Tests for metal coatings. Bi from Pb slimes. Al–Si alloys. Mg.**—See X. **Determining phosphate availability in soils.**—See XVI. **Ozonisation [of fruit]. Examination of foodstuffs.**—See XIX.

Patents.

Controlling the temperature in a closed vessel [furnace]. W. Brown (B.P. 447,850, 27.2.35).—A sample of the material under treatment is connected to an exploring member, and that in turn to means for determining the electrical resistance of the sample and controlling the applied heat by variations thereof. B. M. V.

Electric-arc converters. Gen. Electric Co., Ltd., and W. G. Thompson (B.P. 447,851, 11.3.35).—Means for starting the arcs are described. B. M. V.

Continuously [magnetically] loaded conductor. J. E. Harris, Assr. to Bell Telephone Labs., Inc. (U.S.P. 2,017,657, 15.10.35. Appl., 8.6.29).—The Cu is substantially freed from Cu_2O while molten and may then be subjected to the same heat-treatment in an inert atm. as the surrounding ferromagnetic alloy, *i.e.*, at $> 600°$, the Cu retaining 20% elongation and 95% conductivity. B. M. V.

Production of an insulating material for cables, gas-pipes and water-pipes, and the like. R. Bowran & Co. (1934), Ltd. From L. Cohen (B.P. 447,768, 23.11.34).—Pine resin is mixed with a non-drying vegetable oil, *e.g.*, castor, and a finely-divided mineral insulating material, *e.g.*, asbestos or talc. A. B. M.

Electrical resistances and resistance materials. Marconi's Wireless Telegraph Co., Ltd., Assees. of S. Bloomenthal (B.P. 447,497, 26.11.34. U.S., 25.11.33).—Inert material (air-floated asbestos) is coated with synthetic resin solutions containing colloidal C in suspension. After removal of the surplus vehicle the article is moulded and baked. (Cf. A., 1935, 1340.) B. M. V.

Apparatus for generating ions. E. W. Ballentine, Assr. to Solar Industries, Inc. (U.S.P. 2,018,434, 22.10.35. Appl., 15.3.34).—An apparatus for generating negative ions free from positive ions in air for ventilation comprises (1) a hollow metal anode, (2) a hot cathode comprising a resistance wire of Ni–Cr axially inside (1), and (3) a blower. (2) is heated by low-voltage a.c. and a high alternating potential is maintained between (1) and (2). B. M. V.

Electrolytic cell [condenser]. A. Georgiev, Assr. to Aerovox Corp. (U.S.P. 2,017,835, 15.10.35. Appl., 26.12.30).—A complete section is submerged in hot electrolyte for thorough impregnation and then in cooler electrolyte for the application of forming current, at a progressively increasing voltage. B. M. V.

Electrolytic condensers and other electrolytic devices. Dubilier Condenser Co. (1925), Ltd. (B.P. 448,163, 15.8.35. U.S., 22.8.34).—Al foil is etched in acid, preferably until holes are formed; it is then washed, immersed in a boiling alcohol (*e.g.*, glycerol), again washed, film-formed in HBO_2, NH_3, and $(CH_2\cdot OH)_2$, and wound into a coil interleaved with impregnated fibrous material and similarly treated or untreated Al foil. B. M. V.

Arrangements for use in electrochemical processes. N.V. Philips' Gloeilampenfabr. (B.P. 447,476, 12.11.34. Ger., 25.11.33).—The anode for use in an acid bath may constitute the container and is composed of a hot-pressed moulding of synthetic resin and a conductor, *e.g.*, graphite. B. M. V.

[Primary] electric cell. M. L. Martus and E. H. Becker (U.S.P. 2,018,563, 22.10.35. Appl., 27.2.32).—Additions to the NaOH electrolyte of a Lalande cell comprise approx. 1% of $MgCl_2$, $MgCO_3$, or Mg phosphate, 2% of an org. reducing agent (a quinol; alkali tartrate, formate, or tannate), and, optionally, 1—2% of an alkali stannate. B. M. V.

Gas electrode for primary batteries. G. W. Heise and E. A. Schumacher, Assrs. to Nat. Carbon Co., Inc. (U.S.P. 2,017,280, 15.10.35. Appl., 28.1.31).—A moulded block of porous carbonaceous material is rendered resistant to H_2O and NaOH by a coating of rubber and, if desired, a petroleum oil. B. M. V.

Electric-discharge devices. [Metal-vapour lamp.] Gen. Electric Co., Ltd., V. J. Francis, and J. W. Ryde (B.P. 447,047, 11.10.34).—O_2 is left in the outer envelope during an initial period of running or of baking by external heat, and before normal usage the O_2 is removed, its previous presence exerting an anti-blackening effect. B. M. V.

Electrical-discharge devices: lamps, radiation devices, rectifiers, relays, etc. C. H. Braselton (A—E, G—I, K—M, O, P, T, V—Y, BB), H. R. Davies (AA), R. Harding, jun. (J, U, Z), and S. Ruben (F, N, Q—S), Assrs. to Sirian Lamp Co. (U.S.P. 2,007,919—2,007,934 and 2,007,936—2,007,947, 9.7.35. Appl., [A] 3.6.30, [B, C, I] 7.12.31, [D, V, AA] 27.8.30, [E, O, P, T, U] 4.12.31, [F, N, R, S] 23.8.30, [G] 9.10.30, [H, W, X] 21.10.30, [J] 17.11.30, [K, L, M, Y] 19.8.30, [Q] 31.7.30, [Z] 16.9.30, [BB] 17.5.32. Renewed [X] 18.4.35).—Claims are made for discharge lamps or valves for various purposes comprising one or more closely wound spirals of W or other resistance wire coated with alkaline-earth oxides of greater emissivity than that of ThO_2 in an atm. of gases of the A group, *e.g.*, He 5, Ne 10, A 100 mm. partial pressure, totalling $\not>$ 200 mm. Hg, with the presence, if desired, of Hg or other metal vapour. Various forms of instrument are claimed. B. M. V.

Electric-discharge (A, C) devices, (B) lamps. Brit. Thomson-Houston Co., Ltd. (B.P. 444,934, 445,950, and 445,087, [A] 5.7.35, [B] 30.1.36, [C] 16.9.35. U.S., [A] 7.7.34, [B] 30.1.35, [C] 15.9.34).—(A) An electric-discharge lamp comprising thermionic electrodes mounted in a mixture of a rare gas, *e.g.*, Ne at 1·5—3·0 mm. pressure, and Na vapour is claimed. (B, C) Constructional details are claimed. J. S. G. T.

Positive-column lamp. L. L. Beck, Assr. to Claude Neon Lights, Inc. (U.S.P. 2,018,620, 22.10.35. Appl., 31.5.32. Renewed 16.3.35).—Ne comprises the principal filling, but A, Kr, and Xe are present in the max. (0·05—1·25%) possible proportion that can be employed with respect to the c.d. without impairing the characteristic colour of the Ne. A thermionic cathode is provided and the lamp is worked at 0·05—2·50 amp. per sq. cm. of column cross-section. B. M. V.

Protective circuit arrangements for electric-arc furnaces. Siemens & Halske A.-G. (B.P. 447,669, 3.1.36. Ger., 7.3.35).

(A) **Insulated electrical conductors.** (B) **Manufacture of insulated electrically conductive screens, more particularly for use in cathode-ray tubes.** A. D. Blumlein and H. E. Holman (B.P. 447,754 and 447,824, 26.10.34).

Electric-discharge lamps. Brit. Thomson-Houston Co., Ltd., L. J. Davies, and W. J. Scott (B.P. 448,340, 5.12.34).

Apparatus for investigating the properties [characteristic frequency range] of dipole substances. E. E. W. Kassner (B.P. 448,494, 31.8.34. Ger., 31.8.33).

[Electrically-controlled] pulverising mills.—See I. **Tar boilers.**—See II. **Non-inflammable fibrous material.**—See VI. **Measuring acidity of gases.**—See VII. **Frosting glass bulbs.**—See VIII. **Electroplating apparatus. Electrodeposition of metals.**—See X.

XII.—FATS; OILS; WAXES.

Antioxidants and autoxidation of fats. V. Action of anti- and pro-oxidants. L. A. Hamilton and H. S. Olcott (Oil and Soap, 1936, 13, 127—129; cf. B., 1936, 556).—Aërobic oxidation experiments using purified Me oleate, with and without antioxidants, support the view that the induction period is due to the presence of inhibitors. Phenolic inhibitors and " inhibitols " cause no change subsequent to the end of the induction period. Among pro-oxidants, BzO_2H and Cu oleate decrease the induction period by virtue of their destruction of natural inhibitors. F. C. B. M.

Determination of rosin acids in fatty acids by the refractometer. F. J. Squire (Oil & Soap, 1936, 13, 2—5).—Graphs relating the n^{48} of mixtures of any one specimen of tallow (or tallow fatty acids) and rosin to the rosin content (up to 40%) are approx. straight lines; the very small deviation is probably attributable to variations in the *d* of the mixtures. Hence % rosin in soap can readily be controlled during factory operations by the help of such *n*–% rosin graphs constructed from two observed points for each batch of tallow used (*e.g.*, 0 and 25% rosin). The *n* can also be used for the analysis of mixtures of rosin and unknown tallow fatty acids with an error of, *e.g.*, 1·7 on 25% total rosin. 139 samples of tallow fatty acids showed n^{48} of 1·4451—1·4476 (the better grades having, as in the case of rosin, the higher *n*). The n^{48} of 14 samples of rosin ranged from 1·5255 to 1·5291 (determined by extrapolation from tallow/rosin graphs). The presence of, *e.g.*, coconut oil fatty acids [*n* 1·4329—1·4333 for 64 samples (at 48°?)] would increase the possible error in such analyses. E. L.

Factors affecting the quality of steam-rendered lard. C. E. Morris (Oil & Soap, 1936, 13, 60—62).—The content of free fatty acids of prime, steam-rendered lard increases with (*a*) the time the slaughtered hog is kept in cold-storage prior to rendering, (*b*) the time and (*c*) the pressure of rendering. The stability of the lard to rancidification, however, does not show any definite correlation with these three factors. E. L.

Report of the [A.O.C.S.] Soap Analysis Committee—1935. M. L. Sheely (Oil & Soap, 1936, 13, 6—9).—The existing official A.O.C.S. method for the determination of free NaOH in soaps gives more consistent and appreciably lower results than, and is accordingly retained in preference to, either of the two modifications proposed by Davidsohn (dehydrating the EtOH solution by Na_2SO_4). The Procter and Gamble method for determination of volatile hydrocarbons (cf. following abstract) gives a 97—98% yield with soaps containing known amounts (1—5%) of naphtha and is recommended as a tentative standard method to supersede the existing method. A tentative standard method for hand-screening tests for soap powders is detailed and recommended ; the Ro-Tap (mechanical sifting) method is allowed as an alternative where a large no. of samples are to be examined. With the exception of the two new methods above, all existing tentative A.O.C.S. methods are recommended for adoption as standard methods. E. L.

Determination of volatile hydrocarbons in soaps. PROCTER & GAMBLE LABORATORIES (Oil & Soap, 1936, **13**, 9—10).—Dry, oil-free steam is passed through the distillation flask (*F*) containing the sample (100 g. of sliced soap or 50 g. of soap powder), which is mixed with H_2O (100 c.c.) and gum arabic (10 g.) and carefully acidified with 1 : 3 H_2SO_4 (100 c.c.) before the distillation. The mixed steam and hydrocarbon vapours from *F* are scrubbed with aq. NaOH in a steam-jacketed (Fe) vessel to remove entrained fatty acids, and condensed in apparatus which permits the excess H_2O to be drained away ; the hydrocarbons (solvent) are collected in a graduated receiver. E. L.

Alcoholysis of olive oil. Y. VOLMAR and B. HANSEN (Compt. rend., 1935, **201**, 968—970).—Olive oil, refluxed with MeOH + 2% HCl, yields a mixture of the Me esters of palmitic, oleic, linoleic (about 1%), and arachidic acids. The last-named is a constituent of all the olive oils investigated, to the extent of 0·19% in oils from the first pressing, 0·21% in oils from the second pressing, and 0·23% in sulphured oil. F. A. A.

Analysis of tung fruits grown under different conditions in Mississippi. R. S. MCKINNEY and G. S. JAMIESON (Oil & Soap, 1936, **13**, 71).—The fruits from 6 sources (average wt. 19·9—30 g.) contained 27·0—41·2% of kernel ; these contained 1·7—2·7% of H_2O and 53·6—67·6% of oil (extraction with light petroleum) in the case of uncultivated trees (64·7% and 70·1%, cultivated). The I val. of the oil (Wijs, 30 min.) was 163·1—165·5. E. L.

Wood and perilla oils. R. ERASTOVA (Lakokras. Ind., 1934, No. 5/6, 41—44).—Oil from *Aleurites cordata* from the Caucasus contains an isomeride of α-elæostearic acid which renders it less easy to oxidise than is the oil from *A. fordii* (American). CH. ABS. (*p*)

Air-blowing soya-bean oil. H. Y. CHANG and T. H. CHANG (Chemistry [China], 1935, **2**, 296—301).—Blowing with a slow air current at 130—140° for 42—48 hr. renders the oil suitable for printing ink. During the process *d*, η, and the acid val. increase and the I val. decreases. Further blowing produces a rubber-like solid when *d* is $> 0\cdot9829$ and the I val. $< 82\cdot93$. CH. ABS. (*p*)

Oiticica oil. A. D. LITTLE, INC. (Drugs, Oils, and Paints, 1936, **51**, 247).—The technical and economic aspects of the use of this oil in varnishes and paints are discussed. It has desirable properties and a substitute for tung oil is urgently needed, but the time taken by the oiticica tree to reach maturity (of the order of 100 years) precludes the rapid development of its cultivation outside Brazil. D. R. D.

Oiticica oil. H. A. GARDNER, JUN. (Paint and Var. Prod. Man., 1936, **14**, No. 6, 16—18, 30).—Oiticica oil condenses with *p*-alkylphenols on heating, H_2O being eliminated. This reactivity is attributed to the presence of a keto-group in the licanic acid mol. (A., 1935, 607, 1350 ; B., 1936, 67). The marked durability of varnishes made from this oil and phenolic resins is probably due to the occurrence of such reactions during their prep. D. R. D.

Oiticica oil. C. HOLDT (Drugs, Oils, and Paints, 1936, **51**, 240—242).—Polemical against Kappelmeier (B., 1936, 67). D. R. D.

Composition of oiticica oil. R. S. MCKINNEY and G. S. JAMIESON (Oil & Soap, 1936, **13**, 10—11).—The apparent I val. (Hanus) of the oil is unusually sensitive to variations in time of reaction and concn. of reagents. The I vals. of oils which have been rendered non-gelling by heating for 1 hr. at 225° were < those of the raw oils, but the SCN val. was increased from, *e.g.*, 76·2 to 80·1 by such heating. The oil contains 10·7% of saturated acid (Bertram method) and about 6% of oleic acid (determined as dihydroxystearic acid by a modified Lapworth–Mottram method ; A., 1925, i, 1129). Calculation from the SCN val. therefore indicates a content of 78·2% of licanic acid. E. L.

Characteristics of English[-pressed] cottonseed oil. W. G. MCLEOD (Oil & Soap, 1936, **13**, 67—68).—The oil expressed in England is clearer than the average American (" prime ") crude oil, but is inferior in colour, flavour, and bleaching quality. The free fatty acids range from 1·8 to 2·7% in the best grades, and the refined oil can be bleached by a mixture of activated earth and C black. A suitable modification of the A.O.C.S. refining test (which otherwise is not applicable to English oils) is detailed (refining loss 4·7—7·9%). E. L.

