

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

MAR. 27 and APRIL 3, 1936.*

I.—GENERAL; PLANT; MACHINERY.

Production of high temperatures. G. RIBAUD (Chim. et Ind., 1936, 35, 3—11).—A lecture in which special attention is given to the at. H blowpipe, the induction furnace, and furnaces employing conc. radiation. E. H. B.

Application of physical data to high-pressure processes. Practical approach in modern industry to problems on equation of state and equilibrium. W. K. LEWIS (Chem. & Ind., 1936, 123—130).—A lecture, with special reference to deviations from the ideal gas laws. E. S. H.

Dephlegmator design. A. A. SOLOSCHENKO (Koks i Chim., 1935, No. 10, 78—79).—A dephlegmator consisting of cast-Fe cylindrical sections, with spaces closed by two plates, is described; it is claimed to be less corrodible, more easily cleaned, and to possess better gas-tightness than the tube type of apparatus, and to require less metal than the tray type. D. R. H.

Glass furnaces.—See VIII. **Welding Cr steels.**—See X. **Testing plasticity.**—See XIII. **Pulp-centrifuge for starch.**—See XVII.

See also A., Feb., 181, **Sedimentometer.**

PATENTS.

Furnace construction. A. STURROCK (B.P. 441,395, 19.7.34. Can., 22.7.33).—Imperforate firebricks are grooved in such a manner that when assembled they form a perforated hearth suitable for the combustion of fluid or pulverised fuel. B. M. V.

Furnaces. J. A. HOPE (B.P. 441,417, 18.9.34).—A combustion grate for damp fuel is described. B. M. V.

Sintering, roasting, and drying of ores and the like. F. KRUPP A.-G. (B.P. 441,443, 11.6.35. Ger., 31.7.34).—The sintering is effected without admixture of fuel, in pans, which are caused to travel in a step-by-step motion, the steps being longest in the neighbourhood of the fuel and vac. stages and shortest at the feeding and discharging points. The conveyor is constructed so that the pans are slightly lifted and moved without sliding friction; the return run is preferably at a different level, the raising and lowering being effected by lever devices. B. M. V.

Heat-exchange devices. C. T. WALTER, Assr. to INDUSTRIAL PATENTS CORP. (U.S.P. 2,001,084—5, 14.5.35. Appl., [A] 9.7.34, [B] 25.7.34).—Refrigerating medium is passed through a hollow cylindrical drum which rotates somewhat closely to a fixed outer casing. The liquid to be chilled is passed through the annular space, and frozen material is removed from the drum (A) by scrapers, or (B) by rollers which also assist to support the drum.

Seals at the bearings and means for rapidly opening the apparatus are described. B. M. V.

Anti-freezing agent, more particularly for use in motor vehicles. A. EICHENGRÜN (B.P. 441,266, 14.4.34).—An alkali or alkaline-earth nitrite is added to the H₂O, together with 3—5% of a slightly alkaline oxide or salt, preferably a carbonate or phosphate of a similar metal. B. M. V.

Thermal insulation. M. C. HUGGETT, Assr. to RESEARCH, INC. (U.S.P. 2,001,912, 21.5.35. Appl., 30.9.33).—A unit of the insulation comprises a base sheet covered with a highly polished heat-reflecting film, e.g., paper, adhesive, and flakes of Ag₂S; a no. of other substances, mostly minerals, are mentioned as suitable reflectors. B. M. V.

Drying apparatus. G. E. BAROZZI (U.S.P. 2,002,170, 21.5.35. Appl., 27.10.33).—The apparatus comprises, *inter alia*, a pair of parallel chambers and provides for reversible air circulation. B. M. V.

Heating and drying of materials such as coal, coke, broken stone, sand, gravel, grain, and the like. J. F. WAKE (B.P. 441,326, 1.5.34).—A rotary cylindrical or prismatic dryer with internal longitudinal baffles is described. B. M. V.

Dryer. A. G. FORTY, Assr. to C. G. SARGENT'S SONS CORP. (U.S.P. 2,001,345, 14.5.35. Appl., 18.1.34).—Cloth or other strip material is conveyed in a zig-zag manner through a drying chamber while supported on one or both sides by a chain conveyor. B. M. V.

Production of smokeless hot air for drying, especially of ceramic wares. M. KOTTERBA (B.P. 441,357, 12.3.35).—Air is passed through a bank of horizontal (metal) tubes which are heated by zig-zag flow of hot gases; at the outlet for air and inlet for gases is a form of ceramic recuperator affording a smaller cross-section to the flow of the gases than the rest of the apparatus. B. M. V.

Regenerative pasteurisation apparatus. J. OLSEN, Assr. to BUAAS MEJERIMASKINFABRIKKER, AFDELING AF A./S. FREDERIKSBERG METALVAREFABRIK (U.S.P. 2,001,849, 21.5.35. Appl., 3.2.32. Denm., 20.4.31).—The heat-transmitting surfaces comprise nested frusto-conical plates. Details of construction are claimed. B. M. V.

Temperature-control means for liquid heaters. H. S. FIELDER, Assr. to CHERRY-BURRELL CORP. (U.S.P. 2,001,344, 14.5.35. Appl., 29.6.33).—The liquid heating medium is circulated through a jacket or the like by a pump, and its temp. is maintained by admission of steam or other vapour in an injector device under control of a thermostat in the medium. Another thermostat in

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

the liquid to be heated stops the pump on attainment of the required temp. B. M. V.

Roller mills for grinding paint and other substances. PINCHIN, JOHNSON & Co., LTD. (DOCKER BROS.), and C. LEWIS (B.P. 441,382, 14.7.34).—The collecting apron attached to the delivery scraper is provided with adjustable deflectors near the ends so that material from the ends of the roll may be collected (and returned) separately from the finished material from the middle. B. M. V.

Grinding, blending, and emulsifying machines. S. O. S. PATENTS Co., LTD., and H. C. REDDROP (B.P. 441,215, 27.8.34).—A disintegrator of the intercalating-pin type is described. B. M. V.

Agglomeration of pulverulent materials. P. ROBERT (B.P. 441,328, 14.4.34. Fr., 15.4.33).—Materials which become pasty and evolve vapour when heated are charged into mould pockets formed on the exterior of a rotating drum, and at other points of the circumference are heated by a surrounding casing. A preliminary pressure is applied by cam-operated pistons in the pockets, and the pressure is maintained by the evolved gases. B. M. V.

Mixing apparatus. [Flotation cell.] E. A. COLBURN, JUN., Assr. to DENVER PATENT Co. (U.S.P. 2,002,000, 21.5.35. Appl., 26.3.27. Renewed 11.2.35).—In the first cell the feed pulp and air are admitted through separate conduits to the underside of a suspended agitator; in the subsequent cells the feed conduit draws from the settling zone of the next earlier cell. B. M. V.

Apparatus for blending sand and like materials. H. L. MCKINNON and M. E. FIRST, Assrs. to C. O. BARTLET & SNOW Co. (U.S.P. 2,001,973, 21.5.35. Appl., 5.12.31).—A drum contains one or more rolls rotating at different peripheral speeds. In some forms one of the rolls bears on the interior of the drum by gravity; in others, the drum is provided with pockets which lift the material to the nip between rolls. B. M. V.

[Pneumatic] classifier. H. A. CUPPY (U.S.P. 2,001,184, 14.5.35. Appl., 8.9.31).—In a separator which may form part of the system described in B.P. 429,035 (B., 1935, 658) the feed is conveyed and distributed radially near the bottom of the cylindrical casing by means of a minor air current, and additional air is supplied below the feeding point. Other deflexion devices and the air-dust outlet are situated at the top. B. M. V.

Apparatus for [pneumatically] separating granular material. M. I. DORFAN, Assr. to BLAW-KNOX Co. (U.S.P. 2,003,141, 28.5.35. Appl., 14.12.32).—The material passes through an annular feeder over an annular deflector which divides it into inner and outer falling streams through which air is blown outwardly. The feed and air are both adjustable. B. M. V.

Separation of intermixed divided materials. R. PEALE, JUN., Assr. to PEALE-DAVIS Co. (U.S.P. 2,001,331, 14.5.35. Appl., 23.9.30. Renewed 27.9.34. Ger., 7.12.29).—In a pneumatic shaking table the air apertures in the blast chamber are adjusted by stoppers formed with holes of different sizes. An electric contact device is provided to maintain the feed at const. depth.

Size classification of middlings is effected transversely by means of sloping riffles, the coarse and fine middlings being collected separately. B. M. V.

Screening apparatus. T. SANDY (U.S.P. 2,001,549, 14.5.35. Appl., 21.1.33. Can., 18.8.32).—A crusher is situated inside a rotary screen and the oversize is conveyed thereto by buckets attached to the interior of the screen. B. M. V.

Fractionating device [for fibrous material]. C. A. BENNETT and G. E. GAUS, Ded. to U.S.A. (U.S.P. 2,002,974, 28.5.35. Appl., 26.11.34).—Air-borne material is screened through a no. of superposed stationary screens of decreasing mesh; felting of the small fibres on the screens is prevented by transverse air currents produced by air admitted under pressure to an annular chamber in each screen frame, whence the air emerges through the interstices of the edge of meshwork. B. M. V.

Impact testing machine and method. J. H. ABRAMSON, Assr. to GREENLEE BROS. & Co. (U.S.P. 2,001,087, 14.5.35. Appl., 9.2.31).—For determination of toughness and brittleness, the test-piece is formed with a bevelled edge upon which a striking blade is laid. The blade is struck by a no. of graduated wts. falling from a standard height. B. M. V.

Extraction of substances from [and by] liquid media. A. R. GIBSON, and NAT. SMELTING Co., LTD. (B.P. 441,271, 11.7.34).—Two columns of liquid (having the lower d) are separated by a seal of an immiscible liquid of higher d , and the lighter liquid is continually forced through the heavier by oscillating the columns. *E.g.*, a suitably perforated and baffled vessel containing Pb may be raised and lowered in a kettle of fused $PbCl_2$ to remove Ag and Sb. B. M. V.

Centrifugal separator. H. O. LINDGREN, Assr. to DE LAVAL SEPARATOR Co. (U.S.P. 2,002,954, 28.5.35. Appl., 18.9.31. Swed., 15.12.30).—Packings for the feed inlet and light-constituent outlet in the neck of a closed centrifuge are described. B. M. V.

Centrifugal. F. SCHAUM, Assr. to FLETCHER WORKS, INC. (U.S.P. 2,001,550, 14.5.35. Appl., 11.6.32).—The whole machine (rotor, casing, and motor) is mounted on a spherical bearing of which the centre lies on the axis of rotation. B. M. V.

Removal of semi-solid separated matters from continuously-operating centrifugal bowls. AKTIEB. SEPARATOR-NOBEL (B.P. 440,905, 29.8.34. Swed., 2.9.33).—A scraper for the lighter constituent supported on a tubular carriage is described. B. M. V.

Thickener. N. B. LUND, Assr. to DORR Co., INC. (U.S.P. 2,003,261, 28.5.35. Appl., 16.2.31. Renewed 15.11.34).—Loose drags attached by chains or ropes to carriages running around the edge of the tank are provided to drag the sludge to outlets which are off-centre. B. M. V.

Filter. M. F. MORAN (U.S.P. 2,002,826, 28.5.35. Appl., 30.10.33).—A leaf filter suitable for operation by pressure on the prefilter and with filter-aid is described. B. M. V.

Filtering media [paper] in sheet form. J. A. PICKARD (B.P. 440,884, 5.6.34).—With felted cellulosic

material one or more of the following may be incorporated to afford a high rate of filtration: kieselguhr, pumice, $MgCO_3$, wood meal. B. M. V.

Separation of constituents of gaseous mixtures. J. L. SCHLITT, ASSR. to AIR REDUCTION CO., INC. (U.S.P. 2,000,992, 14.5.35. Appl., 31.1.34).— O_2 is separated from air by partial backward condensation by heat exchange with previously liquefied O_2 , with production of an O_2 -rich liquid. This is rectified by reciprocal evaporation and condensation under partial vac., the vac. being maintained by exhaustion of the N_2 effluent from the rectifier. B. M. V.

Means for freeing liquids from gases. J. ZWICKY (B.P. 440,974, 22.8.34).—An automatic double valve is arranged in a conduit so that when the upper gas outlet is open the lower liquid outlet is closed, and vice versa. B. M. V.

Gas-absorption pipette. M. P. MATUSZAK, ASSR. to FISHER SCIENTIFIC CO. (U.S.P. 2,001,581, 14.5.35. Appl., 23.10.33).—A pipette, with reservoir surrounding it in the form of a jacket, is provided with an automatic ball-valve in the upper end which prevents passage of gas during the bubbling process, but is displaced by a slight reduction of pressure when it is desired to withdraw the residual gas. B. M. V.

(A) **Apparatus for treatment of a gas by a liquid.**
(B) **Bringing a liquid and gas in intimate contact or mixture.** I. HECHENBLEIKNER, ASSR. to CHEM. CONSTRUCTION CORP. (U.S.P. 2,000,443—4, 7.5.35. Appl., [A] 3.2.31, [B] 24.6.32).—For, e.g., the drying of atm. air (for S combustion) by means of 98% H_2SO_4 and the concn. of the 93% acid thus produced with SO_3 : (A) a horizontal cylindrical vessel is provided with downwardly inclined inlets for gas, an inlet for liquid, and with overflows to maintain the vessel about half-full; (B) a horizontal perforated diaphragm is placed across a vessel and gravel placed thereon to such depth and of such size (e.g., 6 in. of $\frac{1}{4}$ -in. material) that gas blown into the lower compartment will be broken up into small bubbles without excessive spray and the gravel will be slightly disturbed, the liquid being supplied to the upper compartment and allowed to overflow at a const. level. Cooling coils for the arriving liquid may be provided in the lower compartment. B. M. V.

Means for reacting semi-fluid materials. P. HOOKER, T. L. B. LYSTER, and J. D. RUE, ASSRS. to HOOKER ELECTROCHEM. CO. (U.S.P. 2,000,953, 14.5.35. Appl., 30.10.33).—A mixing device comprises a helical baffle around a shaft and within a conduit; collars (baffle-plates) on the shaft and longitudinal ribs on the conduit wall serve to produce motion of the inner layers outward and of the outer layers inwards. B. M. V.

(A) **Collector for, (c) revivifying, fuller's earth.**
(B) **Revivifier.** B. MANROSS (U.S.P. 2,000,971—3, 14.5.35. Appl., [A] 4.11.30, [B, C] 23.1.33).—A dust collector of the deflexion type is inserted in the flue from a multi-hearth revivifying furnace to a stack, and the collected dust is returned by gravity to the lower part of the furnace, the whole apparatus being maintained at a temp. $>$ that of condensation. B. M. V.

Treatment of brake-lining and impregnating compound. O. T. HODNEFIELD (U.S.P. 2,001,194,

14.5.35. Appl., 29.10.30. Renewed 19.9.34).—A mixture of 12 constituents (proportions given), consisting chiefly of $(NH_4)_2SO_4$, NH_4 phosphate and other salts, H_2BO_3 , basic materials, etc., is claimed as a fireproofing composition. B. M. V.

Preparation of hygroscopic [indicating] material. A. J. LOEPSINGER and W. M. TRAFTON, ASSRS. to AMER. MOISTENING CO. (U.S.P. 2,001,066, 14.5.35. Appl., 17.7.31).—A H_2O -sensitive element for hygrosopes comprises animal membrane, e.g., the middle layer of the cæum of an ox, composed substantially of elastin, i.e., from which collagenous and all material other than elastin tissue have been removed with KOH or pepsin solution. B. M. V.

Continuous determination of vapour pressure. E. P. VALBY and M. L. ARNOLD (U.S.P. 2,002,101, 21.5.35. Appl., 23.5.32).—A stream of gas (air) is passed at a const. rate (preferably determined by an orifice and an initial pressure of 20 lb./sq. in. to nullify the effect of minor variations in down-stream pressure) through a sinuous tube in a const.-temp. liquid bath to another orifice across which the pressure drop is measured. H_2O is added to the stream, the excess liquid separated in a whirling pot, and the new pressure drop noted. A sample of the liquid is added and treated in the same way as, and simultaneously with, the H_2O , the vol. of gas flow being again increased thereby. B. M. V.

Production of foam such as is used for fire-extinguishing purposes. PYRENE CO., LTD. (B.P. 441,441, 23.5.35. Ger., 23.6.34).

Grinding paper pulp.—See V. **Boiler tubes.**—See X. **Pptg. particles from gases. Determining the humid content of granular substances.**—See XI. **Stabilising liquids.**—See XIX.

II.—FUEL; GAS; TAR; MINERAL OILS.

Nomenclature of coal petrography. W. J. JONGMANS, R. G. KOOPMANS, and G. ROOS (Fuel, 1936, 15, 14—15).—At the 2nd Internat. Congr. for the Study of the Stratigraphy of the Carboniferous Rocks the principles of the Stopes' proposals (B., 1935, 258) were accepted with some simplification. A. B. M.

British coals: analyses and uses. ANON. (Fuel Econ., 1936, 11, 201—202, 232—233).—Analyses of 25 further coals are given (cf. B., 1935, 834).

Cleaning of coal, using dense media. R. A. MOTT (J. Inst. Fuel, 1936, 9, 158—170).—A discussion of the principles involved and of the results obtained in the operation of various processes, including the Chance sand-flotation process, the Lessing process using conc. aq. $CaCl_2$, and the de Vooy's process using a finely-ground barytes-clay suspension. H. C. M.

Cleaning of long-flame Lisichansk coals by flotation with salts. P. D. LISENKO (Koks i Chim., 1935, No. 10, 40—46).—Flotation of the coals requires addition of oils to the $NaCl$ or $CaCl_2$ brine. Best results were obtained with a grain size \gtrsim 2 mm. If phenols are added an absorption of 88—90% of the phenol takes place. A possible explanation is suggested. D. R. H.

Simplification of cleaning processes at modern coal washeries. K. P. CHARTSCHENKO (Koks i Chim.,

1935, No. 9, 34—36).—Instead of the usual operations and equipment, use of dewatering bins and large-capacity jigs is advocated. D. M. M.

Reducing the phosphorus content of coals and coke mixtures of the Don basin. G. I. DESCHALIT (Koks i Chim., 1935, No. 9, 28—30; cf. B., 1935, 978).—The P content of coal occurs mostly in the accompanying stones. Based on tests of cleaning various coals of different P content, steps to reduce the P content in coals and coal mixtures are recommended. D. M. M.

Dedusting of coal. G. LINDLEY (J. Inst. Fuel, 1936, 9, 178—185).—By dedusting of coal prior to cleaning, cleaning processes, both wet and dry, can be made more efficient and, in the case of washing, slurry troubles are minimised. Dedusting is effected by air currents from a centrifugal fan impinging on the coal as it falls down a shoot, or, alternatively, as it is jiggged across a table. In order to extract the bulk of a dust of a given size it is necessary to employ air currents greatly in excess of those theoretically required, and large amounts of an oversize dust are thereby removed. To be efficient the deduster plant should separate the oversize from the fine dust and re-mix it with the dedusted coal. A method is described for calculating the extraction and combined efficiencies of the plant. The efficiencies of the various types of pneumatic plant are compared and brief descriptions given of the methods whereby these efficiencies are realised. Suggestions are also given for utilising the fine dust extracted. H. C. M.

Oxidisability of coal. E. STANSFIELD, W. A. LANG, and K. C. GILBERT (Fuel, 1936, 15, 12—14).—The rates of absorption of O_2 by samples of coal, while being ground in a ball mill filled with air at 30° and of R.H. 32%, have been determined. The rates decreased with time over the first few hr. and were approx. const. thereafter. The O_2 absorbed in 120 hr. varied from 0.36 to 3.12% (calc. on the pure, dry coal) with different samples; there were corresponding decreases in the calorific val. of the coals of 0.46—2%. In general, the higher was the rank the less susceptible was the coal to oxidation. A. B. M.

Determining the degree of softening of bituminous coals when heated. I. V. GEBLER (Koks i Chim., 1935, No. 10, 18—24).—1 g. of pulverised coal is introduced into a pipe of cross-section 1 sq. cm., and above the coal 3 g. of sand are placed. These are compressed under a load of 5 kg. and the pipe is electrically heated during 5 min. up to 850° . The fluidity coeff. is indicated by the amount of interpenetration. Data for various coals are given. D. R. H.

Rapid determination of ash in coal and coke. B. V. MANGUBI and A. L. RUBINSTEIN (Koks i Chim., 1935, No. 10, 67—68).—By moistening finely-ground coal or coke with conc. H_2SO_4 or HNO_3 the time required for ash determination by ignition in a muffle is reduced to 40—60 min. D. R. H.

Determination of superficial fissureness of cokes. A. S. BRUK and M. R. MOISIK (Koks i Chim., 1935, No. 10, 33—39).—Superficial fissureness is defined as the ratio of total length of visible fissures to the superficial area. By means of a net of threads giving 1-cm.

squares, longitudinal and transverse fissureness is determined, the sum of these vals. giving the total fissureness. D. R. H.

Gas producers for motor vehicles and their fuels. Development with particular reference to the use of fossil fuels. R. HARTNER-SEBERICH (Brennstoff-Chem., 1936, 17, 1—11).—The design of suction-gas producers is discussed. Peat coke, brown-coal coke, and brown-coal briquettes have all been used successfully as fuels in appropriately designed producers. Experiments on the use of bituminous coal as a fuel are described. The producer comprises a simple cylindrical container into which projects a H_2O -cooled air-blast nozzle; the gases pass across the producer, at right-angles to the direction of flow of the fuel. A conc. fire zone, surrounded on all sides by the fuel, was produced by using high gas velocities (30—80 m./sec.) in the nozzle. A much higher temp. was necessary in the producer in order to obtain a suitable gas. Disadvantages due to SO_2 and finely-divided SiO_2 in the engine exhaust were obviated by adding 2—3% of $Ca(OH)_2$ to the coal. It was necessary to introduce superheated steam with the air to obtain a gas of const. quality. The particle size of the coal should be $\gt 5$ —10 mm. and its ash content $\gt 8\%$. A. B. M.

Flame gases in the light of recent research. W. T. DAVID (Proc. S. Wales Inst. Eng., 1936, 51, 375—388).—A lecture. The theory is advanced that the flame gases in a CO -, CH_4 -, or C_2H_2 -air explosion have latent energy. Its amount is deduced from a comparison of the observed and calc. flame temp. This energy is connected with the "after-glow" in gaseous explosions. H. J. E.

Hydrogenation-cracking of tars. I. Preliminary experiments. ANON. (Dept. Sci. Ind. Res., Fuel Res. Tech. Paper No. 40, 1935, 107 pp.).—The results of experiments on the conversion of low-temp. tar into motor spirit by hydrogenation-cracking under pressure are presented. Most of them were carried out in 2-litre converters. In the first series, in which a low-temp. tar topped to 230° was hydrogenated in absence of a catalyst, the best results were obtained with an initial H_2 pressure of 100 atm. and a reaction temp. of 450° for 2 hr. The yields of neutral oil fractions of b.p. $< 170^\circ$ and 170 — 230° were 6.9 and 8.5%, respectively. In the second series, using the same topped tar, the effect of a wide range of catalysts was observed; the best were MoO_3 , $MoO_3 + S$, $WO_3 + S$, I, and HI, giving yields (with 5% of catalyst) of neutral oil of b.p. $< 170^\circ$, of 13.9, 21.4, 15.5, 22.4, and 23.1%, respectively, and neutral oil of b.p. 170 — 230° , of 13.1, 15.8, 14.8, 15.0, and 17.5%, respectively. Br and Cl_2 also gave good yields. Halogens, however, attacked the metal of the converter and, moreover, produced relatively large yields (8%) of coke. In a third series of experiments a no. of tars from different low-temp. processes were treated; it was found advantageous to use the whole untopped tar and to support the catalyst (NH_4 molybdate + S) on a porous carrier, e.g., active charcoal. There was little difference in the behaviour of the various tars, except that those obtained from vertical brick retorts were not so readily hydrogenated as those

previously obtained from vertical cast-Fe retorts operated at somewhat lower temp. Engine tests carried out on a spirit produced in a similar way in the Bergius plant are recorded; it possessed a high C_8H_{18} no. (87), but, being deficient in low-boiling fractions, the ease of starting and acceleration were inferior to those of an ordinary petrol. The heavier fractions from this test were unsuitable as a source of lubricating oils. A. B. M.

Hydrogenation-cracking of tars. II. Preparation of catalyst. J. G. KING and C. M. CAWLEY (Dept. Sci. Ind. Res., Fuel Res. Tech. Paper No. 41, 1935, 17 pp.; cf. preceding abstract).—Catalysts prepared by impregnating various porous supports with NH_4 molybdate were tested in a continuous plant having a throughput of 200 c.c./hr. of tar or tar oil (cf. B., 1933, 6). The activities of these catalysts, expressed as % conversion of tar oil into spirit under standard operating conditions ($480^\circ/200$ atm.), ranged from 57.8 with an active C support (I) and 54.4 with Al_2O_3 gel (II), down to 36.2 with SiO_2 gel. The rate of deterioration of (I) was $>$ that of (II). (II) could readily be reactivated by heating in air; this, of course, was not possible with (I). The activity of (II) was enhanced by preheating in air at 500° for several hr.; it fell on preheating in H_2 . The activity of the Mo catalyst was increased in presence of H_2S , probably due to conversion of the oxide into MoS_2 . Most tars or tar oils contain sufficient S to bring about this conversion. The mechanism of the deterioration of the catalyst is discussed. A. B. M.

Destructive hydrogenation for the refining of mineral oils. G. FREE (Petroleum, 1936, 32, No. 7, 1–5).—A review, mainly of patent literature.

Detection and determination of lead tetraethyl in motor-fuel mixtures. B. CARLI (Annali Chim. Appl., 1935, 25, 634–638).—Petrol, or a petrol-EtOH- C_6H_6 mixture, containing $PbEt_4$, is treated with I in petrol, and heated on the water-bath for $\frac{1}{2}$ hr.; pptd. PbI_2 , filtered off and washed with light petroleum, is dissolved in alkali, and Pb determined as $PbSO_4$, any org. carbonisation products being removed by HNO_3 . Alternatively, the petrol is treated with S_2Cl_2 , the pptd. $PbCl_2 + S$ dissolved in NaOH, treated with HNO_3 , and Pb in the solution, filtered from S, determined as $PbSO_4$; if EtOH is present it must be washed out before S_2Cl_2 is added. E. W. W.

Absolute viscosity of automobile cylinder oil. B. ANASTASIU (Ann. Chim. Analyt., 1936, [iii], 18, 5).—Abs. viscosities determined at the flash point are $<$ the vals. given by Walther's formula. R. S.

Enriching crude anthracene.—See III. **Producer-gas plant for glass manufacture. Glass-furnace control. Coke-oven SiO_2 bricks.**—See VIII. **Et-petrol. Dephenolising waste waters.**—See XXIII.

See also A., Feb., 178, **Determination of graphite.**

PATENTS.

Manufacture of artificial fuel. H. KRANICH (U.S.P. 1,993,517, 5.3.35. Appl., 29.7.31).—A solution of cellulose nitrate (I) in EtOH is solidified by immersing therein a solid block of alcoholic soap (neutral Na stearate) containing H_2O , which diffuses into the solution and ppts. the (I) as a framework for the liquid.

After a time (24–48 hr.) the block is removed and the cavity filled with more (I) solution which is itself solidified by H_2O diffusion from the main solidified solution.

F. R. E.

Treatment of fuel by coloration. J. ROBERTS (B.P. 440,402, 26.3.34).—Coke, semi-coke, coal, etc. is given a distinctive coloration or iridescence by treating it with coal-carbonisation vapours other than those of heavy tar. A. B. M.

Catalytic composition for improving the combustion of solid fuels. J. BURELLIER (B.P. 440,224, 19.12.34. Fr., 20.12.33).—The composition comprises MnO_2 32.1, charcoal 2.5, NaCl 27.7, $NaClO_3$ 37.7%. It is added to the fuel in the form of powder in the proportion of 1–2 kg. per ton. A. B. M.

Horizontal chamber coke ovens for production of gas and coke. H. KOPPERS GES.M.B.H. (B.P. 440,009, 1.4.35. Ger., 31.3.34).—The upper part of the oven brickwork as far as the base of the chamber is constructed of SiO_2 bricks, whereas the lower part, including the chamber floor, consists of a material, e.g., fireclay, with a different coeff. of thermal expansion. The bracing of the structure is so designed that no cracks occur due to differences of expansion. A. B. M.

Production of high-grade coke from practically non-coking coals. A. FISHER, and H. A. BRASSERT & Co., LTD. (B.P. 440,434, 28.6.34).—A mobile mixture of the finely-pulverised coal with a liquid hydrocarbon high in asphaltic or pitch-forming constituents is coked, preferably in a relatively thin layer, in a sole-fired horizontal chamber. A. B. M.

Cracking and coking of distillable carbonaceous materials. H. A. BRASSERT & Co., LTD. From H. A. BRASSERT & Co. (B.P. 440,181, 14.3.34).—Pitch, petroleum residue, or a mixture thereof with fine coal etc. is coked in a horizontal chamber (C) having a flat floor, by direct contact with a hot gaseous medium which is introduced at a series of inlets along one side of C and, after crossing this transversely, is withdrawn, together with the volatile coking products, through a corresponding series of oftakes on the other side; the direction of flow of the gases may be reversed at intervals. The initial material is preheated and introduced into C at a rate corresponding to the rate of coking so that a layer of coke of increasing thickness is gradually built up. When sufficient coke is formed the flow of material is stopped, and after a final heating, which, if desired, may be effected by introducing air to burn the vapours evolved at this stage, the product is discharged. A. B. M.

Treatment of wood for obtaining a dry fuel. R. SPATZ and R. SENNAC (B.P. 440,324, 18.5.34. Fr., 30.12.33. Addn. to B.P. 438,664; B., 1936, 179).—The process of the prior patent is modified by mixing the pulverised charcoal from the first stage with mineral or vegetable tars or tar oils (with or without addition of the condensation products of the distillation) in such quantity that the product of the second (coking) stage remains in granular form. A. B. M.

Destructive hydrogenation of carbonaceous materials. M. A. MATTHEWS, L. G. B. PARSONS, and

IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 440,456, 4.12.34).—The process of B.P. 432,958 (B., 1935, 1033) is modified by treating the stable halide, formed on neutralising the H halide in the reaction products, with an inorg. acid, *e.g.*, H_2SO_4 , and/or the NH_4 salt thereof, whereby the halide is converted into the corresponding H or NH_4 halide, which is then recirculated. A. B. M.

Purification of coal gas. CHEM. ENG. & WILTON'S PATENT FURNACE CO., LTD., T. O. WILTON, and N. WILTON (B.P. 439,974, 19.6.34).—An excess of NH_3 is added to the gas so that on subsequent scrubbing with H_2O or liquor the impurities, *e.g.*, CO_2 , H_2S , are removed therewith. The amount of NH_3 added is automatically regulated by suitable devices to correspond with fluctuations in the rate of gas flow. A. B. M.

Purification and separation of gaseous mixtures. M. SCHOELD, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 2,002,357, 21.5.35. Appl., 31.10.31).—Separation of H_2S , CO_2 , HCN, etc. from coal gas or other fuel gas is effected by an absorbent liquid containing an alkali-forming metal (this term to include NH_3) and a phenol in proportions to form an immiscible phase at the end of absorption. Circulation is continuous through a cool absorption stage and a (steam) regeneration stage in which H_2S or the like is removed. PhOH condensed from the vapours of regeneration is returned to an intermediate stage of the regenerator, thus causing a large excess to be in local circulation. B. M. V.

Light oil removal [from gas]. D. L. JACOBSON, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 1,993,344, 5.3.35. Appl., 5.8.31).—Light oil is distilled from tar and the residue used as a wash oil to absorb light oil from gas. The light oil is distilled off from the enriched tar and the residue distilled by heat exchange with hot combustion gases to produce tar, creosote oil, pitch, or coal-tar distillates. C. C.

Increasing the viscosity of tars. C. A. AGTHE, Assee. of J. R. GEIGY A.-G. (B.P. 440,311, 14.5.35. Ger., 16.5.34).—The tar, during or after distillation, is heated with $< 5\%$ of an org. NO_2 - or NO-compound, *e.g.*, $NO_2 \cdot C_6H_4 \cdot OH$, $NO \cdot C_6H_4 \cdot OH$, or $C_{10}H_7 \cdot NO_2$. A. B. M.

Continuous elimination by physical means of sulphur contained in benzols. SOC. DES ETABL. BARBET (B.P. 441,518, 7.3.25. Fr., 10.3.34).— CS_2 and lighter products are removed from crude benzol by rectification in a plate column. The crude benzol is separated into benzol and toluol in another column, at the top of which an extract rich in thiophen is obtained. Apparatus is claimed. C. C.

(A) Solution, (B) electrolyte, for use in testing [oil] wells. G. H. ENNIS, Assr. to R. V. FUNK (U.S.P. 1,994,761—2, 19.3.35. Appl., [A] 16.1.31, [B] 13.6.31. Renewed [B] 31.12.34).—An electrolytic solution for testing the point at which H_2O is leaking into an oil well consists of a mixture of acid electrolyte (85%), a glutinous material, *e.g.*, bentonite clay (10%), and heavy material, *e.g.*, $BaSO_4$ ($< 5\%$), but contains no rotary mud. The electrolyte may contain NH_4Cl , $(NH_4)_2SO_4$, Na_2SO_4 , and a colloidal material, acidified with H_2SO_4 and CrO_3 , *e.g.*, the EtOH fermentation product of waste molasses after removal of EtOH. C. C.

Cracking normally incondensable hydrocarbon gases. G. EGLOFF, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,993,503, 5.3.35. Appl., 22.3.30).—Hydrocarbon gases, *e.g.*, coal gas, natural gas, and incondensable gases from cracking and refinery processes, are cracked in presence of a catalyst, *e.g.*, W, V, Fe, Co, Ni, Cr, Sn, Pb, Zn, and their compounds, with steam and H_2 preactivated by electrical discharge. C. C.

Manufacture of hydrocarbon distillates. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 440,517, 25.10.34. Holl., 4.11.33).—Hydrocarbon mixtures (excluding stabilising gasoline) are fractionally distilled and/or condensed by introducing such a heated vaporous mixture between the top and bottom of a column (C). The vapours are caused to make contact with a counter-current reflux, fractions being withdrawn at top, bottom, and intermediate points of C. Further heat is supplied to C (to prevent overlapping of the boiling ranges of the fractions) by reheating part of the withdrawn fractions and reintroducing the latter at the same points in C. C. C.

Production of valuable products from mineral oils. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 441,806, 28.3.35. Holl., 23.4.34).—Refined kerosenes, gas oils, lubricating oils, or solid resins can be obtained by treating mineral oil distillates or residues containing aromatics, *e.g.*, from Borneo oils or Edeleanu extract, with C_2H_2 hydrocarbons in presence of $AlCl_3$, *e.g.*, at $30-50^\circ$. A diluent, *e.g.*, cyclohexane, light petroleum, or aromatic-free kerosene, is advantageous and the reaction mixture may be extracted with solvents. C. C.

Treatment of petroleum hydrocarbon oils and spirits. J. F. WAIT (B.P. 441,703, 19.4.34).—Colourless gasolines of low gum content, and non-gumming lubricating oils of low sludge val. are obtained by mild oxidation of hydrocarbon oils and distillates (*e.g.*, by air or aromatic NO_2 -compounds) followed by treatment with an active light metal (cf. B.P. 420,909; B., 1935, 135), *e.g.*, Na, Ca, at $250-500^\circ$ and separating the purified oil. The metal may be obtained by electrolysis and used immediately. C. C.

Treatment of oil [to remove asphalt]. E. W. GARD, Assr. to UNION OIL CO. OF CALIFORNIA (U.S.P. 2,002,004, 21.5.35. Appl., 7.8.33).—Oil previously freed from light fractions is mixed with a solvent, *e.g.*, liquid C_3H_8 , in which asphaltic matter is mostly insol. The solution on distillation produces C_3H_8 oil, and a residue of oil and remaining asphalt, the last-named being re-treated as original material. B. M. V.

Removal of wax from hydrocarbon oils. B. Y. McCARTY and W. E. SKELTON, Assrs. to TEXAS CO. (U.S.P. 1,995,153, 19.3.35. Appl., 30.11.31).—Oils of low pour test ($< -28.9^\circ$) are obtained by mixing the original wax-bearing oil with a medium that, at this temp., has substantially complete solvent action for the oil and none for the wax; *e.g.*, a mixture of $o-C_6H_4Cl_2$ with $C_5H_{11} \cdot OH$, $O[C_2H_4 \cdot OH]_2$, Bu ether, COMeEt, $C_3H_6Cl_2$, or $C_3H_7Cl_2$ is used, the proportions of the ingredients and the amount used depending on the oil to be treated. The wax so pptd. is filtered off (using a filter aid) in the cold, and the solvent then removed to give good yields of the desired oil. E. J. B.

Dewaxing of mineral oils. H. T. BENNETT, Assr. to MID-CONTINENT PETROLEUM CORP. (U.S.P. 1,993,396, 5.3.35. Appl., 9.1.30).—Wax is removed from lubricating or other mineral oil by first adding $< 2\%$ of soap insol. in H_2O , e.g., Al stearate, to render any cryst. wax amorphous. The mixture may be stabilised by heating to 176° or adding a stabiliser, e.g., $CH_2Ph\cdot OH$. The product is diluted with 40–80 vol.-% of naphtha, chilled, and centrifuged. C. C.

Hydrogenation of hydrocarbons. R. C. COOK, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,994,982, 19.3.35. Appl., 21.7.28).—The residuum from cracking operations is treated at < 1000 lb. per sq. in. with the fixed gas enriched with H_2 if necessary and heated to 425 – 482° . D. K. M.

Sweetening of hydrocarbon oil. R. B. THACKER, JUN., Assr. to SINCLAIR REFINING Co. (U.S.P. 1,994,969, 19.3.35. Appl., 18.2.32).—Gasoline is treated with aq. Na plumbite and the former separated and $> 0.006\%$ (0.001 – 0.006%) of S added. Gasoline, Pb compounds, and S are maintained in a quiescent state for > 5 hr. and the gasoline is then washed with H_2O . C. C.

Refining of hydrocarbon oils for removal of sulphur compounds. W. G. HAMILTON, R. G. FOLLIS, and H. P. McCORMICK, Assrs. to STANDARD OIL Co. OF CALIFORNIA (U.S.P. 1,993,140, 5.3.35. Appl., 3.1.30).—Hydrocarbon oils containing H_2S are treated with SO_2 (or dil. aq. SO_2 from wash H_2O after acid treatment of oils), whereby S is liberated. The hydrocarbon oil is then sweetened with Na plumbite, no additional S being required. C. C.

Treatment [refining] of petroleum. W. W. GARY, Assr. to C. O. MIDDLETON (U.S.P. 1,994,511, 19.3.35. Appl., 16.10.29).—Petroleum is refined by agitating at -4° or lower with liquid or gaseous SO_3 , which is introduced through an insulated nozzle into the pipe through which the oil passes into the agitating vessel. D. K. M.