Chemistry of linseed stand oils. H. KURZ (Angew. Chem., 1936, **49**, 235—238).—The physical and chemical consts. of stand oil fractions lead to the view that stand oil formation involves condensation, and not polymerisation through the unsaturated centres. In the simplest case condensation occurs between one triglyceride mol. and a reactive CH_2 group (at C_{11} in linoleic and at C_{11} and C_{14} in linolenic acid) of an acid chain from a second glyceride mol., with elimination of a mol. of free fatty acid. Saponification would yield $(OH)_2$-acids, which are, in fact, found in stand oils prepared even in absence of air. F. C. B. M.

Sandal-seed oil and proteins. M. SREENIVASAYA and N. NARAYANA (J. Indian Inst. Sci., 1936, **19A**, 1—8). —Sandal seed contains 50—55% of an oil which dissolves varnish gums, is vulcanisable to a rubber-like product, and polymerises to form a plastic with $ZnCl_2$, and also 1·8% of protein-N consisting of typical globulins. Various consts. and analyses are tabulated. H. D.

[American] elm-seed oil. H. A. SCHUETTE and C. M. LUNDE (Oil & Soap, 1936, **12**, 12—13).—Wisconsin elm seeds (from *Ulmus americana*) which had been separated from their winged envelopes contained ash 5·25,

Et_2O extract 25·55, crude protein 42·0, crude fibre 4·40, N-free extract etc. 22·8%. The green oil extracted by light petroleum had d^{20}_{20} 0·9288, n^{20} 1·4554, η^{20} 0·3381 centipoise, γ^{20} 30·72 dynes/cm., sap. val. 273·0, I val. (Wijs) 24·1, SCN val. 16·2, OH no. 13·45, Reichert–Meissl val. 2·1, Polenske val. 33·9, sol. acids (as $PrCO_2H$) 0·8%, unsaponifiable matter 1·0%, Hehner val. 82·2%, titre 14·0°. The sap. val. of the fatty acids was 288·7, and their I and SCN vals. 23·1 and 15·5, respectively (indicating the % composition: saturated acids 82·8, oleic acid 8·8, linoleic acid 8·4). Methanolysis of the oil indicates the presence of about 50% of decoic acid. E. L.

Indian vegetable oils. I. Viscosity and its variation with temperature. G. N. BHATTACHARYYA (Indian J. Physics, 1936, **10**, 209—225).—η vals. and their variation with temp. in the range 23·9—93·3° have been determined for linseed, coconut, sesamé, olive, rape, poppy, and castor oils. These are more viscous than mineral insulating and transformer oils, and Andrade's law is not obeyed. From the variation of potential energy of mols. with temp. a modified expression, in agreement with experimental results, is deduced. N. M. B.

Haddock-liver oil and its vitamin content. S. R. POTTINGER, C. F. LEE, C. D. TOLLE, and R. W. HARRISON (U.S. Bur. Fisheries, Invest. Rept., 1935, **27**, 1—16).—Crude oil obtained by steam-distillation has I val. 156·8—181·2, unsaponifiable matter 0·82—1·35%, sap. val. 186·1—191·5, d^{25} 0·9176—0·9239, n^{25} 1·4769—1·4808, free acid 0·83—4·12%. The vitamin-*A* and -*D* potencies average 50—70% of those of standard cod-liver oil. CH. ABS. (*p*)

Bromides of highly unsaturated acids. O. B. MAXIMOV (Bull. Far Eastern Branch Acad. U.S.S.R., 1934, No. 10, 99—102).—The bromination of Japanese sardine oil in light petroleum (better yield than in Et_2O) is described. The products are separated by crystallisation of the Li salts from $COMe_2$. It is concluded that the oil contains a preponderance of acids with 4 double linkings. CH. ABS. (*r*)

Analysis of sulphonated (sulphated) oils: Committee report No. 2. Determination of organically combined sulphuric anhydride. R. HART (Oil & Soap, 1936, **13**, 13—18; cf. *ibid.*, 12).—For sulphated (*i.e.*, hydrolysable) oils of the ester type, the A.A.T.C.C. titration method (Bur. of Standards, 1933, CS 43—32; Hart, B., 1917, 1139) with a minor modification of procedure to improve the accuracy of the end-point, is proposed as a tentative A.O.C.S. standard method. When NaOAc, or other substance interfering with the end-point, is present the "extraction-titration" method (I) is required, wherein the sample is dissolved in a solvent, the interfering compounds are washed out with conc. aq. NaCl, and the solvent is evaporated, leaving a purified residue which is examined by the regular titration method. For oils containing true sulphonates (*i.e.*, which are not decomposed by boiling mineral acid) the (slightly modified) A.A.T.C.C. "ash-gravimetric method" is prescribed, in which the purified residue obtained in a manner resembling that of (I) is ashed, the ash, consisting of pure Na_2SO_4, is weighed, and this represents one half of the pre-existing organically combined SO_3". E. L.

The Procter and Gamble oil colorimeter. H. B. STEVENSON (Oil & Soap, 1936, **13**, 18—20).—In this modification of the Bailey (Lovibond) colorimeter (1924), series of whole Lovibond glasses are carried in radial slots in the peripheries of four superimposed concentric discs, which can conveniently be revolved independently in order to superimpose the glasses as required for matching. The light box meets the specification of the A.O.C.S. Colour Committee report (1933—4). E. L.

Recovery of carnauba wax. F. W. FREISE (Chem. Fabr., 1936, **9**, 161).—A process for obtaining the wax from leaves and buds of the palm *Copernica cerifera*, Mart., occurring in Brazil, is outlined. D. R. H.

Oils, fats, fatty acids, and waxes in cosmetics. R. H. AUCH (Oil & Soap, 1936, **13**, 58—59).—A brief outline of the applications of such ingredients. E. L.

Spectro-analysis. Decolorising earths.—See I. **Lubricants. Greases.**—See II. **Perilla oil.**—See XVI. **Fishy flavour.**—See XIX. **Dermatitis and synthetic waxes.**—See XXIII.

PATENTS.

Manufacture of a chemical composition [for use in blending margarine]. B. J. HARRIS (U.S.P. 2,009,796, 30.7.35. Appl., 10.11.33).—The mixture obtained by partly saponifying a triglyceride (*e.g.*, hydrogenated cottonseed oil, cottonseed- or oleo-stearin) with caustic alkali is treated (preferably after mixing to a paste with H_2O) with acid to decompose 75—90% of the soap present; the pasty (or dried) product is used as a wetting or emulsifying agent, *e.g.*, in margarine. E. L.

Treatment of drying oils or varnishes produced therefrom [with phosphorus chlorides]. L. BERGER & SONS, LTD., L. E. WAKEFORD, and L. E. HARRIS (B.P. 447,463, 27.1.36).—Films which set rapidly by polymerisation are obtained by pretreating the oil or varnish with PCl_3 or PCl_5, preferably in solution in, *e.g.*, white spirit, at about 65°. S. M.

Liquid polishing wax. M. T. FLAXMAN, Assr. to UNION OIL CO. OF CALIFORNIA (U.S.P. 2,010,297, 6.8.35. Appl., 5.12.33).—About 5% of Ca stearate (or other metallic soap or "Paraflow") is added to control the crystallisation and η of a polishing composition comprising a volatile solvent and a mixture of about equal proportions of waxes (carnauba, ceresin, montan, and beeswax). E. L.

Lime-soap greases. W. D. HODSON (B.P. 449,007, 9.11.34).—See U.S.P. 1,982,662; B., 1936, 335.

Drying of material [soap] and a conveyor mechanism used in connexion therewith. SWIFT & Co., Assees. of C. T. WALKER (B.P. 448,123, 30.11.34. U.S., 21.12.33).

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Casein paints. F. C. ATWOOD (Off. Digest, 1936, No. 156, 192—200).—The manufacture of casein and the advantages of its use in paints are reviewed. D. R. D.

Radiation and paint. G. F. New (J. Oil & Col. Chem. Assoc., 1936, **19**, 156—170).—The absorption of ultra-violet radiation (data tabulated) by (12) pigments is not related to their durability, probably because of variation in their susceptibility to change. Of white substances tested, white-Pb (I) gave min. and ZnO (II) max. vals.; some coloured pigments, *e.g.*, ultramarine, may also show low absorption and hence high % of transmitted ultra-violet radiation. Absorption of visible radiation by white pigments is small and decreases in the order (I), (II), lithopone, blanc fixe, standard "T" TiO_2. The choice of suitable materials and paints for the promotion and prevention of visible and heat radiation is discussed, and relevant data relating to painted surfaces are reviewed; white paints are superior to Al in reflectivity and cooling power. S. M.

Consistency characteristics [of paints]. J. R. Stewart (Paint and Var. Prod. Man., 1936, **14**, No. 6, 24—29).—The factors determining the brushing properties of paints are discussed. D. R. D.

Effect of conditions of preparation of titanium dioxide on its properties as a paint pigment. A. Shukova and A. Sovalova (Lakokras. Ind., 1934, No. 4, 26—31).—For prep. by hydrolysis with H_2SO_4, p_H 2—3 is best. High concns. of acid or Ti give a product of poor quality. Drying temp. had little effect on quality. Ignition at 850° for 2—3 hr. gives best results. Ch. Abs. (*p*)

Trends in white-pigment consumption. P. M. Tyler (U.S. Bur. Mines Inf. Circ., 1936, No. 6881, 15 pp.).—The requirements and consumption of (particularly white) pigments in modern use are reviewed. F. C. B. M.

Treating lead concentrates from Vaïgach ore for chrome pigments. I. N. Sapgir (Lakokras. Ind., 1934, No. 5/6, 48—51).—If PbS is heated with $MgCO_3$ or $CaCO_3$ and the product treated with a chromate, $PbCrO_4,2PbSO_4$ is obtained. Ch. Abs. (*p*)

Logwood pigment for cellulose nitrate lacquers. R. L. Drew (Amer. Paint J., 1936, **20**, No. 36, 54—58).—The pigment is prepared by adding aq. Fe chloride to an aq. extract of logwood. The ppt. is washed and a liquid plasticiser for cellulose nitrate [*e.g.*, a 1 : 1 mixture of castor oil and o-$C_6H_4(CO_2Bu)_2$] is added to the wet paste. The H_2O is displaced and lost by evaporation on passing through a warm roller-mill. The resultant pigment–plasticiser paste may be diluted with a solvent or a solution of a resin in a solvent and cellulose nitrate solution added in a thin stream (to prevent co-pptn. of pigment and the nitrate) to form a light-fast black lacquer. The tinting strength of the pigment prepared and incorporated thus is superior to that of most C blacks, whereas, if the aq. paste is dried and the dry pigment incorporated in the ordinary way, the pigment is difficult to grind and of poor tinting strength and greyish colour. D. R. D.

Aluminium inks. F. C. Arthur (Amer. Ink Maker, 1936, **14**, No. 6, 23—29).—Recent developments are reviewed and practical hints given concerning the manufacture and use of these inks. D. R. D.

Ethylcellulose as a pigment-grinding base. Hercules Powder Co. (Drugs, Oils, and Paints, 1936, **51**, 247—248).—In order to avoid the danger of explosion which occurs on grinding oxidisable pigments (*e.g.*, Prussian-blue) with cellulose nitrate (I), they may be ground with ethylcellulose and a plasticiser [*e.g.*, $(C_6H_4Me)_3PO_4$] and the mixture added to the (I) lacquer. D. R. D.

Modern drying processes in the mineral pigment industry. A. Karsten (Farben-Ztg., 1936, **41**, 587—588, 617—618).—The general principles involved in pigment drying are discussed, and modern machinery for the purpose is described and illustrated. S. S. W.

Eliminating obnoxious fumes [in gum-running]. Anon. (Ind. Chem., 1936, **12**, 292—293, 301).—The plant at the factory of F. Boehm, Ltd., in which the fumes from gum-heating and -running are washed with a spray of 0·5% aq. linseed soap is described, with illustrations. The plant is constructed entirely of galvanised Fe except for a Pb-lined tank for the wash liquid. D. K. M.

Shellac. VIII. Shellac films. W. Nagel and E. Baumann (Angew. Chem., 1936, **49**, 369—370).—The authors' earlier view (B., 1933, 30) that pliability of lac films is due to EtOH retention is confirmed by OEt determinations by Zeisel's method. Dewaxed lac has no OEt val., whilst films prepared from EtOH–lac solutions show approx. 3% OEt content after 3 weeks' drying at room temp. The (apparently unproven) view is held that EtOH is combined chemically, probably as an "onium" compound (cf. Bhattacharya, B., 1936, 206), and not merely retained mechanically in the film. F. C. B. M.

Characteristics of Hiroe dammar, and its use in the varnish industry. H. Kemner (Farben-Ztg., 1936, **41**, 586).—A sample of Hiroe dammar had acid val. 13·47, 13·47; sap. val. 57·56, 60·37; sinter point 170°, 185°; m.p. 190°, 200°; it gave a negative Storch–Morawski reaction, was sol. in C_6H_6, PhMe, turpentine, white spirit, $CHCl_3$, and partly sol. in EtOH, Me_2O, and light petroleum. Capillary analysis data are quoted. The resin (a type of Borneo dammar) is suitable for use in nitrocellulose lacquers, synthetic resin products, metallic lacquers, matt printing varnishes, etc. S. S. W.

Oil-soluble unmodified phenol–formaldehyde resins, reactive and non-reactive. Heat-hardening phenol–formaldehyde resins. C. F. Pickett (Off. Digest, 1936, No. 156, 185—192).—Details are given of the properties and methods of use of various commercial resins. D. R. D.

Plastics in chemical plant construction. H. V. Potter (Chem. Eng. Cong. World Power Conf., 1936, *B*4, 31 pp.).—A review of the various thermo-hardening synthetic resins available in industry, including those with or without fillers, moulded or laminated materials, and chemically resistant varnishes. A no. of applications are described and illustrated. D. R. H.

Polishing compositions for plastic masses. S. Schapiro (Nov. Techn. Ser. Gorno-Rudn. Prom., 1935, No. 11, 13).—Plastics having an albumin base are polished first with emery and then with kaolin and tripoli; those having asphalt bases, with glass powder, Sn dust, and Fe_2O_3 (in order), and those having PhOH bases, with micro-asbestos, kieselguhr, kaolin, and Fe_2O_3. The composition of suitable preps. is given. Ch. Abs. (*p*)

Ti pigments for paper. Lithographic papers.—See V. **Determining rosin acids in fatty acids. Air-blown soya-bean oil. Oiticica oil. Sandalseed oil.**—See XII. **Perilla oil.**—See XVI. **Dermatitis and synthetic resins.**—See XXIII.

Patents.

Black paint material from hardwood pitch. L. J. Figg, jun., Assr. to Eastman Kodak Co. (U.S.P. 2,008,979, 23.7.35. Appl., 11.9.31).—The pitch (100) obtained by distillation of hardwood tar is agitated with conc. H_2SO_4 (3—5 pts.) at 170° and the product dissolved in $COMe_2$; linseed oil and a softener, *e.g.*, *o*-$C_6H_4(CO_2Bu)_2$ may be added. S. M.