Purification of oils. H. J. WOLLNER, Assr. to GEN. CHEM. Co. (U.S.P. 1,992,979, 5.3.35. Appl., 19.11.30).—Mineral, vegetable, and animal oils and fats are purified, decolorised, bleached, and clarified by active SiO_2 of low d , obtained by digesting acid-treated clay with hot alkali and pptg. the SiO_2 from the solution by adding $NaHCO_3$ or CO_2 and cooling. The gel obtained is washed with H_2O and dil. acid and dried. C. C.

Solvent recovery in oil refining. M. G. PAULUS, Assr. to STANDARD OIL Co. (U.S.P. 1,994,727, 19.3.35. Appl., 10.5.32).—In the purification of hydrocarbon oil by extraction with a solvent, e.g., $(C_2H_4Cl)_2O$, the solvent is removed from each fraction by stripping with a non-oxidising gas, e.g., natural gas, heated to 149 – 370° , H_2O being driven off in the first of a series of towers, and solvent in the remaining towers by further amounts of the hot gas. D. K. M.

Breaking of petroleum emulsions. C. H. M. ROBERTS, Assr. to TRETOLITE Co. (U.S.P. 1,978,227, 23.10.34. Appl., 3.8.33).—The emulsion is mixed with an oil-sol. demulsifying agent consisting of a mixture of a compound containing at least one polybasic CO_2H residue, e.g., phthalic or succinic, and at least one long-

chain (C_{10} – C_{26}) hydrocarbon residue derived from such substances as fatty, naphthenic, and resin acids, or sulphonated acids or alcohols, with the SO_2 extract of petroleum having d 0.9, b.p. 180 – 250° . A. R. P.

Breaking of petroleum emulsions. M. DE GROOTE, Assr. to TRETOLITE Co. (U.S.P. 1,994,758, 19.3.35. Appl., 31.5.34).— H_2O -in-petroleum oil emulsions are broken by treatment with 1 pt. in 500–30,000 of the product obtained by the non-oxidising sulphonation (at $< 35^\circ$ by H_2SO_4 or $ClSO_3H$) of certain terpenes (dipentene, turpentine, pine oil, lemon-oil terpenes) previously carefully polymerised (by, e.g., $AlCl_3$). The material may also be used as alkali, alkaline-earth, or (substituted) NH_4 salts, or as ester, and admixed with known demulsifying agents and/or solvents if required. E. J. B.

Manufacture of (A) water-in-oil, (B) aqueous emulsions. E. I. DU PONT DE NEMOURS & Co. (B.P. 440,575–6, [A, B] 2.7.34. U.S., 1.7.33).—(A) H_2O -insol. salts (prepared *in situ* of H sulphates (I) of n -primary alcohols having $< C_8$ (C_{12-18}), e.g., the Pb, Al, Ba, or Sn salts of dodecyl or cetyl H sulphates, are used for emulsification of mineral or vegetable oils. (B) (I) (free acid) is dissolved in the oil to be emulsified, and the product is shaken with an aq. solution of a metallic compound (e.g., NaOH) capable of forming a H_2O -sol. salt with (I). H. A. P.

Treatment of motor fuel. J. C. MORRELL and C. G. DRYER, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,993,941, 12.3.35. Appl., 7.7.33. Renewed 18.1.35).—Gum and colour formation, with consequent reduction in knock-rating of motor fuels, is prevented by addition of selected tar fractions, e.g., b.p. 200 – 300° (230 – 280°), obtained in the distillation of lignites. C. C.

[Antioxidants for] motor fuel. C. G. LUDEMAN, Assr. to TEXAS Co. (U.S.P. 1,994,891, 19.3.35. Appl., 3.10.32).—Naphthenyl derivatives of polyhydroxybenzenes, e.g., of pyrogallol, are added in 0.001 – 0.1 (0.005 – 0.025%) to cracked motor fuels to inhibit gum formation and discoloration. E. J. B.

Preparation of lubricating oils. RESINOUS PRODUCTS & CHEM. Co. (B.P. 440,916, 17.12.34. U.S., 20.12.33).—A halogenated paraffin hydrocarbon ($< C_{12}$, e.g., kerosene, paraffin wax, petrolatum, etc.) is condensed ($AlCl_3$) with an aromatic ether (e.g., diaryl ethers, aryl alkyl ethers, hydroaromatic aryl ethers, or bridged diaryl ethers). C. C.

Manufacture of lubricating oils. STANDARD OIL Co. (OHIO) (B.P. 441,705, 7.8.34. U.S., 21.3.34).—Lubricating oil stocks are extracted with SO_2 in admixture with a volatile org. solvent for constituents other than wax, e.g., aromatic hydrocarbons, Et_2O , etc. The mixture is cooled and the wax separated. C. C.

Manufacture of high-viscosity-index lubricating oil of low pour test. F. X. GOVERS, Assr. to INDIAN REFINING Co. (U.S.P. 1,995,147, 19.3.35. Appl., 9.3.33).—A wax-bearing fraction of mineral oil is mixed with a solvent mixture composed of $PhCHO$ and a modifying solvent, e.g., Pr^i_2O , Et_2O , C_6H_6 , $PhMe$, so that dissolution is complete at 38° and solid hydrocarbons may be separated on cooling to -18° . The mixture is further

chilled and filtered. One of the component solvents is evaporated from the filtrate until the mixture is of the appropriate composition to exert the desired solvent action on the oil. Two layers are formed containing oils of high and low η -index. The oil may be pretreated with a solvent containing PhCHO. C. C.

Separation of (A) non-lubricating, (B) lubricating, hydrocarbon oils, and (c) hydrocarbon oils [containing lubricating oils], into their components. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 441,104—5 and 441,136, 12.7.34. Holl., 15.7.33. Addns. [A, B] to B.P. 355,294; B., 1931, 954).—(A, B) The oils are separated into components by treatment with two solvents initially only slightly sol. and in which the components are sol. in different proportions. One solvent may be, *e.g.*, a saturated aliphatic hydrocarbon, \llcorner C₃, the b.p. of which is outside the boiling range of the material being treated. The other solvent should have a selective solvent action for non-paraffinic components, *e.g.*, liquid SO₂, furfuraldehyde, PhOH, cresols, ketones, etc. (c) The oils are extracted with two solvents, in countercurrent, which are mutually sol. and in which the components are sol. in different proportions. One solvent may be, *e.g.*, a saturated aliphatic hydrocarbon, \llcorner C₁₁, and the other a selective solvent, as in (A, B). The initial material or the solvents may be diluted with benzol, toluol, C₁₀H₈, or Et₂O.

C. C.

Means for testing lubricants. J. O. ALMEN, Assr. to GEN. MOTORS CORP. (U.S.P. 2,001,861, 21.5.35. Appl., 17.2.33).—The load on and frictional torque between a bearing and a rotating arbor are measured. B. M. V.

[Double-walled] incandescence gas mantles. W. HEAP, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 441,009, 6.7.34).

Exhaust-gas analyser. J. D. MORGAN, Assr. to DOHERTY RES. CO. (U.S.P. 2,006,205, 25.6.35. Appl., 16.9.30).

Production of asphalt. J. C. MORRELL, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 2,004,210, 11.6.35. Appl., 25.11.29).

Hydrocarbon oil conversion. (A) C. W. LUTON and J. BEDDOW, (B) E. F. NELSON, Assrs. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 2,000,399 and 2,001,150, [A] 7.5.35, [B] 14.5.35. Appl., [A] 7.8.30, [B] 9.5.28).

Conversion of hydrocarbon oils. G. B. MURPHY, Assr. to ATLANTIC REFINING CO. (U.S.P. 2,000,186, 7.5.35. Appl., 9.4.29). L. DE FLOREZ, Assr. to TEXAS CO. (U.S.P. 2,001,301, 14.5.35. Appl., 31.8.32). J. W. THROCKMORTON, Assr. to GYRO PROCESS CO. (U.S.P. 2,002,160, 21.5.35. Appl., 2.9.33).

Treatment [conversion] of hydrocarbon oils. R. J. McRAE, Assr. to RADIAL HYDROCARBON PROCESSES, INC. (U.S.P. 2,001,741, 21.5.35. Appl., 29.10.28).

Treatment [cracking] of hydrocarbons. C. P. DUBBS, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 2,001,187, 14.5.35. Appl., 22.1.32).

Conversion process [for hydrocarbon oils]. V. VOORHEES, Assr. to STANDARD OIL CO. (U.S.P. 2,005,118, 18.6.35. Appl., 14.2.30).

Conversion or cracking of high-boiling hydrocarbon oils into low-boiling hydrocarbon oils. J. D. SEGUY, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 2,004,223, 11.6.35. Appl., 24.7.30. Renewed 8.2.34).

Oil-cracking apparatus. F. M. PYZEL, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 2,004,217, 11.6.35. Appl., 11.8.28. Renewed 16.9.32).

Cracking of hydrocarbon oils. H. L. PELZER, Assr. to SINCLAIR REFINING CO. (U.S.P. 2,001,313—4, 14.5.35. Appl., [A] 19.2.29, [B] 27.2.31). J. B. HEID, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 2,003,536—7, 4.6.35. Appl., [A] 26.11.30, [B] 18.12.31). F. W. HALL and H. A. SMITH, Assrs. to TEXAS CO. (U.S.P. 2,005,675, 18.6.35. Appl., 27.4.31).

Cracking [of hydrocarbon oils]. H. SYDNOR, Assr. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 2,006,188, 25.6.35. Appl., 6.12.29).

Recycling of cracking [hydrocarbon] oil. F. H. EDSON, Assr. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 2,002,530, 28.5.35. Appl., 29.4.31).

Return-bend fitting for oil stills. C. E. ARD, Assr. to F. C. FANTZ (U.S.P. 2,005,768, 25.6.35. Appl., 25.1.33. Renewed 7.12.34).

Apparatus for fractionating hydrocarbon oil vapour. F. W. HALL, Assr. to TEXAS CO. (U.S.P. 2,005,316, 18.6.35. Appl., 15.6.32).

Extraction process [for hydrocarbon oil mixture]. D. R. MERRILL and P. SUBKOW, Assrs. to UNION OIL CO. OF CALIFORNIA (U.S.P. 2,002,702, 28.5.35. Appl., 24.10.32).

Continuous pressure distillation [of hydrocarbon oils]. O. C. BREWSTER, M. G. PAULUS, and A. E. THOMPSON, Assrs. to STANDARD OIL CO. (U.S.P. 2,000,687, 7.5.35. Appl., 21.7.30).

Distillation [of petroleum]. J. PERL (U.S.P. 2,003,306, 4.6.35. Appl., 26.10.29).

Condensation of petroleum fractions. G. B. COUBROUGH, Assr. to LUMMUS CO. (U.S.P. 2,002,731, 28.5.35. Appl., 20.3.33).

Continuously using clay in treating [hydrocarbon oils] tower systems. R. K. STRATFORD and C. LEAVER, Assrs. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 2,000,672, 7.5.35. Appl., 16.1.31).

Treatment of heavy oils. A. JOSEPH, Assr. to HOUDRY PROCESS CORP. (U.S.P. 2,000,960, 14.5.35. Appl., 11.12.30. Fr., 14.11.30).

Apparatus for treatment of hydrocarbon oils. W. F. SIMS and V. U. CLOER, Assrs. to PANHANDLE REFINING CO. (U.S.P., 2,003,724, 4.6.35. Appl., 4.3.31).

Treatment of hydrocarbon oils. J. D. SEGUY, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 2,001,159, 14.5.35. Appl., 16.8.30). L. DE FLOREZ, Assr. to TEXAS CO. (U.S.P. 2,003,137, 28.5.35. Appl., 2.2.31). W. M. STRATFORD, Assr. to TEXAS CO. (U.S.P. 2,003,776, 4.6.35. Appl., 12.2.31). J. G. ALTHER, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 2,005,527, 18.6.35. Appl., 19.12.31).

Treatment of petroleum oil. C. P. DUBBS, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 2,004,196, 11.6.35. Appl., 31.7.22. Renewed 11.7.34).

Settling [the constituents of a petroleum mixture]. J. T. WORTHINGTON, Assr. to PETROLEUM RECTIFYING CO. OF CALIFORNIA (U.S.P. 2,001,809, 21.5.35. Appl., 19.4.32).

Recovery of stable gasoline from natural gas. E. R. COX, Assr. to TEXAS CO. (U.S.P. 2,002,340, 21.5.35. Appl., 30.9.30).

Storage of volatile hydrocarbons, particularly butanes. W. G. WHITMAN, Assr. to STANDARD OIL CO. (U.S.P. 2,001,996, 21.5.35. Appl., 23.11.31).

Dewaxing of oils. J. W. WEIR, Assr. to TEXAS CO. (U.S.P. 2,005,062, 18.6.35. Appl., 26.7.28).

Filtration of [paraffin] wax from oil. F. X. GOVERS, Assr. to INDIAN REFINING CO. (U.S.P. 2,003,664, 4.6.35. Appl., 11.1.32).

Anti-freezing agent for motors. Drying coal etc.—See I. C_2H_2 . **Emulsions. Thio-ethers from mercaptans. N bases as antiknocks. Octylphenols.**—See III. **Gas mantles. Utilising "floating soap."**—See V. **Plumbite solution. H_2 from gases.**—See VII. **Gas detector. Separating particles from liquids [oils]. Treating emulsions.**—See XI. **Grease.**—See XII. **Alcohol denaturants.**—See XVIII. **Disinfectant**—See XXIII.

III.—ORGANIC INTERMEDIATES.

Determination of butyric acid in commercial acetic acids. L. KLINC (Ann. Chim. Analyt., 1936, [iii], 18, 6—9; cf. A., 1934, 1331).—Synthetic, and pure pyroligneous AcOH other than that of Yugo-Slavian origin, are free from Pr^oOH . R. S.

Determination of phthalic acid as potassium phthalate. C. P. A. KAPPELMEIER (Farben-Ztg., 1936, 41, 161).—The author's methods (cf. B., 1935, 1151) for the detection and determination of phthalic acid are upheld against Ruff and Krynicki (cf. B., 1936, 229). F. R. G.

Enrichment of crude anthracene in centrifuges. L. V. UDOVITSCHENKO (Koks i Chim., 1935, No. 10, 60—61).—Crude anthracene is enriched from 11.2% to 23.7% by boiling with an equal quantity of H_2O for 20 min., centrifuging for 10 min., washing with hot H_2O until the washings contain no more oils as shown by their transparency, and further drying in the centrifuge for 20 min. D. R. H.

Chromatographic adsorption of intermediates.—See IV. **Refining glycerin. Wetting etc. agents.**—See XII.

See also A., Feb., 187, **Synthesis of $\alpha\beta$ -dichlorobutadiene. *l*-sec-BuOH in fermentation ProOH. Prep. of β -alkoxybutadienes. 194, Prep. of ethyleneimine. Formation of amides from nitriles. Prep. of guanidine nitrate. 195, Separation of guanidine and methylguanidine. Prep. of Mg dialkyl compounds. Prep. of partly deuterated benzenes. 199, Action of dil. alkali on diazo compounds. 203, Synthesis of phenanthrene and hydrophenanthrene derivatives. 247, Fermentation lactic acid.**

PATENTS.

Manufacture of acetylene. H. DREYFUS (B.P. 440,432, 28.6.34).— CH_4 , and/or higher hydrocarbons

previously cracked or preheated to 800—1000°, is/are passed rapidly through an annular space [thickness < 1 ($\frac{1}{8}$) in., diam. < 3 ($\frac{1}{4}$) in.] heated on both sides at > 1200° (1400—1550°) so that the gas is in the reaction zone for 0.05—0.01 sec. Hydrogenation or dehydrogenation catalysts may be used, and the partial pressure is preferably adjusted to < 1 atm. by addition of diluents (N_2 , H_2 , CO_2 , H_2O). The products are quickly cooled and the C_2H_2 is separated or utilised in known manner. C_2H_4 , if treated, requires only 1000—1200° in the process claimed. E. J. B.

Manufacture of alcohols containing more than four carbon atoms. CHEM. WORKS, FORMERLY SANDOZ (B.P. 440,934, 5.7.35. Switz., 7.7.34).—Saturated or unsaturated aliphatic carboxylic acids (including those containing a cycloaliphatic radical) > C_4 , or their esters, are reduced by H_2 at 50—400 (150—500) atm. and 150—400° (250—350°). The catalysts, e.g., heavy metals and their oxides, are activated by 0.1—10% of Fe (or compounds of Fe containing > 10% of Fe). The corresponding alcohols are obtained pure and in good yield. Examples include the prep. of cetyl and lauryl alcohols. E. J. B.

Production of pentaerythritol. LONZA ELEKTRIZITÄTSWERKE U. CHEM. FABR. A.-G. (B.P. 440,691, 5.2.35. Switz., 14.2.34).—Cryst. pentaerythritol (I) is obtained by slowly cooling the aq. solutions of (I) produced by alkaline $[Ca(OH)_2]$ condensation of CH_2O and $MeCHO$, after removal of inorg. matter (pptn.), neutralisation, and evaporation. This is washed (several times or continuously) with a scouring action to remove adhering impurities (dipentaerythritol) and separated by levigation or sieving. Mother-liquors or org. non-solvents for (I) are used for the purpose, (I) being obtained < 95% pure, m.p. < 240°. E. J. B.

Preparation of esters of polybasic acids. E. F. IZARD, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,993,552, 5.3.35. Appl., 14.2.33).—The higher alcohols (I) obtained in the catalytic hydrogenation of C oxides, after removal of the fraction of b.p. < 90°, are esterified with polybasic acids [$o-C_6H_4(CO_2H)_2$] by boiling with the lower alkyl (Me) esters of the latter. The more reactive part of (I) displaces the lower alcohol, which distils off during the reaction. Mildly alkaline catalysts (e.g., the oxide of Sn, Ce, Zn, Cu, Al, Ag, and particularly Pb) are used. The products are filtered and separated by distillation, the incompletely reacted portions being re-treated. The process is also applicable to some monobasic acids. E. J. B.

Manufacture and use of organic esters. BRIT. CELANESE, LTD. (B.P. 440,962, 9.7.34. U.S., 12.7.33).—Acyclic formals of di- or poly-hydric alcohols are esterified with org. acids, e.g., $CH_2(O \cdot C_2H_4 \cdot O \cdot C_2H_4 \cdot OH)_2$ with $o-C_6H_4(CO_2H)_2$. The products are solvents and plasticisers for esters or ethers of cellulose. A. W. B.

Esters of glycol ethers and compositions containing them. CARBIDE & CARBON CHEMICALS CORP., Assees. of H. L. COX and T. F. CARRUTHERS (B.P. 440,986, 16.4.35. U.S., 4.5.34).—1 mol. of a monoalkyl (> C_2) ether of a glycol is esterified by heating with slightly < 1 mol. of $o-OH \cdot C_6H_4 \cdot CO_2H$ for some hr., catalysed by H_2SO_4 . H_2O is removed with C_6H_6 during the reaction

in known manner, and the product neutralised, washed, and distilled in vac. *E.g.*, $\text{OH}\cdot[\text{CH}_2]_2\cdot\text{OBU}$ and $\text{O}[\text{C}_2\text{H}_4\cdot\text{OH}]_2\cdot\text{Bu}$ ether yield, respectively, *butoxy-*, b.p. 159–163°/8–10 mm., and *butoxyethoxy-ethyl salicylate*, b.p. 175°/3 mm. The materials are useful as plasticisers and solvents for resins etc. E. J. B.

Stabilisation of polymerisation products. I. G. FARBENIND. A.-G. (B.P. 440,957, 13.6.34. Addn. to B.P. 418,230; B., 1935, 13).—Elimination of HCl from polymerised halogenated dienes (*e.g.*, β -chlorobutadiene) is inhibited by derivatives of $(\text{CH}_2)_2\text{O}$ of high b.p., *e.g.*, the alkyl or aryl ethers of glycide, glycidic acid and its esters (0.5–4%). H. A. P.

Production of thio-ethers from mercaptans. W. SEAMAN, ASSR. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,993,287, 5.3.35. Appl., 29.12.31).—Mercaptan (I) (*e.g.*, the mixtures obtained from petroleum) vapour is passed over the sulphide of P or Mo (at 150–210°) or, better, of Cd or Zn (300–500°), at ≤ 1 (5–50) atm. Symmetrical or mixed thio-ethers are produced [depending on the constitution of (I)]. Low contact speeds are used, and unchanged material is recycled. E. J. B.

[Carboxylic] acid synthesis. A. T. LARSON, ASSR. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,994,955, 19.3.35. Appl., 14.1.33).—In the vapour-phase production of aliphatic acids from an olefine (I), steam, and CO, catalysed by an acid (HCl), corrosion, polymerisation of the (I), and inactivation of the catalyst etc. are substantially eliminated by the preliminary removal of O_2 from the reactants. *E.g.*, they are passed through a solution of an anthraquinone-2-sulphonate (Na salt), $\text{Na}_2\text{S}_2\text{O}_4$, and 30% aq. NaOH. E. J. B.

Separation of formic acid from other fatty acids. H. E. BUC, ASSR. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,993,259, 5.3.35. Appl., 2.11.29).—The HCO_2H present is selectively neutralised with an amount of alkali (CaO , Na_2CO_3) slightly $>$ that theoretically equiv. to the HCO_2H , and yields preferentially a substantially insol. formate, which is separated. Org. non-solvents (hydrocarbons) for the latter may be used. E. J. B.

Production of aliphatic carboxylic acids. A. T. LARSON, ASSR. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,993,555, 5.3.35. Appl., 15.11.32).—A halogenated aliphatic hydrocarbon (I) is passed with excess of steam and CO, and preferably a halogen (II) or volatile (H) halide, over an absorbent catalyst, *e.g.*, active C, SiO_2 gel, which may be activated by a metal halide, at 275–375°/25–900 atm. The corresponding carboxylic acid predominates in the product. *E.g.*, CO 95, EtCl 5, and H_2O 25 pts. are treated at 325°/700 atm. to yield chiefly EtCO_2H . A hydrocarbon and a slight excess of (II) may be used instead of (I), and the (exothermic) reaction can be controlled by inert gaseous diluents. E. J. B.

Chlorination of propionic acid. S. L. BASS and W. L. BURLEW, ASSRS. to DOW CHEM. CO. (U.S.P. 1,993,713, 5.3.35. Appl., 19.1.33).— EtCO_2H is monochlorinated by passing 75–120 (80–90) mols.-% of Cl_2 into it at 50–140° (80–100°) with stirring, and preferably in actinic light. The mixture must contain 0.02–0.1 mol. of an acyl halide (I), *e.g.*, AcCl , BzCl , and no auxiliary halogenation catalysts capable of forming

intermediate additive compounds with (I), as these yield α -substitution compounds only. The (I) is finally decomposed with H_2O if desired, and the mixed α - and β - $\text{C}_2\text{H}_4\text{Cl}\cdot\text{CO}_2\text{H}$ are separated by distillation in vac., freezing, and crystallisation of the β -isomeride which predominates. The forerunnings are returned to the chlorinator. E. J. B.

Production of methacrylamide, methacrylic acid, and derivatives thereof. J. W. C. CRAWFORD, J. McGRATH, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 440,967, 9.7.34).—Crude $\text{OH}\cdot\text{CMe}_2\cdot\text{CN}$ (cf. B.P. 405,699 and 427,810; B., 1934, 313; 1935, 620) is mixed with ≤ 1 mol. of H_2SO_4 at 100–110° and subsequently heated for $\frac{1}{2}$ –1 hr. at 100–140° in presence of antipolymerising agents, *e.g.*, Cu, S, $m\text{-C}_6\text{H}_4(\text{OH})_2$, tannic acid. The $\text{CH}_2\cdot\text{CMe}\cdot\text{CO}\cdot\text{NH}_2$ (I) formed can be separated by crystallisation with or without previous neutralisation of the acid, *e.g.*, by CaCO_3 . $\text{CH}_2\cdot\text{CMe}\cdot\text{CO}_2\text{H}$ is obtained by heating the reaction product at 130° with 3–5 mols. of H_2O for 1–2 hr., or its metal salts may be prepared by boiling the crude (I), obtained after pptn. of H_2SO_4 , with alkali or alkaline-earth hydroxides. E. J. B.

Preparation of higher lactones containing at least 11 carbon atoms in the lactone ring. W. W. TRIGGS. From SOC. ANON. M. NAEF & Co. (B.P. 440,416, 21.6.34).— ω -OH-acids having a n -chain of $\leq \text{C}_{10}$ or their halides are made to eliminate H_2O or H halide, respectively, under conditions of high dilution. *E.g.*, ξ -hydroxypentadecic acid (I) is heated at the b.p. with SOCl_2 in C_6H_6 ; the lactone, b.p. 125–130°/0.35 mm., is obtained in a yield of 50% of theory: the reaction may also be carried out in presence of a *tert*-amine, *e.g.*, NPhMe_2 . Cyclisation may also be effected by means of PhSO_3H or $\text{C}_6\text{H}_4\text{Me}\cdot\text{SO}_3\text{H}$ in C_6H_6 , or by extremely slow passage of the formate of (I) over TiO_2 at 200–300°/vac. The lactone, b.p. 186–190°/15 mm., of α -hydroxy- Δ^5 -hexadecenoic acid is described. H. A. P.

Conversion of unsaturated [hydr]oxy-compounds into aldehydes, ketones, or substituted derivatives thereof. N.V. DE BATAAFSCHE PETROLEUM MAATS., ASSEES. of H. P. A. GROLL and G. HEARNE (B.P. 440,154, 12.4.35. U.S., 23.4.34).—The rearrangement by acid-reacting substances of compounds containing the group $>\text{C}:\text{C}(\text{OH})$, or their ethers, esters, or β -halogeno-derivatives, is claimed (in the last case, H halide is eliminated). The process is carried out in an org. solvent which may contain H_2O if an ester or ether is used. *E.g.*, *sec*-*iso*Pentenol is converted by H_2SO_4 in glacial AcOH into COMePr^{β} . Other examples are the conversion of $\text{Bu}^{\beta}\text{OH}$, its acetate, or *disobutenyl* ether into $\text{Pr}^{\beta}\text{CHO}$, and of $\text{CH}_2\cdot\text{C}(\text{CH}_2\text{Cl})\cdot\text{CH}_2\cdot\text{OH}$ into α -methylacetaldehyde. H. A. P.

Production of oxygenated nonadecyl compounds. CARBIDE & CARBON CHEMICALS CORP., ASSEES. of J. N. WICKERT (B.P. 440,539, 4.5.35. U.S., 9.5.34).— β -Ethylhexaldehyde (I) is condensed with Me γ -ethyl- Δ^5 -heptenyl ketone (II) in MeOH + KOH at 30–50°. The product, probably *di*- γ -ethyl- Δ^5 -heptenyl ketone (III), b.p. 169–173°/6 mm., is reduced by Ni- H_2 at 150°/900 lb. per sq. in. to *di*- γ -ethylheptenylcarbinol, b.p. 331°. This

is converted by conc. H_2SO_4 or ClSO_3H into its *H sulphate*, which forms H_2O -sol. Na, Ca, and Mg salts of use as detergents, wetting and emulsifying agents, and general textile assistants. In the prep. of (III), (II) may be formed *in situ* by condensation of (I) with COMe_2 .

H. A. P.

Production of nitrogen bases for use as anti-knock compounds. G. EGLOFF and R. E. SCHAAD, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,994,243, 12.3.35. Appl., 14.1.28).— NH_2Ph , $p\text{-C}_6\text{H}_4\text{Me}\cdot\text{NH}_2$, etc., obtained by passing C_6H_6 , PhMe, etc. with NH_3 at approx. $537^\circ/20$ atm. over active C, are claimed.

E. J. B.

Manufacture of 1:2-diaminobenzene. Soc. CHEM. IND. IN BASLE (B.P. 440,697, 4.4.35. Switz., 12.4.34).— $o\text{-C}_6\text{H}_4(\text{NH}_2)_2$ (I) is prepared by heating (10–20 hr.) $o\text{-C}_6\text{H}_4\text{Cl}_2$ or $o\text{-C}_6\text{H}_4\text{Cl}\cdot\text{NH}_2$ to approx. 150° with aq. NH_3 , a Cu salt, and sufficient metallic Cu to ensure its presence throughout the reaction, a pressure of ≤ 80 atm. being maintained by pumping in sufficient NH_3 at the commencement of, or during, the reaction. The complex salt of Cu and (I) separates, the latter being liberated by Na_2S or H_2S and NaOH and purified by distillation *in vac.*

E. J. B.

(A) [**N-Alkylation of aromatic amines.** **N-Alkylation of aromatic amines of the benzene and naphthalene series.** P. W. CARLETON and J. D. WOODWARD, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,994,851–2, 19.3.35. Appl., [A] 12.12.31, [B] 9.3.32).—1 mol. of a primary aromatic amine (I) is N-alkylated by heating for approx. 5 hr. at ≤ 1000 (10–100) atm. and at a temp. sufficiently low to avoid ring-alkylation [*e.g.*, (A) $130\text{--}190^\circ$, (B) $160\text{--}190^\circ$] with (A) an excess (4 mols.) of an alcohol $> \text{C}_1$ and $0.6\text{--}1.0$ mol. of the corresponding alkyl chloride, (B) with ≤ 1 mol. of an alkyl alcohol ($\leq \text{C}_2$) and < 1 ($0.6\text{--}0.9$) mol. of HCl, preferably in solution in the latter. The ratio of mono- to di-alkylamine formed is chiefly controlled by the proportion of (A) alkyl chloride or (B) HCl used. $< 1\%$ of (I) remains unchanged and side-reactions are inhibited in either case. In (A) (I) is non-phenolic.

E. J. B.

Manufacture of 4-nitrosodiphenylamine derivatives. I. G. FARBENIND. A.-G. (B.P. 440,344, 25.6.34. Ger., 24.6.33).—A 3-alkoxydiphenylamine unsubstituted in the 4-position is treated with HNO_2 , NOCl, or $\text{NO}\cdot\text{HSO}_4$ in H_2SO_4 containing $\geq 25\%$ of H_2O . Examples include the prep. of 4-nitroso-3-methoxy-, m.p. $153\text{--}154^\circ$, -3-ethoxy-, m.p. $126\text{--}127^\circ$, -3:4'-dimethoxy-, m.p. $146\text{--}147^\circ$, -3-cyclohexyloxy-, m.p. $140\text{--}141^\circ$, -3-isopropoxy-, m.p. $145\text{--}146^\circ$, -3-methoxy-2'-, m.p. $164\text{--}165^\circ$, and -3'-methyl-, m.p. $180\text{--}181^\circ$, -3-methoxy-2':5'-dimethyl-, m.p. $145\text{--}146^\circ$, and -3-ethoxy-4'-methyl-diphenylamine, m.p. $156\text{--}157^\circ$, and 3'-chloro-, m.p. $184\text{--}185^\circ$, and 3':4'-dichloro-4-nitroso-3-methoxydiphenylamine, m.p. $195\text{--}196^\circ$.

H. A. P.

Manufacture of solid diazonium salts. I. G. FARBENIND. A.-G. (B.P. 440,964, 9.7.34. Ger., 7.7.33).—The mineral acid diazonium salts (I) from halogenated $p\text{-NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{OPh}$ are obtained in solid form by salting out aq. solutions thereof with salts which do not yield double salts with (I), *e.g.*, Na_2SO_4 , NaCl, NaBr, NaNO_3 . Examples include 2- and 4'-chloro-, 2:2':5'-trichloro-

and 3-chloro-6-methyl derivatives. The products are sufficiently stable for marketing in solid form. A. W. B.

Manufacture of stable diazo-salt preparations. I. G. FARBENIND. A.-G. (B.P. 441,085, 13.7.34. Ger., 13.7.33).—Di- and poly-halogenoanilines, nitroanilines, dihalogeno-toluidines and -aminophenyl ethers, 2-halogeno-*p*- and 6-halogeno-*o*-toluidines, 5-chloro-2-alkoxy- or -aryloxy-anilines, 4- or 5-halogeno-2-nitro-, 4-chloro-3-nitro-, and 2-chloro-4-nitro-anilines, 4- and 5-nitro-*o*-toluidine, and 4-nitro-2-amino- or 3-nitro-4-amino-phenyl ethers are diazotised ($\text{NO}\cdot\text{HSO}_4$) in H_2SO_4 of $\leq 75\%$ concn., and the resulting solution is poured into an org. liquid (lower alcohols and ketones) miscible with H_2SO_4 . The pptd. diazonium H sulphate thus obtained is mixed with sufficient of a mild alkaline agent (Na_2CO_3) to give a neutral product and any desired adjuvant or diluent. *o*-Chloro-, 2:5-dichloro-, and *o*-nitro-benzenediazonium H sulphates are described.

H. A. P.

Manufacture of octylphenols and ethers thereof. RÖHM & HAAS Co. (B.P. 440,910, 31.10.34. U.S., 14.11.33).—Phenols having a free *o*- or *p*-position, or ethers thereof, are treated, in presence of conc. H_2SO_4 , with mixed octylenes, of b.p. $106\text{--}123^\circ$, obtained by polymerisation of mixed butylenes from cracked petroleum distillates.

A. W. B.

Manufacture of condensation products. I. G. FARBENIND. A.-G. (B.P. 441,016, 10.7.34. Ger., 12.7., 15.11., and 21.11.33).—A saturated aliphatic or cycloaliphatic hydrocarbon or an aromatic compound having a saturated side chain is condensed with an $\alpha\beta$ -unsaturated acid anhydride, or a substance convertible into such under the conditions of reaction, in absence of a catalyst of Friedel-Crafts type. *E.g.*, PhEt (excess) when heated with maleic anhydride (I) and Cu-bronze at $270\text{--}280^\circ/9\text{--}10$ atm. gives (after hydrolysis) an acid [(II)?], $\text{C}_{12}\text{H}_{14}\text{O}_4$, m.p. $157\text{--}158^\circ$; use of maleic or fumaric acid at $300\text{--}310^\circ/40$ atm. gives α -phenylethylsuccinic acid (II), m.p. $148\text{--}151^\circ$. $(\text{CH}_2\text{Ph})_2\text{O}$ and (I) in a Cu-lined autoclave at $285\text{--}290^\circ/40$ atm. give benzylsuccinic acid, m.p. $160\text{--}161^\circ$, and PhCHO. Other examples describe products from (I) and *n*-heptane, cyclohexane, and decahydronaphthalene.

H. A. P.

Manufacture of nitriles. IMPERIAL CHEM. INDUSTRIES, LTD., J. S. H. DAVIES, and W. O. JONES (B.P. 441,399, 20.7.34).— $o\text{-C}_6\text{H}_4(\text{CO}\cdot\text{NH}_2)_2$ and derivatives thereof, *e.g.*, 4:5-dichloro- and 3-nitro-phthalimide, are treated with COCl_2 , *e.g.*, at $60\text{--}86^\circ$, in presence of a liquid *tert.* aromatic or heterocyclic base, *e.g.*, NPhMe₂, $\text{C}_6\text{H}_5\text{N}$. Examples include preps. of 3-nitro- and 4:5-dichloro-phthalonitrile, m.p. 178° .

A. W. B.

Manufacture of naphthalene derivatives. IMPERIAL CHEM. INDUSTRIES, LTD., M. WYLER, and A. KERSHAW (B.P. 440,733, 5.7.34).—Acenaphthene-5-carboxyethylanilide and -5:6-bis-carboxyethylanilide (cf. B.P. 432,885; B., 1935, 940) are oxidised by $\text{Na}_2\text{Cr}_2\text{O}_7$ in glacial AcOH to 1:8-dicarboxynaphthalene-4-carboxyethylanilide (*anhydride*) and -4:5-bis-carboxyethylanilide (*anhydride*, m.p. 206°).

H. A. P.

Manufacture of N-substitution products of 1:4-diaminoanthraquinones. I. G. FARBENIND. A.-G. (B.P. 441,043, 15.9.34. Addn. to B.P. 434,906; B.,

1935, 1134).—A leuco-1-amino-4-hydroxy- or -4-alkoxy-anthraquinone which may have further OH or NH₂ in the 5 or 5:8 positions is condensed with a mixture of two amines (< 1 equiv. of each) free from salt-forming groups, and the product is oxidised. *E.g.*, interaction of leuco-1-amino-4-hydroxyanthraquinone with NH₂Me and NH₂Bu^a in MeOH at 60–70° and oxidation (air) of the product gives 1-methylamino-4-*n*-butylamino-anthraquinone; similarly, leuco-1-amino-4-methoxy-anthraquinone, NH₂Me, and NH₂·C₂H₄·OH give 1-methylamino-4-β-hydroxyethylaminoanthraquinone.

H. A. P.

Manufacture of ketones of anthracene series. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 440,263, 18.6. and 13.9.34).—The condensation product of a β- or *Bz*-carboxylic chloride of the anthracene series with a metal derivative of a malonic or acylacetic ester is hydrolysed. *E.g.*, the *Na* compound from anthraquinonyl-2-carboxylic chloride, CH₂Ac·CO₂Et, and NaOMe is heated with 78% H₂SO₄ at 90–95°; 2-anthraquinonyl Me ketone is formed. Hydrolysis of the corresponding 3-*Cl*-derivative by stages to *Et* 3-chloro-2-anthraquinonylacetate, m.p. 140–142° (5% NaOH + Na₂S₂O₄), the free acid (HSO₄Me at 60–65°), and the ketone, m.p. 154–156°, is described; 1:4-dichloro-2-anthraquinonyl Me ketone, similarly prepared, has m.p. 182–183°. Other examples describe the prep. of *Bz*1-benzanthronyl, m.p. 174–175°, 2-anthranyl, 3-chloro-2-anthranyl, and 2-thiazoleanthranyl Me ketone, and the use as starting materials of Ca and Mg derivatives.

H. A. P.

Manufacture of intermediates for azo dyes. E. I. DU PONT DE NEMOURS & Co. (B.P. 441,079, 12.7.34. U.S., 12.7.33).—See U.S.P. 1,985,601; B., 1935, 1085.

S [compounds] from benzol. Emulsions.—See II. **Mercerising.**—See VI. **Alkali alkoxides.**—See VII. **Pb-Na alloy for Pb alkyls.**—See X. **Cleansing agents.**—See XII. **Fe oxide pigment.**—See XIII. ***n*-BuOH and COMe₂.** **Alcohol denaturant.**—See XVIII.

IV.—DYESTUFFS.

Chromatographic adsorption of coal-tar dyes and intermediate products. II. **Derivatives of α- and β-naphthol.** P. RUGGLI and P. JENSEN (Helv. Chim. Acta, 1936, 19, 64–68; cf. B., 1935, 586).—The dyes from β-C₁₀H₇·OH with *p*-NH₂·C₆H₄·SO₃H and from 1:4-NH₂·C₁₀H₆·SO₃H with *m*-NH₂·C₆H₄·SO₃H, respectively, are more strongly adsorbed by Al₂O₃ activated by tap-H₂O than are the corresponding compounds from α-C₁₀H₇·OH; the respective pairs are separable in this manner. The behaviour of 1:2-OH·C₁₀H₆·N₂·C₆H₄·SO₃Na shows that the position of the point of coupling has in these cases the predominating influence, but the comparative behaviour of 1:4- and 2:4-OH·C₁₀H₆·SO₃Na proves the favouring action of the 2-OH on adsorption. The possibility of base exchange at the surface of the adsorbent is excluded. The observations apply only to solutions in H₂O, and quite dissimilar results are obtained with the compounds corresponding to the dyes after removal of SO₃H in C₆H₆, xylene, and, particularly, in quinoline. H. W.

Preparation of azo pigments derived from nitroanilines. U. PELAGATTI and G. RICCI (Annali Chim. Appl., 1935, 25, 603–609).—*o*-, *m*-, and *p*-Nitroaniline, 2-nitro-*p*-toluidine, and 4:2- and 2:4-chloronitroaniline, diazotised in H₂SO₄ at 40–45°, couple at 40° in acid solution with a fine suspension of β-C₁₀H₇·OH to form azo dyes chemically identical with those obtained in alkaline solution, but having larger particle size and less intense colour (with the exception of the products from *p*-nitro- and 2-chloro-4-nitro-aniline, in which the reverse is the case). The shade of colour is also slightly different. The acid process has the technical advantage that ice is not needed. E. W. W.

Insoluble dyestuffs. P. M. HEERTJES (Chem. Weekblad, 1936, 33, 115–120).—A lecture on indigoid, thioindigoid, anthraquinone vat, S, and azoic dyestuffs. S. C.

See also A., Feb., 206, **Benzanthrone vat dyes.** 209, **Indigoid dyes.**

PATENTS.

Manufacture and application of soluble azo dyes. IMPERIAL CHEM. INDUSTRIES, LTD., and A. H. KNIGHT (B.P. 437,516, 25.4.34).—The sulphuric ester of a *p*-coupling *N*-alkyl-*N*-polyethenoxyalkylaniline, the alkyl being Me, Et, Pr, or Bu, and the polyethenoxyalkyl containing 1–4 ·CH₂·CH₂·O· groups, is coupled with a diazotised *p*-nitroaniline, both components being free from CO₂H and nuclear SO₃H. Examples are: *p*-NH₂·C₆H₄·NO₂ → sulphuric ester of the product from NHPH₂Et and 3 equivs. of (CH₂)₂O (I) (red on wool, silk, or leather); 6-chloro-2:4-dinitroaniline → sulphuric ester of the product from *N*-β-hydroxyethyl-*N*-*n*-butylcresidine and 2 equivs. of (I) (reddish-blue). C. H.

Manufacture of azo dyes. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 440,112–3, [A] 20.6.34, [B] 20.6.34 and 9.1.35).—(A) Grey to black wool dyes are obtained by coupling a diazotised amine having a metal-complex-forming group and < 1 solubilising group with a 2-keto- or 2-thio-8-hydroxy-1:3-naphth-iminazole or -oxazole. Examples are the dyes: 2:1:4:6- or 2:1:6:4-NH₂·C₆H₂(OH)(NO₂)·SO₃H or 2:4:1:6-NH₂·C₆H₂Cl(OH)·SO₃H → 8-hydroxynaphthoxazole; other coupling components are the cyclic urea and thiourea from 1:2:7-(NH₂)₂C₁₀H₅·OH and COCl₂ or CSCl₂. The products may be after-chromed on the fibre or converted into metal derivatives in substance. (B) A diazotised 2-aminothiazole (S = 1) is coupled with an arylamine in the *p*-position to give dyes for acetate rayon. Examples are the dyes 1-amino-4-methoxybenzthiazole → ββ'-dihydroxydiethyl-aniline (I) (red), and -*m*-toluidine (pink), 5-β-hydroxyethylamino-α-naphthol (blue), 3-hydroxy- (red-blue) or 3:7-dihydroxy-tetrahydro-α-naphthaquinoline (II) (blue-green), 1-phenylpiperazine (red), 3-hydroxy-7-methyl-1-butyltetrahydroquinoline (red-violet), and the 1-β-hydroxyethyl derivative of (II) (blue-green); 1-amino-6-methylbenzthiazole → (I) (yellow-red), 1-aminobenzthiazole → 3:1:4-NH₂·C₆H₃Me·OMe (blue), and the thiazole from tetrahydro-β-naphthylthiocarbamide → NPhMe·C₂H₄·OH (blue-red). H. A. P.

Manufacture of water-insoluble azo dyes. I. G. FARBENIND. A.-G. (B.P. 440,207, 23.6.34 Ger., 23.6.33).

—Diazotised 3-nitro-4-aminobenzotrifluoride (I) is coupled with β -C₁₀H₇·OH (II), an acylacetic arylamide, or a pyrazolone, both components being free from CO₂H or SO₃H. Examples are the pigments (I) → (II) (orange-red), → CH₂Ac·CO·NHPh (yellow), and → 1-phenyl-3-methyl-5-pyrazolone (orange). Fastness to light and oils is claimed. (I), m.p. 109–110°, is prepared by heating 1 : 4 : 3-CF₃·C₆H₄Cl·NO₂ with NH₃ in EtOH at 110–120°.

H. A. P.

Manufacture of disazo dyes. J. R. GEIGY A.-G. (B.P. 440,698, 5.4.35. Ger., 12.4.34).—Oil- and spirit-sol. dyes of good light-fastness are prepared by coupling tetrazotised 4 : 4'-(C₆H₄·NH₂)₂S with a *p*-substituted phenol free from H₂O-solubilising groups, e.g., *p*-cresol (yellow).

H. A. P.

Manufacture of [a] disazo dye. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 441,091, 23.7.34).—The orange dye 4 : 4' : 3 : 3'-(C₆H₃Cl·NH₂)₂ ⇌ 2 1-*p*-tolyl-3-methyl-5-pyrazolone is described; it is used to colour rubber, is fast to vulcanisation, and is insol. in org. solvents.

H. A. P.

Manufacture of vat dyes. I. G. FARBENIND. A.-G. (B.P. 441,049, 4.7.35. Ger., 4.7.34).—NH₂-derivatives of condensation products obtained by treating the "glyoxal-dianthraquinone" compounds of B.P. 369,765 (B., 1932, 672) with AlCl₃ or H₂SO₄, with or without an oxidising agent (cf. B.P. 410,552; B., 1934, 666), are acylated. E.g., the product (I) from anthrone and glyoxal sulphate is treated with AlCl₃-NaCl-MnO₂, and the resulting product is nitrated (94% HNO₃ in PhNO₂ at 100°) and reduced (alkaline Na₂S₂O₄); the leuco-compound thus formed is oxidised (air) and the resulting amine benzoylated, acetylated, or condensed with anthraquinonyl-2-carboxylic chloride (II) to give red-brown cotton dyes. A yellow-brown dye is obtained by treating (I) with HNO₃-H₂SO₄ at 0°, reducing etc. as before, and benzoylating the resulting diamine; with (II) a brown dye is formed. Other starting materials are the products from 1- and 2-chloroanthrones and (CHO)₂.

H. A. P.

Manufacture of dyes of anthraquinone series. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 440,208, 23.6.34).—Red- to green-blue wool dyes are obtained by condensing a 4-halogeno-1-amino-2-anthraquinonylmethanesulphonic acid or its *N*-mono-alkyl or -cycloalkyl derivatives with a primary or *sec*-amine. E.g., 4-bromo-1-amino-2-anthraquinonylmethanesulphonic acid (I) is heated with NH₂Ph, Na₂CO₃, and CuSO₄ in H₂O at the b.p.; the resulting 1-amino-4-anilino-2-anthraquinonylmethanesulphonic acid as *K* salt) is a blue wool dye. (I) is prepared by chlorinating 1-chloro-2-methylanthraquinone (Cl₂ in C₆H₃Cl₃ at 140° in ultra-violet light), treating the ω -Cl-compound, m.p. 165–167°, with aq. NaHSO₃ at the b.p., and heating the product with aq. NH₃ and CuCl₂ (trace) at 120°; the resulting aminosulphonic acid is heated at 90° with Br in 10% aq. HCl. Other examples are: 1-amino-4-*p*-acetamidoanilino- and -4-cyclohexylamino-2-anthraquinonylmethanesulphonic acid (*K* salts), 4-*p*-anisidino-1-cyclohexylamino- (*Na* salt), and 4-*p*-acetamidoanilino-1-methylamino-2-anthraquinonylmethanesulphonic acid (*K* salt).

H. A. P.

[Preparation of dispersed] colouring matters. IMPERIAL CHEM. INDUSTRIES, LTD., C. CHILD, and H. A. THOMAS (B.P. 440,983, 8.6.34).—Colloidal solutions containing (dispersed) anthraquinone or indigoid vat dyes are prepared by vatting the dye in presence of an alkali-sol. degradation product of wool or gluten (not degraded beyond the prot- and lys-albinic acid stage) and reoxidising. Alternatively, suitably dyed wool is dissolved in alkali (e.g., 8% aq. NaOH at 16–50°). A wetting agent may be added. Acidification of the solutions gives a coloured gelatinous ppt. which is redispersible in aq. alkali.

H. A. P.

Manufacture of dyes containing metal in complex union. SOC. CHEM. IND. IN BASLE (B.P. 440,150, 8.3.35. Switz., 24.1.35).—The manufacture of metal derivatives of dyes of the type R₁ → R₂ ← R₃, in which R₁ and R₃ are the same or different diazo components, at least one of which has a metal-binding group, and R₂ is an arylenediamine having two coupling positions, is claimed. Examples of R₂ are *m*-C₆H₄(NH₂)₂, 1 : 2 : 4-C₆H₃Me(NH₂)₂, and 1 : 3 : 4-C₆H₃(NH₂)₂·SO₃H, and of R₁ and/or R₃ are 2 : 1 : 4-NH₂·C₆H₃(OH)·NO₂, 2 : 1 : 4 : 6- and 2 : 1 : 6 : 4-NH₂·C₆H₂(OH)(NO₂)·SO₃H, 2 : 4 : 1-NH₂·C₆H₃Cl·OH, and 1 : 5-NH₂·C₁₀H₆·SO₃H. The metals used are Mn, Fe, Co, Ni, and Cu. The products dye chrome- or vegetable-tanned leather various shades of brown.

H. A. P.

Manufacture of cupriferoous dyes. I. G. FARBENIND. A.-G. (B.P. 437,657, 3.5.34. Ger., 3.5.33).—A *m*-phenylenediamine, *m*-aminophenol, or resorcinol is coupled with 2 mols. of a diazotised aminodiphenylaminesulphonic acid (I) or 1 mol. of (I) and 1 mol. of another diazo or diazoazo compound free from chelate groupings, and the dye is treated with a Cu^{II} compound. Examples are: 4'-nitro-4-aminodiphenylamine-2'-sulphonic acid (II) → *m*-phenylenediamine ← sulphanilic acid, coppered (olive-brown on chrome or vegetable-tanned leather); 4-aminoazobenzene-4'-sulphonic acid → 4-amino-*o*-cresol ← (II).

C. H.

[Leather] dyes containing metal.—See IV.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Preparation of cellulose by the nitric acid decomposition process. I. Decomposition of wood with nitrogen peroxide. I. SHIMODA (J. Cellulose Inst., Tokyo, 1936, 12, 13–16).—Treatment of Japanese *Pinus silvestris* with N₂O₄ for 2 hr. at 60° and 1½–2 hr. at 97° yielded a cellulose giving on analysis 90–92% of α -cellulose, 4.5% of pentosans, and Cu no. 1.2 (Hägglund); the high pentosan content is partly due to the presence of oxycelluloses.

A. G.

[Rayon] spinnerets. I, II. C. L. MOORE (Silk & Rayon, 1936, 10, 41–42, 111–112).—The properties and relative suitability of spinnerets made of glass, porcelain, Pt, Au, Pt-Ir, Pt-Au-Pd, Ta, and bakelite are discussed. Nozzles consisting of small perforated rubies set in a Ta casing are satisfactory.

A. J. H.

Tantalum [rayon] spinnerets. ANON. (Silk & Rayon, 1936, 10, 124, 130).—The suitability of Ta for the manufacture of viscose rayon spinning nozzles is indicated; a Ta nozzle has about 4 times the working life of a nozzle of Au, Pt, or their alloys. Ta nozzles

when blocked with viscose may be cleaned by immersion in a 1 : 1 H_2SO_4 – HNO_3 mixture at $> 100^\circ$. A. J. H.

New use for cellulose acetate rayon [in manufacturing double-texture fabrics]. ANON. (Text. Mercury & Argus, 1936, 94, 135).—Unshrinkable composite fabric is made by hot-calendering three cotton fabrics (the middle one contains about 20% of acetate-rayon yarns) impregnated with a cellulose acetate solvent or plasticiser (1 : 3 MeOH – COMe_2), whereby the rayon is squeezed into the outer fabrics, thus binding them together. A double-texture fabric which can be easily torn into strips having clean edges is produced by calendering similarly two superimposed cotton fabrics each containing acetate rayon in either warp or weft. A. J. H.

Rate of digestion of wood in sodium hydroxide solutions. W. J. NOLAN and D. W. MCCREADY (Paper Trade J., 1936, 102, TAPPI Sect., 48–54).—From experimental cooks in 1-litre digesters (described), the influences of the several operating variables on the rate of digestion of soda pulp from ground spruce wood are differentiated and evaluated. An empirical method of predicting cooking curves is suggested. The calc. curves show quantitatively the effects of the operating variables, and, in general, agree fairly closely with experimental curves of other workers for other types of wood; where anomalies occur they can be traced to differences in the characteristics of the wood. H. A. H.

Adsorption of carbon dioxide and of water vapour by paper pulp. D. J. SALLEY (Text. Res., 1935, 5, 493–508).—Adsorption isotherms were obtained for CO_2 on cotton and mercerised cotton, and for CO_2 and H_2O vapour on (A) a lightly- and (B) a heavily-beaten bleached sulphite pulp. Heats of adsorption (H) and surface areas (S) were calc. from the isotherms. In both cotton and mercerised cotton weak adsorption took place, and S of the cotton was increased almost 3-fold on mercerising. In the case of CO_2 on pulp the points on the isotherms were somewhat restricted, due to slow adsorption at low pressures and partial degradation of the pulp at the higher temp. (90 – 100°), but weak adsorption was obtained at pressures < 100 mm. Hg, giving S vals. of 2.7×10^5 sq. cm. per g. for A and 1.0×10^3 sq. cm. per g. for B with H 4500 and 8000 g.-cal., respectively. With H_2O weak adsorption was obtained at pressures < 0.1 mm. Hg, the amount adsorbed by both pulps being the same; the calc. S of A under these conditions was 1.8×10^6 and of B 1.6×10^6 sq. cm. per g., and H 8900 and 8200, respectively. The results are discussed on the basis of the known structure of cellulose, and it is concluded that owing to the low H_2O adsorption found the H_2O penetrates into the intermicellar spaces but not into their interior, and that beating does not alter the micellar surface. D. A. C.

Effect of beating and pigmentation on [paper] sheet properties. W. R. WILLETS (Paper Trade J., 1936, 102, TAPPI Sect., 36–39).—From laboratory experiments with bleached sulphite pulp it is concluded that beating increases the retention of TiO_2 filler to such an extent that the natural loss in opacity due to beating is more than compensated for if $> 2\%$ of TiO_2 is used in the furnish. The addition of 3% of TiO_2

causes perceptible loss of tensile and bursting strength, but not of tearing strength or thickness. Folding-endurance data were too erratic for any definite conclusion to be made. H. A. H.

Dependence of paper strength on composition of the furnish and quality of the mechanical pulp, and on its beating in the hollander. N. SOLJUS and N. LAUDENBACK (Zellstoff u. Papier, 1936, 16, 56–58).—A hard and a soft sulphite pulp were beaten in a commercial hollander under varying conditions of consistency and sp. pressure. The hard pulp attained a higher strength than the soft, but for optimum conditions required to be rapidly beaten with high sp. pressure and consistency. It is thought that there is a mathematical relation between breaking length, sp. pressure, and beating time. Curves are drawn to show the effect of varying the proportion of sulphite and groundwood on the strength of the mixture, and a formula is given for calculating it from the strengths of the components, in which a factor of 0.98 is used for test sheets and 0.85 for machine-made paper to correct for the reduction of the calc. strength obtained in practice. D. A. C.

Effect of fillers on paper strength. W. BRECHT and H. PFRETZSCHNER (Zellstoff u. Papier, 1936, 16, 51–56).—The influence of adding up to 40% of a no. of fillers used commonly in Germany on the strength of beaten sulphite test sheets is investigated under conditions of maintaining (a) const. fibre content, (b) const. basis wt. of the sheets. The burst and breaking length in all cases is greatly reduced. With (a) the max. reduction is about 40% and is obtained with 30% of china clay, whereas with the same quantity of Annaline there is only a 15% reduction. The rate of strength decrease depends on the physical properties of the filler; thus with china clay, asbestine, and CaCO_3 it is linear, whereas with blanc fixe it is greatest with up to 10% of filler, and with Annaline, leucinite, ZnS , etc. it is greatest above about 20%. The tear is unaffected by fillers, but the folding-resistance decreases very rapidly initially until with 30–40% of filler the reduction is almost 100%. In (b) decrease in fibre content accentuates the reduction (max. 67% with china clay) but differentiates less the effects of the different fillers. With (a) addition of filler increased the resistance to bending of the sheets due to their greater wt. and thickness, and the different fillers were clearly differentiated. With (b), as under commercial conditions, the bending-resistance was reduced. D. A. C.

Water-resistance of paper. P. W. CODWISE (Paper Trade J., 1936, 102, TAPPI Sect., 39–43).—The Cobb and Lowe gravimetric method (B., 1934, 397; 1935, 490) of determining sizing degree, involving the determination of the wt. of H_2O absorbed when applied to the surface of paper under standardised conditions (described), is recommended for consideration as a TAPPI standard method, to supplement the dry indicator method (B., 1932, 674), which measures only the time of complete penetration. Results of tests on a wide variety of papers compare closely with those obtained by the author's surface-spreading method (Tech. Assoc. Papers, 1930, 13, 200). H. A. H.

Rapid microscopical measurement of [textile fibre] diameters in cross-section. F. A. MENNERICH (Text. Res., 1936, 5, 217—222). A. J. H.

Alkali recovery.—See XI. Pulp-mill effluents.—See XXIII.

See also A., Feb., 143, **Structure of cellulose**. 154, **Adsorption of cyclopentanone by cellulose nitrate**.

PATENTS.

Degumming of vegetable fibres. W. E. and A. V. BILLINGHAME (B.P. 440,637, 28.3.34).—The fibres are treated with a solution of Na or K caseinate, containing NaOH or KOH if desired, to hydrolyse and emulsify a certain proportion of the gums and pectins, which are removed by washing. The washed fibres are then treated with acid to restore their colour and strength by fixing the residual gums and resins, again washed, and dried. F. R. E.

Production of filaments from a liquid raw material which may be solidified by the action of liquid or gaseous media. H. ZIEGNER (B.P. 441,440, 16.5.35. Ger., 4.1.35).—The raw material (rubber dispersions, PhOH-CH₂O mixtures, glue) is passed through a tube with porous walls through which the coagulant (acids, CH₂O) is forced. F. R. E.

Manufacture of incandescence [gas] mantles. C. S. FRANCIS, JUN., ASS. TO CELANESE CORP. OF AMERICA (U.S.P. 1,993,778, 12.3.35. Appl., 3.12.32).—Fabric composed of an org. ester of cellulose is hydrolysed in stages and impregnated with suitable refractory incandescence compounds. F. R. E.

Threads or yarns formed of polymerisation products and the like. SIEMENS-SCHUCKERTWERKE A.-G. (B.P. 441,355, 5.3.35. Ger., 5.3.34).—A wool of fine fibres of polymerisation products of polyvinyl compounds is spun to form a yarn with or without other textile materials, wool, or asbestos. The product is non-hygroscopic. F. R. E.

Manufacture of composite sheet material consisting of or including adhesively bound yarns. J. MORTON (B.P. 440,191, 14.6.34).—Two sets of parallel threads are united at right angles, without weaving, by means of an adhesive (rubber compositions, flexible glue, cellulose derivatives). F. R. E.

Preparation of organic acid esters of cellulose. C. J. MALM and C. L. FLETCHER, ASSTS. TO EASTMAN KODAK CO. (U.S.P. 1,992,958, 5.3.35. Appl., 29.12.32).—To avoid degradation of the mol. during esterification, cellulose is treated first with a catalyst and sufficient Ac₂O to esterify it to a 30—40% Ac content, and then, for the major part of the esterification period, with just sufficient Ac₂O, continuously added, to complete esterification. F. R. E.

Purification or refining of sulphate- or soda-cellulose. UDDEHOLMS AKTIEB. (B.P. 440,965, 9.7.34. Swed., 7.7.33).—The material is treated with > 60% of the quantity of an oxidising agent (bleaching powder) required for complete bleaching and then, with or without washing, with as much Cl₂ (gas or aq. solution) as the cellulose will absorb. After dissolution and removal of the reaction products (chlorinated lignin), and before

or after a second treatment with bleaching powder, it is further treated with alkali of mercerising concn. and finally with acid. F. R. E.

Manufacture of nitrogenous cellulose derivatives. I. G. FARBENIND. A.-G. (B.P. 441,448, 29.7.35. Ger., 14.8.34).—Cellulose, after treatment with aq. NaOH, is subjected to the action of epichlorohydrin and NH₃ or its basic substitution products (amines, NH₃-acids, etc.). F. R. E.

Apparatus for making rayon. M. E. WILLS (U.S.P. 1,993,816, 12.3.35. Appl., 30.9.31).—During its passage from the press to the nozzles, the spinning solution passes through pipes or conduits which are tapered from the inlet to the outlet ends so as to maintain equal pressure at the nozzles without the use of pumps. F. R. E.

Production of artificial silk and like filaments. FELDMUEHLE A.-G. VORM. LOEB, SCHOENFELD & Co. (B.P. 441,425, 6.11.34. Ger., 13.11.33).—The spinning rings claimed in B.P. 421,140, when fully wound, are rolled collectively from their supports into a trough alongside, where they are laterally pressed together and the filaments after-treated. F. R. E.

Spinning solution for production of synthetic filaments or threads. R. and J. PICKLES (B.P. 441,447, 25.7.35).—Animal fibres (hair, wool, silk, fur, feathers, etc.), after impregnation with aq. NaOH, are freed from excess liquid, dissolved in aq. NH₃, and the solution is mixed with an equal wt. of rubber latex containing vulcanising and accelerating agents. F. R. E.

Manufacture of artificial silk or artificial spinning threads. I. G. FARBENIND. A.-G. (B.P. 440,449, 20.9.34. Ger., 24.11.33).—Wool-like threads are produced from viscose by addition of an animal or vegetable albuminous substance, together with a metallic salt [ZnSO₄, MgSO₄, Al₂(SO₄)₃] if desired, to the solution shortly before spinning; the resulting fibres are after-treated with CH₂O. F. R. E.

Treatment of cellulose products. DEUTS. HYDRATERWERKE A.-G. (B.P. 441,162, 12.12.34. Ger., 12.12.33).—In order to improve their softness and smoothness and to reduce the swelling capacity and H₂O absorption, cellulose hydrate products in H₂O-swollen or air-dry condition are treated with aq. solutions of H₂O-sol. mono- or poly-hydric alcohols, ketones, or mixtures thereof (EtOH, COMe₂) to displace the H₂O, and are then impregnated with high-mol. aliphatic, cycloaliphatic, or fatty aromatic alcohols (< C₆), or their org. esters or ethers (other than those of cellulose), e.g., cetyl ricinoleate, oleyl alcohol, in suitable solvents (alcohols, hydrocarbons), with or without inorg. or org. hygroscopic compounds (glycerin). F. R. E.

Manufacture of wool-like artificial fibres. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 441,218, 31.8.34).—The desulphurisation of viscose filaments and the after-treatment with org. liquids capable of dissolving H₂O, described in B.P. 424,229 (B., 1935, 351), is replaced by treatment with the org. liquid, e.g., EtOH, in presence of a volatile base of b.p. < 100° (NH₃). F. R. E.

Manufacture and coloration of artificial filaments, films, foils, and the like. BRIT. CELANESE, LTD. (B.P. 441,421, 24.10.34. U.S., 24.10.33).—Diazotisable amines (I) are added to solutions of cellulose esters or ethers (II), 0.5–3 wt.-% of (I), based on wt. of (II). After filament formation the products are subjected to diazotisation and treated with coupling components. Uniform dyeings without close control of conditions are claimed. A. W. B.

Production of artificial filaments. W. MENDEL, Assr. to SYLVANIA INDUSTRIAL CORP. (U.S.P. 2,002,153, 21.5.35. Appl., 13.4.33).—A filament in the form of a ribbon (crinkled by shrinkage) having a central thick, shrivelled portion, the multitudinous facets causing a scintillating effect, is claimed. Such a filament is produced by squirting through an orifice having a central portion about 0.02 in. in diam. and slot-shaped extensions 0.03 in. long, the filament being spun with $\gt 5$ turns per m. B. M. V.

Manufacture of cord from regenerated cellulose or a cellulose compound. BRIT. "NEW-WRAP" Co., LTD., and M. F. MONBIOT (B.P. 440,895, 11.7.34).—A no. of thin narrow strips are twisted together and coated with rubber and/or lacquer. B. M. V.

Grinding or refining machines for paper pulp. F. LORD and A. C. WILBY, JUN. (B.P. [A] 423,898 and Addn. B.P. [B] 441,316, [A] 6.2.34, [B] 29.11.34).—(A, B) The pulp is ground by shearing between stationary blades and blades which are secured to the underside of rotating discs; a no. of pairs are superposed. The general flow is upwards, but shearing takes place only while the pulp is flowing outwardly from the axis. (B) Baffles are provided to ensure the return idle flow inwards without lodgment of pulp in undesirable places. B. M. V.

Defibring lignocellulose material. J. A. DE CEW (U.S.P. 1,993,148, 5.3.35. Appl., 29.3.32).—Ground-wood screenings suspended in H₂O are agitated in presence of steam and subsequently passed under pressure through a (Jordan) refiner at a consistency of about 10%. D. A. C.

Pulp-treating [bleaching] process. J. D. RUE, Assr. to HOOKER ELECTROCHEM. Co. (U.S.P. 2,001,268, 14.5.35. Appl., 18.10.33. Can., 21.9.32).—A process by which bleached pulp may be obtained from any stock, including kraft, without reduction of strength comprises bleaching with excess of Cl₂, but stopping the process after a definite time when the lignin has nearly all been bleached and 20–50% of the Cl₂ remains unused. This excess is neutralised with alkali and the hypochlorite allowed to react before the pulp is washed. B. M. V.

Utilising "floating soap" and derivatives thereof. P. HODGES, Assr. to GULF STATES PAPER CORP. (U.S.P. 1,992,949, 5.3.35. Appl., 9.1.33).—The use of "Tallöl" from black liquors in sulphate- and soda-pulp manufacture is claimed as an emulsifying agent for rubber, casein, lubricating oils, resins, waxes, etc., and as a stabiliser for suspensions. D. A. C.

Manufacture of paper. L. L. DODGE, Assr. to RHINELANDER PAPER Co. (U.S.P. 1,992,996, 5.3.35. Appl., 15.11.33) Paper to be used for waxing and

made on a "Yankee" machine from moderately beaten sulphite stock is impregnated with 2½–10% of a softening agent (glycerin etc.). D. A. C.

Production of nodules [in paper stock]. S. D. WELLS (U.S.P. 1,986,907, 8.1.35. Appl., 18.1.32).—Waste printed [news-]paper is beaten at 15–33% consistency in a rod mill in presence of 1.5% of Na₂CO₃, 2.5% of bentonite, and 0.05% of kerosene, and, if desired, at slightly elevated temp. D. A. C.

Writing paper with white copying preparation. G. GUGGENBUHL (B.P. 440,935, 11.7.35. Switz., 26.3.35).—The underside of the paper is coated with a white prep. which is transferable to dark paper when the front is written on by hand or typewriter. B. M. V.

Production of a protective coating of hard rubber on paper, pasteboard, and the like. E. SACHS (B.P. 440,368, 29.6.34).—A porous base material, after drying, is impregnated under pressure with a hard resin, e.g., hardened colophony or PhOH-CH₂O-type resin, treated with a layer of rubber mixture containing $\lt 15\%$ of S, and vulcanised under pressure. If desired, reinforcing materials (metal strips etc.) may be embedded in the base material or the coating. F. R. E.

[Sized-paper] composition and its manufacture. H. R. RAFTON, Assr. to RAFFOLD PROCESS CORP. (U.S.P. 1,993,750, 12.3.35. Appl., 27.8.30).—A filler is claimed, comprised of a CaCO₃-Mg(OH)₂ mixture, an aq. emulsion of paraffin wax, and alum. The filler may be added to the sized furnish in the beater, the filler being added first, and the alum, together with starch if desired, last. D. A. C.

Reclaiming fibre from waste paper. SNYDER MACLAREN PROCESSES, INC. (B.P. 441,363, 3.5.35. U.S., 23.5.34).—The de-inking agent (e.g., Na silicate, fatty alcohol above C₈, etc.) is continuously fed, together with H₂O at 38–65°, into a pulper (e.g., rod or hammer mill) which is at the same time supplied with waste printed paper sufficient to give a high consistency. The stock may then be diluted, riffled, deckered, jordaned, and finally washed. D. A. C.

De-inking imprinted paper. P. R. HINES (B.P. 441,331, 8.6.34).—Waste printed paper is shredded and boiled with a mixture of NaOH, CaO, and Na silicate. It is then deckered, and the liberated ink particles are flocculated under either acid (with alum) or alkaline (with CaO) conditions; the pulp is conditioned by agitation with, e.g., a high-boiling synthetic alcohol and sol. starch, and the ink particles are separated by flotation under conditions of controlled frothing. D. A. C.

Removing bleachable pigments from paper containing lignocellulosic constituents. S. D. WELLS, Assr. to L. L. ALSTED (U.S.P. 1,992,977, 5.3.35. Appl., 26.1.33).—Paper printed with bleachable pigments (e.g., Fe tannate or lakes), after pulping, is bleached with alkali hypochlorite, the *p*_H being kept at $\gt 8$ by addition of NaOH, to confine the action of the bleaching agent to the pigment. D. A. C.

Production of [crimped etc.] artificial filaments, fibres, threads, yarns, and like materials. BRIT. CELANESE, LTD. (B.P. 441,042, 29.3.35. U.S., 29.3.34).

Dryer [for cloth etc.]. Fractionation of fibrous material. Filtering medium.—See I. Artificial fuel.—See II. Sizing materials [paper]. Films, foils, etc.—See VI. Cellulose-coated wire-cloth.—See X. Paint (etc.) remover. Cellulose derivative compositions. Plastic-impregnated materials.—See XIII. Elastic yarns.—See XIV. Glue.—See XV. Composition for germinating seeds.—See XVI.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Dyeing of wool fibre. R. HALLER (Helv. Chim. Acta, 1936, 19, 15—22).—The inability of diazotised p -NH₂·C₆H₄·SO₃H and the ability of methylene-blue (I) to pass through the epidermis cells of the wool fibre is discussed in detail. Treatment of undyed wool fibre with cold conc. aq. NH₃ slowly causes the separation of some varieties into their histological elements, but dyed wool is very much more resistant. Chlorinated wool behaves similarly. Only the medullary cells become dyed in (I), whereas the epidermis cells remain nearly colourless. Similarly, they are essentially responsible for the reactions towards halogens, NH₃-fuchsin (II), CrO₃, and metallic salts. Evaporation of the ammoniacal solution gives an amorphous, hygroscopic residue which differs entirely from Knecht's lanugic acid. It is free from S, readily adsorbs halogens, and gives an immediate red colour with (II). It appears, therefore, that the components of the histological structure of the fibre which differ from one another chemically also differ in their behaviour towards dyes, and that the fibre must be regarded histologically, chemically, and tinctorially as a heterogeneous structure. The behaviour of the epidermis cells towards solutions of differing physical types is unexplained. The importance of the extent of swelling of the fibre in the dyeing of wool is emphasised. H. W.

Dyeing of half-wool materials containing [white] acetate rayon effect threads. G. W. BARNES (Textilber., 1936, 17, 142—143).—The cotton is dyed at about 90° with direct dyes, then treated with 2% of Sandofix (Sandoz) to increase the fastness of these dyes to the following process in which the wool is coloured with selected acid dyes in a strong acid bath. The wool has a better handle than that given by the older processes. A. J. H.

Constant-temperature baths for dyeing. C. E. MULLIN (Text. Mercury & Argus, 1936, 94, 119, 123).—Different types of apparatus for experimental dyeing are described and compared. A. J. H.

Cloth-mercerising machine. ANON. (Silk & Rayon, 1936, 10, 128, 130).—A Haubold roller type of machine is described. A. J. H.

Sizing of rayon. I. Effect of depolymerisation of starch on sizing. 1. Depolymerisation and viscosity. H. SOBUE, S. MOROYU, and N. MITOME (J. Cellulose Inst., Tokyo, 1936, 12, 4—12).—The η of sol. starch dissolved in cuprammonium hydroxide is not \propto that of the paste prepared from it by boiling, and is not a suitable control measurement. A. G.

Sizing of rayon staple-fibre warp [yarns]. ANON. (Silk & Rayon, 1936, 10, 22, 24).—Unlike ordinary

viscose-rayon yarn, viscose staple-fibre yarns may be sized on the usual slasher sizing machine provided that the stretching is $\geq 1\%$ (excessive stretching increases the lustre and decreases the tensile strength of the yarn). A satisfactory size contains wheat (but not sago) starch and "white softening" made by saponifying stearine with borax. A. J. H.

Porous waterproofing of rayon garments. G. S. RANSHAW (Silk & Rayon, 1936, 10, 113—114).—The advantages of modern one-bath waterproofing processes over the former Al-soap, two-bath, methods are discussed, and the use of Waxol W (I.C.I.) for viscose and acetate rayon materials is described. No relation is found between the permeabilities of a waterproofed fabric to H₂O and air. A. J. H.

Wetting etc. agents.—See XII.

See also A., Feb., 154, Absorption of NaOH, and of dyes, by cellulose.

PATENTS.

Fabric-cleansing system. R. A. HETZER (B.P. 441,238, 15.2.35).—A condenser for a dry-cleaning solvent containing Cl is lined with metal more resistant to HCl than Cu (*e.g.*, Ni, Ag, or Sn), and inserts of a less resistant metal are provided to neutralise the acid, *e.g.*, Cu itself in the form of twisted strips in the tubes. B. M. V.

Process of washing or laundering. ELECTRIC SMELTING & ALUMINIUM CO. (B.P. 441,379, 9.4.34. U.S., 24.2.34).—The materials to be washed are treated in a bath (at $> 38^\circ$, but $<$ the b.p.) containing an alkali, and the alkali Al silicates of B.P. 200,175 and/or 339,355 (B., 1923, 841A; 1931, 202), and/or Na₂C₂O₄, and/or NaF, and/or their K equivs., and/or glycerin, and/or C₂H₄(OH)₂. [Stat. ref.] F. R. E.

Dyeing of animal fibres. SOC. CHEM. IND. IN BASLE (B.P. 439,890, 11.6.34. Switz., 9.6.33 and 31.5.34. Addn. to B.P. 433,230; B., 1935, 946).—The process of the prior patent is extended to include dyes containing one or more SO₃H groups, which are free from metal complexes and dye in presence of AcOH. A. W. B.

Dyeing of pelts, hairs, and feathers. I. G. FARBENIND. A.-G. (B.P. 440,742, 6.7.34. Ger., 20.9.33).—The use of salts of 1:5-C₁₀H₆(OH)₂ (I) with aminodiphenylamines or their alkyl, hydroxy-alkyl, or alkoxy derivatives is claimed. Examples are the salts of (I) with 2- or 4-NH₂·C₆H₄·NHPH, 3:4-NH₂·C₆H₃Me·NHPH, 4:4'-NH₂·C₆H₄·NH·C₆H₄·C₂H₄·OH, and 4:4'-NH₂·C₆H₄·NH·C₆H₄·OMe. H. A. P.

Coloration of textile materials. BRIT. CELANESE, LTD. (B.P. 440,594, 26.1.35. U.S., 26.1.34).—Cellulose esters or ethers are dyed in deep shades with logwood or other natural dyes by chroming in presence of at least one of the following: H₂C₂O₄, C₂O₄'', NH₄CNS, or an alkali sulphite. A. W. B.

Treatment of dyeings prepared on cellulosic materials by means of substantive dyestuffs. A. CARPMAEL. FROM I. G. FARBENIND. A.-G. (B.P. 440,488, 1.6.34).—Treatment of dyeings with substantive dyes by mixtures of polymeric (·CH₂·NH₂)₂, containing substantial proportions of compounds containing

the group $(C_2H_4 \cdot NH)_n$, where n is > 2 , in the form of their salts or in presence of org. or inorg. acids to increase fastness, is claimed. Economical advantages over the process of B.P. 435,388 (B., 1935, 1132) are described.

A. W. B.

[Treatment of] vegetable and artificial cellulosic fibres. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 440,647, 29.6.34).—Impregnation with a N compound containing at least one chain $\leftarrow C_8$, e.g., primary, sec., or tert. amines, or quaternary NH_4 bases or salts thereof, and CH_2O , followed by drying at $80-90^\circ$, to improve the capacity for dyeing with acid wool dyes, is claimed. Impregnation may be effected before spinning artificial fibres, in which case it is preferable also to incorporate a protein (cf. B.P. 440,449; B., 1936, 269).

A. W. B.

Printing or dyeing with azo dyestuffs. SOC. ANON. DES MAT. COL. ET PROD. CHIM. DE ST.-DENIS, and R. LANTZ (B.P. 440,144, 17.12.34. Fr., 6.9.34).—The process of F.P. 760,784 (cf. B.P. 309,166; B., 1930, 902) is improved by employing *p*-acylaminodiazosulphonates substituted in the 2 and 5 positions with halogen, alkyl, or alkoxy groups, which may be the same or different, e.g., *Na* 2 : 5-diethoxy-4-benzamidobenzenediazosulphonate.

A. W. B.

Textile [resist-]printing. IMPERIAL CHEM. INDUSTRIES, LTD., R. J. HANNAY, and A. WORMALD (B.P. 440,573, 2.7.34).—The process of B.P. 433,865 (B., 1935, 946) is improved to give greater latitude of working, being applicable to leuco-vat dyes with and without affinity for cellulosic fibre, if quaternary NH_4 salts derived from other than heterocyclic tert. amines are used in presence of an alkali and/or a reducing agent, e.g., $NPhMe_2Cl \cdot CH_2Ph$ in presence of K_2CO_3 and Formosul.

A. W. B.

Printing of fibrous materials by impregnation. CARTHAGE MILLS, INC. (B.P. 440,559, 25.5.34. U.S., 7.6.33).—A process of printing pile fabric or felted masses and a suitable apparatus are described.