Varnish and lacquer remover. C. Ellis, Assr. to Chadeloid Chem. Co. (U.S.P. 2,009,357, 23.7.35. Appl., 27.3.31).—$COMe_2$ is used in admixture with $Pr^{\beta}OH$, a petroleum hydrocarbon wax solvent, a small proportion of wax, and a metallic soap, *e.g.*, Cd oleate. S. M.

[Plasticisers for] cellulose derivative compositions. E. F. Izard, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,008,716, 23.7.35. Appl., 26.7.33).—The use is claimed of esters (prep. described) of monohydric ether alcohols with aromatic acids containing a CO group, *e.g.*, methoxyethyl benzoylbenzoate. S. M.

Cellulose organic ester composition containing an ether of diethylene glycol monoacetate. S. J. Carroll, Assr. to Eastman Kodak Co. (U.S.P. 2,008,976, 23.7.35. Appl., 29.7.32).—The use is claimed of $BuO\cdot[C_2H_4]\cdot OAc$ etc. for plasticising cellulose acetate. (Cf. U.S.P. 1,943,972; B., 1934, 932.) S. M.

Preparation of [polymerised vinyl] coating composition. A. M. Collins, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 2,008,746, 23.7.35. Appl., 2.6.31).—Pigments are incorporated with synthetic drying oils prepared by the process of U.S.P. 1,812,849 (B., 1932, 435). 16 examples are given. S. M.

Polymerisation of vinyl compounds. C. O. Young and S. D. Douglas, Assrs. to Carbide & Carbon Chemicals Corp. (U.S.P. 2,011,132, 13.8.35. Appl., 11.4.31).—The polymerisation in presence of, *e.g.*, Bz_2O_2 is promoted by Pb, Sn, or Al and restrained by Cu, Ni, Fe, or Zn. S. M.

Polymerisation [of acrylic acid derivatives]. G. M. Kuettel, Assr. to Du Pont Viscoloid Co. (U.S.P. 2,008,719, 23.7.35. Appl., 24.7.34).—To obtain bubble-free polymerides Me α-methacrylate etc. are alternately heated until part of the mass approaches the temp. of bubble formation and then cooled until polymerisation ceases. S. M.

Manufacture of resin [from alkylolamines]. W. J. Mattox, Assr. to Universal Oil Products Co. (U.S.P. 2,011,064, 13.8.35. Appl., 20.10.34).—An alkylolamine, *e.g.*, $N(C_2H_4\cdot OH)_3$, is dehydrated by passing its vapour over activated Al_2O_3; the oily fraction obtained polymerises on keeping. S. M.

Manufacture of [aromatic amine–formaldehyde] synthetic resins. Soc. Chem. Ind. in Basle (B.P. 448,215, 4.10.35. Switz., 5.10.34).—The product obtained by condensing an aromatic amine (1 mol.) and CH_2O ($>$ 2 mols.) in absence of acid (cf. B.P. 441,978; B., 1936, 337) is heated with an acid, *e.g.*, HCl, preferably in an org. solvent. Compounds, *e.g.*, PhOH, which react with $:CH_2$ groups, may be added. The products are useful for varnishes, impregnating compositions, etc. S. M.

Manufacture of synthetic balsam by condensation of phenols with aldehydes. Brick Trust, Ltd. (B.P. 448,100, 25.9.34. Switz., 30.9.33).—Thermohardening resins suitable for use, *e.g.*, in the manufacture of safety glass are formed by causing a phenol to react with CH_2O in presence of NH_3 (as condensing agent) and an unsaturated aromatic acid, *e.g.*, BzOH; the product is heated with a polyhydric alcohol (glycerol) and/or a hydrogenated phenol (*cyclo*hexanol). There may also be incorporated ketones, *e.g.*, camphor, and glycerol esters as decolorisers and plasticisers, fluorescein to retain ultra-violet rays, carbohydrates to produce a mouldable material, and S to improve the insulating properties. S. M.

Manufacture of plastic materials having a basis of a cellulose derivative. Brit. Celanese, Ltd. (B.P. 448,224, 13.11.35. U.S., 16.11.34).—Uniform blocks consisting of cellulose acetate, plasticisers, dyes, and fillers are formed by preheating stacked sheets of the composition under pressure at 10—50° above the conversion temp. prior to the pressing at this temp. S. M.

Plastic compositions containing gelatinised nitrocellulose. H. J. Tattersall, and Imperial Chem. Industries, Ltd. (B.P. 448,246, 3.12.34, 15.8. and 22.10.35).—Nitrocellulose is incorporated with 20—50% of polymerised Me methacrylate and a plasticiser, *e.g.*, *o*-$C_6H_4(CO_2Bu)_2$. S. M.

Composition for use in forming plastic materials. R. L. Sibley, Assr. to Rubber Service Labs. Co. (U.S.P. 2,009,028, 23.7.35. Appl., 25.3.33).—Application to moulds, preferably in aq. solution, of alkali salts of aromatic sulphonic acids, *e.g.*, $PhSO_3Na$, and alkylated derivatives of hydroxydiphenyls (cf. U.S.P. 1,921,546; B., 1934, 492) prevents the adhesion of rubber and other plastics. S. M.

Producing a reaction product of butadiene bodies with hydrogen chloride. Marsene Corp. of America (B.P. 447,110, 6.10.34. U.S. 23.12.33).—Butadiene compounds and their polymerides are treated with HCl under superatm. pressure. After removal of excess of HCl the product, which has a spongy asbestos-like structure, is stable at higher temp. and gives transparent films. D. F. T.

Preparation of stable mixtures containing rubber and pitch. D. D. Pratt (B.P. 448,105, 26.10.34 and 4.6.35).—Milled rubber or latex is dissolved in low-temp. or vertical-retort coal tar, their hydrogenation products, their distillates mixed with coal-tar pitch, or in horizontal-retort coal tar having b.p. $>$ 160° and free from crystallisable constituents. Alternatively, vulcanised latex is dissolved in horizontal-retort coal tar or distillates thereof (b.p. $>$ 160°) and coal-tar pitch. The tars are preferably dephenolated. S. M.

Production of an artificial mass [from chlorinated rubber]. Chem. Fabr. Buckau (B.P. 448,093, 20.12.35. Ger., 29.1.35).—A solution of rubber in $C_{10}H_8$ or a derivative thereof is chlorinated. The product may be pptd. with, *e.g.*, MeOH, dissolved in CCl_4, PhMe, etc., and used for coatings etc. S. M.

Production of moulded articles from artificial resin and artificial resin-containing mixes. P. Kopp (B.P. 447,684, 19.11.34. Addn. to B.P. 380,824).

Non-inflammable fibrous material.—See VI. **Safety glass. Grinding bodies. Abrasive.**—See VIII. **Insulating material.**—See XI. **Treating drying oils.**—See XII.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Rubber analysis. Marty (J. Usines à Gaz, 1936, 60, 248—249).—A method and apparatus for determining org. and mineral matter in vulcanised rubber are described. The sample, contained in a Pt boat inside a Pyrex tube 500 mm. long and 4 mm. diam., is heated slowly to about 500° in an atm. of N_2. The wt. of the uncharred residue enables the org. matter to be calc. Subsequent incineration of the crucible in an oxidising atm., followed by weighing, gives the wt. of mineral matter present. Provision is made for collecting the products of distillation. R. B. C.

Direct determination of rubber, gutta-percha, resins, and the insoluble residue with the help of centrifuging. F. Izriumov (Sovet. Kautschuk, 1934, 40—44).—The material (0·5—1 g.) is refluxed with 50—100 c.c. of C_6H_6 or ligroin containing 5—20% of EtOH or $COMe_2$. The solution is centrifuged, and the residue from this process washed, dried at 105°, and weighed. The material in solution and the residue from the original refluxing are determined by evaporation and weighing. Ch. Abs. (*e*)

Use of rubber for chemical equipment. S. A. Brazier (Chem. Eng. Cong. World Power Conf., 1936, *B*5, 23 pp.).—The alternative uses of soft rubber and ebonite linings and their relative resistance to various reagents are described. The production of non-staining and non-odorous linings is discussed, *e.g.*, in relation to their effects on foods. Limitations in the application of rubber linings are pointed out. Recent developments include linings which resist temp. change and attack by oil, and are flexible. D. R. H.

Some properties of chlorinated rubber. J. P. Baxter (Chem. and Ind., 1936, 407—415).—The difficulties of chlorinating a highly viscous solution necessitate preliminary depolymerisation of the (dissolved) rubber. Products of very low η are undesirable for films, *e.g.*, for wrapping or for safety glass, but may be advantageous for paints or lacquers. With proper control of chlorination the products are stable, and subsequent treatment with "antichlors" or alkalis for stabilisation purposes is generally undesirable. Chlorinated rubber solutions are inferior to those of cellulose nitrate or acetate in colour. Chlorinated rubber has d 1·63—1·66 and a "packing d" from 3·7 to 95 lb./cu.ft.; its tensile strength (in films) is 6000—7000 lb./sq. in., but with 21% and 23% of o-$C_6H_4(CO_2Bu)_2$ (I) as plasticiser it is approx. 3000 and 1500 lb./sq. in., respectively. A film with 21% of (I) although of lower tensile strength than that of similar cellulose films is extremely resistant to rupture on account of its ability to stretch 180%. Chlorinated rubber has marked H_2O-, chemical, and flame-resistance, and good electrical insulation; its n_D is 1·596. Plasticisers with strong ultra-violet absorption at $\lambda < 3100$ A. [*e.g.*, (I)] effect marked stabilisation and protection against discoloration by light. D. F. T.

Separation and purification of ether from by-products from synthetic rubber. V. S. Batalin, A. V. Kozlovskaja, and A. V. Krupnova (Sintet. Kautschuk, 1934, No. 3, 41—50).—Separation and analyses are given. Ch. Abs. (*p*)

Oil-resisting mixture with 100% synthetic rubber. A. Shitlovskaja (J. Rubber Ind. U.S.S.R., 1935, 12, 363—365).—The preps. contained reclaimed rubber, $CaCO_3$, S, and Rubberax. Technical tests of preps. from natural and synthetic rubbers are compared. Ch. Abs. (*p*)

C black.—See II. **Sandal-seed oil.**—See XII.

Patents.

Creaming of rubber latex. (a) L. Mellersh-Jackson. From United States Rubber Co. (b, c) United States Rubber Co. (B.P. [a] 448,203, 3.12.34. [b and c] B.P. 448,244—5, 3.12.34. Holl., 31.1.34).—An aq. extract of (a) seeds of the genera *Cæsalpinia* or *Poinciana* of the tribe *Eucæsalpiniæ*, (b) seeds of the genus *Cassia* of the sub-order *Cæsalpinioideæ*, (c) the meal flour made from plants of the genus *Amorphophallus*, family *Araceæ*, serves as creaming agent for latex. D. F. T.

Manufacture of rubber articles. Internat. Latex Processes, Ltd. (B.P. 447,249, 11.12.35. U.S., 4.1.35).—Articles of thin rubber produced by the direct deposition of vulcanisable latex, *e.g.*, by spreading or spraying, are removed from their formers and vulcanised by "tumbling" in a non-halogen-containing medium such as air or H_2O. Articles with surface markings may be turned inside out prior to "tumbling." D. F. T.

Manufacture of goods of or containing sponge-like or cellular rubber or the like. Internat. Latex Processes, Ltd., S. D. Taylor, and E. W. Madge (B.P. 448,132, 6.12.34).—The process of B.P. 416,077 (B., 1934, 1023) is modified so as to provide sheeted material of sponge-like or cellular structure, by introducing a frothed aq. dispersion (on possibly a continuous material such as fabric) into one or more nips and effecting coagulation concurrently so that the formed material can be withdrawn continuously. D. F. T.

Preparation of a rubber essence. R. Botson and J. Kamp (U.S.P. 2,008,170, 16.7.35. Appl., 22.4.31. Belg., 25.4.30).—The distillate obtained by destructive distillation of rubber (*e.g.*, from old tyres) is purified successively with alkali and acid and then fractionated into two portions, b.p. 70—250° and 250—400°, respectively, which are used to prepare 5% rubber solutions for the impregnation of fibrous or porous material (leather). D. F. T.

Rubber plasticiser. J. Hyman, Assr. to Velsicol Corp. (U.S.P. 2,008,102, 16.7.35. Appl., 14.5.34).—

Rubber or rubber-like material is mixed with a viscous product (0·1—25%) obtained by high-pressure, liquid-phase polymerisation at 232—399° of cracked gasolines. D. F. T.

Formation of hard rubber [ebonite] coatings [on metal]. W. J. McCortney and E. L. Bailey, Assrs. to Chrysler Corp. (U.S.P. 2,008,028, 16.7.35. Appl., 6.6.32).—An ebonite coating firmly attached to metal is obtained by application of a liquid vulcanisable composition, comprising rubber, vulcanising agent, accelerator, and volatile medium, in several successive layers, each layer being partly vulcanised in position before application of the next. Conversion into a true ebonite condition is finally effected simultaneously throughout the coating. D. F. T.

Formation of rough surfaces on rubber goods. J. Fromm (B.P. 448,214, 30.9.35).—A liquid mixture of natural and/or synthetic rubber and/or rubber "substitute," a resin, mineral pitch, turpentine oil and other volatile hydrocarbons is applied to the surface of unvulcanised rubber goods (*e.g.*, gloves), which are then dried and vulcanised. A suitable mixture is obtained by melting together rubber waste (100), colophony (200), and mineral pitch (400), treating this with turpentine oil (200), and adding a mixture of C_6H_6 (1000) and benzine (2000 pts.). D. F. T.

Vulcanisation of rubber. E. I. Du Pont de Nemours & Co. (B.P. 448,126, 30.11.34. U.S., 11.1.34).—Vulcanisation is accelerated by a compound of the formula RNXY ($RN = C_5H_5N$, quinoline, or *iso*quinoline, possibly substituted, X is a salt-forming anion, and Y is a hydrocarbon radical), *e.g.*, benzylpyridinium chloride, methylpyridinium formate. D. F. T.

Vulcanisation of rubber. Belvedere Chem. Co., Ltd. (B.P. 448,237, 17.2.36. U.S., 16.2.35).—Aminothiophenols characterised by the grouping $NH_2{\cdot}C_6H_4{\cdot}SR$ (R = an element or group), *e.g.*, *oo'*-diaminodiphenyl disulphide, are used as activators for org. accelerators, especially those of the arylenethiazyl sulphide class. D. F. T.

Securing adhesion of [soft] rubber to metal [iron]. H. R. Minor, Assr. to Industrial Process Corp. (U.S.P. 2,017,071, 15.10.35. Appl., 10.3.34).—Unvulcanised, but vulcanisable, rubber is brought in good contact with the metal, and then heated through the metal to a temp. $>$ the usual vulcanising temp. and sufficient to depolymerise the rubber locally at the junction before any substantial vulcanisation can occur and so that the adhesion remains perfect ($>$ 400 lb. per sq. in.) on cooling. A second body of rubber may be placed on top and vulcanisation effected at the usual temp. throughout. B. M. V.

Rubber–pitch mixtures. Butadiene derivatives. Chlorinated rubber mass.—See XIII.

XV.—LEATHER; GLUE.

Reticular tissue of the skin. (Miss) M. Kaye (J. Soc. Leather Trades Chem., 1936, **20**, 223—229).—A tissue of very fine fibres binding the coarser skin structures has been isolated. It differs chemically and structurally from collagen and elastin and is similar to the reticular tissue present in other parts of the animal body. The collagen fibres and fibrils are bound together by these reticular fibres, which also cause the constrictions in acid- or alkali-swollen fibre bundles. This tissue gives the typical protein reactions, is digested by pepsin or bacteria, very slowly digested by trypsin, and is very resistant to chemical reagents. D. W.