A. W. B.

Sizing of yarns. G. DIETRICH (B.P. 441,005, 7.6.34. Ger., 24.6.33).—Rayon yarn is drawn in contact with a wick fed with a rapid-drying size consisting of drying oils alone or mixed with semi- or non-drying oils to which are added grease solvents (substances of the pinane group, cyclohexanol) which catalytically accelerate drying of the treated yarn. [Stat. ref.]

A. J. H.

Sizing of absorbent materials. E. I. DU PONT DE NEMOURS & Co. (B.P. 440,574, 2.7.34. U.S., 1.7.33).—An aq. emulsion formed by neutralising a monobasic acid-modified polyhydric alcohol-polybasic acid resin (to the extent of 50–95% of the acidity of the resin) with an org. or inorg. base in presence of H_2O , the resin having an acid val. of 25–70 (40–55) and containing in combined form 60–90 (65–80) wt.-% of a polyhydric alcohol ester of a saturated aliphatic carboxylic acid, RCO_2H , where R is an alkyl radical $\leftarrow C_{15}$ (e.g., stearic acid-modified glyceryl phthalate resin), is incorporated in the pulp before forming into paper, or applied to the formed paper which is afterwards dried.

F. R. E.

Enhancing the wetting capacity of mercerising liquors. W. W. GROVES. From I. G. FARBENIND. A.-G.

(B.P. 441,070, 11.7.34).—Monochloroxylenols (from chlorination of commercial xylenol), or their alkali salts, are claimed; they do not require auxiliary wetting agents or solvents.

E. J. B.

Apparatus for mercerisation of cellulose fibres of all kinds. C. ARNOLD. From BAUMSWOLLESPINNEREI GRONAU (B.P. 440,867, 7.6.34).—The material in any form from sliver to fabric is continuously pressed between conveyor bands of fine mesh during the mercerising process, whereby the individual fibres are maintained throughout in the same condition of length and tautness. The fine conveyor bands are pressed between stronger sieve belts, and these in turn are secured by automatically adjusted clamps.

B. M. V.

Treatment of cellulosic filaments, yarns, ribbons, and the like. H. DREYFUS (B.P. 441,277, 16.7.34).—A solution or paste (in org. solvents) of a derivative of cellulose that is not removed by media containing a large proportion of H_2O , e.g., esters and/or ether-esters, is applied to the surface of cellulosic yarns, threads, etc. (both natural and artificial), preferably after pretreatment with a swelling agent, e.g., $ZnCl_2$, $Zn(CNS)_2$. The coating is applied either irregularly or intermittently, or regularly with subsequent partial removal by intermittent application of a resist and dissolution (by hydrolysis or a solvent) of the unprotected portion. The products have varying properties along their length and may be used to produce crinkled material.

E. J. B.

Treatment of cellulose fibres, yarns, woven fabrics, and the like. IMPERIAL CHEM. INDUSTRIES, LTD., L. G. LAWRIE, R. J. W. REYNOLDS, and H. A. PIGGOTT (B.P. 439,880, 17.5. and 26.9.34).—Fibres, e.g., cotton, are mercerised and treated with an $\alpha\beta$ -alkylene oxide (I), e.g., $(CH_2)_2O$, glycide, at room temp. in a closed vessel. Solvents may be used and the products acylated, e.g., acetylated. The type of finish obtained depends on the quantity of (I) per $C_6H_{10}O_5$ unit employed; e.g., 0.3–1.0 mol. of (I) gives an organdie and 1–1.5 mols. of (I) give a parchment finish.

A. W. B.

Manufacture or treatment of textile materials and of films, foils, and the like. BRIT. CELANESE, LTD. (B.P. 440,590, 15.1.35. U.S., 19.1.34).—To reduce their tendency to become charged with static electricity, materials of org. derivatives of cellulose are treated before (i.e., by addition to the spinning dope), during, or after their production with a salt of an aliphatic diamine containing 2 basic NH_2 -groups, e.g., lactate, citrate, or borate of $C_2H_4(NH_2)_2$, together with a lubricant (olive or sulphonated castor oil, glycerin) if desired.

F. R. E.

Dyeing apparatus [for piece goods]. IMPERIAL CHEM. INDUSTRIES, LTD., D. CARTER, A. G. CUTHBERT-SMITH, H. JACKSON, L. P. RENDELL, and H. A. THOMAS (B.P. 441,660, 13.2.35).

Oxygenated nonadecyl compounds.—See III. Azo dyes.—See IV. Refining sulphate- or soda-cellulose. Colouring artificial filaments etc. Bleaching pulp.—See V. Detergent. Bleaching agents etc.—See XII. Coating materials. Cellulose-coated materials. Artificial masses [for textiles]. Plastic impregnated materials.—See XIII.

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

Production of potassium and sodium hydroxides from the respective sulphates. G. GALLO (Annali Chim. Appl., 1935, 25, 620—628).—A conc. solution of K_2SO_4 or Na_2SO_4 is completely converted into KOH or NaOH when boiled with a slight excess of $Sr(OH)_2$, if $SrSO_4$ is filtered off from the hot solution (on cooling or keeping, the reverse reaction slowly occurs). In this way 10—20% solutions of alkali are obtainable. The reaction is successful on a semi-industrial scale: 150 kg. of solid K_2SO_4 heated with 91 kg. of SrO dissolved in 950 litres of H_2O yield 96 kg. of KOH. A continuous process is suggested. Use of SrO for determination of H_2O , and as a desiccating agent, is mentioned.

E. W. W.

Salt-plant design and construction. C. S. ROBINSON (Canad. Chem. Met., 1935, 19, 324—325).—A kiln-drying salt plant constructed of Ni-cast Fe and monel metal is described.

W. P. R.

Occurrence and amenability to leaching of the phosphorus compounds of Alabama in some red iron ores. E. S. HERTZOG (U.S. Bur. Mines, Rept. Invest. 3294, Dec., 1935, 9 pp.).—The solubility of $Ca_3(PO_4)_2$ (chief ingredient), apatite, dufrenite, triplite, wavellite, and vivianite in various reagents (0.25N- HNO_3 , 0.5N-NaOH, 1% solutions of a no. of salts) has been studied. It is concluded that removal of P by leaching from red Fe ores in Alabama is not commercially feasible.

W. P. R.

Alkali recovery.—See XI.

See also A., Feb., 147, **Low-temp. phenomena [in liquefying He]**. 169, **Prep. of Pt oxide catalyst**. 173, **Prep. of Al_4C_3** . 177, **Determining PO_4^{3-} by pptn. as NH_4 phosphomolybdate**. 178, **Spectrophotometric determination of KCl in sylvines**. 258, **I in marine algæ**.

PATENTS.

Preparation of chromic acid and sparingly soluble chromates. R. E. PEARSON and W. V. GILBERT (B.P. 428,375, 9.11.33 and 21.4.34).—Aq. $Na_2Cr_2O_7$ is electrolysed in a divided cell the anode of which consists of a Cr-rich alloy, whereby CrO_3 accumulates in the anolyte, or of the metal, e.g., Zn, of which the insol. chromate is required. The process ceases when the catholyte consists of aq. Na_2CrO_4 .

A. R. P.

Production of phosphoric acid [from phosphate rock]. C. H. KELLER, Assr. to MINERALS SEPARATION N. AMER. CORP. (U.S.P. 1,981,145, 20.11.34. Appl., 21.10.33).—The crushed rock is heated for 5 hr. at 110—120° with 1:1 H_2SO_4 , just insufficient to decompose all the $Ca_3(PO_4)_2$, the mixture is cooled slowly (18 hr.) and agitated with $COMe_2$ or other ketone, alcohol, or ester of low b.p. to extract the H_3PO_4 , and the org. layer is separated and distilled to recover the solvent and leave pure H_3PO_4 free from H_2SO_4 .

A. R. P.

Double carbonates of sodium and ammonium. R. B. MACMULLIN, Assr. to MATHIESON ALKALI WORKS, INC. (U.S.P. 1,980,691, 13.11.34. Appl., 21.3.32).—A 4% solution of NH_3 in 50% EtOH is saturated with $NaNO_3$, stirred at 25° with $NH_2 \cdot CO_2NH_4$, and cooled to

0°, whereby the compound, $NaNH_4CO_3 \cdot 2H_2O$, separates in crystals.

A. R. P.

Catalyst for oxidation of ammonia. S. L. HANDFORTH, Assr. to E. I. DU PONT DE NEMOURS & Co., and BAKER & Co., INC. (U.S.P. 1,978,198, 23.10.34. Appl., 27.10.31).—The catalyst comprises gauze or chips of an alloy of Pt with Rh 1—10 (5) and W 1—5 (3). The W may be replaced by any other metal of groups V and VI.

A. R. P.

Production of nitrites. W. E. KIRST and F. J. G. THEDIECK, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,978,431, 30.10.34. Appl., 13.6.29).—The catalytic oxidation of NH_3 is so controlled that the mol. ratio of NO: NO_2 in the products is < 1:1. The gases are absorbed in aq. NaOH.

A. R. P.

Manufacture of coarsely-crystalline ammonium sulphate. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 435,007, 6.12.34).—Slightly acid aq. $(NH_4)_2SO_4$ is evaporated with 0.05—1.0% of Na_2SO_4 , K_2SO_4 , $MgSO_4$, $ZnSO_4$, or $MnSO_4$ and 0.005—0.2% of Al_2O_3 as $Al_2(SO_4)_3$, the % additions being based on the wt. of $(NH_4)_2SO_4$ present. On cooling, crystals having a length of 3—6 mm. and a length:thickness ratio of 4—5:1 are obtained.

A. R. P.

Treatment of polyhalite. E. P. SCHOCH (U.S.P. 1,981,125, 20.11.34. Appl., 19.9.31).—The finely-powdered mineral mixed with CaO \equiv its Mg content is stirred rapidly into hot H_2O for a few min., the mixture is boiled vigorously to complete the reaction, and the aq. K_2SO_4 separated by filtering the hot mixture quickly to avoid formation of insol. double salts.

A. R. P.

Preparation of alkali perborate. J. McKEOWN, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,978,953, 30.10.34. Appl., 17.10.28).—Borax is dissolved in 30% H_2O_2 [3—5 (4) mols.] and the solution is evaporated to dryness at 49°/2 in. to produce $NaBO_3 \cdot H_2O_2 \cdot HBO_2$.

A. R. P.

Manufacture of alkali alcoholates [alkoxides]. E. T. OLSON and R. H. TWINING, Assrs. to CLEVELAND CLIFFS IRON Co. (U.S.P. 1,978,647, 30.10.34. Appl., 6.11.31).—A mixture of the alcohol, alkali hydroxide, and $COMe_2$ is either refluxed or kept at room temp. until the desired compound crystallises. The crystals are washed with kerosene and dried in CO_2 -free dry air.

A. R. P.

Production of [pure] barium sulphate [from barytes]. A. L. DUVAL D'ADRIAN, Assr. to INGRAM & DUVAL, INC. (U.S.P. 1,981,094, 20.11.34. Appl., 18.5.31).—The powdered mineral is heated with H_2SO_4 (< 96% concn.) while HCl gas is passed through the liquid, the insol. material is removed, and the acid diluted to 80—93%, whereby practically all the dissolved $BaSO_4$ is pptd. in a pure state.

A. R. P.

Separation of calcium and magnesium chlorides. E. O. BARSTOW, S. B. HEATH, and F. R. MINGER, Assrs. to Dow CHEM. Co. (U.S.P. 1,978,403, 30.10.34. Appl., 31.12.32).—Brine containing $MgCl_2$ and $CaCl_2$ is treated with pptd. $MgCO_3$ in amount < that \equiv the $CaCl_2$, to ppt. pure $CaCO_3$ which later is calcined to CaO. The CaO is slaked and used to ppt. $Mg(OH)_2$ from another portion of the original brine, leaving Mg-free

aq. CaCl_2 . The $\text{Mg}(\text{OH})_2$ is mixed with the mother-liquor from the first stage and CO_2 passed into the mixture to ppt. the remainder of the Ca as CaCO_3 and to convert the remaining $\text{Mg}(\text{OH})_2$ into MgCO_3 for use in the first step, leaving a solution from which MgCl_2 is obtained by evaporation. A. R. P.

Production of high-strength calcined gypsum. W. S. RANDEL, M. C. DAILEY, and W. M. McNEIL, Assrs. to UNITED STATES GYPSUM Co. (U.S.P. 1,979,704, 6.11.34. Appl., 5.8.30).—Lump gypsum is calcined in vertical retorts and the steam is condensed to hot H_2O which is used to preheat and wash the fines from further quantities of ore. A. R. P.

Manufacture of zinc oxide. AMER. ZINC, LEAD & SMELTING Co. (B.P. 435,005, 24.11.34. U.S., 13.12.33).—Roasted Zn ore is heated with C and the vapours together with the CO evolved are burned slowly at 1100° by cautious admission of air to the combustion chamber, to produce ZnO in an acicular form. A. R. P.

Production of [zinc sulphide] precipitates. NEW JERSEY ZINC Co., Asses. of A. J. MYHREN and B. MARQUIS (B.P. 435,287, 16.7.34. U.S., 15.12.33).— H_2S is drawn into the ZnSO_4 solution during its passage through a Venturi valve so that a vigorous intermixing occurs accompanied by rapid pptn. of ZnS in a finely-divided form which readily settles. The process is also applicable to the manufacture of CdS and CaCO_3 pigments. A. R. P.

[Zinc sulphate] solution purification. O. C. RALSTON and F. H. MILLER, Assrs. to UNITED VERDE COPPER Co. (U.S.P. 1,918,068, 20.11.34. Appl., 2.6.31).—Slightly acid aq. ZnSO_4 is freed from Cd by addition of $\text{CuSO}_4 \equiv 0.12\text{--}1.0$ g. of Cu per litre and agitation with Zn dust. A. R. P.

Preparation of alumina poor in silicic acid from alkaline-earth aluminates. J. STRÖHR (U.S.P. 1,978,823, 30.10.34. Appl., 12.11.32. Ger., 23.11.31).—The aluminate is digested with an excess of aq. Na_2CO_3 over that \equiv the alkaline earths present, and the mixture is treated with $\text{Ca}(\text{OH})_2 \equiv$ the excess of Na_2CO_3 and to \ll 12 times the wt. of dissolved SiO_2 , so that the free CaO in the liquor is 6—17.5 kg. per cu. m. After filtration the Al_2O_3 is recovered by the Bayer process or by treatment with CO_2 . A. R. P.

Preparation of base-exchange materials. A. S. BEHRMAN, Assr. to GEN. ZEOLITE Co. (U.S.P. 1,978,889, 30.10.34. Appl., 23.9.31).—In the manufacture of zeolites by reaction of aq. Na_2SiO_3 with Al or other salts the gel is washed first with H_2O , then with a buffered solution which has $\text{pH} \ll 4.3$ and is capable of neutralising free alkali, e.g., a borate or phosphate buffer of $\text{pH} 7$. A. R. P.

Preparation of absorbent [clay] low in salts and free from acid. D. S. BELDEN and W. KELLEY, Assrs. to FILTROL Co. of CALIFORNIA (U.S.P. 1,980,569, 13.11.34. Appl., 2.9.30).—Clay is heated with H_2SO_4 to remove sol. impurities, washed with H_2O until the sol. salts are reduced to 1—2% and the acidity to 0.2—0.8%, dried, heated to 120—400°, and again leached to remove the remaining salts and acid. A. R. P.

Recovery of beryllium compounds [chloride]. J. E. BUCHER, Assr. to ANTIOCH INDUSTRIAL RES. INST.,

INC. (U.S.P. 1,988,109, 15.1.35. Appl., 5.10.32).—BeO is heated in a current of COCl_2 , CCl_4 , S_2Cl_2 , or SO_2Cl_2 at a temp. at which the BeCl_2 formed volatilises, and the gases issuing from the furnace are passed over NaCl at 215° , whereby the BeCl_2 is absorbed with the formation of the eutectic BeCl_2 -NaCl mixture, which is drained away. A. R. P.

Improving the fireproofing, heat-insulating, and other properties of products having a base of asbestos or other magnesium silicates. COMP. INTERNAT. DE PROD. IGNIFUGES ET CALORIFUGES (B.P. 440,409, 28.5.34. Belg., 31.3.34).—The materials are immersed in (a) a cold aq. solution of a hardening agent, e.g., $(\text{NH}_4)_2\text{SO}_4$ or Na_2HPO_4 , to which $(\text{NH}_4)_2\text{CO}_3$, alum, H_3BO_3 , and starch may be added, (b) an aq. alkaline silicate to which are added Fe_3O_4 and a filler, e.g., graphite, (c) a composition containing Na_2SiO_3 (65), BaSO_4 (10), CaCO_3 (10), C (2), Al powder (7), and Co linoleate (3 pts.). S. M.

Apparatus for converting lead suboxide into litharge. L. S. ISHIMURA (U.S.P. 1,979,745, 6.11.34. Appl., 21.1.31).—The powdered Pb_2O is fed by means of a screw conveyor into a horizontal flue containing rotating paddles which beat the charge into a fine dust and drive it through burners by which it is roasted to PbO, which falls down a vertical shaft into a collector box fitted with a screw conveyor and a cyclone dust collector. A. R. P.

Plumbite solutions [for refining petroleum oils]. M. P. KIRK, Assr. to M. P. KIRK & SONS, INC. (U.S.P. 1,977,993, 23.10.34. Appl., 26.8.29. Renewed 29.12.32).—Old accumulator plates are ground with Na_2CO_3 solution to convert PbSO_4 into PbCO_3 , the resulting Na_2SO_4 is washed out, and the residue dried and roasted at $590\text{--}650^\circ$ to produce PbO containing antimoniate, which is subsequently dissolved in aq. NaOH (d 1.11—1.16) to form Na_2PbO_2 containing Na_2HSbO_4 . A. R. P.

Manufacture of [basic] chromic salt [sulphate] solutions. F. W. BINNS, Assr. to VIRGINIA SMELTING Co. (U.S.P. 1,983,733, 11.12.34. Appl., 14.11.32).—Liquid SO_2 is introduced into aq. $\text{Na}_2\text{Cr}_2\text{O}_7$ to form aq. Na_2SO_4 and $\text{Cr}(\text{OH})\text{SO}_4$ for use in tanning leather. A. R. P.

Manufacture of titanium dioxide. B. D. SAKLATWALLA, H. E. DUNN, and A. E. MARSHALL, Assrs. to SOUTHERN MINERAL PRODUCTS CORP. (U.S.P. 1,978,228, 23.10.34. Appl., 8.8.32).—Ilmenite is dissolved in H_2SO_4 , the solution diluted to 5% TiO_2 , the Fe^{++} reduced to FeSO_4 , part of which is removed by crystallisation, the acidity of the solution adjusted to 6—14 (10)% free H_2SO_4 and the TiO_2 content to about 2.5%, and the solution hydrolysed at $95\text{--}100^\circ$ so that the $\text{TiO}(\text{OH})$ is pptd. slowly in a more finely-divided form free from impurities. A. R. P.

Purification and regeneration of platinum catalysts [for oxidation of sulphur dioxide]. E. S. RIDLER, Assr. to GRASSELLI CHEM. Co. (U.S.P. 1,980,829, 13.11.34. Appl., 22.6.33).— MgSO_4 catalysts containing Pt are regenerated by impregnating them with volatile reducing agents, e.g., NH_2OH , N_2H_4 , or aldehydes, and heating to expel volatile matter. A. R. P.

Repurification of carbon dioxide gas. G. T. REICH (U.S.P. 1,978,508, 30.10.34. Appl., 22.4.32).—Crude CO_2 is compressed, purified by passage through H_2SO_4 containing CrO_3 , and further compressed and cooled to liquefy it. The gas used for cooling, derived from the final expansion process, is passed through further purifiers and again condensed, and the two liquids are mixed and expanded to obtain CO_2 snow.

A. R. P.

Recovery of hydrogen from gases containing hydrogen and hydrocarbons. E. HOCHSCHWENDER and M. JOSENHAUS, Assrs. to STANDARD-I. G. Co. (U.S.P. 1,977,992, 23.10.34. Appl., 20.2.32. Ger., 14.2.31).—Gases from a hydrogenation process containing volatile hydrocarbons are passed through a stripper to remove the less volatile components, then compressed, and washed countercurrently with an oil solvent for the more volatile hydrocarbons, the purified H_2 being returned to the hydrogenator.

A. R. P.

Manufacture of hydrogen peroxide. M. J. RENTSCHLER, Assr. to W. R. JEAVONS (U.S.P. 1,978,551, 30.10.34. Appl., 22.6.31).— BaO_2 is mixed with about $\frac{1}{2}$ of the stoichiometric vol. of dil. H_2SO_4 and the mixture is ground in a pebble mill with cooling while the remainder of the acid is added. The acidity of the solution is then adjusted by successive additions of $\text{Ba}(\text{OH})_2$ and H_2SO_4 to p_{H} 4 (approx.) before the ppt. of BaSO_4 is removed by filtration.

A. R. P.

Production of oxygen of high purity. LINDE AIR PRODUCTS Co., Asses. of G. J. BOSKOFF (B.P. 435,281, 4.5.34. U.S., 18.5.33).— O_2 -rich fractions from the rectification of liquid air are liquefied and rectified in two low-pressure stages, in the first of which the vapours are refluxed solely with a liquid from the first liquefaction, and in the second with pure O_2 .

A. R. P.

Storage of oxides of nitrogen. I. HECHENBLEIKNER, Assr. to CHEM. CONSTRUCTION CORP. (U.S.P. 1,979,544, 6.11.34. Appl., 16.9.31).—Gases from the catalytic oxidation of NH_3 are stored over dil. HNO_3 in such a way that the condensate from the inner walls of the holder will be collected in the acid.

A. R. P.

Plastics [sulphur]. W. A. HAMOR and W. W. DUECKER, Assrs. to TEXAS GULF SULPHUR Co. (U.S.P. 1,981,232, 20.11.34. Appl., 5.10.32).—A mixture of S with 10% As_2S_3 is heated at $> 200^\circ$ and poured into H_2O at $0-60^\circ$. The resulting plastic product is stable indefinitely at $< 60^\circ$, but hardens to a glassy mass on keeping at 70° for 18 hr.

A. R. P.

Separating constituents of mixed gases.—See I. Separating gaseous mixtures.—See II. Treating Zn-Pb ore.—See X. Gas detector. Electrolytic apparatus [for salts].—See XI. Bleaching agents etc.—See XII. White-Pb pigments.—See XIII. Fertilisers.—See XVI.

VIII.—GLASS; CERAMICS.

Producer-gas plant in glass manufacture. F. J. HURLBUT (J. Soc. Glass Tech., 1935, 19, 330—338 τ).—It is recommended that the size of the producer be such that it is operated on only moderate output (11-ft. producer, 25 tons/day, *i.e.*, 24.6 lb./ft./hr.) because less

“fines” is blown out, the CO_2 and temp. of operation are lower, lower-grade fuel may be gasified, and a smaller steam pressure is required. The power for blowing the producer (electric or turbo), the choice of coal, handling of coal, ash, and dust, and the design of gas mains are briefly discussed. A const. gas pressure can be maintained by the use of an “Askania” regulator. Producer gas (2.2d. per therm) may be used in place of town’s gas (5d. per therm) for feeders, “glory holes,” etc.

J. A. S.

Control of glass furnaces. W. MASKILL (J. Soc. Glass Tech., 1935, 19, 312—318 τ).—Much improvement in existing furnace performance may be obtained by a more careful study of the size and design of gas flues, mains, and ports, of regenerators, of air leakage through brickwork, insulation, and chimney design. More scientific control of gas quantity and quality and furnace temp. is advocated.

J. A. S.

Distribution of heat losses in a tank furnace system. H. S. Y. GILL (J. Soc. Glass Tech., 1935, 19, 319—329 τ).—The losses, expressed as % of heat in the coal, from a tank with an output of 50 tons/day were: producer and gas main to valve 22.3, furnace structure 37.2, regenerators 7, stack 25 (including 2.5 for excess air). The efficiencies of the furnace and regenerator were 7.3 and 57%, respectively. Insulation of the crown reduced the loss from it from 6% to 3%.

J. A. S.

Resistant glasses for modern electric-discharge lamps. J. H. PARTRIDGE (J. Soc. Glass Tech., 1935, 19, 266—278 τ).—Glasses suitable for Hg-vapour lamps contain SiO_2 50, Al_2O_3 20, CaO (or CaO + ZnO or BaO) $< 16\%$, and little or no alkali, and are melted at $1450-1480^\circ$ in special aluminous porcelain (maturing at $1550-1600^\circ$) pots. These glasses have a low Fe_2O_3 content, a high softening point (900° , $10^{8.5}$ poises), and a low sp. resistance ($< 2 \times 10^6$ ohms/cm. at 600°). The presence of 5% of P_2O_5 lowers the thermal expansion to approx. 3.4×10^{-6} . Glasses suitable for Na lamps (*i.e.*, resistant to the reducing action of Na on SiO_2 at 300°) contain SiO_2 0—25, Al_2O_3 10—30, B_2O_3 30—50, BaO 0—30, CaO 10%, and as little Fe_2O_3 as possible (0.02%). The glasses have a softening point (10^8 poises) of $600-700^\circ$, a thermal expansion of $5-8 \times 10^{-6}$, and are very fluid and corrosive. Such glasses may be worked alone at 800° or “flashed” on ordinary glass.

J. A. S.

Analysis of some glasses for modern electric-discharge lamps. R. C. CHIRNSIDE (J. Soc. Glass Tech., 1935, 19, 279—295 τ).—Full details are given for the analysis of glasses containing high proportions of Al_2O_3 and P_2O_5 , with particular reference to the glasses described by Partridge (cf. the preceding abstract). Al_2O_3 is separated from P_2O_5 by pptn. with 8-hydroxyquinoline. The conditions necessary for the use of this reagent are very crit. Adaptation of the methods for rapid semi-micro-analysis is described.

J. A. S.

Effect of frequency of impressed electromotive force on the power losses and dielectric constant of various glasses. L. S. McDOWELL, P. BULLARD, and M. E. WHITNEY (Physical Rev., 1934, [ii], 46, 939).—Data are recorded.

L. S. T.

Permanent anisotropy of window glass. P. GAUBERT (Bull. Soc. franç. Min., 1935, 58, 314—323).

L. S. T.

Determining the coefficient of expansion of coke-oven silica brick. G. V. KUKOLEV and V. A. BRON (Koks i Chim., 1935, No. 10, 49—53).—A sample of SiO_2 brick approaching a coke-oven brick in size is heated in a special electric furnace. The expansion of the refractory is obtained by difference of the expansions of brick and brick + furnace floor.

D. R. H.

See also A., Feb., 145, **Tridymite and cristobalite.**

PATENTS.

Glass furnace. B. D. BROWN, Assr. to CAPSTAN GLASS Co. (U.S.P. 2,001,766, 21.5.35. Appl., 29.3.33).—A water-cooled feeding aperture is claimed.

B. M. V.

Cooling of glass. CORNING GLASS WORKS, Asses. of G. V. MCCAULEY (B.P. 440,872, 2.8.35. U.S., 28.2.35).—A large mass of glass is cooled rapidly to a temp. between the softening and annealing points, the exposed surface is reheated to allow the exterior to yield, and the whole mass is annealed.

B. M. V.

Tempering of glass sheets. PILKINGTON BROS., LTD., L. J. B. FORBES, and J. WILSON (B.P. 441,017, 10.7.34).—The greater part of the heat in the glass is absorbed by H_2O very finely sprayed from a large no. of uniformly spaced points, the mist of H_2O being preferably obtained by condensation of steam in a current of air.

B. M. V.

Annealing of sheet glass. W. L. MONRO, Assr. to AMER. WINDOW GLASS Co. (U.S.P. 2,002,544, 28.5.35. Appl., 8.9.34).—All processes, from drawing the molten glass from a tank to the final cooling, are effected in one vertical upward pass, the temp. being lowered to $< 600^\circ$ while in the drawing pit and to $< 450^\circ$ later on, localised cooling while the glass is between those temp. being prevented by circulations of hot air transverse to the travel and parallel to the surface of the glass.

B. M. V.

Manufacture of safety glass. W. W. GROVES. From DEUTS. CELLULOID-FABR. (B.P. 440,887, 2.7.34).—Each sheet of glass is coated with an aq. dispersion of a polymerisation product containing no solvent or emulsifying agent, the product being derived from a vinyl compound or mixed vinyl chloride and an acrylic ester. Previously the plates may be "prepared" with gelatin, and afterwards the H_2O is removed by heat and the plates are pressed together without interposition of any other lamina.

B. M. V.

Decoration of glass. A. H. ERNST, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,977,625, 23.10.34. Appl., 11.11.31).—The hot glass (600°) is sprayed with a mixture of Ag_2O (0.06), Pb borate flux (0.11), rosin 32.62, copaiba balsam (10), and turpentine (56.67%), and then annealed in the usual way, whereby a bright Ag film is obtained.

A. R. P.

Metal-protected mirror. S. C. LANGDON, Assr. to CURTIS LIGHTING, INC. (U.S.P. 1,977,639, 23.10.34. Appl., 15.10.31).—Silvered glass is plated first with Ni, Co, Fe-Co, Fe-Ni, or Ni-Co alloys to a thickness = 0.6 times the Ag thickness, then with Cu = 9 times the Ag thickness, and finally with a protective enamel.

A. R. P.

Production of enamelled articles carrying a gloss and matt finish. R. TURK, Assr. to PORCELAIN ENAMEL & MANUFG. Co. (U.S.P. 1,993,196, 5.3.35. Appl., 13.3.31).—Decorative rock (*e.g.*, marble) effects are obtained by applying matt and gloss enamels to separate areas and allowing them to intermingle before firing. The matt enamel preferably should contain ZnO .

J. A. S.

Indurated clay product. M. H. KLIEFOTH, Assr. to C. F. BURGESS LABS., INC. (U.S.P. 2,000,338, 7.5.35. Appl., 28.7.32).—A small proportion, 1—8 (2—5)%, of caustic alkali is added to clay (raw or burnt clay, bentonite, bauxite alone or admixed with limestone, porous or fibrous aggregate), and the mass heated at $110\text{--}500^\circ$ ($250\text{--}400^\circ$) to produce a non-vitrified product nearly as hard as clay fired to just below the fusion point. Cellulosic materials may be incorporated, and the temp. must not then rise above the charring point.

B. M. V.

Manufacture of abradant material. L. E. BARRINGER, Assr. to GEN. ELECTRIC Co. (U.S.P. 1,980,151, 6.11.34. Appl., 3.12.26. Renewed 8.9.30).—Claim is made for abrasive wheels made by bonding abrasive grains with glycerol-phthalic acid resin, moulding under pressure, and baking at $75\text{--}190^\circ$.

A. R. P.

Manufacture of abrasive metal castings. H. W. MOWERY (U.S.P. 1,978,319, 23.10.34. Appl., 16.6.32).—A chill mould is coated with a thin paste of clay and molasses on to which the abrasive particles are sprinkled, and, after drying, the molten metal is cast over the abrasive so that one half of each grain is embedded in the metal while the other is exposed.

A. R. P.

Reclaiming aluminous oxide grains or the like. D. M. RAMSEY, Assr. to EXOLON Co. (U.S.P. 1,978,884, 30.10.34. Appl., 31.12.28).—Abrasive grains embedded in an Al silicate bond are recovered by soaking the material with aq. NaOH , drying, heating it at $200\text{--}300^\circ$ to render the Al_2O_3 and SiO_2 sol. in acid, and then mulling the mixture with HCl in order to dissolve the Al_2O_3 and allow the gelatinous SiO_2 readily to be washed away.

A. R. P.

Drying air for ceramic wares.—See I. **Bulbs for transmitting ultra-violet light.**—See XI.

IX.—BUILDING MATERIALS.

Inorganic infiltration theory of wood decay. (A) W. G. CAMPBELL. (B) E. A. RUDGE (Chem. & Ind., 1936, 117).—(A) Rudge's inorg. infiltration theory (*cf.* B., 1935, 592; 1936, 62) must stand or fall in relation to the action of Ca salts.

(A) A reply. The issue is considered to be biological theory *versus* the inorg.-infiltration theory.

D. K. M.

See also A., Feb., 160, **System $\text{CaO-SiO}_2\text{-H}_2\text{O}$** . 161, **System $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$** .

PATENTS.

Portland cement product. C. G. GILBERT, Assr. to RESEARCH CORP. (U.S.P. 2,001,608, 14.5.35. Appl., 1.11.32).—The particles of cement are caused to become spherical by fusion while dispersed in a suitable fluid.

B. M. V.

Production of arsenate-aluminate cement. BOLIDENS GRUVAKTIEB. (B.P. 435,015, 16.2.35. Swed., 19.2.34).—A moist mixture of As_2O_3 and bauxite or clay is roasted in a rotary furnace at 100–500° to produce an arsenate-aluminate material which is mixed with any type of commercial cement and/or with $Ca(OH)_2$ and sand or the like. A. R. P.

Production of cementitious material. G. A. HOGGATT, Assr. to CERTAIN-TEED PRODUCTS CORP. (U.S.P. 2,002,945, 28.5.35. Appl., 1.3.34).—An aq. halogen acid is added to gypsum, in the later stages of calcination, in various proportions (the effects of 0.005–0.25% are tabulated) to reduce the "boiling temp." and also the H_2O -carrying capacity (C), or, alternatively, the calcination temp. for the same C. B. M. V.

Manufacture of gypsum plaster. J. G. GUSTAFSON, Assr. to UNITED STATES GYPSUM CO. (U.S.P. 2,002,176, 21.5.35. Appl., 3.2.34).—The consistency is increased by admixture of 0.00048–0.096% of paraffin before calcination. B. M. V.

Treatment of furnace slag for production of foamed and granulated slag. DORMAN, LONG & Co., LTD., and J. S. LEWIS (B.P. 440,997, 9.7.35).—Two jets of H_2O are provided, one passing directly through the falling molten slag, the other meeting it on a surface, e.g., a rotating drum. The jets are individually regulable to adjust the proportion of foamed to granulated slag. B. M. V.

Manufacture of artificially-coloured [roofing] granules. M. R. BEASLEY, Assr. to BIRD & SON, INC. (U.S.P. 2,001,448, 14.5.35. Appl., 2.5.34).—Suitable granules are coated (a) with hydrous plastic clay and (b) with a coating containing Na silicate, either coating containing the pigment. They are heated at 232° to become glazed. B. M. V.

Manufacture of cellular clay products. H. D. FOSTER, Assr. to NAT. FIREPROOFING CORP. (U.S.P. 2,001,664, 14.5.35. Appl., 15.6.33).—The clay is finely ground, calcined, and mixed with a gas-generating material and later with dil. acid; the pulp is agitated to a cream, set aside to form cells, and finally fired. B. M. V.

[Solution for] preserving wood. A. R. LINDBLAD (B.P. 434,984, 12.6.34).—The wood is impregnated with a solution of $ZnCl_2$ or $Ca(OAc)_2$ containing As_2O_3 and $AcOH$, so that, after drying, the wood contains an insol. arsenate which acts as a fungicide and insecticide. A. R. P.

Drying sand etc.—See I. **Glue and adhesive [for plywood].**—See XV.

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

Heat losses in a Thomas converter during extended operation. M. PASCHKE and E. PEETZ (Stahl u. Eisen, 1936, 56, 86–93).—The two sources of heat loss, viz., conduction through the converter walls and radiation from its open mouth, have been studied during a series of melts in a Bessemer converter. Experiments show an increased heat loss through the walls with the age of the converter. The heat conductivity of the dolomite refractories used was established as 1.0 kg.-

cal./sq. m./hr. In spite of the greater heat loss of the old converters they function on a shorter blowing period. W. P. R.

Cast iron and [its production in] electric furnaces. A. LE THOMAS (Rev. Mét., 1936, 33, 14–23).—The production of pig Fe in electric furnaces is not commercially feasible, but its refinement to produce special cast Fe low in C, S, and P can be carried out in furnaces with a consumption of 700–800 kv.-amp. per ton. Electric cast Fe is uniform in hardness and composition, and generally has a higher tensile strength than cupola-melted Fe. W. P. R.

American malleable cast iron. R. GAILLY (Rev. Mét., 1936, 33, 38–42).—The production of malleable castings to a rigid specification is possible only when complete control of the annealing process is maintained. Addition of 0.22% Cr increases the tensile strength to 50 kg./sq. cm., but Ni tends to cause the formation of primary graphite with deterioration of the mechanical properties. Cu (\approx 1.73%) increases the fatigue strength and decreases the annealing time to effect complete graphitisation. W. P. R.

Special cast irons. A. LE THOMAS and M. BALLAY (Rev. Mét., 1936, 33, 24–37).—Ni, Cr, Cu, Ti, U, and Mo are the usual elements added to cast Fe to produce special cast Fe. The addition of small proportions, \approx 3%, of the alloying element affects the properties of the Fe by modifying the character and distribution of the ferrite, pearlite, and graphite. 0.1% Ti produces very finely-divided graphite. Larger proportions of the alloying elements alter the properties by the formation of structurally different constituents than are usually found in cast Fe. W. P. R.

Alloying of cast iron especially for rolls. E. SCHARFFENBERG (Giesserei, 1935, 22, 31–35).—Cast-Fe rolls can be obtained having a Brinell hardness (H_B) of up to 660 and, in rolling properties, equal to or better than the ordinary Ni-Cr steel rolls, by addition of sufficient Ni and Cr to the cast Fe to cause the surface layers to solidify with a structure composed of cementite and martensite; max. H_B is obtained with Cr 1.32 and Ni 4.27%. Almost as good results can be produced by addition of Mo \approx 0.4 and Cr \approx 0.5%. A. R. P.

Influence of nitrogen and oxygen on occurrence of veining in ferrite. W. EILENDER and H. CORNELIUS (Arch. Eisenhüttenw., 1935–6, 9, 263–264).—Examination of a no. of specimens of pure Fe melted in vac., air, or A under varying conditions and containing various amounts of N and O showed that there is no relation between the composition and the occurrence of veining. The phenomenon is ascribed to stresses produced by the γ - α transformation on cooling. A. R. P.

Heat-conductivity of pure iron and technical steel. F. BOLLENRATH and W. BUNGARDT (Arch. Eisenhüttenw., 1935–6, 9, 253–262).—From a review of recent literature, curves have been constructed for the heat-conductivity of pure Fe and various Fe-rich alloys containing W, Co, Ni, Cr, Al, Mn, P, and Si. The validity of several expressions which have been proposed for calculating the conductivity of alloys from their composition is discussed. A. R. P.

Photometric determination of silicon in presence of iron and accompanying elements. H. PINSL (Arch. Eisenhüttenw., 1935—6, 9, 223—230).—The steel (0.1 g.) is dissolved in 18 c.c. of 3*N*-HNO₃ and 1 c.c. of 15% H₂O₂ at 90°; after 5 min. 0.2*N*-KMnO₄ is added dropwise until the solution is pink, the colour is destroyed by heating with 2 c.c. of 3*N*-HCl, the solution cooled exactly to 20° after addition of 10 c.c. of 3*N*-NaOH, treated with 5 c.c. of 20% aq. (NH₄)₂MoO₄ and, after 8—10 min., with 20 c.c. of 2% aq. NaF, diluted to 100 c.c., and the yellow colour measured in a photometer. A blank trial should be made on the reagents. The NaF prevents interference of P; the presence of V makes the results about 0.02% high, and > 0.6% Ti invalidates the process. A. R. P.

Welding of chromium steels in chemical plant equipment. J. R. DAWSON (Canad. Chem. Met., 1935, 19, 337—338).—Cr steels fall into 7 classes in the ranges 7—30% Cr and 0.1—0.3% C. The use of coated electrodes is essential in electric welding because of the high affinity of Cr for O₂. Some of the Cr steels air-harden on cooling and require careful annealing to prevent hard welds. Intergranular corrosion near welds is prevented by addition of Ti or Nb to the 18 : 8 type of stainless steel. W. P. R.

Resistance of nitrided austenitic manganese steel against sea-water corrosion. S. SATOH (Sci. Papers Inst. Phys. Chem. Res. Tokyo, 1936, 28, 221—230; cf. B., 1934, 99).—Voltage-time measurements have been made on various nitrided and non-nitrided steels in sea-H₂O. Austenitic Mn steel becomes nobler by approx. 0.9 volt when nitrided, and then is self-healing and quite stainless in sea-H₂O. Nitrided Nitralloy containing Ni becomes slightly rusty, and is less noble than the nitrided Mn steel. The latter when nitrided by NH₃ at 500° for 40 hr. ultimately rusts, but nitriding for 60 hr. gives a perfectly stainless steel. The Mn steel shows no increase in hardening on nitriding, in contrast to Nitralloy. The penetration of N is greatest with the Mn steel. R. S. B.

Simplified technique for lattice-parameter measurements. J. T. NORTON (Met. & Alloys, 1935, 6, 342—344).—A technique for a "back-reflexion" camera is described and results are given of the solubility of Cu in Fe. E. H. B.

Mechanism of hardening [in alloys]. G. WASSERMANN (Arch. Eisenhüttenw., 1935—6, 9, 241—245).—The validity of the pptn.-hardening theory is discussed with reference to recent work on Al and Fe alloys. There is little doubt that hardening is conditional on a change in solubility of the solute metal with rise in temp., but the necessity for the presence of a disperse phase in the hardened alloy has not been confirmed. Recent work has indicated that pptn. is the final stage of a series of preliminary processes the nature of which determines the hardening; the term "pptn.-hardening" is therefore considered to be misleading. A. R. P.

Pressure die-casting. P. BASTIEN (Rev. Mét., 1936, 33, 43—54).—This process enables the cheap manufacture of unstressed articles to a high degree of accuracy, which entails the use of alloys of dimensional stability. The extension of the method to alloys of

high m.p. has been made possible by the use of alloy^s with a long solidification range, and the development of special heat-resisting steels. The causes of porosity in die-castings are: disengagement of dissolved gas at the moment of solidification, oil or grease in the moulds, entrapment of air bubbles. W. P. R.

Brass and copper forgings. Their manufacture, properties, and uses. E. F. CONE (Met. & Alloys, 1935, 6, 337—341).—Brass for forging contains Cu 58.5—61.5, Pb 1.5—2.5, other impurities < 0.5%, Zn remainder. Forging tools are described and the microstructure of forgings is illustrated. E. H. B.

Temper-hardening of commercial nickel-coppers containing phosphorus. E. C. ROLLASON and T. G. BAMFORD (Met. & Alloys, 1935, 6, 345—346, 349).—Addition of P to Cu containing 1.5—2.5% Ni renders the metal hardenable by suitable heat-treatment, such as quenching from 750—800° followed by tempering for ½—2 hr. at 500°. An alloy containing Ni 1.73, P 0.11% has after this treatment: tensile strength 23 tons/sq. in., elastic limit 7 tons/sq. in., and Brinell hardness 80; the corresponding vals., as quenched, are 14.7, 0.8, and 42. Little microstructural change is observed in this alloy, but material containing 0.4% P exhibits a second constituent as tempered. E. H. B.

Mercurous nitrate test [for copper alloys]. H. C. JENNISON (Met. & Alloys, 1935, 6, 348—349).—All Cu alloys crack in time in a 10% solution of HgNO₃ with 13 c.c. of HNO₃ per litre; the period of immersion cannot be interpreted quantitatively as a measure of internal stress. E. H. B.

Determination of tin in minerals and metallurgical residues by 0.1*N*-potassium bromate. L. DEUTSCH (Ann. Chim. Analyt., 1936, [iii], 18, 10).—The sample is fused with Na₂O₂, dissolved in dil. HCl, and reduced by Fe and then Al. The Sn is redissolved in HCl and titrated (ZnI₂) with 0.1*N*-KBrO₃. Sb in alloys may be determined by the KBrO₃ method before reduction of the Sn. R. S.

Corrosion of tinplate. T. P. HOAR (Tech. Publ. Tin Res. Council., 1936, A, No. 30, 10 pp.).—A lecture on the mechanism and remedies. E. S. H.

Use of ultra-violet lamps in mines for rapid detection of scheelite in ores by fluorescence. W. O. VANDERBURG (U.S. Bur. Mines, Inf. Circ. 6873, Dec., 1935, 3 pp.).—An Fe arc lamp fitted in a suitable apparatus is described. Scheelite (I) fluoresces (light blue in Fe spark) in ultra-violet light, and by means of the apparatus a rapid qual. and approx. quant. determination of (I) in ores and mill products is possible.

W. P. R.

Extraction of aluminium from German raw materials. F. GEWECKE (Chem.-Ztg., 1936, 60, 133—135, 155—158).—A review.

Protection and decoration of aluminium and its alloys by anodic oxidation. J. BALLY and O. DUMAS (Rev. Aluminium, 1935, 12, 2983—3008).—The electrolytes used in anodic oxidation of Al are H₂CrO₄, H₂SO₄, and H₂C₂O₄. The hardness of the anodic film of Al₂O₃ varies with the temp. of the electrolyte, the inner layer attaining a hardness 2½ times that

of glass. The film will absorb pigments and dyes, and has a high electrical resistance. The application of anodic treatment to various industrial uses is fully described.

W. P. R.

Diffusion of copper into the [aluminium] coating on hardenable aluminium alloys ["alclad"].

A. BURKHARDT and G. SACHS (*Metallwirts.*, 1935, 14, 1—3).—When alclad with a duralumin core is annealed at 500° the Cu diffuses from the core into the Al coating at such a rate that in 2—3 hr. the protective val. of a coating 0.5 mm. thick is entirely destroyed. The presence of Mg in the core has no retarding effect on the Cu diffusion.

A. R. P.

Tests for determining the properties of cast aluminium alloys.

A. VONZEERLEDER (*Rev. Mét.*, 1936, 33, 1—6).—The problem of obtaining a satisfactory sample for testing which will be characteristic of a casting is discussed. A round test-piece cast horizontally is recommended.

W. P. R.

Simple methods for identifying aluminium alloys.

E. ZURBRÜGG (*Rev. Aluminium*, 1935, 12, 3009—3013).—Heat-treated and wrought material can be approx. classified by a scratch test, using two needles made from annealed and heat-treated "Almelec alloy." A spot test using 20% aq. NaOH indicates the absence or presence of Cu. Cast alloys can be placed in one of the following six groups: (1) Al-Cu, (2) Al-Zn, (3) Al-Si, (4) Al-Mg, (5) Mg alloys, (6) pure Al, by putting on the surface a drop of NaOH and observing the colour of the resulting stain and its reaction to HCl and HNO₃. The stain caused by aq. CdSO₄ further helps in identifying the alloys.

W. P. R.

Plastic deformation and age-hardening of duralumin.

P. L. TEED (*J. Inst. Metals*, 1936, 58, Advance copy, 495—502).—Plastic deformation of duralumin immediately after normalising and quenching in cold H₂O produces an immediate increase in hardness \propto the degree of deformation (D), an increase in the rate of age-hardening during storage at room temp. and a more rapid completion of the process, a marked increase in the proof stresses related to D , a slight decrease in the ultimate stress and a somewhat greater decrease in shear stress irrespective of D , and a decrease in elongation $\propto D$. Plastic deformation after complete age-hardening at room temp. produces an instantaneous increase in hardness $\propto D$ which is practically stable and smaller than that produced under similar conditions when the ageing precedes deformation, a large increase in proof stress and a small increase in ultimate stress both related to D , and a decrease in elongation roughly $\propto D$. These results indicate that superior mechanical properties are obtained by the second procedure.

A. R. P.

Determination of the best quenching temperatures for duralumin.

V. VON SCHEIDT (*Z. Metallk.*, 1935, 27, 275—277).—Duralumin alloys containing Cu 4—4.2, Mg 0.5—0.8, Si 0.2—0.4, and Mn 0.35—0.65% blister at 530° and should therefore be quenched from 510—515°, after which the best tensile properties are obtained on ageing. The alloy with Cu 3.6, Mg 1.1, Si 0.6, and Mn 1.1% fails at 520° and should be quenched at 505°.

A. R. P.

Metallic wear. H. W. BROWNSDON (*J. Inst. Metals*, 1936, 58, Advance copy, 535—549).—Wear of a metal in lubricated frictional contact with another metal may be measured by rotating against the surface of a flat specimen a hard steel wheel, 1 in. diam., 0.10 in. thick, with a radius of 0.05 in. on the periphery; the area of the impression formed is a measure of the rate of wear. With a light mineral oil lubricant alloys containing Zn produce most fouling or seizing of the wheel, whereas Cu and Cu-Ni and Cu-Sn alloys produce none. Brass and nickel-silver wear less in soap solution than in oil, but the reverse is true for Cu, cupronickel, and Al bronze. Addition of Pb to a Sn-bronze increases the wear; variations in hardness have little effect on the wear of any metal, but in alloys which can exist in a single-phase and a duplex structure the wear is the less the more homogeneous is the structure. The effects of variations in the composition of the lubricant and in the nature of the surface on the wear of metals are briefly discussed.

A. R. P.

Ta spinnerets.—See V. Leaching red Fe ores.—See VII. Welding properties of bare steel electrodes.—See XI.

See also A., Feb., 143, Martensite in C steels. LiAl. AlB₂. 145, Explosive Sb. 151, Constitution of alloys. Diffusion and structure in solid alloys. System Li-Al. Fe-C-Be alloys. 152, Systems Mg-Ni, Mg-Mn, Al-Si, Au-Mn, Ni-Mn, Ag-Cu, Cu-Ni-Fe, and Cu-Al-Ti. Pptn.-hardening. Diffusion in metallic crystals. 161, Thermal decomp. of Fe₃C. 166, Rate of corrosion of steel in pure O₂ and air at 25°. 170, Electrodeposition of Cu. 173, Ductile Cr. 180, Iodometric determination of Sn. Determining Zr. Separation and determination of Pt metals. 181, Determining transformation points in alloy systems.

PATENTS.

Furnace for producing purified metals. M. L. WOOD, ASSR. TO CHASE COMPANIES, INC. (U.S.P. 2,001,808, 21.5.35. Appl., 28.8.33).—A furnace especially suitable for producing highly-refined Cu or Cu alloy comprises a main bath from which a molten metal loop of small cross-section extends downwards, and embraces a heating means which may conveniently be an electromagnetic core and H₂O-cooled winding.

B. M. V.

Open-hearth slag utilisation. J. E. LOSE and R. H. WATSON (U.S.P. 1,979,753, 6.11.34. Appl., 14.11.32).—The slag is melted in a blast furnace to obtain Fe containing Mn 12—24, P 1.5—3, Si 0.3—0.7, and C 4—4.5%, which is blown in a basic converter until the Mn and C are oxidised and a slag is obtained containing Mn 35—55, Fe 3—5, and P ∇ 0.3%. This slag is reduced with ferrosilicon to obtain a high-grade ferromanganese, and the phosphatic Fe in the converter is further blown with the addition of CaO to produce basic slag and Fe for making steel.

A. R. P.

Heat-treatment. [Bright annealing of metals.] W. S. BOWLING, ASSR. TO ELECTRIC FURNACE CO. (U.S.P. 1,979,820, 6.11.34. Appl., 2.6.32).—Natural gas and insufficient air for complete combustion are passed through an electrically heated reaction tube to produce

a mixture of N_2 , CO, H_2 , and H_2O vapour, which is cooled to condense most of the moisture, passed through a dryer, and then used as a furnace atm. for bright annealing. A. R. P.

Flotation of hæmatite. A. M. GAUDIN (U.S.P. 1,979,324, 6.11.34. Appl., 29.6.29).— Fe_2O_3 ore containing quartz and feldspar is activated with $CuSO_4$ and floated with oleic acid and terpeneol in a solution of pH 3—6. A. R. P.

Mineral separator. W. R. J. WOOCK (U.S.P. 2,001,756, 21.5.36. Appl., 11.8.33).—A vibrating sluice box is provided with one or more superposed screens and below the lowest a cross-riffled conveyor belt running up the slope, the concentrates being washed off the belt in a flush box on the return run. B. M. V.

Production of sponge iron. W. D. BROWN (U.S.P. 1,979,729, 6.11.34. Appl., 5.6.33).—Natural gas is passed through a catalyst chamber containing coke impregnated with NiO and heated at 1000° , then over the ore which has been preheated by waste gases from a previous operation. A. R. P.

Fused salt bath for carburising iron, steel, and the like. W. BECK and K. BONATH, ASSRS. to DEUTS. GOLD- U. SILBER-SCHNEIDANSTALT VORM. ROESSLER (U.S.P. 1,980,152, 6.11.34. Appl., 3.3.32. Ger., 5.3.31).—The bath consists of $BaCl_2$ 50—65 (65), $NaCN$ 8—15 (9), $SrCl_2$ 6—15 (9), $BaCO_3$ 3—15 (11), and KCl 5—10 (6)%. A. R. P.

Production of cast-iron castings surface-hardened or hardenable by the nitrogen-hardening process. J. E. HURST, and BRADLEY & FOSTER, LTD. (B.P. 435,316, 19.3.34).—Sand-castings of Fe containing C 2.5—4, Si < 1 (0.25—0.5), Al 0.3—1.75, Cr 0.5—2, and Ni, Cu, Mo, and Ti \geq 3% (in all) are annealed at 850 — 1050° , cooled slowly, machined to shape, hardened by quenching from 800 — 875° in a liquid heated at 150 — 200° , and then case-hardened in NH_3 at 500° . A. R. P.

Treatment of cast-iron castings. J. W. FORD, ASSR. to J. H. BRUNINGA (U.S.P. 1,980,578, 13.11.34. Appl., 10.2.22. Renewed 15.12.32).—The castings are packed in a mixture of cast Fe and Cu or Cu alloy, then heated for 2—4 hr. at 870 — 925° with an oil flame to adjust the C content, and allowed to cool over 10 hr. A. R. P.

Carbonising ferrous metal [sheet for radio-valves]. P. G. WEILLER, ASSR. to SWEDISH IRON & STEEL CORP. (U.S.P. 1,978,180, 23.10.34. Appl., 22.7.23).—The metal is degreased, heated to 600° in air to oxidise the surface, soaked in 3% aq. $Ni(NO_3)_2$, and heated at 650 — 700° in a hydrocarbon atm. to produce a thin adherent film of C on the surface without case-hardening the metal. A. R. P.

Pickling of metal [rustless iron or steel]. L. F. V. MATER (U.S.P. 1,978,151, 23.10.34. Appl., 30.7.31).—The scale produced by heat-treatment is loosened by anodic treatment in hot aq. NaOH, and removed by pickling in 5—10% HNO_3 containing 1% of HF. A. R. P.

Treatment of metallic materials [silicon-iron alloys]. O. M. OTTE, ASSR. to ALLEGHENY STEEL CO.

(U.S.P. 1,978,219—22, 23.10.34. Appl., [A, B] 31.8.32. [C] 13.9.32, [D] 24.9.32).—(A) Si-steel sheets for transformers are mechanically stressed, e.g., by alternate bending in a magnetic field, while a current is passed through them. (B) The sheets are hot-rolled in a magnetic field. (C) The sheets are compressed at $>$ the crit. temp. and allowed to cool in a magnetic field while maintaining the pressure. (D) The molten metal is poured into a mould previously filled with inert gas, and a high current is passed through the ingot while it is allowed to cool in a strong magnetic field to below its crit. temp. A. R. P.

Cold-rolled iron-chromium alloy article. H. S. GEORGE, ASSR. to ELECTRO METALLURG. CO. (U.S.P. 1,980,331, 13.11.34. Appl., 21.12.28).—Claim is made for cold-rolled sheet of an alloy of Fe with 8—40% Cr which has been box-annealed for 5 min. at 600° and electrolytically pickled in cold aq. NaOH to remove the thin oxide film produced by the anneal. A. R. P.

Treatment of metals. [Melting steel scrap.] G. E. HILLIARD (U.S.P. 2,002,010, 21.5.35. Appl., 17.2.31. Renewed 11.10.34).—Comparatively light steel scrap (turnings etc.) is mixed with fine C and charged on to a fuel-fired melting hearth, the conglomerate being worked outwards against the flames so that it does not meet an oxidising flame until melting takes place, before which time additional coarser C has been added; the melt is similar in composition to pig Fe. After storage in an intermediate hearth if desired, the melt is run to an electric furnace for refining and alloying. B. M. V.

Case-hardening of steel. E. A. HARDING and D. A. HOLT, ASSRS. to E. I. DU PONT DE NEMOURS & Co., Inc. (U.S.P. 1,979,214, 30.10.34. Appl., 17.10.32).—The salt bath contains $SrCl_2$ 25—60, $NaCl$ 73—25, and $NaCN$ 2—15%, the $SrCl_2$ and $NaCl$ being present preferably in eutectic proportions. A. R. P.

Inhibitor for nitriding processes. H. A. ECKMAN and H. W. MAACK, ASSRS. to CRANE CO. (U.S.P. 1,980,670, 13.11.34. Appl., 20.6.31).—The steel parts which are not to be nitrated are painted with a mixture of Sn powder 35—90 (70), ground SiO_2 5—60 (26), and kaolin 1—25 (4)% made into a paste with a solution containing $(NH_4)_2HPO_4$ 30—40 (21), H_3BO_3 3—10 (4), $ZnCl_2$ 5, and HCl 21%. A. R. P.

Case-hardened alloy steels. E. C. MOFFETT, ASSR. to AMER. CYANAMID. CO. (U.S.P. 1,980,817, 13.11.34. Appl., 12.2.30).—Claim is made for an alloy steel containing < 1% C hardened in a fused chloride bath containing $Ca(CN)_2$ until the surface layers contain $>$ 1% C. A. R. P.

Heat-treatment of [chromium-molybdenum] steel [tubes]. E. IVINS and H. S. KIRCHER (U.S.P. 1,978,265, 23.10.34. Appl., 16.2.34).—Prior to the final drawing operation the tubes are plated thinly with Cd, Zn, or Sn; after drawing, they are annealed in the usual way. The plated film prevents scaling. A. R. P.

Manganese-molybdenum-vanadium steel and articles [boiler tubes] made therefrom. S. D. WILLIAMS, ASSR. to TIMKEN ROLLER BEARING CO. (U.S.P. 1,979,594, 6.11.34. Appl., 3.10.31).—A steel with a

high creep limit at $\geq 510^\circ$ contains C 0.1—0.5, Mn 1—3, Mo 0.01—0.5, V 0.01—0.5, and Si $\geq 0.5\%$.

A. R. P.

Coating iron or steel sheets with a protective metallic coating [zinc]. W. H. SOMMER, Assr. to NAT. CITY BANK OF CLEVELAND, and J. A. CHAPMAN (U.S.P. 1,980,961, 13.11.34. Appl., 10.8.32).—To obtain a thicker Zn coating on one side of an Fe sheet than on the other, the sheet as it emerges from the galvanising bath is passed between two grooved rollers, those on the side to have the thin Zn coating being provided with a greater no. of grooves than those on the other side.

A. R. P.

Material for coating metal [sheet for painting]. J. H. GRAVELL, Assr. to AMER. CHEM. PAINT CO. (U.S.P. 1,980,518, 13.11.34. Appl., 17.5.32).—Claim is made for a paste for etching steel plates for painting consisting of fuller's earth 30, $\text{Ca}(\text{H}_2\text{PO}_4)_2 \cdot \text{H}_2\text{O}$ 5, $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$ 0.5, and BuOH 2.4 lb. in H_2O 6.32 (U.S.) gals.

A. R. P.

Surface coating [of steel] castings. J. W. WEITZKORN (U.S.P. 1,981,403, 20.11.34. Appl., 8.12.31. Renewed 2.6.34).—Surface-hardened steel castings are made by pouring the metal into a mould the surface of which is coated with a mixture of a binder and WC, MoC, or mixtures which form these compounds on heating, whereby the carbides enter the surface layers of the metal.

A. R. P.

(A) **Protectively facing [metal] surfaces with abrasion-resisting material.** (B) **Welding rod for applying protective abrasion-resisting facings.** K. STROBEL, Assr. to STODY CO. (U.S.P. 2,003,019—20, 28.5.35. Appl., 16.9.30).—(A) Particles of diamond substitute, e.g., WC, are coated with a semi-heat-insulating flux of m.p. intermediate between those of the particles and base metal, and are welded to the base by flooding welding metal around them, preferably by means of the electric arc. (B) The particles and flux are enclosed in a metal tube to form a welding rod. The flux coating may consist of C 25, CaF_2 75%, and a binder, or of Ni 15, Fe 85%.

B. M. V.

[Non-combustible, cellulose acetate]-coated wire-cloth. A. EICHENGRÜN, Assr. to CELANESE CORP. OF AMERICA (U.S.P. 1,985,771, 25.12.34. Appl., 19.10.31. Ger., 7.8.31).—Fine wire gauze is coated with a mixture of cellulose acetate with 10—15% of Ph_3PO_4 and $> 50\%$ of $(\text{CH}_2\text{Br})_3\text{PO}_4$ or $(\text{C}_4\text{H}_9\text{Cl})_3\text{PO}_4$.

A. R. P.

Etching of planographic [metal printing] plates. G. S. ROWELL, Assr. to MULTIGRAPH CO. (U.S.P. 1,977,646, 23.10.34. Appl., 13.9.33).—The first etching is made with a mixture of 0.5M- $\text{NH}_4\text{H}_2\text{PO}_4$ (9), 0.5M- NH_4NO_3 (1), 0.5M- $\text{Ni}(\text{NO}_3)_2$ (2), and glycerin (3 vols.); subsequent cleaning etches are given with the same solution diluted with an equal vol. of H_2O .

A. R. P.

Treating [zinc-lead] ore material with a complex brine. R. L. SESSIONS, Assr. to HUGHES-MITCHELL PROCESSES, INC. (U.S.P. 1,977,648, 23.10.34. Appl., 5.5.32).—Zn-Pb sulphide ore is roasted to ZnO and PbSO_4 , the SO_2 being converted into H_2SO_4 for the manufacture of HCl with which the Zn is extracted from the roast. The residue is leached with hot brine

and the filtered solution treated with a brine containing Na_2SO_4 and Na_2CO_3 to ppt. PbCO_3 . The mother-liquor is evaporated to crystallise $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, and purified from SO_4^{--} for re-use by treatment with CaCl_2 .

A. R. P.

[Cadmium] alloys and bearings incorporating them. GEN. MOTORS CORP. (B.P. 436,633, 15.3.35. U.S., 2.7.34).—Claim is made for the use as a bearing metal of an alloy of Cd with Ag 0.5—5.0 (1.75—2.5), Cu and/or Ni 0.25—1 (0.25—0.5), and Zn $\geq 0.25\%$. For bonding the lining to the shell a Zn-Cd solder is used.

A. R. P.

Removal of residual debismuthising reagents in lead refining. J. O. BETTERTON and Y. E. LEBEDEF, Assrs. to AMER. SMELTING & REFINING CO. (U.S.P. 1,979,442, 6.11.34. Appl., 6.8.32).—Molten Pb containing residual Ca etc. from the removal of Bi is stirred vigorously at 405—455° while it is treated with three doses of (per 100 tons of Pb) NaOH (75) and NaNO_3 (30 lb.), each treatment lasting 1—1½ hr.

A. R. P.

Lead-sodium alloy [for making lead alkyls]. F. B. DOWNING and L. S. BAKE, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,979,254, 6.11.34. Appl., 25.1.34).—The alloy contains Na 10, Pb 89.95—89.0, and Mg 0.05—1.0 (0.15—0.2)% . With EtCl an 85% yield of PbEt_4 is obtained.

A. R. P.

[Rhodium-osmium] alloy. H. E. HOLBROOK, Assr. to H. A. WILSON CO. (U.S.P. 1,980,801, 13.11.34. Appl., 16.6.33).—Claim is made for an alloy of Os 50—90 (66) and Rh 50—10 (34)% for making electrical contacts.

A. R. P.

Smelting of aluminium. J. G. G. FROST, Assr. to NAT. SMELTING CO. (U.S.P. 1,980,263, 13.11.34. Appl., 27.5.30).—Ashes and dross from Al melting are treated, in a rotary inclined kiln containing loose rectangular blocks of refractory material, with a regulated supply of Cl_2 , whereby AlCl_3 is volatilised and the metallic particles are melted and caused to coalesce into a pool of molten Al by the exothermic heat of reaction and the rubbing action of the blocks.

A. R. P.

Arc-welding flux. V. MILLER, Assr. to GEN. ELECTRIC CO. (U.S.P. 1,978,318, 23.10.34. Appl., 7.7.33).—Steel welding rods are coated with a paste of bentonite 0—5 (1), NaOH 1—10 (4), Na_2CO_3 1—5 (2), TiO_2 10—40 (18), feldspar 25—74 (53), and H_2O 12—40 (22).

A. R. P.

Electroplating process [for descaling and tinning iron]. W. M. PHILLIPS and G. M. COLE, Assrs. to GEN. MOTORS CORP. (U.S.P. 1,979,996, 6.11.34. Appl., 3.4.31).—The metal is cathodically pickled in 5—20% H_2SO_4 containing 1.5—2 g. of Sn (as SnSO_4) per litre.

A. R. P.

[Electrolytic] method of forming high-pressure [metal] tanks. B. BART (U.S.P. 2,001,998, 21.5.35. Appl., 2.2.31).—A metallic "mould" (hollow core) is constructed, and sprayed or flash-plated with Cu; Ni is then deposited (at 43—60°; 25—30 amp. per sq. ft.) to a thickness of about 0.025 in. Any joints or other imperfections are then soldered and the whole is polished, after, if desired, application of another coat of Cu. The mould is then used as mandrel for the deposition

of the desired metal in thickness sufficient to resist the desired pressure, and the mould itself is finally removed by dissolving in a reagent that will not attack Ni or Cu.

B. M. V.

Removing impurities from metallurgical solutions [copper-refining electrolytes]. E. C. PITZER, Assr. to AMER. SMELTING & REFINING CO. (U.S.P. 1,979,229, 30.10.34. Appl., 2.5.32).—As, Sb, Fe, Se, and Te are removed from aq. CuSO_4 electrolytes by addition of $\text{Ti}(\text{SO}_4)_2$ and agitation with air at 55° .

A. R. P.

Production of a non-seizable article of aluminium. S. G. MALBY, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,978,112, 23.10.34. Appl., 1.2.32).—Anodically oxidised Al articles, e.g., screws or pistons, are immersed in molten Zn stearate to impregnate the Al_2O_3 film with a lubricant.

A. R. P.

Anodic treatment of aluminium. R. W. BUZZARD (U.S.P. 1,977,622, 23.10.34. Appl., 22.5.34).—The electrolyte consists of aq. $\text{H}_2\text{CrO}_4 + \text{K}_2\text{Cr}_2\text{O}_7$ in which the Cr is 2–30%, and 5–60% of the total Cr is reduced to Cr^{2+} by treatment with $\text{H}_2\text{C}_2\text{O}_4$.

A. R. P.

Apparatus for hardening metal surfaces. A. E. SHORTER, and PATENT GEAR & METAL HARDENING CO., LTD. (B.P. 441,329, 17.4.34).

Sintering etc. of ores. Flotation cell. Extraction of substances from liquids [Pb].—See I. NH_3 -oxidation catalyst. Pt catalysts.—See VII. Metal-protected mirror. Abrasive-metal castings.—See VIII. Grid electrodes. Al-Ba alloy.—See XI. Scouring agents.—See XII. Paint removers (etc.). Wire enamel.—See XIII. Composite [rubber-metal] product.—See XIV. Alloy for beer-making plant.—See XVIII.

XI.—ELECTROTECHNICS.

Technical control of thermal breakdown [of insulators]. H. LUEDER, W. SCHOTTKY, and E. SPENKE (Naturwiss., 1936, 24, 61).—The variation of temp. in an insulator under an electric potential can be compared with the variation in lateral bending of a rod subjected to pressure along its axis.

A. J. M.

Influence of cold deformation on the welding properties of bare steel electrodes. A. KESSNER and H. SPECHT (Arch. Eisenhüttenw., 1935–6, 9, 231–239).—The use of cold-drawn mild steel welding rods instead of annealed rods leads to excessive sputtering, increased oxidation, and a porous and uneven weld, the tensile strength, elongation, and bending properties of the welded joint decreasing with increasing degree of deformation of the rod. Loss of Mn and C and absorption of O and N are scarcely affected by prior cold-work. The unsatisfactory behaviour of cold-drawn rods is attributed to their lower heat- and electrical conductivities, whereby the rate of melting is increased, the weld becomes hotter, and the structure deteriorates.

A. R. P.

Alkali recovery [from waste gases in alkaline pulp manufacture] by electrical precipitation. N. W. SULTZER and C. E. BEAVER (Paper Trade J., 1936, 102, TAPPI Sect., 45–47).—The Cottrell electrical-pptn. method for the recovery of Na salts from the

furnace gases resulting from black-liquor incineration is discussed, and its advantages over mechanical and filtration methods are pointed out. Typical operating and running conditions for both soda- and sulphate-pulp liquor-recovery plants are given.

H. A. H.

Producing high temp.—See I. Lamp glasses. Dielectric const. of glasses.—See VIII. Cast Fe. Welding Cr steels. Detecting scheelite in ores. Protecting and decorating Al.—See X. Decidifying milk. Katadyn process in industry.—See XIX.

See also A., Feb., 145, Explosive Sb. 170, Electrodeposition of Cu. 181, Sedimentometer.

PATENTS.

Low-frequency induction furnace. R. R. HAUSHEER (B.P. 441,364, 17.5.35. Switz., 18.5.34).—The primary winding, *W*, surrounding a chamber forming a secondary winding is enclosed by a magnetic envelope, e.g., sheets of magnetic material, connected at the ends of *W* to the ends of a heating chamber made of Fe or heat-resisting steel alloy to form therewith a closed magnetic circuit.

J. S. G. T.

Electric-furnace muffle. T. H. FORDE, Assr. to DIASCOPE CORP., LTD. (U.S.P. 2,002,241, 21.5.35. Appl., 30.10.31).—The muffle comprises, in order outwards, a ceramic muffle, the heating winding, an air space, a ceramic casing, fibrous heat insulation, an outer casing.

B. M. V.

Electrode for arc welding. A. R. NYQUIST (U.S.P. 2,001,848, 21.5.35. Appl., 3.10.32).—The core is composed of a metal of good electrical conductivity, e.g., Cu, over which is a sheath of a poorer conductor, e.g., steel, and over all is a covering of flux composed of a basic compound produced by double decomp. of MgSO_4 and NaHCO_3 , also KNO_3 , borax, and CaCO_3 .

B. M. V.

Welding electrode. J. C. HODGE and M. CHRISTENSEN, Assrs. to BABCOCK & WILCOX CO. (U.S.P. 1,979,264, 6.11.34. Appl., 20.2.32).—An Fe or steel welding rod is coated with a mixture of flint (150), MnO_2 (75), Fe_3O_4 (75), asbestos (30), and 80% ferromanganese (60 g.) mixed with water-glass (200 c.c.); the Fe-Mn is sufficient to reduce the MnO_2 and Fe_3O_4 to MnO and FeO.

A. R. P.

[Steel] welding rod. J. M. SAWHILL and G. A. MEAD, Assrs. to OHIO BRASS CO. (U.S.P. 1,980,229, 13.11.34. Appl., 22.8.31).—The Fe rod is coated with a mixture of 40% of reducing material and 60% of crater-forming material bonded with plastic rubber; e.g., the coating consists of SiC 40, SiO_2 10, Na_2CO_3 5, and CaCO_3 5 pts.

A. R. P.

Electric [primary] batteries. J. W. H. REYNOLDS, and STERLING BATTERIES, LTD. (B.P. 441,268, 13.6.34).—Zn cells of square section, suitable for multiple assembly in a box, are provided with an unwrapped "dolly" comprising the C rod surrounded by a paste of MnO_2 , ZnCl_2 , saturated aq. NH_4Cl , and, if desired, gum.

B. M. V.

Primary [Leclanché] cell. H. COLLOSEUS (U.S.P. 1,978,624, 30.10.34. Appl., 14.7.32. Ger., 8.8.31).—The electrolyte comprises saturated aq. MgCl_2 containing a little MnCl_2 . The central Zn rod is surrounded by a cylinder of porous C impregnated with NH_4Cl crystals

which are almost insol. in the electrolyte and in consequence the Zn has little tendency to dissolve when no current is flowing. A. R. P.

Voltaic couple. S. RUBEN (U.S.P. 2,001,978, 21.5.35. Appl., 31.8.33).—A battery having long life if not much current is drawn is composed of a no. of couples in a sealed container, each couple comprising dry solid CrO_3 pressed against an electropositive material, *e.g.*, Cd, Al, Zn. The spacers between the couples comprise a metal incapable of setting up an e.m.f. with CrO_3 , *e.g.*, Ni or steel. B. M. V.

Utilisation of consumed electric storage batteries. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 440,629, 12.8.35. Ger., 14.8.34).—Piled positive and negative plates are treated (countercurrently) with an acid yielding an easily sol. Pb salt, *e.g.*, AcOH , H_2SiF_6 . J. S. G. T.

Electric-discharge lamps. GEN. ELECTRIC CO., LTD. FROM PATENT-TREUHAND GES. F. ELEKTR. GLÜHLAMPEN (B.P. 440,911, 6.11.34).—Very finely-dispersed alkali or alkaline-earth metals are introduced into the space between the two walls of the envelope of a double-walled metal-vapour lamp, in order to maintain the vac. in the jacket. J. S. G. T.

Electric-discharge tubes [containing alkali-metal vapour]. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 440,551, 9.7.35. Ger., 26.7.34).—That part of the tube wall which makes contact with the discharge is made of borate glass free from or containing $< 10\%$ of SiO_2 . J. S. G. T.

Cathodes for electric-discharge tubes. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 440,780, 21.5.35. Ger., 13.8.34).—Projections made of a material, *e.g.*, Cu, having a better thermal conductivity but radiating $< \text{Ni}$, and coated with electron-emitting material, are provided on the cathode. J. S. G. T.

Oxide-coated cathodes for gaseous electric-discharge tubes. BRIT. THOMSON-HOUSTON CO., LTD. (B.P. 441,250, 6.6.35. Ger., 7.6.34).—Oxide is arranged around holes in a disc or plate cathode on the side of the cathode remote from the anode. J. S. G. T.

Manufacture of getter material [aluminium-barium alloy]. S. UMBREIT, ASSR. TO RADIO CORP. OF AMERICA (U.S.P. 1,979,506, 6.11.34. Appl., 1.9.32).—A 50 : 50 Al-Ba alloy is made by gradual addition of Ba to molten Al in an atm. of He, the metal being allowed to solidify and then remelted after each addition of Ba. The alloy is stable in air and sufficiently brittle to be ground to a fine powder, which can be applied as a paste in collodion to parts of radio-valves. A. R. P.

Cathode-ray tube. RADIO-A.-G. D. S. LOEWE (B.P. 440,810, 7.7.34. Ger., 8.7.33).—Mass cores for electromagnetic control means of low hysteresis and eddy-current loss and of high μ are composed of metal powder (carbonyl-Fe, or alloys of Fe, Ni, Al or Fe, Ni, Cu), the grains being preferably elongated and embedded in insulating material. B. M. V.

[Bulbs for] high-temperature sources of ultra-violet light. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 440,778, 17.5.35. Ger., 18.5.34).—Bulbs are constructed of glass consisting of < 60 (< 70)% SiO_2 together with B_2O_3 and Al_2O_3 containing $< 1\%$ of alkali oxide. CaO

or other alkaline-earth oxide may be added to the melt. Such glasses have a softening point of $> 600^\circ$.

J. S. G. T.

Fluorescent screens. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 441,813, 21.5.35. Ger., 4.8.34).—A thin layer of one or more metals, *e.g.*, Mo, Ta, having m.p. $> 1800^\circ$ is applied to the fluorescent material or arranged between that and the carrier. J. S. G. T.

Manufacture of grid electrodes. L. KLINKERT, ASSR. TO RADIO CORP. OF AMERICA (U.S.P. 2,002,148, 21.5.35. Appl., 19.3.34. Holl., 22.3.33).—A grid is formed of Mo or W wires crossing others of Fe or brass and is passed between rolls to embed the former wires in the latter; the whole is then bent to its final form of a cylinder or the like and the base-metal wires are dissolved in acid. B. M. V.

Gas-detecting apparatus. KOEHLER MANUFG. CO. (B.P. 440,947, 21.10.35. U.S., 19.10.34).—For detection, especially, of CH_4 dust, or CO_2 a photo-electric cell is incorporated in a Davy-type lamp, and the indications are transmitted by a flexible cord to an electric meter at the surface or other safe place. B. M. V.

Apparatus for separating magnetic particles from liquids. A. M. ARMOUR, and ASSOCIATED ELECTRICAL INDUSTRIES, LTD. (B.P. 441,418, 26.9.34).—An electromagnet of approx. horseshoe shape is suspended with the poles in a stream of the liquid, *e.g.*, lubricating oil. The pole pieces have large surfaces parallel to each other and perpendicular to both the magnetic flux between them and to the flow of liquid, the latter taking place through holes in the poles, which are tapered both ways. B. M. V.

Separation of [oil-water] emulsions by electrical action. R. HEINRICH, ASSR. TO SIEMENS-SCHUCKERTWERKE A.-G. (U.S.P. 2,000,018, 7.5.35. Appl., 30.11.31. Ger., 5.12.30).—An emulsion of, *e.g.*, oil and H_2O is subjected to waves of unidirectional current spaced at periods < 10 times the duration of each impulse ($> 10^{-5}$ sec.) and having the front slope so steep that it occupies $> 10^{-6}$ sec., the impulses being consequently distinctly separate. By this means the field strength without flash-over may be increased 50–100% over that with d.c. B. M. V.