Chemistry of myrobalans. I. Extraction of myrobalans nuts and liquors with organic solvents. H. Phillips (J. Soc. Leather Trades Chem., 1936, **20**, 230—238).—The tans/non-tans ratio and the buffer index of an aq. infusion of the $COMe_2$-sol. fraction of myrobalans were $>$ those of aq. myrobalans infusion. Different fractions were obtained by extracting the infusion at different p_H vals. with org. solvents. Ellagitannins were obtained by extracting the infusion at p_H 7·0 with EtOAc. The product was stable, only slightly sol. in cold H_2O, and yielded 23·6% of ellagic acid when hydrolysed with $2N$-H_2SO_4. D. W.

Determination of degree of olation in basic chrome-tanning liquors. C. Riess (Collegium, 1936, 129—138).—The Stiasny and Königfeld method (B., 1933, 159) of determination has been followed, using the Theis–Serfass conductometric method (B., 1935, 564), and the results agreed with those obtained by the potentiometric method if the inflexion of the S curve and not p_H 2·8 was taken as the end-point. Stiasny's theories on hydrolysis and olation have been confirmed. D. W.

Nature of the compound formed by basic chromium salts with hide substance. A. Küntzel and C. Riess (Collegium, 1936, 138—170).—The absorption spectra of mixtures of basic Cr salts with gelatin, glycine, and AcOH, respectively, have been shown to be similar. The glycine is linked up with the Cr chiefly by primary valency through its CO_2H group, but there is some secondary valency attachment through the basic NH_2-groups, the amount varying according to the p_H of the medium. The strength of the linkings increases progressively with p_H, as also does the stability of the Cr–hide substance compound. Cr tannage is dependent on the p_H of the system and the presence both of aggregate multinuclear Cr complexes and of ionised CO_2H groups in the hide substance. The large Cr complexes fit into the micellar network and the end Cr atoms combine with the polar groups, thus explaining the contraction of the fibres by Cr tanning. D. W.

Non-impregnated vegetable-tanned Danish, Norwegian, and Swedish sole leathers. J. S. Aabye (Collegium, 1936, 170—178).—The chemical and physical data of 30 sole leathers of different origin have been compared. The average % figures for H_2O-sol. matter, degree of tannage, yield, and H_2O absorbed in 3 hr. were, respectively: Swedish 17·9, 75·9, 282, 33; Norwegian 20·0, 71·8, 284, 22; Danish 24·8, 60·8, 287, 33. D. W.

Effect of acidity of vegetable tan liquors on the swelling of pelt and the physical properties of the finished leather. G. Rézabek (J. Soc. Leather Trades Chem., 1936, **20**, 209—223; cf. B., 1935, 817).—Four tanning tests have been made with liquors of different series of p_H vals., respectively. Swelling was observed in the first four liquors only Subsequently the swelling diminished. No dehydration occurred in a purely alkaline tannage (p_H 8·0) and the wear-resistance of the leather produced thereby was poor. The thickness of the leather fibres was increased, the interfibrillary spaces and consequent permeability were diminished by commencing the tannage at p_H 8·0 and finishing at p_H 3·0, and the wear-resistance of the leather produced thereby was only 1% $<$ that of normally-tanned leather. D. W.

[Determination of the degree of] hydrolysis of gelatin and glue. H. Stadlinger (Chem.-Ztg., 1936, **60**, 305—308).—The degree of hydrolysis ("AGS "no.) is given by $100N_2/2N_1$, where N_1 is the N content of 25 c.c. of a 2% solution of the glue or gelatin in a NaOAc–AcOH buffer of p_H 4·7, and N_2 is the N content of the portion pptd. from 50 c.c. of the gelatin or glue solution by $MgSO_4$–H_2SO_4 mixture. Results are quoted for 58 samples. D. W.

Rubber essence.—See XIV.

XVI.—AGRICULTURE.

Origin of horizons in claypan soils. R. H. Bray (Amer. Soil Survey Assoc., Rept. 15th Ann. Meet. Bull., 1935, **16**, 70—75).—Chemical data are given and profile development is examined in 5 loessial soils. Deposition of colloids forming the pan is caused by changes in the efficiency of H_2O movement. Development of horizons is characterised by a downward movement of clay material and accumulation at lower depths. Secondary horizons result from movement and accumulation of oxides. This silicatic type of formation is a sub-type of podsolisation. The latter produces more free oxides relative to secondary silicates. Movement of these oxides forms the major horizons. Ch. Abs. (p)

Report on agricultural chemistry. **["Usar soils."]** T. J. Mirchandani (Agric. Dept. Bihar and Orissa, Rept. [Mar., 1934], 1935, 39—40).—"Usar" soils contain barren patches having p_H 9·5—10·2 and incrustations of Na salts. Analyses and the effects of manurial treatments are described. Ch. Abs. (p)

Uniformity of soil types: fundamental differences between different soil series. F. L. Davis (Ala. Agric. Exp. Sta. Bull., 1936, No. 244, 153 pp.).—Comparison is made of the physical and chemical characteristics and the productivity of soils of varied types. A. G. P.

Use of electrodialysis for determining phosphate availability in calcareous soils. J. B. Goodwin (Colorado Agric. Exp. Sta. Tech. Bull., 1935, No. 12, 32 pp.).—The amount of P extracted from soils by electrodialysis is markedly affected by the stirring, temp., and p_H changes in the suspension and the salt and $CaCO_3$ content of the soil. The amount of electrodialysable P per coulomb used is less subject to variations. The method of electrodialysis is not sufficiently sensitive to measure the increase in available P due to fertiliser treatment. The H_2O- or K_2CO_3-sol. P is more in accordance with field response to P fertilisers. A. G. P.

Rapid determination of readily-soluble plant nutrients, viz., calcium, magnesium, sodium, and potassium, in soil. J. Kivekäs (Suomen Kem. 1936, **9**, **B**, 17).—Adsorbed bases in soil are extracted by 8—12% aq. NH_4Cl on a water-bath. Org. matter in the extract is removed by H_2O_2. Ca is pptd. as CaC_2O_4 (I) and Mg as arsenate simultaneously. The mixed ppt. is dissolved in H_2SO_4, C_2O_4'' determined by $KMnO_4$, and AsO_4''' reduced to AsO_3''' and determined iodometrically. In another portion of the extract Ca is removed as (I) and Mg as $Mg(OH)_2$ by $Ba(OH)_2$, excess of Ba being pptd. by $(NH_4)_2CO_3$. The filtered solution is evaporated and the residue ignited to remove NH_4'. The residue is treated with HCl and evaporated, the mixed NaCl and KCl being weighed and subsequently titrated with $AgNO_3$. A. G. P.

Use of sugar-beet petioles as indicators of soil-fertility needs. R. Gardner and D. W. Robertson (Colorado Agric. Exp. Sta. Tech. Bull., 1935, No. 14, 16 pp.).—Petiole analysis was more effective than the K_2CO_3 test in demonstrating differences in available P in soils resulting from manurial treatment. K and N requirements may also be determined by this means. Manure was more effective than superphosphate in increasing the available P of soils. A. G. P.

Production of concentrated fertilisers from poor phosphates. E. Britzke and S. Volfkovich (Chem. Eng. Cong. World Power Conf., 1936, *L*11, 14 pp.).—The manufacture in U.R.S.S. of fertilisers from low-grade phosphorites and apatite–nepheline minerals is discussed, the processes employed being those of mechanical concn. by calcination and flotation, treatment with mineral acids, and electrothermal or blast-furnace reduction to P, followed by oxidation and hydration. The production of mixed fertilisers containing P and N and the enriching of metallurgical slags are also described. L. C. M.

Solubility of applied nutrients in muck soils: composition and quality of certain muck crops as influenced by soil-reaction changes and moisture conditions. W. S. Ligon (Mich. Agric. Exp. Sta. Tech. Bull., 1935, No. 147, 51 pp.).—Treatment of fertilised muck soils with S increased the acidity, sol. Ca, PO_4''', and, to a smaller extent, K, and frequently depressed nitrification. Liming increased the sol. Ca, decreased the sol. PO_4''', and improved nitrification. The nutrient concn. of the surface (2—3 in.) layer was largely influenced by the H_2O relationships of the soil, but the p_H was little affected. The solubility of soil PO_4''' was closely related to the p_H, reaching high vals. at p_H 6·2—6·4. The solubility of $Ca^{\cdot\cdot}$ was independent of p_H and was controlled by the level of supply and by the associated cations. HCl and HNO_3 increased the solubility of Ca, K, and PO_4''' in a manner similar to that of H_2SO_4, but the effects of the acids on plant growth were different. Addition of acid to alkaline muck did not increase the sol. Ca as did additions of mineral acids, although the PO_4''' solubility was notably increased. No relation was apparent between the % of sol. $K^{\cdot}$, $Ca^{\cdot\cdot}$, or PO_4''' in soil and that in the crop. Beneficial effects of CaO and of S on crop quality are examined. A. G. P.

Assimilation of phosphorus by *Aspergillus niger* and *Cunninghamella* sp. E. B. Smith, F. E. Brown, and H. C. Millar (J. Amer. Soc. Agron., 1935, **27**, 988—1000).—The wt. of mycelium of *A. niger* produced in Niklas' medium to which soil is added is roughly $\propto$ the amount of P available to the mould within the range 0—60 p.p.m., provided a standardised technique is adopted. The method is not sufficiently trustworthy for general application to determinations of available P in soil. A. G. P.

Effect of intensive treatment on yield and quality of grass from an exposed Boulder clay pasture. B. Thomas and R. Hope (J.S.C.I., 1936, **55**, 146—151 t). —Management under the Hohenheim system increased the yield of dry matter by $> 20\%$, but had no significant effect on quality. The results suggest that intensive treatment is unlikely to prove economical on the poor Boulder clay pastures of North Eastern England.

Effect of naphthalene on germination of paddy seed. C. R. Mudaliar (Madras Agric. J., 1935, **23**, 223—231).—Contact with $C_{10}H_8$ vapour for 1 year did not affect the germination of some varieties of paddy seed, but the vapour injured the new tissues of germinating seed, and the ungerminated seed if stored in an atm. saturated with H_2O. Ch. Abs. (*p*)

Perilla plantings and properties of perilla oil. H. A. Gardner (Nat. Paint Var. Assoc., May, 1936, Circ. 506, 178—198).—A review of (largely unsuccessful) planting experiments in various parts of the United States. Technical notes on the properties of perilla oil are also given. F. C. B. M.

Breeding of coumarin-free sweet clover, *Melilotus*. T. M. Stevenson and J. S. Clayton (Canad. J. Res., 1936, **14**, C, 153—165).—The coumarin (I) content of sweet clover leaves varies with the stage of development and with species and variety. High vals. are associated with dark colour. *M. dentatus* contains very little (I) in leaves or seed. Air- or oven-drying causes marked loss of (I). A direct correlation exists between the (I) content of leaves and seeds. A. G. P.

Statistical analysis applied to research in weed eradication. F. F. Lynes (J. Amer. Soc. Agron., 1935, **27**, 980—987).—Application of statistical methods to experimental data reveals no significant difference in efficiency between acid As preps. and $NaClO_3$. A. G. P.

Weed control. Anon. (Nova Scotia Dept. Agric. Rept. [Sept., 1934], 1935, 59).—3% aq. $CuSO_4$ controlled charlock in grain. $FeSO_4$ was less effective. Promising results are recorded with dil. H_2SO_4. Sprays containing $NaClO_3$ or a mixture of H_2SO_4 and Na_3AsO_3 gave good results with perennial sow thistle. Ch. Abs. (*p*)

Insecticide and fungicide investigations. W. H. Read (Cheshunt Exp. Sta. Ann. Rept., 1934, No. 20, 79—80).—Emulsions of Cu oleate (I) in cottonseed oil (II) made with glue solution were effective against rose mildew, but not against red spider mite. (I)–petroleum oil emulsions were less easily made, less effective, and more injurious to rose leaves. Petroleum oils penetrate leaf tissues more readily than does (II).

Damping-off of tomato seedlings was not completely controlled by soaking soil in 1 : 400 solutions of malachite-green, Me-green, or auramine. Germination and growth of seedlings was checked. Ch. Abs. (*p*)

Nicotine peat. A new insoluble nicotine insecticide. L. N. Markwood (Ind. Eng. Chem., 1936, **28**, 561—563).—The H_2O-insol. insecticide obtained by interaction of nicotine (I) and peat in aq. solution is investigated. Highly acid peats combine with a greater amount of (I) than less acid or neutral peats. The (I) content of the peat, particularly with peats of least natural acidity, may be increased by first treating with acids to remove inorg. bases. P. W. C.

Dormant and delayed dormant sprays for aphids and red spider. S. W. Frost (Proc. 76th Ann. Meet. State Hort. Assoc. Penn., 1935; Penn. State Hort. Assoc. News, 1935, **12**, No. 1, 107—114).—For aphids on apple dormant tar-distillate sprays should contain $\nless$ 2·4% of creosote oil. Tar distillates with 3% of lubricating oil are very effective against red spider. Delayed dormant sprays containing 3% of oil kill aphids and eggs of red spider, and their ovicidal val. is increased by addition of CaO–S (3 gals. per 100 gals. of spray). Ch. Abs. (*p*)

Effect of paraffin wax emulsions on oil-depositing properties and insecticidal efficiency of oil sprays. W. Ebeling (J. Econ. Entom., 1935, **28**, 728—729).—Addition of a 30% emulsion of paraffin or spermaceti wax [$N(C_2H_4{\cdot}OH)_3$ stearate emulsifier] to an oil spray to produce a spray mixture containing 0·3—1·0% of wax increased the amount of oil deposited and the kill of insects. Sprayed trees suffered no apparent injury. A. G. P.

Aluminium sulphate as a sticker for hydrated lime in sprays. J. W. Lipp and M. R. Osburn (J. Econ. Entom., 1935, **28**, 728).—A repellent spray against Japanese beetle contains CaO 20, $Al_2(SO_4)_3$ 3 lb., H_2O 100 gals. The deposit was very resistant to rain washing. A. G. P.

Analysis of lime-sulphur solutions. A. K. Hobbs (J. Proc. Australian Chem. Inst., 1936, **3**, 141—146).—The direct fungicidal val. of CaO–S depends on the % of polysulphide S present, which may be determined either directly by the Goodwin–Martin method (B., 1925, 780) or indirectly from the complete analysis. Details are given of both methods of analysis which, on direct trial, gave vals. for the % polysulphide S in good agreement. H. C. M.

Codling-moth research, 1934. H. N. Worthley and L. C. Marston, jun. (Proc. 76th Ann. Meet. State Hort. Assoc. Penn.; Penn. State Hort. Assoc. News, 1935, **12**, No. 1, 96—107).—Pb arsenate (I) sprays were more effective when mixed with fish oil. Ca arsenate was inferior to (I) or nicotine and caused excessive scorching. Tree bands should contain about 8 lb. of β-$C_{10}H_7{\cdot}OH$-oil mixture per 250-ft. roll. Ch. Abs. (*p*)

Arsenic deposit and codling-moth control. R. L. Webster and J. Marshall (Wash. Agric. Exp. Sta. Bull., 1934, No. 293, 31 pp.).—The As deposit from Pb arsenate (I) sprays was increased by admixture of fish or mineral oil. Residues from fish oil mixtures are the more easily removed, especially with a Na silicate wash-liquor. On the basis of equal deposits of As, Mn arsenate–fish oil is less effective than (I) alone. Ca arsenate (II)–soap was not fully effective, but (II)–

mineral oil gave good control without injury to trees. (II)–fish oil causes foliage injury and premature falling of fruit. A. G. P.