(A, B) **Electrical precipitation (B) of suspended particles from gases.** (A, B) R. HEINRICH and (A) W. FELDMANN, ASSRS. TO INTERNAT. PRECIPITATION CO. (U.S.P. 2,000,019–20, 7.5.35. Appl., [A] 3.12.31, [B] 26.5.32. Ger., [A] 16.12.30, [B] 2.6.31).—A condenser is charged by unidirectional current and discharged by a spark gap. (A) The high-tension impulses are delivered to a no. of pptg. units in turn by a distributor, the resulting waves being as described in U.S.P. 2,000,018 (cf. preceding abstract). (B) The energy supply is merely interrupted for the long intervals, which are < 0.01 sec. The peak voltage is $< 130\%$ of that attainable with d.c. B. M. V.

Electrical treatment of emulsions. H. C. EDDY, ASSR. TO PETROLEUM RECTIFYING CO. OF CALIFORNIA (U.S.P. 2,001,776, 21.5.35. Appl., 18.4.32).—Viscous and oxidised emulsion of oil and H_2O is forced under considerable pressure through a filter and subjected to an electric field at high potential while maintaining the

pressure sufficiently high to retain considerable CH_4 etc. in entrained condition; a suitable gaseous oil is initially incorporated, if necessary. B. M. V.

Electrolytic apparatus. H. B. FRANKLIN (B.P. 434,542, 22.3.34).—Apparatus for the production of chlorates, bromates, or per-salts by electrolysis comprises a no. of superimposed cells connected in series, each cell being connected to the one above by means of a narrow-bore tube in such a way that the gas generated by electrolysis drives the solution from one cell to the next above while fresh electrolyte is supplied to the lowermost cell. A. R. P.

Electrolytic condensers. SIEMENS & HALSKE A.-G. (B.P. 435,300, 15.2.35. Ger., 15.2.34).—The electrolyte consists of a 1 : 5 mixture of $\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$ and olein. A. R. P.

Dry rectifier. W. C. VAN GEEL and H. EMMENS, Assrs. to N. V. PHILIPS' GLOEILAMPENFABR. (U.S.P. 2,002,221, 21.5.35. Appl., 1.5.31. Holl., 15.5.30).—Two layers, e.g., Cu and Cu_2S , having different electron emissivities are separated by a very thin, independent, solid insulating layer which remains cold and non-ionised during operation. B. M. V.

Measuring apparatus for determining the humid content of granular substances by measurement of the dielectric constant of the same. S. H. HARTMANN (B.P. 440,966, 9.7.34).—A funnel and baffle device for feeding a stream of the material very uniformly across the section of the measuring condenser tube is described. B. M. V.

Manufacture of dielectric materials. TELEGRAPH CONDENSER CO., LTD., and F. C. STEPHAN (B.P. 435,323, 7.4.34).—A mixture of PhNO_2 , 70, carnauba, paraffin, or montan wax 18, and chlorinated rubber (or polymerised Cl-compounds of unsaturated hydrocarbons) 5 is heated until a clear solution is obtained which congeals to a jelly or wax-like solid. A. R. P.

[Oil-resistant] insulated electrical conductor. E. C. PITMAN, Assr. to E. I. DU PONT DE NEMOURS & CO. (U.S.P. 2,000,095, 7.5.35. Appl., 11.3.31).—The wire is coated, in turn, with rubber, fabric impregnated with oil-resistant synthetic resin, and cellulose lacquer, the resin being of the polyhydric alcohol-polybasic acid type, especially diethylene glycol phthalate-polyvinyl acetate, with, if desired, $(\text{C}_6\text{H}_4\text{Me})_3\text{PO}_4$ as plasticiser. B. M. V.

Electric heating elements for ovens, furnaces, or other apparatus. G. H. S. GRENE, and WILD-BARFIELD ELECTRIC FURNACES, LTD. (B.P. 440,890, 5.7.34).

[Twin-filament] electric incandescence lamp. S. G. S. DICKER. From N. V. SPLENDOR GLOEILAMPEN-FABR. (B.P. 440,956, 7.6.34).

CrO_3 . Plumbite solution.—See VII. **Mirror.**—See VIII. **Furnace for metals. Ferrous-metal sheet for radio-valves. Pickling metal. Treating Si-Fe alloys. Welding rod for abrasive facings. [Rh-Os] alloy [for contacts]. Arc-welding. Tinning Fe. Metal tanks. Removing impurities from Cu electrolytes. Non-seizable Al. Treating Al.**—See X. **Composite [rubber-metal] product.**—See XIV. **Vaporising liquids.**—See XXIII.

XII.—FATS; OILS; WAXES.

Composition of soaps and their action in the wash. A. LOTTERMOSER (Angew. Chem., 1936, 49, 104—106).—The properties of soaps sophisticated with water-glass, and certain aspects of water softening, are discussed. T. G. P.

Refining and distillation of glycerin. J. ALTENBURG (Chem.-Ztg., 1936, 60, 113—115, 135—137).—A review.

Degradation of fatty acids by mould fungi. K. TÄUFEL, H. THALER, and M. LÖWENECK (Fettechem. Umschau, 1936, 43, 1—4).—24—48-hr. growth tests with cultures of *A. niger* and *P. glaucum* on nutrient media containing lauric acid at various p_{H} indicate that, in the acid range, the formation of Me ketones ("perfume rancidity") and visible growth of the moulds both cease at about the same p_{H} , whereas, on the alkaline side, ketone formation persists at $p_{\text{H}} >$ those which inhibit visible growth. Growth of the moulds with consumption of the fatty acids can proceed without ketone formation on media containing fatty acids $>$ C_{16} , viz., stearic, palmitic, and oleic acids, but with Δ^{Δ} -undecenoic acid (as Na soap) in sufficient dilution ketones appear. E. L.

Determination of the practical value of foaming, wetting, washing, detergent, and similar agents. Determination of wetting power. J. HETZER (Fettechem. Umschau, 1936, 43, 4—8).—Measurements of the "sinking time" (T) of a test-fabric in solutions of different concns. of the same wetting agent in H_2O show that the times observed in a series of duplicate tests are widely divergent both when the T vals. are very short ($<$ 2 sec.) or much longer; when the concn. is chosen so that T is 2 sec. concordant results for duplicate tests are obtained. As there may exist a certain (narrow) range of concns. which all show the same T (2 sec.), the crit. wetting concn. is defined as the highest concn. of the wetting agent (in a given solvent at a given temp., e.g., H_2O at 20—23°) which just permits consistent readings of 2 sec. for the T of a given fabric to be obtained. This highest-concn. val. can be used as a basis for the comparison of the efficacy of different wetting agents. E. L.

Moroccan olive oils. J. VALIN (Ann. Falsif., 1936, 29, 31—41).—Analyses are tabulated. Approx. half of the samples examined had I val. $>$ 90, some being 95, whilst results hitherto obtained are \gtrsim 88. The margaric contents were usually small ($<$ 10%), the yields of oil are high (50 kg./tree/harvest), and the oil amounts to 40% of the pulp and 30% of the whole fruit. J. G.

Seed oil of *Psidium guyava*, var. *pyriferum*, from India. I. P. S. VARMA, N. N. GODBOLE, and P. D. SRIVASTAVA (Fettechem. Umschau, 1936, 43, 8—9; cf. Azadian, B., 1923, 70A).—The seeds from fruit harvested at Benares in the rainy (summer?) season and stored until December yielded 5% of oil, on extraction with light petroleum, having d^{20} 0.9365, n^{35} 1.4687, f.p. 12°, acid val. 6.4, sap. val. 198.7, Reichert-Meissl val. 0.35, Polenske val. 0.1, I val. (Hanus) 96.4, unsaponifiable matter 0.68%, Hehner val. 96.03%; the insol. fatty acids had d^{20} 0.9121, n^{35} 1.4835, f.p. 17°.

mean mol. wt. 278.7, I val. (Hanus) 101.9, SCN val. 76.4, gave a positive hexabromide test, and consisted of 16% of saturated acids (Twitchell separation), 55.8% of oleic, 27.8% of linoleic, and 0.4% of linolenic acid (calc. from I and SCN vals.). E. L.

Examination and determination of cod-liver oil. N. W. VERE-JONES (Ind. Chem., 1936, 12, 85—88).—The determinations of I val. (Rosenmund-Kuhnenn), sap. val., unsaponifiable matter, and of vitamin-A content by means of the Hilger Vitameter or Lovibond "blue val." are described. E. L.

Vitamin-A potency of liver oils from some miscellaneous Pacific Coast fishes. B. E. BAILEY (Rept. Biol. Bd. Canada, 1935, No. 26, 17—18).—The liver oil of red cod (*Sabastodes*) had vitamin-A potency (blue units per g.) 18,000—200,000; longjaw (*Paralichthys*) 70,000; rock cod (*Sabastodes*) 1625—2850; grey cod (*Gadus*) 415—2000; perch (*Phanerodon*) 1000; whiting (*Menticirrhus*?) 1275; and skate (*Raja*) 0—1200. E. C. S.

Viscosity determinations of [fatty] oils. W. NORMANN (Fettchem. Umschau, 1936, 43, 9—10; cf. Boekennoogen, B., 1936, 28).—Discrepancies between the vals. observed by Boekennoogen (*loc. cit.*) and by Schrader (B., 1934, 770) may be due to differing amounts of mucilage in the oils examined, resulting from different refining treatments. E. L.

Working up of used bleaching earths. O. ECKART (Chem.-Ztg., 1936, 50, 153—155).—A discussion dealing mainly with products used for treating fats and oils.

See also A., Feb., 156, η of hydrogenated fats. 158, Emulsifying power of soaps. 189, Hydrogenation of polymerised Et linoleate. Separation of physeteric acid from sardine and pilot-whale oil. Sardine oil unsaturated acids. Hydrogenation of Me clupanonate. 207, Oil of *Sciadopitys verticillata*. 225, Separation of selacholeic acid from liver oils. 226, Sei-whale oil. Oil of *Chanoschanos* (Forsk.). 227, Carotenoids of butter.

PATENTS.

Composition of fatty matter and its stabilisation. (A) A. S. RICHARDSON, F. C. VIBRANS, and J. T. R. ANDREWS, (B) E. W. ECKEY, Assrs. to PROCTER & GAMBLE Co. (U.S.P. 1,993,181 and 1,993,152, 5.3.35. Appl., [A] 5.8.32, [B] 22.8.32).—(A) Substantially dry fatty substances (cottonseed oil, lard) are stabilised against rancidification during storage by incorporating small amounts of H_3PO_4 or H_2SO_4 , or their acid salts or acid-reacting esters (*e.g.*, NaH_2PO_4 , glycerylphosphoric acid); the antioxidant can be removed from the fat by treatment with alkali before use. (B) Oils treated as in (A) tend to develop a characteristic (non-rancid) flavour and to discolour on heating; such defects can be avoided by stabilising the oils with < 0.01% of H_3PO_4 or its acid (Ca) salts and acid-reacting derivatives (pyro-, meta-, poly-phosphoric acids or acid salts etc.) in amount \equiv < 0.01% P_2O_5 . E. L.

Detergent for use in, and a process for, washing, laundering, or the like. ELECTRIC SMELTING & ALUMINIUM Co. (B.P. 440,952, 9.4.34. U.S., 24.2.34).—The

detergent consists of a mixture of separate grains simultaneously susceptible to the solvent action of H_2O and having different rates of dissolution so that in the bath there are formed successively solutions of different chemical composition at time intervals sufficiently long to permit successive detergent actions on the goods. A typical detergent contains Na_3PO_4 or NaOH, or Na_2CO_3 , albumin, a hydrated Na or Na-Al silicate (cf. B.P. 200,175; B., 1923, 841 A), a similar anhyd. silicate (cf. B.P. 339,355 and 357,224; B., 1931, 202, 1092), and a soap of relatively high titre. A. J. H.

Bleaching agents [detergents] and the like. W. J. TENNANT. From HENKEL & Co. G.M.B.H. (B.P. 435,861, 21.3.34).—Claim is made for mixtures of $NaBO_3$ with $NaPO_3$ or $Na_4P_2O_7$, soap, and 0.1—1.5% of $MgSiO_3$. A. R. P.

Cleansing agents [detergents] and the like. W. J. TENNANT. From HENKEL & Co. G.M.B.H. (B.P. 435,562 and 435,710, [A] 24.3.34, [B] 26.3.34).—Detergents for cleansing white wool, silk, or rayon comprise mixtures of sulphonated soaps with (A) $Na_4P_2O_5$, or (B) polyphosphates (Na salts of acids with a H_2O content between that of HPO_3 and $H_4P_2O_7$). A. R. P.

[Preparation of] cleansing agents in the form of emulsions. W. J. TENNANT. From HENKEL & Co. G.M.B.H. (B.P. 440,642, 18.6.34).—The use as emulsifying agents for org. solvents, *e.g.*, C_6H_6 , decahydronaphthalene, benzene, or oils or waxes, of H_2O -insol. higher aliphatic or cycloaliphatic OH-ethers or -sulphides having \leq 2 free OH groups, is described. Examples are the mixed C_{12} , C_{14} , C_{16} , and C_{18} *n*-alkyl ethers of glycerol and similar derivatives of di- and poly-glycerol. The use of the emulsions produced for the cleansing of rigid surfaces, *e.g.*, of wood or metal, is claimed. [Stat. ref.] H. A. P.

Products for scouring operations. A. ABRAHAM and M. L. A. PHILIPPON (B.P. 440,525, 10.1.35. Fr., 10.1.34).—Mixtures such as CH_2Cl_2 570, $C_6H_5Cl_2$ 350, paraffin wax 80, resin (synthetic or natural) 20, and, optionally, $C_{10}H_8$ 100, EtOH 40, rubber 10, and COPhMe (as deodorant) 2 pts. by wt. are claimed for use in scouring metal, paint, wax, etc. surfaces. E. J. B.

Extraction of oils having high vitamin contents from fish livers, particularly cod livers. B. A. REWALD (B.P. 441,545, 16.6.34).—Vitamin-A and -D are liberated by treatment of the minced liver with EtOH or MeOH etc. before or during the extraction of the oil by such solvents as C_6H_6 , benzene, etc. E. L.

Manufacture of grease. G. KAUFMAN, Assr. to TEXAS Co. (U.S.P. 2,002,819, 28.5.35. Appl., 15.8.31).—A mixture of mineral lubricating oil and soap-forming material is heat-treated at 215° in presence of air until η is increased and penetration decreased by \leq 20%. B. M. V.

Production of vitamin concentrates [from oils and fats]. W. W. TRIGGS. From HEALTH PRODUCTS CORP. (B.P. 441,513, 3.12.34).—See U.S.P. 1,984,858; B., 1935, 1150.

Purifying oils. Emulsions.—See II. Alcohols. Oxygenated nonadecyl compounds.—See III. Utilising "floating soap."—See V. Sizing yarns.—See VI. Butter.—See XIX.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Disinfectant paints. CAMEL LEAD, COLOR & CHEMICAL PRODUCTS MANUFG. CORP. (Paint Tech., 1936, 1, 5—9).—A series of paints containing 0.25—8% of about 70 different disinfectants and 12 different pigments were tested for their germicidal action on *Bacillus typhosus* and *Staphylococcus aureus*. In no case was there any permanent superiority over untreated paints; powerful disinfectants such as PhOH and CHI_3 render the film initially germicidal but are rapidly lost by evaporation. By using drying oil chlorinated to 4% Cl, a paint is obtained which has marked germicidal properties which are retained for 3—4 years (also after washing), and has no unpleasant odour or toxic action on man. D. R. D.

Yellowing of oil films. I. A. EIBNER (Paint Tech., 1936, 2, 23—27).—The yellowing of dried linseed oil films occurs most rapidly in the dark and the colour produced is destroyed by bright sunlight. On the other hand, the natural resins, coumarone resins, and many phenol-aldehyde resins and varnishes made from them turn yellow or brown even in the light, but polystyrene and polyvinyl resins show no tendency to yellowing. The causes of these differences are discussed. D. R. D.

Possible oil economies. J. SCHEIBER (Farbe u. Lack, 1936, 75—76).—The following suggestions are made: use of non-oil coatings for indoor exposures; reduction of oil content for other purposes where investigation shows this to be possible; further exploitation of oil-modified alkyd resins; prolongation of film life by (a) omitting reactive oils, e.g., tung, (b) inserting between the oil coatings an intermediate layer of nitrocellulose, rubber, etc., (c) adding antioxidants. S. M.

Practical measurement of the hardening velocity of resins. R. HOUWINK (Brit. Plastics Year Book, 1936, 62—73).—Resinification can be followed by measuring changes in the n , η , esterification, and Br vals. of the reaction mixture, the time taken for turbidity to appear, the plasticity, η , modulus of elasticity, and bending strength of the resultant resin, or the time required for it to reach the elastic *B*-stage when heated in a definite manner. The methods are outlined. S. M.

Developments in plastics. E. E. HALLS (Brit. Plastics Year Book, 1936, 24—61).—The dimensional and wt. decreases (tabulated) of several series of mouldings when heated at 70° for periods up to 21 days show that $\text{CS}(\text{NH}_2)_2$ (I) resins undergo greater losses than phenol- CH_2O (II) products and reach equilibrium more slowly; the use of mineral fillers instead of wood flour is not a remedy although improved heat-resistance is thereby obtained. Stability was, however, much enhanced in one case by preheating the moulding for 24 hr. at 135°. A transparent vinyl ester plastic (III) underwent relatively large contraction and cellulose acetate (IV) even more; the length and breadth of bakelite-bonded papers and fabrics decreased by only 0.2—0.6% after 96 hr. at 130°; casein rods contracted considerably, particularly at their ends. H_2O -immersion at 20° for 21 days produced approx. the same wt. increases in (I) and (II), but (I) swelled more readily;

(III) underwent no dimensional change; (IV) expanded rapidly, and showed large increases in diam. and wt. Measurements were also made of the effects of combined temp. and R.H. fluctuations on (I)—(IV) and ebonite; although heat-shrinkage and H_2O -swelling tend to balance, expansions or contractions may ensue. (II) again showed greater resistance than (I), but (I) had the advantage over other resins of not being discoloured after 12 hr. exposure to ultra-violet light. Variations in the electrical insulation of moulded articles with temp. and R.H., the dimensions of finished products and their deficient machining qualities, and the lack of standard specifications are discussed. S. M.

Westinghouse method of plasticity testing. ANON. (Brit. Plastics Year Book, 1936, 95—97).—The apparatus is described. 100 g. of the resin are pressed at 165—170° in a steam-jacketed cylindrical mould; the no. of g. extruded in 5 min. through six V-grooves is a measure of the plasticity. S. M.

Determining α - $\text{C}_6\text{H}_4(\text{CO}_2\text{H})_2$.—See III. Azo pigments.—See IV.

See also A., Feb., 187, α , β -Dichlorobutadiene, and β -alkoxybutadiene, polymerisation products. 206, S compounds of terpenes. 207, Balata resin.

PATENTS.

[Water-]paint composition. H. A. SCHOLZ and O. HAYDON, Assrs. to UNITED STATES GYPSUM CO. (U.S.P. 1,994,438, 12.3.35. Appl., 22.10.31).—Dry mixtures of hydraulic cement (50—70%) and $\text{Ca}(\text{OH})_2$ (20—35%), with small proportions of a gel-forming substance (Irish moss, pectin, agar), a sol. chloride (NaCl), and an inorg. acetate (of Ca, Zn, Na), suitable for conversion into paint by admixture of 75—90% of H_2O , are claimed. S. S. W.

Manufacture of paints, varnishes, printing inks, and the like. W. G. DEWSBURY and A. DAVIES (B.P. 441,571, 18.10.34. Addn. to B.P. 425,049; B., 1935, 470).—0.5—1% of graphite is incorporated into a dispersion of the type described in the prior patent (*loc. cit.*) in a drying oil base, and reduced to colloidal dimensions by suitable grinding. S. S. W.

Paint, varnish, and lacquer remover. P. HODGES, Assr. to GULF STATES PAPER CORP. (U.S.P. 1,993,096, 5.3.35. Appl., 20.4.33).—“Floating soap” (obtained from black liquors in the manufacture of soda- or sulphite-cellulosic materials) is incorporated with one or more of the following: org. paint solvents (amylene dichloride), inorg. abrasives, higher fatty acids (oleic acid), and H_3PO_4 , giving paint etc. removers also suitable for metal cleaning, degreasing, and rust-inhibiting. S. S. W.

Manufacture of (A) zinc-base white pigment, (B) pigment. H. A. GARDNER (U.S.P. 1,979,379—80, 6.11.34. Appl., [A] 16.1.31, [B] 31.3.31).—(A) Claim is made for a ZnO pigment coated with ZnC_2O_4 for use in making rubber articles and in paints. (B) The pigment is blown with air or an inert gas up a tower into which is admitted spray or vapour of an org. coating material which coats the particles with H_2O -repellent materials. Suitable coating agents are vulcanising accelerators, org. acids, tung or linseed oil. A. R. P.

Production of iron oxide pigment. R. D. WOOD, Assr. to NAT. ANILINE & CHEM. CO., INC. (U.S.P. 1,979,595, 6.11.34. Appl., 26.2.30).— Fe_2O_3 sludge from the reduction of PhNO_2 to NH_2Ph is ground with CaO , $(\text{NH}_4)_2\text{SO}_4$ is added to convert the CaO into CaSO_4 , and the mixture is roasted to produce a bright red pigment. A. R. P.

Manufacture of white-lead pigments. N. C. CHRISTENSEN (U.S.P. 1,992,191, 26.2.35. Appl., 21.10.30).—A solution of PbCl_2 in brine is treated cold or hot with CaCO_3 to ppt. PbCl_2 , PbCO_3 , CaCO_3 , or a basic salt thereof, and, after washing, the ppt. is stirred with hot H_2O to convert it into PbCO_3 or a basic carbonate and CaCl_2 . A. R. P.

Coating of materials. BRIT. CELANESE, LTD. (B.P. 441,622, 23.7.34. U.S., 22.7.33).—A cellulose derivative or other thermoplastic substance is ground into a non-solvent, e.g., H_2O , which is evaporated. The powdered product is hot-pressed in a thin layer on paper, cotton-netting, etc. which are heated to a higher temp.; cooling is effected by drawing heat through the supporting material. S. M.

Coating preparations. J. R. GEIGY A.-G. (B.P. 441,669, 27.6.35. Ger., 27.6.34).—S is incorporated in chlorinated rubber lacquers, together with other fillers or pigments, e.g., C, if desired. S. S. W.

Manufacture of nitrocellulose lacquers. DEUTS. CELLULOID FABR. (B.P. 441,716, 18.9.34. Ger., 4.11.33).—Commercial ester-sol. collodion cotton (II-5—12% N) is dissolved in an anhyd. mixture of abs. EtOH (50—95 pts. by vol.) and an aromatic hydrocarbon (C_6H_6) (5—50 pts.), softeners, resins, pigments, etc. being then incorporated as desired. The solvent may also contain small proportions of a medium-boiling "true solvent," e.g., an ester of AcOH with a primary aliphatic mono- or poly-hydric alcohol (4%, on the lacquer, of BuOAc). S. S. W.

Cellulose derivative compositions. E. I. DU PONT DE NEMOURS & Co. (B.P. 440,364, 28.6.34. U.S., 15.7.33).—Compositions used in the manufacture of artificial leather consist of a cellulose derivative (nitrate) and a non- or semi-drying oil (castor), the development of rancidity in which is inhibited by (4:4'-)dihydroxy-diphenyl oxides or -diphenylmethanes, quinol monoalkyl ethers, *o*- or *p*-alkyl- or -cycloalkyl-phenols, or 2:3-, 2:4-, 2:5-, 2:6-, or 3:4-dialkylphenols, e.g., quinol Me ether, *o*-cresol, 4:4'- $\text{CMe}_2(\text{C}_6\text{H}_4\text{OH})_2$ or its $(\text{CH}_2\text{OH})_4$ derivative, carvacrol. Plasticisers and pigments are added as required. H. A. P.

Manufacture of cellulose-coated materials. E. I. DU PONT DE NEMOURS & Co. (B.P. 441,391, 19.7.34. U.S., 19.7.33).—Finely-divided (light-coloured) solids, e.g., Al_2O_3 , asbestos, lithopone, TiO_2 , are suspended in aq. alkali solutions of mono-esters of cellulose with dicarboxylic acids; on heating to $> 50^\circ$, these solids become coated with cellulose in a non-fibrous form and may be dyed by the usual cellulose dyeing processes. A. W. B.

Production of [synthetic-resin] coatings or fillings. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 440,889, 3.7.34).—Compositions comprising Pb_3O_4 and/or CdO , an inert filler if desired, and a PhOH -

CH_2O -type condensation product (in the EtOH -sol. stage) are allowed to harden without application of heat. The resin may be introduced as a solution in org. solvent or as an aq. suspension. S. S. W.

Liquid coating composition. J. V. MEIGS, Assr. to PLASTIX CORP. (U.S.P. 1,993,708, 5.3.35. Appl., 14.7.32).—Potentially reactive compositions comprising a solution of the reaction product of a carbohydrate-phenol resin and a metal oxide or hydroxide [$\text{Ca}(\text{OH})_2$] in a volatile solvent (EtOH), and a reactive hardening agent [CH_2O , $(\text{CH}_2)_6\text{N}_4$], together with fillers (wood flour) if desired, are claimed as rapid-hardening products of high mechanical and electrical strength. S. S. W.

Manufacture of (A) α -terpinene-, (G) terpene-, (K) pinene-, (M) cineole-maleic anhydride reaction products, (B-D) [coating] compositions, (E, F, H-J, L) synthetic resins. (A) E. G. PETERSON and E. R. LITTMANN, (B, K, M) E. R. LITTMANN, (C-I) E. G. PETERSON, (J, L) I. W. HUMPHREY, Assrs. to HERCULES POWDER CO. (U.S.P. 1,993,025—37, 5.3.35. Appl., [A] 18.11.30, [B] 23.5.33, Ger., 3.5.32, [C] 24.7.34. Ger., 21.4.32, [D] 14.3.32, [E] 22.4.33, [F] 2.9.33, [G] 4.8.33, [H] 29.8.33, [I] 23.8.33, [J] 6.9.33, [K] 26.8.33, [L] 11.9.33, [M] 10.11.32).—Maleic anhydride (I) is heated at 150 — 200° with excess of (A) α -terpinene (II), (G, J) α - and β -pinene, dipentene, and terpene distillates. (B, H) The products are esterified with alcohols; (C, D, I) a polyhydric alcohol is used and some of the OH groups either remain free or are caused to react with rosin, linseed oil acids, etc. (E) The resin produced from (I), (II), and abietic acid (III) or a derivative is heated with an alcohol and (F) an org. acid, e.g., stearic, succinic. (K) Acidic catalysts convert pinene (IV) into higher-boiling fractions and are omitted. (L) (I), (III), and (IV) are heated together at 150 — 200° . (M) (I) and cineole are heated in presence of an acidic catalyst. The various resins are used for varnishes, plasticisers, mouldings, etc. S. M.

Coating composition [enamel for wire]. W. H. WRIGHT, Assr. to SCHENECTADY VARNISH CO., INC. (U.S.P. 1,977,932, 23.10.34. Appl., 2.5.34).—The wire is drawn through a mixture of drying oil, resin, and a solvent which is that fraction of hydrogenated petroleum boiling at 95 — 315° . A. R. P.

Application of an ornamental finish to surfaces. S. BROOKS and M. J. DE FESTA (B.P. 441,257, 27.7.35).—The surface is treated successively with (a) a pore-sealing compound, a varnish (I) of resin in $\text{C}_5\text{H}_{11}\text{OAc}$, and a filler (II); (b) (II) and the desired colour; (c) a stoving enamel and (I); and (d) a stoving lacquer and (I); after each application it is heated at 32 — 110° for $\frac{1}{2}$ — $\frac{3}{4}$ hr. and buffed. E. J. B.

Production of finishes imitative of stone. H. COHEN, Assr. to PERFECTION STEEL BODY CO. (U.S.P. 2,002,848, 28.5.35. Appl., 11.7.34).—A painted or lacquered surface is masked in an irregular manner by drops of, e.g., H_2O spread by pressure or broken into spots by air spray, and then one or more coats of paint or lacquer are applied to adhere only to the unwetted parts. B. M. V.

Synthetic resins. BRIT. THOMSON-HOUSTON CO., LTD. (B.P. 440,924, 22.3.35. U.S., 23.3.34).—A

polymerisation product of C_2H_2 (solid cuprene) is heated with maleic anhydride and a polyhydric alcohol (glycerol) for, *e.g.*, 10–20 hr. at 85–100° followed by 5–10 hr. at 185–200°. S. S. W.

Production of synthetic resins. A. JOHNSON and C. E. HOWSON, Assrs. to COMBUSTION UTILITIES CORP. (U.S.P. 1,994,714, 19.3.35. Appl., 23.5.31).—Volatile components which escape during the heating may be condensed, and these are sprayed into the lower portion of the reaction vessel. Suitable plant is described. S. M.

Manufacture of phenol-formaldehyde condensation products. L. NAST and J. C. VREDENBURG (B.P. 440,959, 4.7.34).—The reaction mixture produced by the alkaline condensation of $PhOH$ (1 mol.) and CH_2O (2–2.8 mols.) is neutralised or weakly acidified and cooled to about 14°; the resinous ppt. is removed and any H_2O retained by it distilled off in vac. S. M.

Preparation of potentially reactive phenolic condensation products. O. A. CHERRY, Assr. to ECONOMY FUSE & MANUFG. CO. (U.S.P. 1,994,753, 19.3.35. Appl., 28.4.30).—Products suitable for moulding are obtained by condensing CH_2O and a phenol (I) in presence of a mixture [6 wt.-% of (I)] of a fixed base, *e.g.*, NaOH, and NH_2Ph or derivative. S. M.

Manufacture of oil-soluble artificial resins. DR. K. ALBERT GES.M.B.H., Asses. of H. A. BRUSON and H. R. RATERINK (B.P. 440,110, 20.6.34. U.S., 21.6.33).— $\alpha\alpha\gamma\gamma$ -Tetramethylbutylphenol (cf. B.P. 409,111; B., 1934, 535) is dissolved in H_2O containing at least 1 mol. of caustic alkali, treated with CH_2O (1–2.5 mols.) at 90–95° in an inert atm., *e.g.*, N_2 , and in presence of a trace of a H_2O -sol. oxalate, and then acidified in presence of a H_2O -insol. volatile org. solvent, *e.g.*, $C_2H_4Cl_2$. The solvent layer is washed free from acid and the solvent and traces of H_2O are driven off by heating. Pale resins, highly resistant to "after-yellowing," are obtained. A. W. B.

Manufacture of [vinyl] polymerisation products. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 441,064, 9.7.34 and 15.4.35. Cf. B.P. 378,544; B., 1932, 1071).—Pure vinyl Bu^t ether is polymerised below 10° (–40°) in presence of BF_3 ; cooling may be effected by adding liquid C_3H_8 , solid CO_2 , etc. The rubber-like product may be used for electrical insulation, coating compositions, non-splintering glass, etc. S. M.

Manufacture of synthetic resin. L. C. SWALLEN and K. M. IREY, Assrs. to COMMERCIAL SOLVENTS CORP. (U.S.P. 1,993,700, 5.3.35. Appl., 24.2.31).—By-products comprising esters of polybasic acid and monohydric alcohol, *e.g.*, Bu phthalate, are extracted by means of liquid petroleum hydrocarbons, b.p. 95–160°, from the final product of the reaction between 1 mol. of polyhydric alcohol (glycerol) and $1\frac{1}{4}$ –2 mols. of dibasic acid [o - $C_6H_4(CO_2)_2O$] in presence of a monohydric alcohol ($BuOH$) and an esterification catalyst (HCl). S. S. W.

Compositions containing [polyvinyl] synthetic resins. H. E. POTTS. From SHAWINIGAN CHEMICALS, LTD. (B.P. 441,052, 5.4.34 and 7.5.35. Cf. B.P. 410,770; B., 1934, 686).—The impact-resistance of acetalised polyvinyl ester resins is increased by incorporating

2–10% of paraffin wax or a bivalent metal salt or ester of monobasic aliphatic acids ($> C_8$), *e.g.*, palmitates (stearates excepted). The effect is increased by adding also ZnO , ZnS , BaF_2 , TiO_2 , etc. S. M.

Production of [plastic-impregnated] artificial materials. BRIT. CELANESE, LTD. (B.P. 440,767, 29.3.35. U.S., 30.3.34).—Paper, textile fabrics, and other porous materials, particularly in continuous sheets, are pre-heated and hot-pressed with a plastic composition containing, *e.g.*, cellulose esters, but no volatile solvents. Apparatus is described. S. M.

Impregnating fillers and fibrous materials with resins of the [aromatic] amino-aldehyde series. ALLGEM. ELECTRICITÄTS GES. (B.P. 441,483, 16.7.34. Ger., 27.7.33).—Before being used the resin is heated in solution at 50–60° to increase its η ; the solvent is removed from the impregnated material. S. M.

Production of [colourless hydrazo-aldehyde] artificial masses. E. POLLAK (B.P. 441,038, 3.12.34. Austr., 4.12.33, 14. and 15.9.34).—2 or 3 mols. of CH_2O are condensed with 1 mol. of a dicarboxylic acid amide of N_2H_4 , its substitution products, or monothio-derivatives thereof, in presence of acid or alkaline catalysts in the first stages, final hardening being done with acid catalyst. Other hardenable artificial resins, *e.g.*, urea- or thiourea- CH_2O , may be incorporated before the final hardening process. The products are suitable as dressing media for textile fibres. [Stat. ref.] S. S. W.

Plastic compositions [containing rubber]. A. E. BOND and J. T. K. CROSSFIELD (B.P. 441,765, 21.7.34).—An aq. dispersion of rubber, cement, and granulated cork is used for constructional units and covering floors, walls, etc. Coagulation of the rubber is retarded by incorporating casein glue. S. M.

Composition for phonograph records. J. DOLID, Assr. to DICTAPHONE CORP. (U.S.P. 1,994,946, 19.3.35. Appl., 20.5.30).—Products which do not crystallise are obtained by treating lauric acid in described manner with aq. $NaAlO_2$, with or without PbO . Other soaps, carnauba wax, etc. may be added. S. M.

Production of shellac compositions for moulding. W. H. GARDNER (U.S.P. 1,994,071, 12.3.35. Appl., 22.10.32).—Shellac, fillers (asbestos), and, if desired, condensing agents [dicyanodiamide, o - $C_6H_4(CO_2)_2O$] are mixed thoroughly by repeated passage between hot rolls, and then baked, *e.g.*, for $\frac{1}{2}$ hr. at 149° (condensing and/or polymerising the shellac), and are finally cooled and comminuted. S. S. W.

[Pearlescent] moulded products. WINGFOOT CORP. (B.P. 440,879, 3.4.34. U.S., 12.8.33).—0.1–1% of a powdered metal (250–300-mesh), *e.g.*, Al, Cu–Al bronze, Mg, is incorporated with a thermoplastic and preferably transparent resin, *e.g.*, rubber which has been heated in solution with HCl and $SnCl_2$ (details given), cellulose esters. The effect is increased by adding a soap. Dyes and pigments may also be added. S. M.

Manufacture or treatment of albuminous artificial masses. DEUTS. HYDRIERWERKE A.-G. (B.P. 440,760, 31.1.35. Ger., 31.1. and 31.3.34).—Gelatin, glue, casein, etc. masses are softened by incorporating aliphatic, cycloaliphatic, or fatty aromatic alcohols ($<$

C_6 , the no. of OH groups being < the no. of C atoms), *e.g.*, oleyl alcohol, cyclohexanol, $CH_2Ph\cdot OH$, cyclic OH-substituted ethers, *e.g.*, acetoneglycerol, tetrahydrofurfuryl alcohol, their esters or ethers. S. M.

["Matting" the surface of] bodies formed of polystyrol or mixtures thereof with other substances. SIEMENS & HALSKE A.-G. (B.P. 440,926, 5.4.35. Ger., 6.4.34).

Roller mills for paint. Joint-making packing.—See I. Products from mineral oils.—See II. Org. esters. Esters of glycol ethers.—See III. Filaments. Yarns etc. from polymerisation products. Utilising "floating soap." Removing pigments from paper.—See V. Sizing absorbent materials.—See VI. ZnS ppts. TiO_2 . Plastic S.—See VII. Safety glass. Abradant material.—See VIII. Painting of metal sheet.—See X. Oil-resistant conductor.—See XI. Scouring agents.—See XII.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Creaming [rubber] latex with (A) gum tragacanth, (B) tragon-seed gum. E. RHODES and K. C. SEKAR (J. Rubber Res. Inst. Malaya, 1935, 6, 137—139, 140—142).—The processes of B.P. (A) 415,133 and (B) 430,935 (B., 1934, 933; 1935, 776) are outlined. D. F. T.

Rubber dispersions. J. A. PLAIZIER (Verfkroniek, 1935, 8, 306—310).—A descriptive review, covering natural, preserved, conc., vulcanised, flocculated, and coagulated latex, mixtures containing latex, and artificial dispersions of rubber. D. R. D.

Thermal plasticising of rubber. M. I. FARBEROV and J. L. MARGOLINA (India-Rubber J., 1936, 91, 249—253).—The structural changes in rubber when plasticised by mechanical and thermal treatment, respectively, are shown, by plasticity tests, alteration of relative η of solutions with pressure, and microscopical examination of the protein network, to be similar, but the inner structure is less affected by the thermal treatment. The decisive feature in thermal plasticisation is the concn. of atm. O_2 , although only 0.5% was absorbed in 2 hr. at 170° . In CO_2 , N_2 , or NH_3 thermoplasticisation is very slow, and at 170° part of the rubber is rendered insol. in the ordinary solvents. D. F. T.

Plasticisation of rubber. T. L. GARNER and C. M. BLOW (Trans. Inst. Rubber Ind., 1935, 11, 436—438).—Experiments show that, when masticated under controlled conditions, smoked sheet rubber softens more slowly than a (2:1) mixture of rubber with C black. The effect of an atm. of O_2 (relative to N_2) on the rate of softening of the smoked sheet also is > that for the above mixture. The effect of O_2 and a softener is not additive, the softener being more effective in O_2 than in N_2 . D. F. T.

Inflammability and fireproofing of rubber. T. R. DAWSON (Trans. Inst. Rubber Ind., 1935, 11, 391—420).—A general survey of the subject is given together with a description and discussion of methods for testing inflammability and an account of various fireproofing agents. Comparative tests on a no. of fireproofed rubbers as to their fire-resistance and H_2O absorption are described. An important measure of fire-resistance can

be imparted to soft rubber by incorporating various inert mineral fillers, *e.g.*, $Al(OH)_3$, and certain org. materials, *e.g.*, chlorinated rubber or $(C_6H_4Me)_3PO_4$. D. F. T.

Effect of conditions of drying on ageing properties of sheet rubber. I. J. D. HASTINGS (J. Rubber Res. Inst. Malaya, 1935, 6, 90—104).—Ageing tests on vulcanisates in O_2 at 60° and 300 lb. pressure show that sheet rubber dried in hot air is inferior to smoked sheet rubber except when prepared from very dil. latex. D. F. T.

Toughness of sole crêpe [rubber]. ANON. (J. Rubber Res. Inst. Malaya, 1935, 6, 135—136).—The hardening of rubber in storage at low temp. has led to unjustified complaints as to variation in quality; the effect is reversible. D. F. T.