Blackberry mite in Oregon. W. D. Edwards, K. W. Gray, J. Wilcox, and D. C. Mote (Oregon Agric. Exp. Sta. Bull., 1935, No. 337, 33 pp.).—Recommended control measures include oil or CaO–S spraying in autumn followed by a delayed dormant application of CaO–S. A. G. P.

Root-weevils injurious to strawberries in Oregon. J. Wilcox, D. C. Mote, and L. Childs (Oregon Agric. Exp. Sta. Bull., 1934, No. 330, 109 pp.).—Characteristics and control measures are described. A. G. P.

Bacterial rust on tobacco. S. E. Gruschevoi (Tabacn. Prom., 1935, No. 1, 27—29).—Control measures include steam-sterilisation of soil and seed treatment with $AgNO_3$ (0·1%) or CH_2O followed by washing. Young plants are sprayed with Bordeaux mixture. Ch. Abs. (*p*)

Influence of products of hydrogenation from waste of *Nicotiana rustica* and nicotine manufacture on the crop of *N. rustica*. P. A. Girko, R. L. Fratkin, and M. I. Jakovenko (Tabacn. Prom., 1935, No. 1, 29—32).—The dust accumulating during treatment of tobacco is a good fertiliser. On hydrogenation (high pressure and catalyst) it yields liquid hydrocarbons, bases, and a tar-H_2O. The proportion of aromatic hydrocarbons in distillate fractions increases with the b.p. The fraction 250—300° and also the tar-H_2O produced the best fertiliser effects on tobacco plants. Ch. Abs. (*p*)

Control of tapeworm infestation in chickens: pathology of the intestine of the host. H. J. Stafseth (Mich. Agric. Exp. Sta. Tech. Bull., 1935, No. 148, 46 pp.).—Beneficial effects of colloidal I are recorded. A. G. P.

Patents.

Extraction of mucinous substance from plants. H. B. Near, A. J. Pacini, R. W. Crosley, M. M. Gerth, F. T. Breidigam, and J. D. Kelly, Assrs. to Libby, McNeill, & Libby (U.S.P. 2,010,880, 13.8.35. Appl., 5.4.33).—The mucilage of the seeds of *Plantago psyllium* etc. is extracted by boiling for 30 min. with much H_2O, containing agar-agar (I), which reduces the η of the solution and allows more ready filtration. Evaporation and adjustment of p_H to 2—5 gives jellies suitable for the basis of foods or medicaments. Use of cane sugar instead of (I) gives readily sol. solids. R. S. C.

Fertiliser and method of fertilising. W. Eggert, jun. (U.S.P. 2,017,090, 15.10.35. Appl., 5.5.34).—A mixture is made of finely-ground phosphate rock (*A*) and felspar (*B*) with an org. N compound (*C*) including meal of oilseeds (*e.g.*, cotton, castor, linseed) in proportion so that, in the soil, *C* will release the active constituents (P_2O_5 and K) of *A* and *B*. B. M. V.

Light-stable insecticide. V. Voorhees, Assr. to Standard Oil Co. (U.S.P. 2,011,428, 13.8.35. Appl., 4.5.31).—Small amounts of amino-anthracenes and -anthraquinones or the $(NH_2)_2$-compounds or their *N*-derivatives stabilise pyrethrin–oil emulsions to light; 0·001—0·1% of 1 : 4-ditoluidinoanthraquinone is cited as an example. R. S. C.

XVII.—SUGARS; STARCHES; GUMS.

Manufacture of glucose. P. Smit (Z. Spiritusind., 1936, **59**, 191).—In place of the usual activated C, a decolorising agent (*D*) prepared at lower temp. with the aid of hygroscopic agents (*e.g.*, H_2SO_4, H_3PO_4) may be used, the activity of the colloidal product being dependent on the presence of a certain [H_2O]. A boiling mixture of *D* and H_2O is mixed with starch milk (from maize, potatoes, etc.). After suitable heating and neutralisation, the filtrate is practically colourless, and the last trace of colour can be removed by further treatment with washed *D*. The H ions of *D* are easily exchanged with ions of Cu, Fe, and Pb; the regulation of such ionic exchanges is discussed. I. A. P.

Thermophiles in sugar. E. J. Cameron, J. Yesair, and C. C. Williams (Canner, 1935, **80**, No. 9 [2], 110).—Suitability of sugars and starch for canning is examined in reference to their contents of thermophilic and S bacteria. Ch. Abs. (*p*)

Starches from indigenous grains and tubers. II. Jowar starch. III. Ragi starch. IV. Cassava starch. V. Starches from different varieties of rice. VI. Use of the tintometer in the study of degradation products of starch. H. P. Das Gupta (J. Indian Inst. Sci., 1936, **19**, A, 19—26, 27—29, 31—34, 35—36, 37—43; cf. B., 1935, 284).—II. Starch (I) may be separated from Jowar grain by fermentation and subsequent treatment with aq. NaOH and centrifuging, or by steeping in aq. SO_2, centrifuging the paste, and treating the product with aq. NaOH.

III. (I) is prepared from Ragi by the same method as above; the product is useful in textiles.

IV. (I) is separated from the cassava tuber directly by aq. lixiviation and purified by treatment with aq. NaOH; solutions of the (I) have high η.

V. The % yields of (I) from 6 varieties of rice are recorded.

VI. There is a parallelism between the η of and tint produced by I with solutions of the degradation products of (I). H. D.

Starch for sizing etc.—See VI. **EtOH from pentoses.**—See XVIII. **Honey.**—See XIX. **Purifying yeast-factory waste-H_2O.**—See XXIII.

XVIII.—FERMENTATION INDUSTRIES.

Design of apparatus and heat economy in the fermentation industry. W. Vogelbusch (Chem. Eng. Cong. World Power Conf., 1936, *L*1, 11 pp.).—Apparatus is described for minimising the consumption of compressed air during the manufacture of yeast, the air bubbles entering the wort being finely broken up and dispersed by mechanical means. Yeast effluents may be purified biologically, whilst when EtOH is manufactured as a by-product the effluent may be conc. and worked up for recovery of K, the waste gases from the furnace being utilised as a source of heat; the coal utilisation is accordingly scarcely increased by the recovery process. I. A. P.

Water-softening in a modern lager-beer brewery. C. Iacobsen (Chem. Eng. Cong. World Power Conf., 1936, *L2*, 8 pp.).—The influences of liquor salts on the brewing process are discussed. H_2O-softening processes are outlined, and a large-scale softening plant is described in which softening is accomplished by the $Ca(OH)_2$ process, using marble powder to catalyse the deposition of cryst. $CaCO_3$. I. A. P.

Steaming rye in the high-pressure process. A. Frey and E. Malenke (Z. Spiritusind., 1936, **59**, 197—198, 200, 205—206).—Steaming rye at high pressures increases the mash extract. With increasing pressure and duration of steaming the acidity of the mash is increased. The degree of colour in the mash is dependent on the pressure and duration of steaming, a pressure of 5 atm. having approx. 2½ times the caramelising effect of 4 atm. The most favourable proportions of H_2O to rye and treatment times for various pressures are discussed; a preliminary steeping with H_2O gives improved results at lower pressures (3 atm., greater proportion of H_2O), but not at higher pressures (4—5 atm., less H_2O). Addition of H_2SO_4 to the steep-H_2O gives unfavourable results when the higher pressures are used for stewing. I. A. P.

Yeast from sulphite waste liquor. Anon. (Paper Trade J., 1936, **102**, TAPPI Sect., 259—261).—The Heijkenskjold method is briefly described. The waste liquor (*W*) from 1 ton of sulphite pulp yields 350—450 lb. of yeast. The advantages of *W* over molasses and beet sugar are indicated. H. A. H.

Formation of alcohol from pentoses. A. I. Virtanen and T. Kirkkomäki (Suomen Kem., 1936, **25**, **B**, 18).—EtOH (up to 23% yield) was obtained by fermentation of pentoses by *B. coli*. A. G. P.

Obtaining a correct alcoholometer reading. H. Kreipe (Z. Spiritusind., 1936, **59**, 185—186).—Sources of error associated with the use of the alcoholometer are indicated, with special reference to its use with liquids of low [EtOH]. Methods for minimising such errors are discussed, the necessity for cleanliness of the instrument and of the liquid surface being stressed. I. A. P.

Cucumber fermentation. VIII. Genuine dill pickles: biochemistry and bacteriology of the curing process. F. W. Fabian and L. J. Wickerham (Mich. Agric. Exp. Sta. Tech. Bull., 1935, No. 146, 20 pp.; cf. B., 1935, 120).—A definite sequence of bacterial populations occurs during fermentation although weak acid producers predominate throughout. Addition of sugar improves the product by increasing acid production in the early stages. The course of fermentation is not affected by the hardness of the H_2O used, by presence of mustard, by soil adhering to cucumbers, or by preliminary washing of these with aq. Cl_2. Addition of AcOH to produce p_H 4·6 in the pickle brine is recommended. A. G. P.

Concn. of heat-unstable solutions. Distillation [of whisky].—See I. **EtOH as motor spirit.**—See II. **Abs. EtOH.**—See III. **Activity of amylases.**—See XX.

Patents.

(A) Maturing and ripening of malt beverages. (B) Fermented beverages. L. Wallerstein (U.S.P. 2,011,095—6, 13.8.35. Appl., [A] 2.5.33, [B] 20.5.33).—(A) Sterilised malt wort containing autolysed yeast is used in thin layers (1—3 in.) for the cultivation of *B. subtilis* or *B. mesentericus*, aëration being necessary. After 7—10 days at 37—45°, the liquor (*L*) is separated from the bacterial skin, infection being avoided by the use of low temp. or of antiseptics. *L* may be used for direct addition to the beer to be matured, or, alternatively, the metabolic products present in solution may be pptd. from *L* by addition of EtOH or $COMe_2$ or by half-saturation with $(NH_4)_2SO_4$, the ppt. being separated and dried and used at the rate of 1—5 g. per 31 gals. of beer. The addition is preferably made while the beer still contains much yeast, and shortens the time of maturation from, *e.g.*, 1—3 months to 7—10 days, clarification also being accelerated. The acquired maturing effect is not stopped by pasteurisation. (B) A similar accelerating prep. is obtained by growing moulds, *e.g.*, *Penicillium*, *Aspergillus*, *Mucor*, or *Amylomyces*, on comminuted cereal grains etc., the mass being kept moist and at 35—45°. After 30—90 hr. the mass is extracted with H_2O and either the extract is used as such, or the active products are pptd. as above before use. I. A. P.

Distillation of alcohol-containing fermented liquors. G. T. Reich (U.S.P. 2,010,929, 13.8.35. Appl., 13.10.31. Cf. U.S.P. 1,930,861; B., 1934, 658).—The liquor containing EtOH is evaporated in effect 1 (*A*) so that the bulk of the EtOH is removed, approx. one half of the vapour passing direct to the rectifier (*R*), whilst the rest passes to the steam chest of effect 2 (*B*) where it heats up the partly de-alcoholised liquor (from (*A*) which is now under reduced pressure. The vapours from *B* are likewise employed for heating in effect 3 (*C*), which serves for the further concn. of the waste slop under further reduced pressure, the vapour from this (substantially H_2O) passing to waste. The condensates from the steam chests of *B* and *C* pass to *R*, preferably at points higher than the entrance of vapours from *A*. Appropriate apparatus is figured. The principle is applicable to direct-flow evaporation and to countercurrent and vapour-compression systems. I. A. P.

Denatured alcohol and denaturant for the same. J. H. James, Assr. to C. P. Byrnes (U.S.P. 2,009,661, 30.7.35. Appl., 30.6.26).—Petroleum fractions of selected boiling range are subjected catalytically to partial oxidation, and free org. acids and highly oxidised substances may be removed from the product, *e.g.*, by suitable alkali and solvent treatment, respectively. A fraction of the product the boiling range of which covers that of the EtOH represents a denaturant impossible of separation from EtOH and containing unsaturated compounds and aldehyde-like compounds. The objectionable odour and taste of the denaturant may be emphasised by chemical combination with, *e.g.*, Cl_2 or S. I. A. P.

Gas-condensing and -separating system [for breweries]. A. H. Baer, Assr. to Worthington Pump & Machinery Corp. (U.S.P. 2,018,594, 22.10.35.

Appl., 1.5.34).—For the recovery of CO_2 in a brewery the atm. from a fermentation vat or the like is withdrawn and passed through a refrigerating system to recover liquid CO_2, the cold in the permanent gases being recovered by heat exchange. B. M. V.

Apparatus for production of vinegar. H. Frings (B.P. 448,392, 22.11.35).—A thermometer in the feed container (*C*) for the circulated and cooled gyle regulates the flow of cooling-H_2O. The flow of gyle from *C* is regulated by thermometers embedded in the contact mass at various depths, the devices being electromagnetic. B. M. V.

Producing lactic acid [from lactose]. O. M. Urbain, Assr. to C. H. Lewis (U.S.P. 2,009,753, 30.7.35. Appl., 22.3.33).—Whey is treated with the calc. amount of $Pb(OAc)_2,2PbO,H_2O$, and the washed ppt. of "plumbyl lactose" is decomposed with the equiv. quantity of hot dil. H_2SO_4. The separated lactose solution is cooled to 34° and then treated with a 5% excess of $CaCO_3$ and with peptone and Na_3PO_4. After inoculation with lactic bacteria the fermentation is allowed to proceed to completion (approx. 72 hr.) at 34° with intermittent agitation. The clear solution of Ca lactate is conc. to 1/5 of its vol., treated with H_2SO_4, and the lactic acid (I) is distilled in steam. On cooling the distillate to 10°, (I) separates as small crystals. I. A. P.

Treatment of distillery slop [for use as yeast nutrient]. H. L. King, Assr. to Nat. Grain Yeast Corp. (U.S.P. 2,008,584, 16.7.35. Appl., 4.2.31).—A converted grain mash, prepared with the min. of H_2O, is inoculated with lactic acid (I) bacteria at 53·3—54·4°, and one half of the hot waste slop is added when souring is actively proceeding, the original temp. being maintained by appropriate cooling. The acidity is maintained between suitable limits by adding NH_3 or CaO, thus favouring the continued action of the bacteria and the hydrolysis of the slop protein to NH_2-acids. Meanwhile the remaining slop is added to molasses, and the mixture acidified with H_2SO_4 and heated to 90—95°. After allowing the ppt. to settle, the clear liquid is added to the soured grain mash and (I) production continued, the acidity being maintained as before and the final acidity adjusted as desired. The sterilised and filtered wort resulting gives improved yields of yeast, which after washing is of good colour. The maintenance of the desired p_H during the yeast cultivation (necessary to obtain the best colour) is facilitated by the richness of the wort in buffer substances. I. A. P.

Dehydration of liquids [EtOH].—See I.

XIX.—FOODS.

Quality of canned whole-kernel maize. Z. I. Kertesz (Canner, 1935, **80**, No. 11, 12—13).—Maize with $>$ 21% of EtOH-insol. solids was of inferior quality. A method of determining this characteristic is described. Ch. Abs. (*p*)

Corrosion-resistance of metals in maize processing. F. L. LaQue (Canning Age, 1935, **16**, 315—317, 322).—The order of corrosiveness of metals in brines was Cu $>$ Fe $>$ Ni $>$ Sn, Zn, Cr. Only Cu is likely to affect the colour of canned maize. Ch. Abs. (*p*)

Acceptance of soya-bean flour depends on correct processing. A. A. Horvath (Food Ind., 1935, **7**, 15—16).—Processing should inactivate lipases, oxidases, and peroxidases, which may destroy vitamin-*A* and -*D* and also liberate free acids from the oil and oxidise them to nonaldehyde and dihydroxyacetone. Rapid inactivation at an appropriate temp. is recommended. Ch. Abs. (*p*)

Sampling milk. D. H. Bailey (Penn. Agric. Exp. Sta. Bull., 1934, No. 310, 30 pp.).—The influence of the sampling technique on the results of fat determinations is examined. A. G. P.

Attainable standards in the bacterial counts of raw and pasteurised milk. M. E. Barnes (Amer. J. Publ. Health, 1936, **26**, 561—566).—In raw milk a logarithmic average of 5000 bacteria per c.c., and in pasteurised milk a max. of 1000 per c.c., is considered an attainable standard. H. D.

Controlling the composition of Oregon butter. G. H. Wilster (Oregon Agric. Exp. Sta. Bull., 1935, No. 338, 37 pp.).—Methods of analysis and the application of the results to the standardisation of butter are described. A. G. P.

Influence of chemical and physical factors on egg-white foams. M. A. Barmore (Colorado Agric. Exp. Sta. Tech. Bull., 1934, No. 9, 58 pp.).—Egg-white foam conforms to modern concepts of foam structure. A concn. of protein occurs at the liquid–air interface and it becomes insol. during the formation of the foam. $Ca(OH)_2$, NaOH, Na_2SO_4, and heat-treatment do not affect the foams, but certain acids and acid salts increase their stability, probably by modifying the interfacial concn. of protein. K H tartrate (I) stabilised the foam $>$ did AcOH or citric acid. If (I) is added early in the beating process, later neutralisation by NaOH has little influence on the action of (I). In presence of (I) egg-yolk lowers the stability of the foam. A. G. P.

Chemistry of Cheddar cheese-making. I. Mineral content of cheese and whey. F. H. McDowall and R. M. Dolby. **II. Buffer capacity of wheys.** R. M. Dolby and F. H. McDowall. **III. Conversion of lactose into lactic acid by starter cultures.** F. H. McDowall and R. M. Dolby (J. Dairy Res., 1935, **6**, 218—234, 235—242, 243—251).—I. The Ca and P contents of whey increase steadily throughout the process up to salting and subsequently decline. Vals. vary with the titratable acidity of the whey. Ca shows the wider variations. Normally 60% of the Ca and 57% of the P of the milk are retained in the cheese. Loss of Ca and P from whey occurs principally before running. Increased acidity in milk before renneting increases the loss of minerals in the whey and lowers the Ca content of the cheese.

II. The buffer capacity of whey between p_H 3 and 5 is mainly due to lactate, and that at higher p_H to Ca phosphate.

III. Increased acidity of milk during souring by starter cultures is accounted for by the lactic acid (I) produced. In the early stages considerable amounts of substances other than (I) are produced from lactose, but over the whole fermentation period the proportion of by-products is small. A. G. P.

Cheese-ripening studies. (A) Influence of different extracts on acid production of lactic acid bacteria. W. Sadler, B. A. Eagles, J. F. Bowen, and A. J. Wood. **(B) Wildier's bios and the lactic acid bacteria. Fractionation of bios from lucerne and effect of fractions obtained on the vital activity of the *Betacocci*.** B. A. Eagles, A. J. Wood, and J. F. Bowen (Canad. J. Res., 1936, **14**, B, 139—150, 151—154).—(A) The stimulating influence of forage crop and yeast extracts on acid production by two strains of *Streptococcus cremoris* and two of *Betacoccus cremoris* is investigated. A factor (or factors) present in lucerne, and to a smaller extent in other forage crops, has (have) a stimulating effect on the vital activity of these organisms. Lucerne extract appears, in the case of one of the *Betacocci*, to possess a stimulating influence not present in a yeast extract. (B) The influence of lucerne extracts on the acid-producing abilities of *Betacocci* is due to $>$ 1 stimulating factor. Fractionation according to Miller (A., 1933, 637) into bios I, II*a*, and II*b* shows that *Betacocci* require all three factors for max. metabolism. E. A. H. R.

Some discolorations of stored fresh and frozen fish and their control. R. H. Bedford (Biol. Bd. Canada Progr. Repts., 1936, No. 27, 11—14).—Discoloration due directly or indirectly to bacterial growth is prevented by storage at $<$ —10°. That due to contact with NH_3 or NH_3-like substances is prevented by complete glazing and storage at $<$ —20°. E. C. S.

Fishy flavour. W. L. Davies and E. Gill (J.S.C.I., 1936, **55**, 141—146 T).—Increasing fishiness of fish oils and Et_2O extracts of fish products is associated with an increased N content of the oil and of organically-combined N. The browning of fish oils is associated with an increase in fish flavour and in N content. Only 30% of the combined N of fish oils is liberated by oxidative–hydrolytic reactions. N enters into org. combination with autoxidising oils when casein, betaine, and lecithin are kept in contact with them for a time. Linseed oil grows fishy under such conditions. Heating oils with NMe_3O causes some reduction to NMe_3 and drying oils acquire a fishy flavour. It is the fatty acid portion of the oil which is responsible for fixing the N. Cholesterol and glycerol brown slightly but do not become fishy when heated with NMe_3O, although the unsaponifiable fractions of fishy oils are fishy and contain much combined N. Fishy oils, their H_2O extracts, and their steam-distillates after various treatments give positive reactions for CH_2O. Fishiness appears to be associated with traces of peroxides, CH_2O, and *tert.*-N either as NMe_3O or as NMe_3, or as both. W. L. D.

Ascorbic acid content of fruits and vegetables, with special reference to the effect of cooking and canning. M. Olliver (J.S.C.I., 1936, **55**, 153—163 T).—The vitamin-*C* content of 20 different English-grown fruits and vegetables has been determined by indophenol titration. Considerable variation is found in the amount of -*C* in different parts of individual fruits and vegetables. Storage at room temp. causes rapid decrease in -*C* content of vegetables, but the loss is diminished at 0°. The effect of cooking and canning on -*C* in plant tissues has been studied and the % destruction found to be comparatively small. -*C* is extracted from fruits and vegetables by the liquid in which it is heated, and finally becomes evenly distributed throughout tissue and liquid. Biological tests on bottled gooseberries, canned black currants, and canned spinach purée showed good agreement with the results of chemical tests. The -*C* content in canned material tends to fall on storage, but for all practical purposes the loss is not great. Raw and heated plant tissues are compared for their antiscorbutic val. in human diet.

Cause of colour fading in processing green vegetables. G. S. Bohart (Canner, 1935, **80**, No. 9, [2], 115).—Losses of total solids and ash contents during blanching of spinach are examined. Extraction of mineral matter is $\propto$ the time and temp. of treatment. Ca is retained as CaC_2O_4. Ch. Abs. (*p*)

Enzymic activity in frozen vegetables. A. L. Arighi, M. A. Joslyn, and G. L. Marsh (Ind. Eng. Chem., 1936, **28**, 595—598).—The catalase (I) content of peas and spinach blanched at const. time is greater using temp. of 40° than of 20° or 50°. It is necessary to heat to a temp. above that required for inactivation of (I) in order to obtain a product of good quality. The MeCHO content of peas is, and of spinach is not, related to the (I) activity. A satisfactory product is obtained by scalding peas for 2 min. at 80—90°, when they retain their good quality for over 2 years in frozen storage. P. W. C.

Maraschino-type cherries. E. L. Turner (Canner, 1935, **80**, No. 14, 20—24).—Conditions for bleaching, cleaning, colouring, and flavouring, for bottling purposes, are described. Ch. Abs. (*p*)

Influence of various acids on corrosion in Royal Anne cherries. G. S. Bohart (Canner, 1935, **80**, No. 9, [2], 114).—Acid produced by flat-sour bacteria in canned cherries is largely lactic acid. When the acidity of experimental cherries was adjusted to p_H 3·5 by addition of citric, lactic, or malic acids, H_3PO_4 (I), AcOH, or $PrCO_2H$, vac. losses due to corrosion were greatest with (I). The cherries contain much PO_4'''. Ch. Abs. (*p*)

Acidity variations in fruits for canning. G. S. Bohart (Canner, 1935, **80**, No. 9, [2], 113—114).—Canned fruits contain thermophilic bacteria causing spoilage if the p_H is $>$ 4·35 and, in pears, 3·8. Titratable acidity averages 1·2—2·2%. The p_H of fruit is closely related to the ash constituents, notably K, Na, Mg, PO_4''', SO_4'', and SiO_3''. Ch. Abs. (*p*)

(A) Influence of sugar on corrosion of canned fruits. (B) Influence of acids on corrosion in prepared prunes. E. F. Kohman and N. H. Sanborn (Canner, 1935, **80**, No. 9, [2], 111—112, 112).—(A) Corrosion is usually less when the sugar concn. is high. Sugars combine with certain fruit constituents and also increase the $[H^{\cdot}]$ of grapefruit juice.

(B) Of acids added to prevent corrosion in canned prunes citric acid (sufficient to produce p_H 3·84) was the most effective. Complex citrates of metals are probably formed. Ch. Abs. (*p*)

Determination of acidity [in fruit products]. C. E. Lachelle and H. Ehrenberg (Canner, 1935, **80**, No. 9, [2], 114).—Hartmann's Pb method gives slightly higher vals. than direct or electrometric titration methods except when the PO_4''' content is low. p_H data for fruits are given. Ch. Abs. (*p*)

Rapid determination of lead residues on apples. D. E. H. Frear and D. E. Haley (Penn. Agric. Exp. Sta. Bull., 1934, No. 304, 8 pp.).—To the washings from the fruit are added sucrose and H_2SO_4. The mixture is heated until charring occurs, and then further digested with HNO_3 till colourless. The diluted residue is neutralised with a solution containing aq. NH_3, KCN, and citric acid, and, after cooling, is treated with Na_2S. The density of the ppt. is determined colorimetrically, using a photoelectric cell. Results agree closely with those of the official method. A. G. P.

Spray-residue removal in Pennsylvania. D. E. H. Frear (Proc. 76th Ann. Meet. State Hort. Assoc. Penn., 1935; Penn. State Hort. Assoc. News, 1935, **12**, No. 1, 67—69).—The amount of Pb arsenate residue removed by HCl was ∝ the concn. used. With 1·5—2·0 wt.-% equal proportions of Pb and As were removed. Wetting agents did not increase the removal of Pb by HCl, but increased that of As. Addition of NaCl had no appreciable effect. Washing with aq. Na silicate or Na_2CO_3-soap was not effective. Ch. Abs. (*p*)

Manufacture of fruit pectin. E. L. Turner (Canner, 1935, **81**, No. 1, 20—23; No. 2, 12—13).—Technical details are given. Ch. Abs. (*p*)

Combating browning of peaches after lye peeling. W. V. Cruess, E. M. Mrak, and P. J. Quin (Canner, 1935, **81**, No. 5, 12—13, 28).—Dipping (0·5—1·0 min.) in 0·25% HCl checks oxidation and lowers the p_H of the flesh to approx. the initial val. Hot 2% aq. NaCl temporarily prevents discoloration. Ch. Abs. (*p*)

(i) Humidity control; (ii) ozonisation; (iii) deaëration of fruit juices—some laboratory improvisations. J. B. Hyatt (J. New Zealand Inst. Chem., 1936, **1**, 31—36).—(i) The expansion of a hair is employed to operate a relay controlling a H_2O evaporator. Constancy within 2% R.H. is obtainable.

(ii) An ozonising chamber for the treatment of fruit etc. with low concns. of O_3 is described.

(iii) Apparatus for de-aërating fruit juice is described. J. S. A.

Temperature of tomatoes and colour development. H. MacGillivray (Canner, 1935, **81**, No. 5, 7—8; cf. B., 1935, 250).—Max. lycopene production in tomatoes occurs at 23—25°. Higher temp. favours the development of yellows. Ch. Abs. (*p*)

Liquid honey. E. F. Phillips (Canner, 1935, **81**, No. 6, 19—21).—Fermentation of honey is prevented and its flavour and storage quality are improved by inducing the formation of minute crystals in liquid honey. Honey is heated to 71°, rapidly cooled to 24°, and, after addition of fine cryst. honey, stirred for 15 min. and bottled. Ch. Abs. (*p*)

Processing honey. R. E. Lothrop and H. S. Paine (Glass Packer, 1934, **13**, 705—707).—Flavour, colour, and appearance of liquid honey are improved by admixture with infusorial earth, flash heating in coils at 60—71°, and subsequent filtering in a heated press. Ch. Abs. (*p*)

Detection of adulteration of honey with commercial invert sugar. R. E. Lothrop (J. Assoc. Off. Agric. Chem., 1936, **19**, 338—341).—In conjunction with colour reactions, the % of ash and N are valuable aids to the detection of adulteration. The % N of 32 samples of honey of American origin was 0·017—0·186, and increased with increasing depth of colour, as did also the % of ash. E. C. S.

Coffee-packing process based on use of venting closures. H. D. Roselius (Glass Packer, 1935, **14**, 107—108).—Gases evolved from roasted coffee contain CO_2 87, CO 7, O_2 0·4, and N 5·6%. As coffee ages, occluded gas is gradually evolved. A non-return valve is fitted to containers to permit release of gas. Ch. Abs. (*p*)

Photoelectric colorimetry in examination of foodstuffs. K. Woidich (Oesterr. Chem.-Ztg., 1936, **39**, 88—89).—For determination of Cu in foods, a 1—5-g. sample is ashed, and the ash evaporated down with Br + HBr to remove Sn, and with HCl + HNO_3 to remove Br. The residue is dissolved in H_2SO_4, and the 2% H_2SO_4 solution is treated with a slight excess of dithizone (I) in CCl_4 or $CHCl_3$. Excess of (I) is removed with dil. aq. NH_3, and the CCl_4 or $CHCl_3$ layer is washed with H_2SO_4 and H_2O, and finally measured colorimetrically by green light. For determination of nitrates and nitrites in meat, 15—20 g. of finely-minced material is rubbed up with sand + H_2O. The diluted suspension is filtered (solution *A*). An aliquot portion of *A* is treated with an excess of solid Ag_2SO_4, filtered, and mixed with a well-cooled solution of *p*-diaminophenolsulphonic acid in conc. H_2SO_4. The red solution produced is measured colorimetrically. For the determination of NO_2', solution *A* is pptd. completely with $Pb(OAc)_2$, and the filtered solution treated with Griess' reagent at 100°. J. S. A.

Comparative efficiency of various proteins for growing chicks. J. S. Carver, J. L. St. John, M. W. Miller, and G. E. Bearse (Wash. Agric. Exp. Sta. Bull., 1935, No. 321, 27 pp.).—Protein sources are compared at various levels of feeding and with chicks of different ages. A. G. P.

Effect of heat on the nutritive value of soya-bean oil meal. H. S. Wilgus, jun., L. C. Norris, and G. F. Heuser (Ind. Eng. Chem., 1936, **28**, 586—588).—Soya-bean oil meals which are satisfactory as sources of high-quality protein for feeding poultry may be produced by the expeller, hydraulic, and solvent processes, the optimum temp. being, respectively, 140—150° for 2 min. in the expeller, 105° for 90 min. in the cooker, and 82° for 15 min. in the solvent process. The vitamin-B_2 content of the beans was low and was not affected to any measurable extent by the processes. Colour and flavour of meals was not necessarily diagnostic of nutritive val., but raw heavy flavour usually indicated insufficient application of heat and inferior protein efficiency. P. W. C.