Solvent recovery in the rubber industry. ANON. (Synth. Appl. Fin., 1936, 6, 269—273).—A discussion of the active-C process.

Determination of free sulphur in rubber. E. W. OLDHAM, L. M. BAKER, and M. W. CRAYTOR (Ind. Eng. Chem. [Anal.], 1936, 8, 41—42).—The thinly sheeted sample is boiled gently with dil. aq. Na_2SO_3 , an aq. suspension of Na stearate, and paraffin wax. Then dil. $SrCl_2$ solution (to ppt. fatty acids) and $Cd(OAc)_2$ solution (to ppt. mercaptobenzthiazole) are added, the whole is filtered, and the ppt. washed with $Cd(OAc)_2$ solution. To the filtrate are then added 40% aq. CH_2O , glacial AcOH, and dil. starch solution and the whole is titrated at $< 15^\circ$ with standard I solution (1 c.c. = 0.002 g. of S). A parallel blank determination is also made. D. F. T.

PATENTS.

Creaming of rubber latex. R. F. TEFFT, Assr. to UNITED STATES RUBBER CO. (U.S.P. 1,994,328, 12.3.35. Appl., 9.9.33).—A small % of a H_2O -sol. alkylated cellulose (*e.g.*, dimethylcellulose) (≈ 0.5 pt. per 100 pts. of total solids) is added to latex to expedite creaming with formation of a conc. latex with a sub-normal amount of non-caoutchouc constituents. D. F. T.

Manufacture of rubber or elastic thread. T. L. SHEPHERD (B.P. 441,124, 6.4.34).—Latex and coagulant are formed into a thread and stretched, complete coagulation being delayed until the stretching is finished. Vulcanising may be effected while the threads are wound on a bobbin, and the surface may be made tougher than the core. B. M. V.

Radioactive rubber threads. W. GRUNZIG and C. BAUMGÄRTEL, Assrs. to J. ROMPLER A.-G. (U.S.P. 1,980,519, 13.11.34. Appl., 21.5.32. Ger., 1.6.31).—An aq. solution of a radioactive material is added to rubber latex, the mixture is coagulated, and the coagulum formed into threads which are made into a textile fabric. A. R. P.

Spinning solutions and production of elastic yarns therefrom. R. and J. PICKLES (B.P. 440,623, 31.7.35).—Crude viscose is purified by pptn. with saturated brine solution or EtOH, mixed with an equal quantity of unconc. rubber latex containing vulcanising and accelerating agents, and spun into yarn. F. R. E.

Manufacture of rubber articles. C. E. LINSOTT, Assr. to UNITED STATES RUBBER CO. (U.S.P. 1,994,317,

12.3.35. Appl., 15.7.33).—Rubber is deposited from aq. dispersion on to a deposition surface of rubber which has been rendered non-adherent by treatment, *e.g.*, with S_2Cl_2 , H_2SO_4 , or an oxidising agent. The deposit is removed after solidification. D. F. T.

Manufacture of composite product [containing rubber]. C. L. BEAL, Assr. to AMER. ANODE, INC. (U.S.P. 1,994,165, 12.3.35. Appl., 4.11.29).—Metal articles are given an adherent rubber coating by first electrodepositing from aq. dispersion a thin layer of a tough, heat-plastic isomeride of rubber (together with a resinous solid, *e.g.*, ester gum), and thereafter electrodepositing the coating of rubber from aq. dispersion. D. F. T.

Curing [vulcanisation] of rubber articles. E. SACHS (B.P. 441,253, 14.6.35. Ger., 25.6.34).—Before vulcanisation the articles are covered with wet org. material, such as a solution or moist film of cellulose (or derivatives), which on drying shrinks and thereby exerts pressure on the article. After vulcanisation the coating is removed and leaves a smooth or glossy surface. D. F. T.

Aldol condensation product and vulcanisation of caoutchouc therewith. L. B. SEBRELL, Assr. to WINGFOOT CORP. (U.S.P. 1,994,732, 19.3.35. Appl., 14.10.32).—Vulcanisation is effected with the aid of the product obtained by the reaction of an aldol (acetaldol) with an amine (NH_2Ph) and further treatment with an aldehyde (CH_2O). D. F. T.

Preparation of accelerator compound [for rubber]. D. H. POWERS, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,993,803, 12.3.35. Appl., 9.10.26. Cf. U.S.P. 1,732,532; B., 1930, 205).—In the condensation of the aldehyde, primary amine, and CS_2 it is advantageous to use a higher aldehyde (*e.g.*, $PrCHO$) and 2–4 mols. of aldehyde per mol. of amine. The products are dark and viscous or resinous and have no definite composition. D. F. T.

Depolymerisation and reclamation of rubber. R. L. DAVIES, and PENNSYLVANIA SALT MANUFG. Co. (B.P. 440,604, 18.4.35).—Rubber (waste etc., with or without cellulose) is treated with $NaOH$ and nascent O ; the latter may be produced by adding $NaOCl$ or Cl_2 . D. F. T.

Treatment of rubber scrap, old rubber, or the like. B. G. CALISE (B.P. 440,690, 30.1.35. Fr., 12.11.34).—A S-terpene additive compound obtained by heating together colophony, S, and turpentine (*e.g.*, at 165°), or by heating colophony and S and dissolving the product in boiling turpentine, is used as an agent for the regeneration and direct utilisation of vulcanised rubber scrap etc. D. F. T.

Stabilisation of polymerisation products.—See III. Disazo dye.—See IV. Filaments. Utilising "floating soap." Rubbered paper.—See V. Pigments. Coating preps. Plastic compositions.—See XIII.

XV.—LEATHER; GLUE.

The liming process in leather manufacture. S. T. LEO and C. T. CHANG (J. Chem. Eng. China, 1935, 2, 89–101).—The liming effects of As_2S_3 , Na_2S , and

$Ca(OH)_2$ on raw calfskins have been studied, the limed pelts being tanned and finished. A lighter grain was produced by $As_2S_3-Ca(OH)_2$ than by $Na_2S-Ca(OH)_2$ and a loose grain by $Ca(OH)_2$ alone. More hide substance was removed from the pelt by $Ca(OH)_2$ than by the other depilants, and the treated pelt contained more mineral matter and CaO . The greater was the hide substance in the limed pelt, the better was the quality of the finished leather. Leathers tanned from limed pelt containing $< 63\%$, $63-72\%$, and $> 72\%$ of hide substance were soft, good, and stiff, respectively. D.W.

Developments in the theory of tanning. E. STIASNY (J. Soc. Leather Trades Chem., 1936, 20, 50–60).—A lecture, in which the various theories are discussed and the bearing of recent scientific research on the problem is examined. D. W.

Principles and mounting of the glass electrode, and measurement of current therewith in the determination of p_H in the tannery. G. PARSY (J. Soc. Leather Trades Chem., 1936, 20, 84–105).—The theory of the instrument is given, together with practical notes. D. W.

Effect of variations in p_H of vegetable tan liquors on the amount of tannin fixed by hide pelt. G. REZABEK (J. Soc. Leather Trades Chem., 1936, 20, 72–84).—Previous tests on hide powder (B., 1935, 817) have been applied to pelt. The results with hide powder were not confirmed in the case of pelt; this is attributed to the diminished rate of penetration of the tannin into the pelt at p_H 8.0. Max. fixation of tannin was obtained in a series of liquors at p_H falling from 5.0 to 3.0, respectively. D. W.

Deterioration of vegetable-tanned leathers containing sulphuric acid and glucose. E. L. WALLACE and J. R. KANAGY (J. Res. Nat. Bur. Stand., 1935, 15, 523–527).—The deterioration of chestnut- and quebracho-tanned leathers containing 0–3% of H_2SO_4 (measured by change in tensile strength after up to 24 months' storage at 21° and 65% R.H.) was uninfluenced by approx. 5% of glucose. There was no deterioration under these conditions of leathers with $p_H < 3$. H. J. E.

Fat-liquoring of chrome-tanned leather. S. T. LEO and T. Y. CHENG (J. Chem. Eng. China, 1935, 2, 106–111).—Chrome leathers were fat-liquored with soap-oil, soap-sulphonated oil, and soap-egg-yolk-oil liquors, respectively, and the petroleum spirit and $COMe_2$ extracts and combined fat determined in their different layers. Max. penetration was obtained with egg-yolk fat-liquors, and min. with those containing sulphonated oil. High petroleum-spirit extract was accompanied by low $COMe_2$ extract and combined fat, and vice versa. D. W.

PATENTS.

Glue. G. E. PIERSON, Assr. to PERKINS GLUE Co. (U.S.P. 1,989,150, 29.1.35. Appl., 8.7.33).—Claim is made for a mixture of starch powder with urea 5–20, BaO_2 0.4–2, and Na_2CO_3 about 0.1% in the manufacture of glues for making plywood. A. R. P.

Manufacture of glue. O. JOHNSON (U.S.P. 1,992,867, 26.2.35. Appl., 4.2.33).—Cotton or wood pulp is

digested cold with 10–30% NaOH containing NaCl 0.2–0.5, FeSO₄ 0.05–0.25, and K₂Cr₂O₇ 0.025–0.1%, the fibres are separated from the lye, pulverised, shredded, and converted into viscose, and the product is mixed with dil. aq. NaOH containing Na₃PO₄ and Na₂SiO₃ to form a glue which may be thickened with casein, soya-bean meal, or the like. A. R. P.

Manufacture of waterproof glue. T. SATOW (U.S.P. 1,994,050, 12.3.35. Appl., 9.1.30).—The coagulating action of CH₂O on glutinised protein adhesives is retarded by treating the CH₂O with aq. NH₃ or Na₂SO₃ before mixing. The glue so produced is fluid after 6–10 hr., but sets completely in 24 hr. and is then impervious to boiling H₂O. *E.g.*, raw, oil-free soya-bean flour 100, Na₂HPO₄ 10, NaF 5, Ca(OH)₂ 7–10, CaCO₃ 50, CuSO₄ 0.5, NaCl 2, and H₂O 530 pts. are mixed and 5–10 pts. of the reaction product of 35% aq. CH₂O and 18% aq. NH₃ (in the ratio 1 : 3) are added. E. J. B.

Adhesive. G. H. OSGOOD (Assee.) and R. G. PETERSON (U.S.P. 1,989,424, 29.1.35. Appl., 17.11.33).—A mixture of cellulose fibre and pea, maize, bean, or rice hulls is soaked in 16–24% aq. NaOH for some time, then squeezed until the wt. of the wet mass is three times that of the original dry mixture, and treated with CS₂ for 3–5 hr. to form an adhesive for making plywood. A. R. P.

Sol. azo dyes.—See IV. **Filaments.**—See V. **Dyeing pelts etc.**—See VI. **Chromic salt solutions.**—See VII. **Cellulose derivative compositions [for artificial leather].** Treating artificial [gelatin etc.] masses.—See XIII.

XVI.—AGRICULTURE.

Shot soils of western Washington. L. C. WHEETING (Soil Sci., 1936, 41, 35–45).—Shot soils develop only under forest vegetation where the internal drainage of the profile is restricted. The shot contain more silt and less clay, more sesquioxides and P, and less SiO₂ than does the soil immediately surrounding them. "Shot" are possibly formed by pptn. and dehydration of Fe and Al compounds during the dry season. A. G. P.

Static friction measurements in the study of soil-moisture relationships. L. C. WHEETING (Soil Sci., 1936, 41, 1–11).—Changes in the coeff. of static friction with H₂O content in soils are determined. Comparison of results with Atterberg consts. indicate that interfacial forces at the soil-H₂O phase boundary are important factors in many physical properties of soils. A. G. P.

Composition and constitution of the colloids of certain of the great groups of soils. H. G. BYERS, L. T. ALEXANDER, and R. S. HOLMES (U.S. Dept. Agric. Tech. Bull., 1935, No. 484, 38 pp.).—Chernozem colloids are characterised by high SiO₂ : R₂O₃ and SiO₂ : Al₂O₃ ratios and uniformity of colloid composition throughout the profile. Prairie colloids have lower ratios, are free from CO₃, and have const. composition in the profile. Grey-brown podsol colloids are similar to prairie colloids, but vary in the profile. Laterites have low SiO₂ : Al₂O₃ and high SiO₂ : base ratios. The constitu-

tion of the fundamental aluminosilicic acids of soil colloids is discussed. A. G. P.

Surface behaviour of bentonites and [soil] clays. H. F. WINTERCORN (Soil Sci., 1936, 41, 25–32).—Differences between the properties of clays and bentonites are explained by the electrical properties of their surfaces. A. G. P.

Relation between physical properties and the nature of the adsorbed bases in soil. L. G. KOTZMANN (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 24–26).—Soils saturated with Na form practically no stable aggregates. The latter are formed freely in soils saturated with bivalent bases or H. The plastic limit of Na⁺ is > that for Ca⁺⁺-saturated soils. With varying proportion of Ca⁺⁺ and Na⁺ in soils the influence of Na⁺ is appreciable when 4–5% saturation is reached, and increases steadily to 30% saturation, at which latter level the soil properties are similar to those of a 100%-saturated Na-soil. A. G. P.

Distribution and condition of phosphorus in three horizons of a differentially fertilised Hagerstown clay loam soil planted to apple trees in metal cylinders. W. THOMAS (J. Agric. Res., 1935, 51, 321–339).—The total PO₄^{'''} in P-fertilised surface soils was greater under grass than when cultivated. In subsoils (7–21 in.) the reverse distribution occurred. The downward movement of P is probably due to the mobilising action of humic acids. No movement into deeper layers (21–53 in.) was apparent. Leaching trials indicate the presence in P-treated soils of at least one moderately sol. phosphate which dissolves in proportion to the amount present in the soil. One third of the added P remained sol. in H₂O after 7 year and one third was converted into basic Al and Fe phosphates of low solubility. The portion of fertiliser P which moved into the subsoil was converted into a difficultly sol. form. A. G. P.

Effect of replaceable bases on physical properties of soils, with special reference to effect of replaceable calcium and sodium on index of friability. D. H. WEBB, D. S. JENNINGS, and J. D. PETERSON (Soil Sci., 1936, 41, 13–24).—Treatment of soils with Na salts lowers the index of friability and renders them inferior in physical condition to Ca-treated soils. The difference in index of Na- and Ca-treated soils is greater in wetter samples. The index is related more closely to the chemical treatment of soils than to the exchangeable bases present after treatment. A. G. P.

Microbiology of Appalachian podsol soils. II. Seasonal changes in microbial activity. P. H. H. GRAY and H. J. ATKINSON (Canad. J. Res., 1935, 13, C, 358–366).—Seasonal variations in CO₂ production in these soils were, in general, of the same nature but smaller than those in bacterial nos. The average level of both vals. differed in successive years and was influenced by manurial treatment. (Cf. B., 1935, 1010.) A. G. P.

Direct microscopical and bacteriological examination of soil. G. ROSSI [with S. RICCARDO, G. GESUÈ, M. STANGANELLI, and T. K. WANG] (Soil Sci., 1936, 41, 53–66).—The method and its applications are described. A. G. P.

Broad relationships between micro-organisms and soil fertility. J. G. LIPMAN and R. L. STARKEY (New Jersey Agric. Exp. Sta. Bull., 1935, No. 595, 32 pp.).—A discussion. A. G. P.

Practicability of the Walkley and Black method for determining soil organic matter. G. O. BAKER (Soil Sci., 1936, 41, 47—51).—The method (B., 1934, 248) gives results slightly $>$, but, in general, parallel to those obtained by wet combustion (A.O.A.C. Methods, 1930). Differences are traced to the difficultly-decomposable (H_2SO_4) fraction of the org. matter. The Walkley and Black method is adapted for determining the approx. amount of org. matter in CO_3'' -containing soils without correction for CO_3'' . A. G. P.

Determining available phosphorus by extracting soils with a potassium carbonate solution. R. S. WHITNEY and R. GANDER (Soil Sci., 1936, 41, 33—34).—Soil is extracted with 1% aq. K_2CO_3 . The PO_4''' in the extract is determined by the Mo-blue method, using $SnCl_2$ as reducing agent. A. G. P.

Has the moon an influence on plant growth? H. JAEGER (Z. Pflanz. Düng., 1935, 41, B, 336—347).—Cosmic conditions influence the growth of several species of plants. A. G. P.

Has the moon an influence on plant growth? II. M. POPP (Z. Pflanz. Düng., 1935, 41, B, 348—357).—The growth of potatoes, maize, and beans was not affected by phases of the moon. A. G. P.

Influence of the moon on plant growth. K. OPITZ (Z. Pflanz. Düng., 1935, 41, B, 357—359).—The growth of oats is unaffected by the moon. A. G. P.

Aërial fertilisation of wheat plants with carbon dioxide. E. S. JOHNSTON (Smithsonian Misc. Coll., 1935, 94, No. 15, 9 pp.).—Plants grown in an atm. enriched with CO_2 showed increased tillering, higher straw yield, increased no. and wt. of heads and no. of grains produced. Heading was slightly delayed, and the wt. per grain was not appreciably affected. A. G. P.

Effect of potassium supply on composition and quality of wheat. II. A. G. MCCALLA and E. K. WOODFORD (Canad. J. Res., 1935, 13, C, 339—354; cf. B., 1935, 244).—Restricted supplies of K retarded growth, lowered the intake of minerals, and lowered the quality of the grain. The composition of the grain was less affected than that of the remainder of the plant. Neither Na nor Ca could replace K in the nutrition of wheat. Consideration of the % composition only may lead to erroneous views of the mineral intake of plants. A. G. P.

Nature of disease-resistance in cereals. III. Organic nitrogen content of mature and immature tissues of the wheat plant in relation to stem-rust resistance. T. JOHNSON and O. JOHNSON (Canad. J. Res., 1935, 13, C, 355—357).—The greater susceptibility of younger tissues cannot be attributed to their higher org. N contents. A. G. P.

Fertiliser requirements of sweet maize. W. A. HUELSEN and M. C. GILLIS (Illinois Agric. Exp. Sta. Bull., 1935, No. 417, 354—435).—Effects of individual

fertiliser constituents and of various combinations of these on the growth, yield, and maturing of maize are examined. A. G. P.

Relationships between plant growth, soil, and the nutrient ratios of manures. II. K. RACKMANN (Z. Pflanz. Düng., 1935, 41, A, 313—335; cf. B., 1935, 1109).—The intake of nutrients in proportion to dry-matter production is much higher in younger plants, the rate of intake being in the order $N > K > P$. Proportional growth and nutrient intake is more rapid in unmanured and lightly manured than in heavily manured soils. Heavy dressings of K salts lower the general intake of young plants. Acid soils facilitate intake, especially that of P. The relative utilisation of N increased with the amount of fertiliser applied, whereas that of K declined rapidly. A. G. P.

Phosphorus content and buffer capacity of plant sap as related to the physiological effect of phosphorus fertilisers in fibrous low-moor peat. J. R. NELLER (J. Agric. Res., 1935, 51, 287—300).—Applications of P fertilisers to peat soils markedly increased the [PO_4'''] of the leaf saps of plants growing therein. Much of the P of saps was in inorg. forms. Liming increased the assimilation of P and lowered that of S. The p_H of saps was not appreciably affected by different fertiliser treatments, but buffer capacities tended to be high in saps of high P content. Total acidity and total inorg. P varied directly with the amount of sol. P in saps. Physiological disturbances of growth resulting from the action of certain P fertilisers were unrelated to the sp. conductivity or total sol. solids of saps. High response of plants to P manuring is associated with low [P] in saps of untreated plants. A. G. P.

Action of the supplementary manure Naaki. R. HERRMANN (Z. Pflanz. Düng., 1935, 41, A, 257—274).—Naaki (99% of SiO_2 of which 9.3% is colloidal) does not increase the sol. P of fertilisers, nor facilitate the intake of P by plants in Neubauer tests. Its NH_3 -fixing capacity is $>$ that of similar finely-divided materials. A. G. P.

Soil reaction and azalea growth. R. M. BARNETTE and H. MOWRY (Soil Sci., 1936, 41, 71—79).—Best growth was obtained in soils having p_H 5.0—6.0. Above p_H 7.0 growth was slow and foliage chlorotic. The distribution of healthy and chlorotic plants in a large no. of soils is examined. A. G. P.

Greenhouse culture of carnations in sand. H. M. BIEKART and C. H. CONNORS (New Jersey Agric. Exp. Sta. Bull., 1935, No. 588, 24 pp.).—Appropriate conditions and nutrient media are described. Sand-cultured plants were less sensitive to fungal attack. Addition of Fe to the nutrient to prevent chlorosis is unnecessary. The carnation can absorb and store large proportions of NO_3' which may be assimilated over a long period. A. G. P.

Soil moisture and irrigation investigations in eastern apple orchards. J. R. MAGNESS, E. S. DEGMAN, and J. R. FURR (U.S. Dept. Agric. Tech. Bull., 1935, No. 491, 35 pp.).—The growth rate of the fruit is not appreciably reduced under drought conditions until the driest parts of the root zone approaches the wilting

%. Insufficient H_2O supply is associated with lower total carbohydrate and starch contents in trees and higher sugar contents in wood and bark. A. G. P.

Effect of drought on nutrient levels in the tomato plant. E. M. EMMERT (Soil Sci., 1936, 41, 67—70; cf. B., 1933, 483).—In greenhouse beds dry soil conditions are associated with higher NO_3^- and K^+ and lower PO_4^{3-} in tomato plants than in those in wetter soils. A. G. P.

[Sugar] cane growth in nutrient solutions. J. P. MARTIN (Hawaiian Planters' Rec., 1935, 39, 79—96; Internat. Sugar J., 1935, 37, 447).—Different varieties of cane were grown in jars in nutrient solutions, when with certain of the solutions the best results were obtained at pH 5.0—5.2. A pH of 3.0 was definitely detrimental under the conditions concerned. Absence of Mn was injurious, normal growth resulting when 0.25 p.p.m. of Mn was present; above this amount the effect became increasingly harmful. Fairly good results were obtained when the solutions were aerated by bubbling in air, root rot being thus much less marked, even with the Lahaina variety. J. P. O.

Value of sugar-factory carbonation scums as fertiliser. L. DÈCOUX (Inst. Amél. Betterave, 1934, 2, 241—242; Internat. Sugar J., 1935, 37, 445).—Owing to its extremely fine state of division, the reaction capacity of $CaCO_3$ is little inferior to that of CaO. Its best time of application is in Aug. and Sept., using it at the rate of 4—16 long tons per acre, the material being well mixed in after spreading. J. P. O.

Lespedeza in Illinois. J. J. PIEPER, O. H. SEARS, and F. C. BAUER (Illinois Agric. Exp. Sta. Bull., 1935, No. 416, 301—347).—The culture and manurial response of this legume are examined in relation to soil types suitable to its growth. A. G. P.

Seasonal march of carbohydrates in *Elymus ambiguus* and *Muhlenbergia gracilis*, and their reaction under moderate grazing use. E. C. McCARTY (Plant Physiol., 1935, 10, 727—738).—Changes in the carbohydrate contents of the grasses are inversely \propto the rate of growth of the herbage. During tillering vials maintain a steady but relatively low level. Resumption of growth after clipping is followed by rapid decline in carbohydrates (I) in the basal structures. With the slackening in growth rate, accumulation of (I) proceeds steadily. Results are discussed in relation to grazing practice. A. G. P.

Influence of soil reaction on yield and feeding value of hay. A. W. BLAIR, A. L. PRINCE, and S. H. WINTERBERG (New Jersey Agric. Exp. Sta. Bull., 1935, No. 586, 8 pp.).—Liming acid soils increased the yield and N contents of lucerne and mixed hays, Mg being more effective than Ca-limestone in most cases. Hay from second and third (treated) cuttings had a higher nutritive val. than that from the first. A. G. P.

Control of insect pests of lawns and golf courses. C. C. HAMILTON (New Jersey Agric. Exp. Sta. Circ., 1935, No. 347, 16 pp.).—Use of Pb arsenate and CS_2 emulsions for grubs is described. Various poison baits (including $TiSO_4$ for ants) serve to control other species. A. G. P.

Sodium chlorate in weed control. A. S. CRAFTS (Plant Physiol., 1935, 10, 699—711).—The toxic action of $NaClO_3$ differs from that of heavy-metal salts in that it passes into the plant at low concns. and accumulates in the system until a toxic level is reached. Under these conditions $NaClO_3$ does not act directly on the protoplasm, but kills by effecting a prolonged disturbance of the metabolism. High concns. kill by contact. A. G. P.

Derris insecticides. III. Aphicidal properties of derris and cubé. J. M. GINSBURG and P. GRANETT. **IV. Derris-root residues extracted with different solvents.** P. GRANETT (New Jersey Agric. Exp. Sta. Bull., 1935, No. 581, 12 pp.; No. 583, 12 pp.; cf. B., 1935, 247).—III. The toxicity of derris root to aphids is not always \propto its rotenone (I) content, especially when this is high. Derris and cubé roots having similar (I) content show similar toxicity. The rate of killing by dusts was $<$ that by wet sprays. Use of Pb arsenate, $Ca(OH)_2$, or S with derris reduces its toxicity unless effective wetting agents are included. Loss of toxicity of derris due to admixture with CaO-S is not fully corr. by wetting agents.

IV. Among solvents examined only EtOH extracted practically all insecticidal matter from the roots. In general, H_2O -sol. solvents extracted more total solids than did H_2O -insol. materials. Insecticidal vals. of extracts are not \propto the total solid content. A. G. P.

Use of resin and terpene derivatives in the preparation of insecticides. J. FEYTAUD and P. DE LAPPARENT (Bull. Inst. Pin, 1935, 241—242).—Preps. containing derris are described. A. G. P.

Silicofluoride insecticidal powders for vines, and fluorine in the resulting wines. H. ASTRUC and A. CASTEL (Ann. Falsif., 1936, 29, 16—22).—Analyses of wines fermented in the laboratory from grapes which had been treated with 70 kg. of a powder containing 10% of $BaSiF_6$ per hectare provided no conclusive indication of the presence of abnormal quantities of F from this source. J. G.

Rôle of zinc sulphate in peach sprays. K. J. KADOW and H. W. ANDERSON (Illinois Agric. Exp. Sta. Bull., 1935, No. 414, 207—255).— $ZnSO_4$ -CaO sprays are not as effective as is S for controlling peach scab, and have no marked superiority over Pb arsenate-CaO preps. (I) for general use on peach. Addition of $ZnSO_4$ to (I), however, counteracts foliage injury by retarding carbonation of CaO and by pptg. sol. As. In sand, but not in soil, cultures Zn improved the growth of peach seedlings. A. G. P.

Biology and control of the pepper maggot. R. C. BURDETTE (New Jersey Agric. Exp. Sta. Bull., 1935, No. 585, 31 pp.).—Dusting with talc, 25—30 lb. per acre, at weekly intervals while young peppers are forming is recommended. A. G. P.

Chlorosis of *Primula obconica* in relation to iron. W. SCHOLZ (Z. Pflanz. Düng., 1935, 41, A, 274—282).—CaO-induced chlorosis affects only young growing leaves. It is attributable to either an abs. deficiency of Fe or to imperfect utilisation of Fe within the plant. Chlorotic leaves have neither a marked deficiency of Fe nor a notable excess of Ca. A. G. P.

Lime-chlorosis of lupins. F. PARSCHE (Z. Pflanz. Düng., 1935, 41, A, 282—312).—The sensitivity of lupin varieties to CaO-chlorosis was in the order yellow > white > blue > perennial. Only in yellow lupin is there any apparent relation between the occurrence of chlorosis and the Fe content of the seed. In this variety excessive treatment with Mn leads to a form of chlorosis which is remedied by Fe treatment. Liming of soil lowers the Mn content of plants. Chlorosis caused by top dressings of NH_4 salts is indistinguishable from that induced by CaO. A. G. P.

Diseases and insect pests of rhododendron and azalea. R. P. WHITE and C. C. HAMILTON (New Jersey Agric. Exp. Sta. Circ., 1935, No. 350, 23 pp.).—Spray schedules are given. A. G. P.

Antirrhinum rust. II. Results of spraying and dusting with fungicides. D. E. GREEN (J. Roy. Hort. Soc., 1936, 61, 64—76).—Cu sprays were superior to S preps. Burgundy mixture gave better results than Bordeaux mixture, but neither gave complete control. A. G. P.

See also A., Feb., 177, **Determining phosphates by pptn. as NH_4 phosphomolybdate.** 256, **Intake of Cs by potato plants.** 258, **Tobacco mosaic.**

PATENTS.

Preparation of a composition for germinating seeds. A. L. CLAPP, Assr. to PAPREX FIBRE Co. (U.S.P. 1,978,102, 23.10.34. Appl., 28.2.29. Renewed 20.9.33).—The material consists of a mixture of leather fibre, sawdust, and cellulose fibre made into a loose sheet of felt on a paper-making machine. A. R. P.

Curing and preserving plant products [tobacco or hops]. M. R. COE (B.P. 438,093, 5.12.34).—The foliage is cured in light of $\lambda > 4900 \text{ \AA}$. (i.e., in green or yellow light) and packed in transparent containers coloured similarly to exclude violet and ultra-violet light. A. R. P.

Manufacture of phosphoric acid-containing fertilisers. AKTIEB. KEMISKA PATENTER (B.P. 437,833, 27.6.34. Swed., 29.6.33, 6. and 11.4.34).—Phosphate rock is decomposed with H_2SO_4 to give H_3PO_4 and CaSO_4 , and this mixture is caused to react with more rock to form superphosphate in a separate reaction vessel. A. R. P.

Preparation of a plant-protective agent [insecticide]. J. H. FALES, Assr. to BOWKER CHEM. Co. (U.S.P. 1,979,213, 30.10.34. Appl., 16.1.31).—A mixture of aq. CuSO_4 and $\text{Ca}(\text{OH})_2$ (Bordeaux mixture) is treated with H_3AsO_4 to give the free CaO. A. R. P.

Drying grain etc.—See I.

XVII.—SUGARS; STARCHES; GUMS.

[Sugar-juice] filtration tests with kieselguhrs. H. A. SCHLOSSER (Centr. Zuckerind., 1935, 43, 389—392; Internat. Sugar J., 1935, 37, 445).—Satisfactory results were obtained with American and German kieselguhrs as filter-aids, using bag filters on thick-juices of a beet-sugar factory. In general, the amount added was 0.04%, which raised the purity about 0.4, the principal advantage, however, being smooth operation and a brilliant filtrate, though no improvement in

colour was observed. These advantages appear to justify the extra cost of the application of such filter-aids. J. P. O.

Clarifying quality of the juice of POJ 2878. J. G. SALINAS (Internat. Sugar J., 1935, 37, 447).—Difficulties in the clarification of this juice are due chiefly to the fact that the cane is cut mostly when insufficiently mature, and partly to the presence of a large proportion of secondary shoots deficient in proteins and PO_4''' . Its juice requires > 5—6 hr. for decantation, and even after that time often has a turbidity due principally to colloidal SiO_2 . It is necessary to apply H_3PO_4 , tannic acid, and SO_2 acids in its clarification and to employ kieselguhr for the filtration of the mud, but the large tonnage and high sugar content of this variety justify careful preliminary analyses for the purpose of determining whether the cane has reached maturity. J. P. O.

Purity difference between first-expressed cane juice and syrup. C. L. LOCSIN (Internat. Sugar J., 1935, 37, 431—433).—In a factory in the Philippines operating with a modified Petree process, the purity drop from crusher juice to syrup declined to 0.09, whereas formerly when using the ordinary process of clarification drops of around 1.0 had been the rule. One reason suggested for this change is the higher glucose ratio with an increased laevorotation of the crusher juice compared with that of the syrup. Other contributing causes might be the double clarification of the impurer fractions of the mixed juice; the application of hot mud for maceration, which would retard juice deterioration; the rapid removal of the lighter juices from the system; and the heating of the combined primary and secondary juices to 100—104°, all of which conditions would assist in maintaining the purity. J. P. O.

Recovery of lime from saccharate cake. ANON. (Facts about Sugar, 1935, 30, 194; Internat. Sugar J., 1935, 37, 445).—Cold saccharate cake is broken down by adding sufficient juice to decompose the trisaccharate, from which solution the hydrate is extracted in sufficient quantity to permit its use in the coolers, in place of dry CaO. A saving of 20% in the consumption of dry CaO was effected by working in this way. J. P. O.

Pulp-centrifuge in [potato-]starch manufacture. W. UHLAND and F. SCHMIDT (Z. Spiritusind., 1936, 59, 45).—Processes of starch manufacture involving prolonged contact between the pulp and the "sweet- H_2O " are disadvantageous since smooth running of the process is impeded, starch quality suffers, and the plant may corrode. The use of the pulp-centrifuge immediately after the first pulping rapidly removes a large proportion of the diluted "sweet- H_2O " and of the foaming materials. Thus sieving is facilitated and finer sieves may be used, whilst in consequence of the more satisfactory washing and separation which can be effected, smaller plant can be used. I. A. P.

Pulp-centrifuge in potato-starch manufacture. FRITZE (Z. Spiritusind., 1936, 59, 45—46).—The course of the process when the pulp-centrifuge is used is outlined, and advantages of the process are emphasised (cf. preceding abstract). I. A. P.

Preparation of sorghum starch. C. K. KAO (J. Chem. Eng. China, 1935, 2, 133—136).—Sorghum contains 60—65% of starch or, after removal of bran and germs, 80%, on the dry basis. After soaking in H₂O, grinding, and sieving, the starch is separated from hemicellulose etc. by extraction with "green-beans" extract. Repeated extraction followed by air-agitation gives finally a colourless product in a yield of 80%, the remainder of the starch being firmly held by the fibres. C. I.

Microscopy of starches and their modifications. O. A. SJOSTROM (Ind. Eng. Chem., 1936, 28, 63—74).—Photomicrographs of maize, rice, tapioca, sweet-potato, wheat, rye, sago, potato, and canna starches and their thin-boiling modifications are given. The mechanism of growth of the granules and of their disintegration during pasting is discussed. E. C. S.

Sugar cane. Carbonation scums as fertiliser.—See XVI. **Analysis of honey.**—See XIX.

See also A., Feb., 194, **Starch-splitting enzymes.**

XVIII.—FERMENTATION INDUSTRIES.

Influence of carbon dioxide in beer on the pasteurisation pressure. J. HUBER (Woch. Brau., 1936, 53, 41—42).—When beer is heated in a closed vessel, the pressure developed at corresponding temp. is > that found for H₂O similarly heated. Since the expansions of beer and of H₂O are substantially the same, the observed difference must be attributed to a release of free CO₂ from the beer into the head space. I. A. P.

Determination of carbon dioxide in beer. E. C. MARTIN (J. Inst. Brew., 1936, 42, 79—83).—A known vol. of beer is mixed with a measured vol. of 40% aq. NaOH. 2 c.c. of the mixture are transferred to a described apparatus and treated with 1 c.c. of 20% H₂SO₄, the vol. of liberated gas being measured. Correction for non-CO₂ is applied by reabsorbing the gas with NaOH. Errors due to temp., pressure, etc. are eliminated by carrying out control tests on a standard Na₂CO₃ solution. The method of calculation is indicated. The determination is rapid, and gives results in good agreement with those obtained gravimetrically. I. A. P.

Alcoholic fermentation of sorghum grain in the solid state. K. C. CHANG and T. T. KANG (J. Chem. Eng. China, 1935, 2, 102—105).—Fermentation of sorghum, steam-cooked at atm. pressure, as carried on in China, gives an EtOH yield of 55% (on the starch used). With steam treatment at 50—60 lb. per sq. in. and fermentation at 35° the laboratory yield is 90%. Realisation of this yield on a larger scale requires some mechanical arrangement for mixing the yeast culture with the solid mash. C. I.

Methods of wine analysis. C. H. McCHARLES and G. A. PITMAN (Ind. Eng. Chem. [Anal.], 1936, 8, 55—56).—Methods used in Californian wineries for the determination of EtOH, volatile and total acids, reducing sugars, metals, SO₂, and tannin are given. S. C.

Influence of vintage date on quality of "aramon de plaine" wines. E. ALEXIS (Ann. Falsif., 1936, 29,

29—30).—Such wine is frequently low in EtOH, and this is attributed to premature harvesting. Analyses of musts prepared under similar conditions from the same vines at intervals between Aug. and Oct., 1935, show that the total H₂SO₄ decreases and the total (Fehling) sugars increase progressively, the fructose being always < the glucose. Harvesting should take place before the rainy period when the total sugars correspond with the expected EtOH val. of > 10°.

J. G.

Changes in whisky stored for four years. P. VALAER and W. H. FRAZIER (Ind. Eng. Chem., 1936, 28, 92—105).—The content of EtOH, acids, esters, fusel oil, solids, aldehydes, and furfuraldehyde and the change in colour of 11 brands of whisky, determined at 6-monthly intervals during 4 years' storage in wood, are tabulated. The content of acids and esters, calc. to the original vol., increases, on the average, 40.1 and 15.5 g. per 100 litres, respectively, the greatest increase occurring during the first 6 months. At no time is there any fixed relationship between these constituents. Fusel oil decreases, on the average, 28.6 g. per 100 litres. Quick ageing increases colour, solids, and acids. In glass, acids usually decrease and esters increase. E. C. S.

F in vines.—See XVI. **Katadyn process in industry.**—See XIX. **Distillery waste.**—See XXIII.

See also A., Feb., 187, **Fermentation PrOH.** 194, **Starch-splitting enzymes.** 241, **Enzyme chemistry.** **Ox-kidney uricase.** 243, **Purification of invertase.** 244, **Activation of arginase and urease.** 247, **Fermentation lactic acids.**

PATENTS.

[Alloy for making] plant for manufacturing beer. L. C. BANNISTER, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 436,662, 16.4.34).—Pipes and storage vessels for handling beer are made of an alloy of Cu with > 10 (7)% Al. A. R. P.

Apparatus for aërating beer wort. K. BARTH, K. SCHULER, and J. WANGER (U.S.P. 2,001,564, 14.5.35. Appl., 14.12.31).—The surface of the beer is cooled by germ-free air maintained under slight pressure by a fan. B. M. V.

Production of [n]-butyl alcohol and acetone by fermentation. J. F. LOUGHLIN (U.S.P. 1,992,921, 26.2.35. Appl., 6.8.31).—The anaërobic soil organism, *Clostridium saccharobutyl-acetonicum* (I), with spores of high heat-resistance capacity, is employed for the fermentation of previously sterilised sugar-containing mashes (e.g., from molasses, maize syrup) at 36° and *pH* 4.0—7.5. The solvent products are 65—85% of BuⁿOH and 15—35% of COMe₂; EtOH is not normally produced. The gaseous products are CO₂ and H₂. Various types of nutrients containing protein may be added as required. Inorg. nitrogenous materials (0.0002—0.1% of NH₄ salts) increase the sugar utilisation, shorten the time of fermentation (normally 2—3½ days), and increase the yield of COMe₂ relative to that of BuOH. If solid matter is absent from the mash, fermentation is favoured by addition of, e.g., finely-divided C, sawdust, straw, etc. The fermentation

is characterised by low titratable acidity throughout. (I) will not ferment starchy materials. Its isolation in a pure state, and its morphological, cultural, and physiological characteristics are described. I. A. P.