Apple waste for dairy feed. Anon. (Nova Scotia Dept. Agric. Rept. [Sept., 1934], 1935, 40—42).—

Fermented pomace contained H_2O 80, protein 1·2, fat 0·67, carbohydrates 16·7, and ash 0·6%.

CH. ABS. (*p*)

Erratum.—On p. 567, col. 2, line 19 from bottom, *for* Starch *read* Storch.

Spectro-analysis. Concn. of heat-unstable solutions.—See I. **Salt for meat packing.**—See VII. **Pasteurisation [of milk].**—See XI. **Sandalseed proteins.**—See XII. **Casein paints.**—See XIII. **Rubber [in the food industry].**—See XIV. **Cucumber fermentation.**—See XVIII.

PATENTS.

Evaporation of whey and its production in powdered form. W. C. MASON and W. W. HUTCHESON (B.P. 447,105, 4.2.36).—A plant is described by which whey is conc. in vac. at $\ngtr$ 69° in an evaporator and then dried on a steam-heated roller dryer. E. B. H.

Processing of cheese. R. PASTERNACK and R. W. BURNHAM, Assrs. to C. PFIZER & Co. (U.S.P. 2,011,074, 13.8.35. Appl., 16.11.32).—The γ- and δ-lactones of gluconic acid are claimed to be superior as emulsifying agents for processed cheese to the alkali phosphates and citrates commonly used. By their use a gritty texture in the cheese is avoided, and it is possible, by adding, if necessary, a suitable neutralising agent, to adjust the final acidity of the cheese to an optimum val. E. B. H.

Manufacture of "casein" [from soya-bean meal]. D. N. BURRUSS, JUN., and J. P. RUTH, Assrs. to CHEM. & PIGMENT CO., INC. (U.S.P. 2,007,962, 16.7.35. Appl., 17.3.33).—Soya-bean meal is extracted with an aq. solution of alkali or alkaline salt, and the "casein" (I) pptd. with acid. The pptd. (I) is washed with H_2O in a series of tanks, the undissolved portion being passed from one tank to another in one direction and the aq. liquid being passed in the opposite direction. The (I) sludge is finally dried by spraying into a stream of hot air. E. B. H.

Inhibiting the discoloration of fruits and vegetables. A. K. BALLS and W. S. HALE (U.S.P. 2,011,465, 13.8.35. Appl., 28.2.34).—Discoloration of the cut surfaces of fruit etc. is prevented by treatment with a 0·01% solution of a thiol compound or derivative (such as cysteine or glutathione) in H_2O or dil. HCl. The activity of papaya and pineapple juices containing such inhibitors may be restored or increased by treatment with a reducing agent such as H_2S. E. B. H.

Canning of pineapples and similar products. R. B. TAYLOR, Assr. to HAWAIIAN CANNERIES CO., LTD. (U.S.P. 2,011,020, 13.8.35. Appl., 12.1.32).—The vac. treatment is replaced by a pressure treatment in H_2O at 147° for 8 min. This processing also replaces the normal exhaust stage. E. B. H.

Production of pectin preparations. L. WALLERSTEIN, Assr. to WALLERSTEIN CO., INC. (U.S.P. 2,008,999, 23.7.35. Appl., 13.7.28).—Pectin (I) of high jellying power is prepared by digesting the pomace (or the like) with strong inorg. acid (H_2SO_4, HCl, or HNO_3) at 50—75° and p_H 0·7—2·2 until the (I) products are pptd. by a $CaCl_2$ solution at p_H 3—7 (time 20—40 hr.). The (I) solution is neutralised to this p_H and conc. if necessary before pptn. by $CaCl_2$ or EtOH. E. B. H.

Cream separator.—See I. **Blending margarine.**—See XII. **Mucin from plants.**—See XVI.

XX.—MEDICINAL SUBSTANCES ; ESSENTIAL OILS.

Liquor cresolis saponatus, B.P. 1932. W. L. SUMMERFIELD and C. GUNN (Pharm. J., 1936, **136**, 622).—An improved method of prep. is described. The linseed oil is saponified at room temp. with more conc. aq. KOH, the soap being then dissolved in the cresol. A. L.

Examination of pharmaceutical inositol phosphates. C. STAINIER, H. PENAU, and H. PIERRET (J. Pharm. Chim., 1936, [viii], **23**, 641—660).—The constitution, extraction, solubility, properties, identification, determination of P, Ca, and Mg, and the detection of starch, albumins, NH_3, As, sugars, citric and tartaric acids, glycerophosphates, and mineral phosphates in commercial inositol phosphates is described. E. H. S.

Decomposition of barbiturate solutions by heat. A. E. BAILEY (Pharm. J., 1936, **136**, 620—621).—Aq. diethylmalonylurea is hydrolysed by heating above 100°, giving diethylacetylurea, the reaction rate increasing with increase of p_H. Other *C*-substituted malonylureas examined behave likewise. A. L.

Determination of the activity of pharmaceutical amylases. M. VAN HAUWAERT (Pharm. J., 1936, **136**, 621).—The method depending on the rate of hydrolysis of sol. starch is described. A. L.

Leaf oils of Washington conifers *(Abies lasiocarpa)*. C. SCHWARTZ, JUN. (Amer. J. Pharm., 1936, **108**, 197—200).—Steam-distillation of the leaves and twigs of *A. lasiocarpa* ("alpine fir") gave 0·78% of oil having d^{2}_{20} 0·8828, n^{20}_{D} 1·4766, $[\alpha]^{23}_{D}$ —33·68°, sap. val. 47·360, acid val. 0·365, ester val. 46·995 (after acetylation 74·635), total alcohol (as borneol) 20·69%, and containing *l*-β-pinene 26·56%, *l*-β-phellandrene 24·0%, esters (chiefly bornyl acetate) 16·45%, free borneol 7·76%, *l*-camphene 5·11%, *l*-α-pinene 4·11%, salicylic acid 0·5%, and traces of free acids. Sesquiterpenes, if present, are negligible. E. H. S.

Oil of sweet basil. E. S. GUENTHER (Amer. Perfumer, 1935, **30**, 183—185).—Analytical data for the European oil and the Reunion oil are d^{15} 0·8959—0·9168, 0·945—0·987 ; $[\alpha]^{20}_{D}$ —10° 14′ to —13° 52′, +0° 22′ to +12° ; n^{25}_{D} 1·477—1·488, 1·512—1·518 ; acid val. 0·7—3·5, up to 3·0 ; and ester val. 3·5—9·8, 9—22, respectively. The true (European) oil contains alcohols (as linalool) 34·5—39·66% and methylchavicol 55%. CH. ABS. (*p*)

Assay of lobelia. W. A. N. MARKWELL (Pharm. J., 1936, **136**, 617).—A modification of the method of Vanderkleed and E'We (J. Amer. Pharm. Assoc., 1916) is proposed for the official assay process. A. L.

Perfumes and other odours. L. W. BOSART (Oil & Soap, 1936, **13**, 63—67).—An elementary talk. E. L.

Halogenation of liquid paraffin.—See II. **Tobacco. Nicotine.**—See XVI.

PATENTS.

Preparation of (A) sodium 1-phenyl-2 : 3-dimethylpyrazolonyl - 4 - aminomethylene sulphoxylate, (B) dimethylpyrazolonyldiphenyl. (C)

Crystallisation, and purification of 4 :4′-di-(1-phenyl-3-methyl)pyrazolonyl. I. I. Ostromislensky, Assr. to Medico Chem. Corp. of America (U.S.P. 2,011,255—7, 13.8.35. Appl., [a, c] 5.7.34, [b] 16.7.34).—(a) This cryst. *compound* is obtained from 4-aminoantipyrine and $OH{\cdot}CH_2{\cdot}O{\cdot}SO_2Na$ in hot H_2O or EtOH. (b) *pp′*-Dihydrazinodiphenyl [prepared in good yield from diazotised benzidine by means of $Na_2S_2O_4$, m.p. 168—170° (lit. 165—167°)], on heating with $CH_2Ac{\cdot}CO_2Et$ gives pp′-*di-*(3-*methylpyrazolonyl-*1)-*diphenyl*, decomp. 135—143° [*bis-*4-*benzeneazo-* and *-oximino-*derivatives, the latter reduced by Zn–AcOH to the $(4\text{-}NH_2)_2$-compound (*hydrochloride*), oxidised by air]. (c) The substance is purified by addition of hot AcOH, MeOH, or EtOH to its solution in hot HCO_2H. R. S. C.

Production of [sterile] antigen. A. P. Krueger (U.S.P. 2,011,225, 13.8.35. Appl., 16.3.33).—A conc. sterile antigen solution, free from degradation and metabolic products, is obtained by grinding the washed bacilli in a ball mill (described), which disrupts 90% of the bacilli, filtering through an acetic-collodion membrane (cf. A., 1930, 728), and preserving the filtrate with "Merthiolate." R. S. C.

Compositions of matter. [Preparation from the pituitary gland of substances having antidiuretic activity.] (a) I. W. Grote, (b) O. Kamm and I. W. Grote, Assrs. to Parke, Davis & Co. (U.S.P. 2,011,443 and 2,011,447, 13.8.35. Appl., [a] 10.4.31, [b] 9.6.31).—(a) An aq. solution of a posterior pituitary substance high in pressor activity is treated with alkali, *e.g.*, NaOH, neutralised, freed from H_2S, and evaporated. The residue is extracted with acid, *e.g.*, AcOH, and the extract treated with org. solvents to ppt. the active principle. (b) The aq. pituitary substance is treated with $NaHSO_3$, Na_2SO_3, $Na_2S_2O_3$, $Na_2S_2O_4$, or SO_2, instead of alkali. H_2S is not produced and the product differs chemically from that formed in (a). E. H. S.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Determination of halides in photographic materials. S. Whiteley and O. V. Soane (J.S.C.I., 1936, **55**, 167—168 t).—A suitable procedure for routine analysis is described. The Ag halides are extracted from the coated emulsion (plate, film, or paper) by means of aq. KCN, and the Ag is pptd. by boiling with Zn dust. Further boiling with H_2SO_4 drives off HCN, and the resulting solution of K halides is titrated electrometrically with $AgNO_3$, using a potentiometer of the electrometer-valve type.

Effect of pressure on photographic sensitivity. T. Ny and L. Tsien (Chinese J. Physics, 1934, **1**, No. 2, 66—75).—Pressure reduces the sensitivity in the region of normal or over-exposures, or in that of reversal. The effect of pressure diminishes with λ. Ch. Abs. (*e*)

Weigert's phenomenon and its importance in photography. H. Freundlich (Phot. J., 1936, **76**, 395—406).—A detailed account is given of the phenomena of primary and developable photoanisotropy in photohalides. The theories of the processes are discussed, and the effects with dyes, visual purple (in relation to colour-sensitivity of the retina), and circularly polarised light (producing circular dichroism) are also considered. The last-named also produces optical activity. J. L.

Gloss investigations.—See I.

Patents.

Photographic light-sensitive material for production of coloured photographs. B. Gaspar (B.P. 448,161, 9.8.35. Ger., 9.8.34).—A bipack of two films is used, one film carrying two superimposed layers, and the other having one or two layers. Each layer has a different colour-sensitivity, and contains colour-forming compounds giving subsequent dye pictures with non-overlapping absorption and transparency ranges. No dyes are incorporated except, if desired, easily destructible filter dyes. Suitable combinations of colour-forming compounds are detailed. J. L.

[Plate for] colour photography. M. Zeller, Assr. to R. Röchling (U.S.P. 2,009,424, 30.7.35. Appl., 5.8.32. Ger., 14.8.31).—The emulsion of a plate bearing a colour screen is sensitised so that the parts covered by the several elements of the screen are sensitive to the colours of those elements only. The emulsion is covered with the ruling of one colour, then sensitised in the spaces to a second colour, a second colour ruling is applied, the remaining parts are re-sensitised to a third colour, and the third colour ruling is finally applied. J. L.

Photographic sensitive element. L. D. Mannes and L. Godowsky, jun. (U.S.P. 2,010,459, 6.8.35. Appl., 30.7.32).—A transparent base is coated on one side with an ordinary blue-sensitive layer, on which is coated a varnish layer, sol. in C_6H_6, but unaffected by photographic baths. The other side of the base is coated with superimposed green- and red-sensitive layers. A yellow filter dye is incorporated in the blue-sensitive layer, or in a layer between the blue-sensitive layer and the support. J. L.

Colour photography. Kodak, Ltd. From Eastman Kodak Co. (B.P. 447,092, 10.11.34. Cf. B.P. 440,032 ; B., 1936, 221).—Films for colour photography, comprising three thin superimposed layers sensitised to different colours, are developed, after exposure, with a colour developer to give the final colour of the bottom layer in all the layers. After fixing, the top two layers only are bleached by controlled penetration, destroying the dye and converting the Ag into Ag salt. After re-exposure, these images are colour-developed in a second colour ; the top image is then bleached and developed to a third colour. The three layers of the film are preferably separated by clear gelatin layers. The colours developed are complementary to the sensitivities of the layers. (Cf. B.P. 427,516 ; B., 1935, 703.) J. L.

Colour photography. I. P. Rodman, Assr. to Lektophone Corp. (U.S.P. 2,011,544, 13.8.35. Appl., 18.10.30. Renewed 30.3.34).—The object photographed is successively illuminated by red, green, and blue lights, by which photographs are taken on suitably sensitised emulsions, without using filters. The colours may preferably be "minus blue" (Ne arc), "minus red" (pure Hg-vapour arc), and blue. The intensities are adjusted to give correctly exposed negatives. Further modifications are described. The process is particularly adapted to half-tone and colour-printing processes. J. L.

Photomechanical colour reproduction. A. Murray, Assr. to Eastman Kodak Co. (U.S.P. 2,008,290, 16.7.35. Appl., 9.9.33).—The original picture to be copied is formed with colouring materials in which suitable amounts of fluorescent materials have been incorporated in order to enable supplementary exposures of certain colours to be given. The different colour-separation exposures are made first by white light, with suitable colour filters on the lens, followed where required by exposures by ultra-violet light (filtered from white light), with a filter on the lens excluding ultra-violet light and passing only the visible fluorescence. J. L.

Manufacture of combined sound and picture films. I. G. Farbenind. A.-G. (B.P. 447,765, 23.11.34. Ger., 23.11.33).—When reversal development of the picture record is used, the sound track is covered with a layer of varnish during the first development; the layer is removed (*e.g.*, dissolved in CCl_4) before the second development; the sound track will thus receive only one development; the layer need not be removed till after both developments of the picture, the sound track then being developed separately. The varnish is coloured blue, the picture "reversal" exposure being made with red light, thus not affecting the sound record. The varnish layer need not be dissolved off, but, having been made of a thin layer of cellulose nitroacetate, it may be rendered permeable to H_2O, when required, by treatment with KOH and EtOH. J. L.

Packing for photographic plates. I. G. Farbenind. A.-G. (B.P. 448,937, 17.12.34. Ger., 20.12.33).

[Optical device for] projection of lenticular colour-record photographic copies. I. G. Farbenind. A.-G. (B.P. 447,834, 26.11.34. Ger., 25.11.33).

Photographic printing of colour-record lenticular films. I. G. Farbenind. A.-G. (B.P. 447,917, 27.11.34. Ger., 28.11.33).

[Apparatus for contact printing in] colour photography. W. Chapman, and Dufaycolor, Ltd. (B.P. 448,264, 4.12.34).

XXII.—EXPLOSIVES; MATCHES.

Comparison between litmus and Taliani tests for measuring the stability of nitrocotton. M. Landon (Mém. Poudres, 1934—5, **26**, 308—311).—Results obtained by the 100° and 135° tests and the Taliani test show considerable divergence and indicate that the thermal decomp. of nitrocotton (I) does not always occur in the same manner. (I) that has had a normal stabilisation emits products that act on litmus, whilst (I) stabilised in a neutral medium does not. The Taliani test takes into account only the quantity, and not the nature, of the gases evolved, but tests in which litmus is used are influenced only by the nitrous or acid vapours. W. J. W.

Steeping [nitrocellulose powder] with progressive elimination and recovery of solvent. R. Brichet (Mém. Poudres, 1934—5, **26**, 341—354).—With T powders, for which $COMe_2$ is used as solvent, recovery of this during steeping presents no difficulty, but with B powders, for which EtOH is used, a temp. of 95° necessary for recovery runs counter to the limiting safety temp. (80°) for steeping. In a system which reconciles these two conditions the steeping-H_2O is in a closed circuit, becoming charged with solvent when entering the tank and then passing to another tank, where it is heated to give up the solvent, after which it is cooled before re-entering the first tank. The process eliminates changing of the H_2O and reduces the time of steeping. W. J. W.

Evolution of nitrous oxide in the decomposition of nitrocelluloses. M. Vandoni (Mém. Poudres, 1934—5, **26**, 303—307).—The gases obtained by (1) heating nitrocellulose at 110°, (2) treating it at 50° with 25% HNO_3, or (3) heating it in a sealed tube at 130°, all contain N_2O. This may be determined by condensation by means of liquid air. W. J. W.

Action of diphenylamine on nitrocellulose during the drying and storing of powder B. P. Demougin and M. Landon (Mém. Poudres, 1934—5, **26**, 273—293).—Reworked powders containing 1, 2, 4, and 8%, respectively, of $NHPh_2$ (I) were heated in an open tube at 110° and the denitration and degradation (reduction in η) of the nitrocellulose (II) and loss in wt. of the powder were determined after various periods. These tests and the Taliani test were also carried out on freshly-made powders containing 0·04—7·0% of (I), heated at 110° and 135°. (I) has a double action; it acts as stabiliser by absorbing nitrous products, but also saponifies and slowly degrades the (II), degradation increasing with the time of stoving and being related to the (I) content. The optimum amount of (I) is obtained by a compromise between these two effects. Stoving tests cannot give a val. for this optimum, the reactions being too complex. An arbitrary parameter must be fixed, such as the permissible velocity of change of the (II), or the period for which it must be stored. For min. alteration of the (II), the best powder is that which still contains (I) after a given drying time, but in the least amount. W. J. W.

Determination of residual solvent in B powders. Air-drying and steeping. R. Dalbert (Mém. Poudres, 1934—5, **26**, 312—331).—In a simplification of Desmaroux's method (B., 1935, 831) the separate determination of EtOH is replaced by a measurement of surface tension by the stalagmometer. The results obtained by this method in determining the variation, loss, and dispersion of solvent at various stages during and after air-drying and steeping, respectively, are tabulated. There is no relation between the coeff. of emission during steeping and the amount of solvent in the powder. In new powders there is a slightly higher proportion of residual solvent in the interior of the grains than at the surface. W. J. W.

Electrification of B powder by tearing or friction, and its bearing on accidental ignitions in powder factories. A. Langevin and P. Biquard (Mém. Poudres, 1934—5, **26**, 355—397).—75% of accidental ignitions occur with dry powder and of these 41% are caused by electrification due to tearing or friction. Such electrification is responsible for 19·5% of the 25% of ignitions with powders containing an appreciable amount of solvent. Tearing is resorted to when the strips adhere to their supports or to the bottom of the recovery tank. Experiments were conducted to determine the charges developed when squares of the powder were forcibly torn from a surface, the powders being selected after extrusion, after 4 hr. in the recovery tank, after steeping and drying, and after cutting. Temp. had an important effect on the development of a charge, and the hygrometric state of the atm. was influential. The time of drying also has an effect, the max. charge being obtained after 1 hr. drying. Friction tests were carried out with the powder and felt, filter-paper, polished and roughened brass, galvanised Fe, cotton tissue, pine wood, and with the powder itself. The charges obtained by friction with felt were of the same order as those developed on tearing; they varied within large limits with different rubbing surfaces. Paper, felt, cotton, and dry wood should be avoided; polished metals give the min. electrification and may be used without risk. Evaporation of solvent does not give rise to an electric charge. A study has been made of the spark energy necessary to cause ignitions. W. J. W.

Tests of old propellant powders at Ripault powder factory. T. TESSIER (Mém. Poudres, 1934—5, 26, 332—340).—The tests included stability at 110°, N content, residual solvent and its analysis, and coeff. of emission, and the results are tabulated. W. J. W.

Pure $C_6H_2Me(NO_2)_3$.—See III.

PATENT.

Propellant powders. W. E. WAGNER, Assr. to WESTERN CARTRIDGE Co. (U.S.P. [A, B] 2,008,888—9, 23.7.35. Appl., 8.12.30. Renewed 24.3.34).—(A) A preformed, ungelatinised nitrocellulose powder is surface-treated with diamyl phthalate to retard the initial rate of combustion and promote progressive burning. (B) A double-base propellant powder containing 15% of nitroglycerin is surface-treated with a dialkyl phthalate to obtain the same effects as in (A). W. J. W.

XXIII.—SANITATION; WATER PURIFICATION.

Recent advances in fumigation and the needs of fumigation practice. J. W. MUNRO (Chem. Eng. Cong. World Power Conf., 1936, *L*3, 8 pp.).—The general principles of application are discussed with special reference to the effect of heat and the use of "auxiliary" fumigants. The importance of uniform distribution and the complete final removal of the residual gas are stressed. C. J.

Technical dust control. F. PROCKAT (Chem. Fabr., 1936, 9, 153—156).—From the viewpoint of silicosis, basic slag, asbestos, fine SiO_2, quartz, and silicates are particularly objectionable. Wet operation does not always absorb the finest dust. Good layout of plant may effect considerable improvement; *e.g.*, fresh air may be blown downwards over the workman's head, and then sucked out at the point where the dust is produced. Dusty air should not be discharged where it may re-enter the building. H_2O-sprays are effective in removing fine dust, especially when used in conjunction with the eddy principle. Masks are to be recommended only where other methods are impracticable; many designs are incapable of removing the final 5% containing the finest particles ($< 15\ \mu$), which are the most injurious to the lungs. D. R. H.

Germicidal properties of phenolic compounds. C. G. DUNN (Ind. Eng. Chem., 1936, 28, 609—612).—Pentacresol (1% *sec.*-amyltricresol in 2% soap solution) showed high germicidal action towards Gram-positive bacteria, *e.g.* hæmolytic streptococcus, but low efficiency against Gram-negative bacteria, *e.g.*, *E. coli.* In presence of 20% horse serum, 1% pentacresol was more germicidal against *Staph. aureus* than 6 mercurials and a PhOH derivative with which it was compared. Mercarbolide (*o*-hydroxyphenylmercuric chloride) was most effective against Gram-negative bacteria, the PhOH coeff. with *E. typhosa* being > 1100 on the basis of the dry chemical. In presence of 20% serum its efficiency against *Staph. aureus* was only slightly less. Mercresin (a mixture of the above two compounds) was fairly uniform in its germicidal activity towards all Gram-positive and -negative pathogens and non-pathogens, and showed no signs of deterioration over long periods of time. P. W. C.

Dermatitis from synthetic resins and waxes. L. SCHWARTZ (Amer. J. Publ. Health, 1936, 26, 586—592).—Dermatitis may occur in persons handling or manufacturing PhOH– and urea–CH_2O resins, due to hypersensitivity to CH_2O. In synthetic wax manufacture the chlorinated Ph_2 products cause toxic symptoms. H. D.

Economics of [sewage-]sludge disposal. A. J. FISCHER (Sewage Works J., 1936, 8, 248—271).—For all plant sizes the first costs of raw sewage-sludge incineration are > those for digested-sludge filtration without incineration. In plants of $> 15 \times 10^6$ gals./day capacity they are < in those where digested sludge or mixed digested primary and undigested thickened activated sludge are filtered and incinerated. Installation costs are lowest when all the sludge is digested and dewatered on a vac. filter, except in the case of activated sludge treatment where the filtration of the combined digested primary and thickened undigested activated sludges gives the lowest first cost. Operating costs are lowest for plants of $< 10 \times 10^6$ gals./day capacity where open sand drying beds are used. For plants treating $> 25 \times 10^6$ gals./day the costs of digested sludge filtration or filtration with incineration are the lowest. In the case of activated sludge it is best to combine digested primary and thickened undigested activated sludges prior to filtration or filtration with incineration.

In the discussion, A. L. GENTER claims that the most economical means of disposal of raw sludge is by digestion, elutriation, and vac. filtration either with or without final drying and incineration. C. J.

Over-chlorination and dechlorination of drinking water. H. PICK and T. GRUSCHKA [with E. KROB and A. LINKE] (Gas- u. Wasserfach, 1936, 79, 365—369, 425—429).—Determination by chemical means of the necessary amount of Cl_2 to add to a H_2O supply to ensure the desired bactericidal effect is uncertain. With H_2O that shows rapid fluctuations in quality, in particular in org. content, it is therefore preferable to over-chlorinate. This necessitates the subsequent removal of the excess Cl_2, which is usually effected by means of filtration through active C. The operation of such filters at a no. of waterworks is described; they fulfil the necessary requirements and are economical in use. "Katarsit," a pelleted form of $CaSO_3$, has recently been introduced as a dechlorinating agent, but it appears doubtful that it offers any advantages over active C. A. B. M.

Treatment of the Colorado river water. D. M. FORRESTER (J. Amer. Water Works Assoc., 1936, **28**, 637—639).—The raw-H_2O supply of Boulder City is drawn from the river and shows extreme variations in suspended solids, hardness, etc. The introduction of a storage reservoir for the pretreated H_2O has averaged the quality of the supply, which may be softened with 219 p.p.m. of $Ca(OH)_2$ and 120 p.p.m. of Na_2CO_3 to have an average total hardness of 95 p.p.m. C. J.

Attack of hard-lead pipes by tap-water. E. NAUMANN (Gas- u. Wasserfach, 1936, **79**, 214—216).—The suitability of hard Pb (*i.e.*, crude Pb hardened by Sb etc.) for replacing the refined Pb previously used for drinking-H_2O pipes is examined. Only Sb–Pb is considered, on account of various objections to other hardening elements. Specimen pipes were tested with 3 different tap-waters and the results are tabulated; it is concluded that hard-Pb pipes with $\not>$ 1·5% Sb would show no marked difference in corrosion behaviour tor efined Pb pipes. The use of the latter for H_2O-piping is now forbidden in Germany. D. M. M.

Comparative study of certain presumptive media for testing raw waters. R. L. FRANCE (J. Amer. Water Works Assoc., 1936, **28**, 785—793).—The results indicate that from the viewpoint of total nos. of *coli–aërogenes* organisms present the use of lactose broth with confirmations of all positive presumptive tubes by inoculation into secondary tubes of brilliant-green–bile broth might prove the most satisfactory method of testing raw polluted H_2O. C. J.

Barium chromate method for volumetric determination of sulphate in water. M. D. FOSTER (Ind. Eng. Chem. [Anal.], 1936, **8**, 195—196).—Since $BaCrO_4$ as usually supplied contains either sol. $Ba^{\cdot\cdot}$ or sol. CrO_4'', it must be purified before use and a determination of the blank titration carried out on each fresh sample. E. C. S.

Rapid and exact determination of total alkali metals in water. R. DUROUDIER (Ann. Falsif., 1936, **29**, 283—287; cf. A., 1934, 981).—After removal of the alkaline earths with K palmitate (I) the filtered solution is digested with H_2SO_4, calcined, and the residue weighed. The wt. of K_2SO_4 corresponding to the (I) added is deducted from the wt. of the residue. E. C. S.

Determination of fluorine. Application to Portuguese mineral waters. A. H. DE CARVALHO (Rev. Chím. pura appl., 1936, [iii], **11**, 99—117).—F' in a no. of waters from various Portuguese sources has been determined by the methods of Willard *et al.* (A, 1933, 242) and Sanchis (A., 1934, 500). The vals. obtained by both these methods are concordant. F. R. G.

Determination of phosphates in turbid or coloured natural waters. S. V. BRUEVITSCH and E. I. PLETNIKOVA (J. Appl. Chem. Russ., 1936, **9**, 925—931).—Coloured colloidal constituents and suspended particles are largely eliminated by adding 1 c.c. of 8% H_2SO_4 and 1 c.c. of 10% $BaCl_2$ to 200 c.c. of H_2O, and passing through an ultra-filter after 2 hr. The residual coloration should be compensated in the colorimetric determination of P_2O_5. Approx. half of the P_2O_5 present in natural H_2O may be in suspension, and may be eliminated by ultra-filtration; it passes into solution in presence of H_2SO_4. Coagulation with Al salts involves simultaneous pptn. of phosphates. R. T.

Treatment and disposal of industrial wastes. W. L. STEVENSON *et al.* (Chem. Eng. Cong. World Power Conf., 1936, *F7*, 24 pp.).—The gross pollution of surface-H_2O in America by industrial wastes demands the formation of a central authority to co-ordinate research towards lessened pollution by changed processes of manufacture, re-use of wastes, and recovery of by-products, thereby minimising the subsequent purification treatment required. Brief descriptions are given by other authors of successful methods adopted for dealing with many types of waste-H_2O. C. J.

Disposal of gaseous effluents. W. A. DAMON and B. WYLAM (Chem. Eng. Cong. World Power Conf., 1936, *F4*, 32 pp.).—A survey of methods used for the removal of noxious constituents from industrial waste gases. C. J.

Disposal of industrial effluents. H. T. CALVERT (Chem. Eng. Cong. World Power Conf., 1936, *F3*. C. J.

Purification of waste water from yeast factories. K. E. JENSEN (Chem. Eng. Cong. World Power Conf., 1936, *F2*, 16 pp.).—The waste liquor after manufacture of yeast on beet-molasses wort is submitted to anaërobic bacterial fermentation at optimal temp. Very little sludge is produced, whilst the gas obtained is combustible and is used under the factory boilers as a supplementary fuel. The fermented liquor passes through a series of ponds, effecting further purification, whilst final treatment is carried out on biological filters. To minimise H_2S production, the use of SO_4'' in the yeast nutrients may be avoided, or, if SO_4'' is used, compressed air is blown through the liquor before passing to the filters, the product being led away. I. A. P.

Fe oxide for gas purification.—See II. **Cosmetics.**—See XII. **Eliminating obnoxious fumes.**—See XIII.

PATENTS.

Gas masks. HUNGARIAN RUBBER GOODS FACTORY, LTD., and C. EHRMANN (B.P. 447,729, 8.11.35. Hung., 10.7.35).

Respiratory apparatus for protection against noxious gases. A. LEIGH-SMITH and H. O. W. RICHARDSON (B.P. 448,060, 25.2.35).

Purifying air.—See I. **Apparatus for generating ions [in air]. Insulation for H_2O-pipes etc.**—See XI.