(A) **Alcohol denaturant.** (B) **Denaturant for alcohol and its preparation.** P. K. FROLICH and F. L. MILLER, Asss. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,993,270—1, 5.3.35. Appl., 3.8.31).—(A) Org. liquids containing 4–20% S (*e.g.*, mercaptans etc., "alcotate" or liquids obtained by neutralising or steam-distilling acid or alkali used for treating petroleum oil) are treated with gaseous Cl_2 (or with Br or I) at room temp. and atm. pressure till substantially saturated, and the product is refluxed with a small excess of NaOH for approx. 4 hr. After cooling, the oily product (O) immiscible with H_2O is recovered (b.p. 80–207°). (B) Similar org. liquids containing S are treated for 2 hr. at 140–550°/atm.—3000 lb./sq. in. with 0.25–3 mols. of O_2 /mol. of liquid. The product is cooled and distilled, and the fraction (F) of b.p. 104–210° is collected. Oxidising agents (H_2O_2 , CrO_4'' , MnO_4') may be used in place of O_2 . (A, B) O and F are suitable denaturants for EtOH, being difficult to separate from it. Thus F cannot be completely removed from EtOH by adding H_2O or by filtration through active C. The pleasant odour of O permits its use as a denaturant in many cases where "alcotate" would be unsuitable. F is also suitable for use as a gas odorant. I. A. P.

Curing etc. hops.—See XVI.

XIX.—FOODS.

Protein and moisture content of wheat grown in New Mexico. C. W. BOTKIN (New Mexico Agric. Exp. Sta. Bull., 1935, No. 230, 16 pp.).—Data are given for wheat grown under irrigation and dry farming conditions.

A. G. P.

Maturation of flour. I. Behaviour of diastases. D. MAROTTA, F. DI STEFANO, and A. VERCILLO (Annali Chim. Appl., 1935, 25, 586–602).—During the maturation of flours, the diastatic activity, ρ_{H} , and contents of reducing and hydrolysable sugars remain unchanged. Addition of malt diastase (malt flour) does not produce an increase in the diastatic activity in the mature flour \propto the amount added, but results in a better-quality bread.

F. O. H.

Differentiation of rice from oats in flour from adulterated wheat. R. TUFFI and E. BORGHETTI (Annali Chim. Appl., 1935, 25, 643–646).—The third sediment in the authors' method (B., 1935, 1113) is dried, washed with MeOH, briefly treated with methylene-blue and eosin, washed and treated with tannic acid followed by $\text{K}_2\text{Cr}_2\text{O}_7$, and again washed. Microscopical examination shows that starch grains from oats are blue, whilst those from rice are yellow; in this way the two impurities can be differentiated when present to the extent of 1%. Starch grains from darnel behave similarly to those from oats, but have a different shape.

E. W. W.

Modern heating (pasteurisation) of milk. I, II. K. J. DEMETER (Chem.-Ztg., 1936, 60, 73–75, 96–98).—Various forms of apparatus used for pasteurising by

the flash, holding, and short-heating methods are described. After pasteurising by the holding method the proportion of acid-forming organisms is $>$ in raw milk, but progressively diminishes as the temp. of heating is raised. Above 93° practically only proteolytic organisms remain.

E. C. S.

Electrical method of deacidifying milk. J. PIEN and J. BAISSÉ (Lait, 1936, 16, 20–26).—It is suggested that the decrease in acidity is due chiefly to the neutralisation of lactic acid by the free bases formed during the electrolytic treatment; the corresponding acid radicals formed react with the Al electrodes used and are thus removed from solution. A disadvantage of this process is the appreciable pptn. of casein which occurs.

E. B. H.

Relation between the vitamin-A content of the dairy ration and of milk. W. C. RUSSELL, M. W. TAYLOR, D. F. CHICHESTER, and L. T. WILSON (New Jersey Agric. Exp. Sta. Bull., 1935, No. 592, 11 pp.).—The vitamin-A content of milk was never $>$ 3.5% of the intake in the ration. The % transference of -A from food to milk decreased with increasing -A content of the ration.

A. G. P.

Effect of interval between milking on yield and fat content of milk. GROH (Lait, 1935, 15, 854–864).—Milking 3 times a day, altering the hour of milking, did not appreciably affect the daily yield of milk or % of fat. The intensity of milk and fat secretion depended on the interval since the last milking and on the interval between that and the preceding milking.

NUTR. ABS. (m)

Cooling and freezing curve for fish. II. O. C. YOUNG (Rept. Biol. Bd. Canada, 1935, No. 26, 12–16; cf. *ibid.*, 1934, No. 22).—Fish is described as "rapidly frozen" when it is cooled from 0° to -5° within 35 min. To cool at this rate when immersed in brine at -18°, steaks must be \succ 2 in. thick. When cooled by the indirect brine system with brine at -20.5° steaks must be \succ 1.5 in. thick, and with brine at -37°, \succ 2.75 in. In still air at -23° fish cannot be rapidly frozen in practicable thicknesses. The rate of freezing is doubled in air moving at 1000 ft. per min.

E. C. S.

Factors influencing the refrigeration of packages of peaches. J. W. LLOYD and S. W. DECKER (Illinois Agric. Exp. Sta. Bull., 1935, No. 418, 439–464).

A. G. P.

Fumigation of fresh fruit to destroy the adult Japanese beetle. M. R. OSBURN and J. W. LIPP (U.S. Dept. Agric. Circ., 1935, No. 373, 29 pp.).—Use of CS_2 , $(\text{CH}_2)_2\text{O}$, and HCN is examined. In general, effective control was obtained with each. Absorption of fumigant was small.

A. G. P.

Value of Fiehe's reaction in the chemical analysis of honey. MOREAUX (Ann. Falsif., 1936, 29, 22–25).—The reaction is best carried out by extracting 20 c.c. of a 50% solution of honey with 20 c.c. of Et_2O , filtering and evaporating the extract, and adding a few drops of a fresh 1% solution of resorcinol in HCl (*d* 1.19); an orange colour turning red indicates chemically-inverted sugar (I). Negative results were given by liquid or cryst. natural honey; by the latter after melting at

60—65° and cooling; by natural honey after 12 hr. at 80—90°; and by fermenting honey kept under humid conditions. Positive results were given whenever (I) was added, and (weakly) when natural honey had been heated for 30—45 min. at 110—115° in an autoclave. J. G.

Variations in caffeine and in the useful principles of commercial coffee extracts. A. GUILLAUME and C. LEFRANC (Ann. Falsif., 1936, 29, 10—16).—The yield of extract and the % of the total caffeine (I) which it contains vary similarly (0.881—1.40 and 60.3—96.5%, respectively), and the latter is unaffected by the nature of the H₂O used. Since the analytical data obtained for 10% extracts prepared in the laboratory are approx. double the mean of those obtained for 26 commercial products (the exception being the non-caffeic N, which is approx. 4 times) it is considered that the latter are prepared on a 5% basis; since the mean (I) content is 53.9 mg. per 100 c.c. it is probable that the commercial samples examined were prepared from powdered coffee. Analytical methods are described. J. G.

Katadyn process and its uses in the foodstuff industry [etc.]. M. MANSFELD (Oesterr. Chem.-Ztg., 1936, 39, 19—23).—There is no objection to the oligodynamic use of Ag in the food industries. Examples are the artificial ageing of spirit distillates; cleansing dairy vessels, brewery bottles, pipe-lines, etc.; inhibiting objectionable fermentation of beverages and vinegar; sterilisation of sausage skins; application (in a vaseline) to wounds. Sterilisation of milk is less successful (on account of proteins), but when it is to be diluted Ag-treated H₂O may be used. Descriptions are given of analytical methods for small amounts of Ag and for bacteriological tests, and of an apparatus by means of which liquids may be treated continuously or otherwise by inserting two Ag rods which are connected to a battery. J. G.

Properties and characteristics of materials for food-plant machinery. ANON. (Food Ind., 1935, 7, 599—611).—The materials tested are pure metals, alloys, synthetic plastic material, and wood. Information is given concerning resistance to corrosion and abrasion, solubility in food materials, and type of machinery for which they are suitable. E. B. H.

Vitamin-B content of raw pinto beans. M. L. GREENWOOD (New Mexico Agric. Exp. Sta. Bull., 1935, No. 232, 19 pp.).—The beans contained 298 Sherman units per g. The relation of vitamin-B to health and nutrition is discussed. A. G. P.

Oxidation and gas formation in the spontaneous heating of hay. E. J. HOFFMAN (J. Agric. Res., 1935, 51, 527—546).—A loss of O₂ much > the production of CO₂ shows that along with biological processes there occurs a chemical oxidation in the heating hay mow. Positive results are obtained by experiments conducted under conditions excluding biological activity. The gases of the hay mow do not contain CH₄; H₂ and CO were found in traces in some samples. E. P.

Influence of commercial limestone and mica grits on growth, feed utilisation, and gizzard measurements of chicks. C. S. PLATT and A. B. STEPHENSON (New Jersey Agric. Exp. Sta. Bull., 1935,

No. 587, 26 pp.).—Mica-grit supplements increased the live wt. of the birds > did limestone (I) or (I)-mica mixtures. Utilisation of food was not appreciably affected. A. G. P.

Vitamin-A in liver oils.—See XII. Carbohydrates [in grasses]. Hay.—See XVI.

See also A., Feb., 227, Curdling of milk. Carotenoids of butter. 253—7, Vitamins.

PATENTS.

Manufacture of rice flakes. E. O. STOKKEBYE (B.P. 441,232, 4.12.34).—The rice is cooked, before rolling, at 100° for < 30 min., H₂O absorption being regulated so that the cooked grain contains > 20% of H₂O. E. B. H.

Preparations of natural or artificial milk containing *Bacillus acidophilus*. J. H. KELLOGG (B.P. 441,574, 16.11.34).—A method is described of preparing cultures of *B. acidophilus* in soya-bean milk, in which, it is claimed, the organism grows more rapidly and more readily than in cow's milk. A product resembling *Acidophilus* milk is obtained, which can be taken in cases of acute colitis, or by persons suffering from other conditions in which cow's milk cannot be taken. E. B. H.

(A, C) **Manufacture of butter.** (B) **Cream process.** H. D. WENDT, Assr. to MILK PROCESSES, INC. (U.S.P. 1,977,927—9, 23.10.34. Appl., 23.2.34).—(A) Cream containing > 65% of butter fat (I) is moderately worked in a plastic condition at < 10° to avoid phase reversal, then blended with sweet or sour milk to the correct pH, and finally churned to form butter. (B) Sour milk is neutralised with Na₂CO₃ + NaOH at 42° until the free acid is reduced to 0.05%, then centrifuged to separate the liquid from the cream, which contains > 65% of (I). (C) The cream produced as in (B) is blended with milk to give a product containing 45—55% of (I), which is then churned to form butter. A. R. P.

Determining the solids content of eggs. W. H. ATKINSON (U.S.P. 1,994,264, 12.3.35. Appl., 17.2.34).—100 c.c. of a volatile solvent (EtOH, COMe₂) are added to 10 g. of sample, and the pptd. protein is filtered off and weighed after drying at low temp. The residue obtained by evaporation of an aliquot portion of the filtrate is also weighed, the total solids content of the sample being calc. from the wt. of the two residues. E. B. H.

Treatment of fruit juices. H. H. BROWNE, Assr. to HILLS BROTHERS Co. (U.S.P. 1,989,399, 29.1.35. Appl., 17.6.32).—Fresh citrus juice is preserved without loss in flavour by heating at about 80° for 15 sec. during flow through an inclined tube at a rate such that the juice only half fills the tube, gases being thus freely liberated, and thence into cans containing the sugar syrup necessary. The cans are sealed and heated for 10—15 min. at 70—75°. Suitable plant is described. E. B. H.

Stabilisation of beverages and other liquids. G. GRINDROD (U.S.P. 1,993,511, 5.3.35. Appl., 30.10.34).—Stabilisation of, e.g., cocoa and chocolate against separation of ingredients is obtained by the use of a hydrating agent, e.g., agar, in a quantity which, while not increasing the η or other characteristics of the

product, is sufficient to bring about general hydration and adsorption of protein or other material on the fat and solid particles. These particles are brought into relation to each other in such a way that clusters of mixed particles have the same d as the fluid product surrounding them. Details of prep., homogenisation, sterilisation, etc. are given.

E. B. H.

Treating albuminous masses.—See XIII. **Lecithin emulsions.**—See XX.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Effect of oils and ointment bases, especially cod-liver oil, on bacterial development. J. GORTZEN (Zentr., Bakt. Par., 1935, I, 134, 169—181).—Oils used in medicine and ointment bases could not serve as substrates for bacteria, but with the exception of turpentine oil had little or no inhibitory action. Cod-liver oil does not prevent the development of bacteria, the formation of proteolytic enzymes, or the dissolution of tissues in meat.

A. G. P.

Potassium hydroxyquinoline sulphate. F. HARTLEY and W. H. LINNELL (Quart. J. Pharm., 1936, 8, 674—682).—Commercial preps. of this substance and "chinisol" consist of a mechanical mixture of K_2SO_4 and $(C_9H_7ON)_2 \cdot H_2SO_4$ in such proportions as to yield a product containing approx. 50% of C_9H_7ON .

W. O. K.

Preparation and preservation of morphine injections. H. DAVIS (Quart. J. Pharm., 1936, 8, 683—687).—For hypodermic injections a solution containing 2.5% of morphine hydrochloride and 0.05 or 0.1% of *p*-chloro-*m*-cresol is recommended.

W. O. K.

Nicotine in cigarette smoke. V. C. PYRIKI (Z. Unters. Lebensm., 1935, 70, 527—535; cf. B., 1935, 174).—In evenly-packed cigarettes the rate of combustion with const. suction is const. throughout the length of the cigarette. The nicotine (I) in the smoke is only slightly affected by change in the rate of suction, but varies widely when totally different smoking methods are employed. The destruction of (I) \propto the amount of smouldering permitted, and in tobaccos giving alkaline smoke is $<$ in those giving acid smoke. The % of H_2O has little influence on the amount of (I) in the smoke.

E. C. S.

Accumulation of nicotine in the butt of cigarettes made with oriental tobacco. A. WENUSCH (Z. Unters. Lebensm., 1935, 70, 536—537).—The author submits that his contention that negligible amounts of nicotine accumulate in the butt of cigarettes made from acid-type tobaccos (cf. B., 1932, 1136; 1934, 475) is supported by Preiss' results (B., 1935, 653).

E. C. S.

Detection and determination of citric acid in tobacco. M. PIATNITZKI (Z. Unters. Lebensm., 1935, 70, 511—527).—Citric acid (I) was isolated as the Ba salt from green, dried, and fermented oriental-type tobacco. The % of (I) in the last-named, determined by the pentabromoacetone method, varied from a trace to 2%. In leaves from a single harvest, the % of (I) varied directly with the % of ash, nicotine, and protein, and inversely with the % of carbohydrate.

E. C. S.

Classification of tobaccos. A. WENUSCH (Z. Unters. Lebensm., 1935, 70, 506—510; cf. B., 1935, 381, 606).—Tobaccos are divided into (i) acid (cigarette and long and short pipe) and (ii) alkaline (cigar). They are distinguished by the reactions given by their aq. extracts with $FeCl_3$, $Hg(NO_3)_2$, $AgNO_3$, phosphomolybdic acid, $NHPh_2 \cdot H_2SO_4$, and KOH in $EtOH$. The smoke of (ii) contains myosmin.

E. C. S.

Essential oil content of drugs. W. J. STRAŻEWICZ (Pharm. Zentr., 1936, 77, 81—85, 97—99).—Determinations on 5 drugs by a standardised steam-distillation method gave vals. which represented only from 38.9 to 95.8% of the respective true oil contents. This loss of oil during distillation can be expressed as a const. for the oil, and the resulting "K val." is suggested as a physical characteristic of the oil.

E. H. S.

Vitamin-A in liver oils.—See XII. **Katadyn process in industry.**—See XIX.

See also A., Feb., 183, **Torrente Iungari water**. 200, **Derivatives of Ph_2O** . Prep. of arylethylamines and arylethanolamines. Prep. of resorcinol Me ether. 201, **Determination of ephedrine**. 202, **Sexual hormones**. 211, **Derivatives of barbital and luminal**. 214, **Synthesis of aminomethylidihydro-oxazine derivatives**. 215—7, **Alkaloids**. 217, **Prep. of sulpharsphenamine**. 219, **Sp. reaction for yohimbine**. **Aminometry of alkaloids**. 240, **Phenanthrene derivatives**. 249, **Purification of bacteriophage**. "Nag-anin" synthesis. 253—7, **Vitamins**. 258, **Tobacco mosaic**.

PATENTS.

Manufacture of salts of aromatic aminoalcohols. G. B. ELLIS. From K., L., W., and F. MERCK (E. MERCK) (B.P. 440,968, 9.7.34).—*trans*- (I), m.p. 196°, 1-, m.p. 137°, and 1-*Nor*-ephedrine, m.p. 134°, β -methylamino- α -*p*-aminophenylpropanol, m.p. 182°, β -methylamino- α -*p*-hydroxyphenylethanol, m.p. 192°, and 1-*adrenaline coumarin-3-carboxylate*, m.p. 162—163°, are prepared by standard methods. They are claimed to have less excitant action, and in the case of (I) greater therapeutic action, than the bases from which they are derived.

H. A. P.

Production of guaiacol compounds. SYNGALA, FABR. F. CHEM.-SYNTHET. U. GALENISCHE ARZNEIMITTEL G.M.B.H. (B.P. 440,217, 27.6.34. Austr., 28.6.33 and 21.2.34).—The manufacture of salts of org. bases and mono- (I) (*dichloride*, b.p. 152°/14 mm.) and di-guaiacylphosphoric acid (II) are claimed. Examples are the *quinine* salt of (I), m.p. 200—201°, and the *quinine*, $C_2H_4(NH_2)_2$, m.p. 143°, and $N(C_2H_4OH)_3$, m.p. 100°, salts of (II).

H. A. P.

Bactericidal preparations. E. MONESS, Assr. to E. R. SQUIBB & SONS (U.S.P. 1,992,577, 26.2.35. Appl., 11.9.31).—Hydroxydiphenyls, or their halogeno-, alkyl, thiocyno-, etc. derivatives, are mixed with a solution of a fat, previously hydrolysed with 1 equiv. of an alkali hydroxide or a substituted NH_3 , and preferably with more alkali to increase stability. The bactericides so produced are stable and need no added hydrocarbon oil.

E. J. B.

Production of stable lecithin emulsions. E. ASSER (B.P. 437,859, 25.1.35. Ger., 7.2.34).—Stable emulsions containing lecithin, of animal or vegetable origin, and fatty oil and/or paraffin oil and H_2O can be prepared by addition also of pine oil (alone or with turpentine oil, terpenes, or terpineols). Soya sludge, from extraction of the oil from the beans, consists of a lecithin-oil- H_2O emulsion. Evaporation under vac. gives a stable mixture of lecithin and oil, which is used in the above process; e.g., soya lecithin (oil content 30%) 8, pine oil 15, turpentine oil 12, paraffin oil 10, and H_2O 55 pts. E. B. H.

Manufacture of acridine derivatives [pharmaceuticals]. I. G. FARBENIND. A.-G., F. MIETZSCH, and H. MAUSS (B.P. 437,953, 4.5.34. Addn. to B.P. 363,392; B., 1932, 368).—The products are differentiated from those of the prior patent by the presence in position 2 of an alkylthiol group. Thus 6:9-dichloro-2-methylthiol- (I) and -2-ethylthiol-acridine are condensed with δ -amino- α -diethylaminopentane in PhOH at 100° to give 6-chloro-9- δ -diethylamino- α -methylbutylamino-2-methylthiol- (citrate), and -2-ethylthiol-acridine (B, 2HCl, citrate, methylenedisalicylate), respectively. Other examples are: 6-chloro-9- δ -diethylamino-*n*-butyl- (citrate), -9- β -diethylaminoethoxyethyl- (methylenedisalicylate), -9- β -diethylaminoethylthioethyl- (methylenedisalicylate), -9-*p*-aminomethylphenyl- (B, HCl, decomp. 138°) {the *Ac* derivative, m.p. $228-229^\circ$, is prepared by condensation of 6-chloro-9-*phenoxy*-2-methylthiolacridine, m.p. $157-158^\circ$ [from (I) and PhOH] with *p*-aminobenzylacetamide, m.p. $93-94^\circ$ }, -9-*p*-diethylaminoethoxyphenyl- (B, HCl, decomp. $246-247^\circ$) [*p*-aminophenyl β -hydroxyethyl ether, b.p. $179-181^\circ/7$ mm. (from $OH \cdot C_2H_4Cl$ and *p*-ONa $\cdot C_6H_4 \cdot NO_2$ followed by reduction) is condensed with (I), and the product, m.p. 221° , is heated with $SOCl_2$ followed by anhyd. NH_4Et_2], and -9- β -diethylaminoethylthiolphenylamino-2-methylthiolacridine (B, HCl, decomp. $246-247^\circ$) [the chloride, m.p. $101-102^\circ$, of 3-chloro-4'-methylthiol-diphenylamine-6-carboxylic acid (2:4- $C_6H_3Cl_2 \cdot CO_2H$ and *p*- $NH_2 \cdot C_6H_4 \cdot SMe$), m.p. $196-197^\circ$, is condensed with *p*- $NH_2 \cdot C_6H_4 \cdot S \cdot C_2H_4 \cdot NEt_2$ (II), and the resulting amide cyclised with $POCl_3$; (II), b.p. $149-150^\circ/1$ mm., is prepared by interaction of 4:4'-($S \cdot C_6H_4 \cdot NO_2$) $_2$, $NEt_2 \cdot C_2H_4Cl$, and NaOEt in EtOH, and reduction (Fe-AcOH) of the resulting NO_2 -compound, b.p. $172-174^\circ/1$ mm.]; 6-chloro-9- δ -diethylamino- α -methylbutylamino-2-*n*-butyl- and -2-isooctyl-thiolacridine (citrate); 9- δ -diethylamino- α -methylbutyl- and 9- ϵ -dimethylamino-amyl-amino- and 9- γ -diethylamino- $\beta\beta$ -dimethylpropylamino-2-methylthiol-6-methylacridine (citrate). Other acridine derivatives, prepared from the appropriate *S*-ether of *p*- $NH_2 \cdot C_6H_4 \cdot SH$ and chlorobenzoic acid followed by cyclisation, are: 6:9-dichloro-2-methylthiol- m.p. $184-185^\circ$, -2-ethylthiol-, m.p. $126-127^\circ$, -2-butylthiol-, m.p. $88-89^\circ$, and -2-isooctylthiol-acridine, m.p. $80-81^\circ$, and 9-chloro-2-methylthiol-6-methylacridine, m.p. 143° . 3-Chloro-4'-methyl-, m.p. $196-197^\circ$, -ethyl-, m.p. $177-178^\circ$, -butyl-, m.p. $153-154^\circ$, and -isooctyl-thiol- m.p. $85-86^\circ$, and 3-methyl-4'-methylthiol-diphenylamine-6-carboxylic acid, m.p. 190° , are also described. H. A. P.

Preparation of stable suspensions of animal-tissue cells. J. Y. JOHNSON. From I. G. FARBENIND.

A.-G. (B.P. 440,802, 24.5.34).—Agglutination of aq. suspensions of the cells is prevented by preparing the suspension in presence of an alcohol of high mol. wt. ($C_8H_{17} \cdot OH$) or a compound containing SO_3H groups, e.g., Na polyanetholesulphonate. Oral or intravenous administration of these substances to the test animal also produces the desired effect. Suitable antiseptics may be added to the suspension. E. H. S.

Production of preparations containing the active constituents of vegetable products. G., F., and H. MADAUS (DR. MADAUS & Co.) (B.P. 441,796 and Addn. B.P. 441,805, [A] 7.12.34, [B] 21.3.35. Ger., [A] 28.8.34, [B] 4.2.35).—(A) Fresh plants or portions thereof are disintegrated with difficultly crystallisable sugars, or mixtures of sugars, e.g., starch-sugar and lactose, and the product is dried at $< 37^\circ$. (B) Honey is specified. E. H. S.

Preparation of blood-serum for diagnostic purposes. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 440,558, 24.5.34).—Blood-serum, to which may be added albumin precipitants or adsorbents, is heated at $80-110^\circ$ until pptn. of solids occurs and these, after cooling, are removed. E. H. S.

Producing a gonad-stimulating substance. H. H. COLE and G. H. HART (U.S.P. 1,994,853, 19.3.35. Appl., 10.3.32).—Blood from pregnant mares which are between the 37th and 130th days of gestation is freed from non-serum constituents. E. H. S.

Manufacture of a gonadotropic hormone. P. HADDAN. From A. J. H. KONGSTED (B.P. 440,530, 19.2.35).—Blood-plasma or -serum from pregnant mares is freed from proteins, e.g., by pptn. with $CCl_3 \cdot CO_2H$, then neutralised, conc., dialysed, and the hormone pptd., e.g., by addition of $(NH_4)_2SO_4$. It may be purified by repptn. from aq. solution with aliphatic alcohols or ketones. E. H. S.

Manufacture of medicaments. I. G. FARBENIND. A.-G. (B.P. 440,963, 9.7.34. Ger., 8.7.33).—Flocculation of clear solutions of albuminous substances obtained from the thyroid gland is prevented by addition of protein degradation products of high mol. wt., e.g., alkali salts of protalbinic or lysalbinic acids. E. H. S.

Liver oils.—See XII. **Radioactive rubber threads.**—See XIV. **Curing etc. tobacco.**—See XVI. **Milk preps.**—See XIX.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Summation of different colour radiations by a photographic emulsion. J. H. WEBB (Phot. J., 1936, 76, 78-89).—Van Kreveld's addition law (A., 1934, 264; B., 1935, 702) is shown to be very accurate for exposure of an emulsion to three different-coloured radiations simultaneously. For the addition of colours applied successively, a special technique, avoiding possible reciprocity failure, has been evolved with exposure to crossing intensity scale curves; the law is also exact here. The theory is briefly discussed. J. L.

Determining Si etc. Lattice-parameter measurements.—See X.

See also A., Feb., 171, **Image reversal in AgI and HgI₂ emulsions. Latent Röntgen image.**

PATENTS.

Composite-layer film for use in colour photography. H. D. MURRAY and D. A. SPENCER (B.P. 440,422, 25.6.34).—Three-colour positives are obtained on film bearing two emulsions on one side and one on the other. The outer layers are sensitised to blue light and the inner layer to red. The inner layer alone incorporates a leuco-dye or a yellow dye. Colour-separation negatives are printed on to the different layers by suitably coloured lights; the inner layer is thus obtained correctly coloured, and the outer layers are then processed to suitable coloured images. The inner layer may be isolated from the outer by a layer of collodion; the inner layer is then developable only by substances dissolved in H₂O-EtOH mixtures. The inner layer may contain α -C₁₀H₇·OH, and be developed with Eikonogen. J. L.

Colour photography. KODAK, LTD. FROM EASTMAN KODAK CO. (B.P. 441,325, 15.6.34).—A support is coated on one side with a yellow filter layer, bearing on it an emulsion sensitive to blue light only. The other side is coated with two layers, sensitive to green and red, respectively, the latter being on top, and preferably with a layer of clear gelatin between the two. The film is exposed with the blue-sensitive emulsion nearest the lens. J. L.

Colour-record lenticular films. OPTICOLOR A.-G. (B.P. 441,713, 7.9.34. Ger., 8.9.33).—The filter for taking or copying pictures has equally transparent colour zones of prescribed dimensions. J. L.

Developers for photographic silver halide emulsions. W. W. GROVES. FROM I. G. FARBENIND. A.-G. (B.P. 440,272, 29.6.34).—Nuclear NH₂-derivatives of *o*-OH·C₆H₄·NHMe, particularly those having alkyl or halogen in the 4, 5, or 6 position, which are stable to atm. oxidation, are used (with Na₂SO₃) in absence of alkalis. Examples are: 4:1:2-NH₂·C₆H₃(OH)·NHMe, 5:1:2-NMe₂·C₆H₃(OH)·NHMe, 3:1:4:5- and 5:1:2:3-NH₂·C₆H₂Me(OH)·NHMe, and 4:5:1:2- and 4:6:1:2-NH₂·C₆H₂Cl(OH)·NHMe. H. A. P.

Fine-grain development of silver halide emulsions. W. W. GROVES. FROM I. G. FARBENIND. A.-G. (B.P. 440,101, 13.6.34).—The use as developers of 2-alkylaminophenols substituted with halogen in one or more of the 4, 5, and 6 positions, *e.g.*, 4- or 5-chloro- or 4:6-dichloro-2-methylaminophenol. A. W. B.

Photographic reproduction. M. G. M. G. BIZOT (B.P. 440,448, 19.9.34. Fr., 19.9.33).—Gelatin layers are sensitised with an acid bath containing CrO₃, with or without K₂Cr₂O₇ or (NH₄)₂Cr₂O₇. The gelatin may be tanned with, *e.g.*, CH₂O, before or during the sensitising process. Such layers, after exposure, are "developed" with a suitable dye bath, *e.g.*, NH₂Ph-black or nigrosine, in H₂O, with or without Na₂SO₃ and Na₂CO₃. The pigment is absorbed where the gelatin has not been hardened by exposure; direct positives are thus obtained. J. L.

Projection screens. D. F. NEWMAN, ASSR. TO TRANS-LUX DAYLIGHT PICTURE SCREEN CORP. (U.S.P.

1,980,285—6, 13.11.34. Appl., [A] 25.4.29, [B] 13.5.30).—A screen which serves as a diaphragm for the reproduction of sound and for the display of pictures from a projector behind it consists of a film made from a mixture of gelatin 450, glycerin 570, and H₂O 900 pts. containing ZnO (light diffuser) 20, NaF (germicide) 25, 10% CH₂O (curing agent) 14, and (A) CoO (light-filtering agent) 6 and BeO (sound reproducer) 40, or (B) Co-blue 6 pts. A. R. P.

Multicolour filters for use with lenticular films [on projection]. OPTICOLOR A.-G. (B.P. 440,582, 9.11.34. Ger., 10.11.33).

Printing lenticular colour-record films. W. W. GROVES. FROM I. G. FARBENIND. A.-G. (B.P. 440,567, 2.7.34).

XXII.—EXPLOSIVES; MATCHES.

Gases of war. A. MARSHALL (Nature, 1936, 137, 256—258).—A summary. L. S. T.

See A., Feb., 166, **Explosive decomp. of tetryl.**

PATENTS.

Manufacture of explosives. C. BELANI, and BERGITE CO., LTD. (B.P. 441,216, 28.8.34).—Each granule of an explosive of the type prepared by stirring dried granular (0.1—0.8 mm.) NH₄NO₃ (and, if necessary, damping salts, *e.g.*, NaCl) into fused trinitrotoluene (I) is coated with celluloid by stirring into a conc. solution of the latter in a H₂O-free volatile solvent (COME₂) until dry, thus forming a waterproof skin. The detonation speed is controlled by the thickness of the latter, or, better, by including in it > 80% of finely-divided (I). Roasted (at 200°) turmeric flour or Al powder is added to the material, preferably before the coating is quite dry, and an extremely stable product is obtained. E. J. B.

Pyrotechnic device. H. CLAUSER (U.S.P. 1,980,910, 13.11.34. Appl., 8.11.30).—A mixture of gum arabic 180, MgCO₃ 55, P₂S₃ or P₂Se₃ 65, KClO₃ 92, and inert filler 88 pts. is claimed. A. R. P.

XXIII.—SANITATION; WATER PURIFICATION.

Safety in handling noxious materials. P. J. CARLISLE (Paint Tech., 1936, 1, 37—38). G. H. C.

Morbific properties of ethyl-petrol. G. LIND (J. Ind. Hyg., 1936, 18, 37—41).—In the use of PbEt₄ in petrol there is no likelihood of Pb poisoning, with the quantities normally used. P. G. M.

Extension of the Manchester Corporation sewage works at Davyhulme. C. G. KENT (J. Inst. Sewage Purif., 1935, 1, 7—35).—The works are designed to deal with a daily dry-weather flow (*D.W.F.*) of 32 × 10⁶ gals.; existing contact beds will treat 14.5 × 10⁶ gals. and the remainder will be purified in the new activated-sludge plants. The main portion of the new plant will deal with a daily *D.W.F.* of 16 × 10⁶ gals. on the "diffused-air" principle in tanks which are 15 ft. deep and are fitted with 3 longitudinal rows of diffusers. A "Simplex" plant to treat a daily *D.W.F.* of 10⁶ gals. and a vertical paddle "Bio-aeration" plant to treat 500,000 gals. have also been installed. Other new plant includes detritus tanks, screens, laboratory, and an additional final-effluent culvert. C. J.

Performance of the new activated-sludge plant at the Davyhulme sewage works. E. ARDERN and C. JEPSON (*J. Inst. Sewage Purif.*, 1935, I, 36—48).—Preliminary operating results of the 3 types of activated-sludge plant installed indicate that the "Bio-aëration" plant is the least efficient since it requires more power than the "Simplex" and diffused-air plants although producing effluents of lower quality. To produce similar effluents the "Simplex" plant requires a longer period of aëration and therefore a larger aëration-tank capacity than a diffused-air plant, but the power required is less. C. J.

Experiments with model [sewage-settlement] tanks. W. CLIFFORD and M. E. WINDRIDGE (*J. Inst. Sewage Purif.*, 1935, I, 136—150).—Apart from trouble due to septic action, settlement efficiencies of $\approx 89\%$ were obtained with long retention periods (14 hr.) irrespective of the nature of the inlet. Comparative results obtained with various types of inlets show the importance of rapid dissipation of the kinetic energy of the incoming sewage. C. J.

Sedimentation and anaërobic digestion of sewage sludge at Colac, Echuca, and Mildura, Australia. E. T. M. GARLICK (*J. Inst. Civil Eng.*, 1935—6, No. 4, 50—82).—Results obtained from the three "Simplex" activated-sludge plants described, each dealing with the separate-system sewage from 4000—6000 people, show that properly designed, 2-storey tanks can be operated without foaming, but are less efficient than Dorr clarifiers for the removal of solids and less suitable for the digestion of surplus activated sludge than are separate digestion units. The overflow H_2O from sludge-digestion plants when returned to the crude sewage upsets the subsequent operation of Bio-aëration units and causes the sludge to bulk. Septicity of sewage during hot weather can be prevented by chlorination, but it also retards gas production in the digestion plant. C. J.

Separate [sewage] sludge digestion at the Birmingham, Tame, and Rea District Drainage Board's Yardley works. E. F. STEELE (*J. Inst. Sewage Purif.*, 1935, I, 133—136).—The plant consists of 7 primary digestion tanks maintained at 25—28° by heated alkaline H_2O withdrawn from 2 second-stage tanks. The primary tanks have a total capacity of 7500 cu. yards and deal with an average of 140 cu. yards of sludge daily with the production of approx. 60,000 cu. ft. of gas. C. J.

[Sewage-]sludge digestion. J. BOLTON (*J. Inst. Sewage Purif.*, 1935, I, 211—220).—A single-stage experimental digestion tank at Bury is fitted with a floating roof and a Pruss circulator. It has proved capable of dealing daily with 4.35% of its capacity of mixed fresh and activated sludges when operated at 27°. The bulk of the gas is evolved during the first 10 days of the digestion period and the daily vol. of gas obtained is $\equiv 0.71$ cu. ft. per head or 8.08 cu. ft. per lb. of org. matter. C. J.

[Sewage-]sludge digestion at Stockport. A. R. WARD (*J. Inst. Sewage Purif.*, 1935, I, 204—210).—A mixture of sedimentation-tank sludge and surplus

activated sludge is digested without nuisance in open primary and secondary tanks of such capacity that the digesting material has an average stay of 4½ months. C. J.

Digestion of activated sludge [from sewage]. E. ARDERN and W. T. LOCKETT (*J. Inst. Sewage Purif.*, 1935, I, 86—109).—The comparative results of 3 years' operation of two experimental (500-cu. ft.) pilot digestion tanks operating at 25—30° and 50—55°, respectively indicate that at neither temp. is the digestion of activated sludge alone satisfactory, on account of low gas yields and difficulty in maintaining optimum p_H . The addition of primary settlement-tank sludge removed the difficulty and with 15 vol.-% the gas yield is 3-fold and a satisfactory p_H is assured. Primary digestion at 25—30° for 10 days followed by secondary digestion in open tanks at atm. temp. for 20—30 days is recommended for large-scale operation. Digestion at 50—55° can be effected in about one half the time, but there is doubt about the adequacy of the gas obtained to maintain this temp. C. J.

Adsorption by activated sludge [from sewage]. E. J. THERIAULT and P. D. MCNAMEE (*Ind. Eng. Chem.*, 1936, 28, 79—82).—The adsorption of org. matter from sewage is intimately related to the aluminosilicate complex, whether it acts simply as an inorg. zeolite or combined with lignoproteins as a humic aluminosilicate. The reaction can be represented with reasonable accuracy by the Freundlich formula, as with ordinary zeolites. Dried activated sludge is given the following proximate analysis: zeolite 30, bacterial cells etc. 35, readily-oxidisable matter 20, H_2O 5, and C from humus 10%. C. J.

Biozeolitic theory of sewage purification. E. J. THERIAULT (*Ind. Eng. Chem.*, 1936, 28, 83—86).—The adsorptive or clarifying agent in activated sludge or the biological slime of filters is a zeolite. The adsorbed org. matters are dialysed to the bacterial cells and thus the sludge is reactivated for further adsorption from the liquid. The cations so transferred are probably released as highly reactive radicals capable, under aërobic conditions, of combining directly with the dissolved O_2 to produce CO_2 and H_2O and later NO_2' and NO_3' . Under such conditions the bacterial growth is restricted to the sludge particles as the main source of food. Under anaërobic conditions the radicals by condensation form CH_4 , N_2 , etc.; the efficiency of the zeolite is impaired by the increasing amounts of NH_3 , which is non-assimilable, and ultimately the bacterial action takes place largely in the liquid and not in the sludge zeolite. C. J.

Practical activated-sludge research. H. J. N. H. KESSENER and F. J. RIBBIUS (*J. Inst. Sewage Purif.*, 1935, I, 50—85).—A method is outlined for studying the effectiveness of the activated sludge of sewage purification in order that the individual plant may be designed to meet local conditions. It is based on the assumption that purification capacity is dependent mainly on oxygenation capacity, and that determination of these factors for a sp. sewage can be accomplished in an experimental plant of wide flexibility operating simultaneously with a control plant treating the same sewage. C. J.

Distillery waste and its effect on treatment of sewage at Stockport. A. R. WARD (J. Inst. Sewage Purif., 1935, I, 199—204).—It is economically impossible to treat sewage containing 0.7% of trade waste from the manufacture of EtOH by acid fermentation of molasses owing to the large amount of oxidisable matter in true solution. The rate of oxidation is considerably reduced, the time required being approx. double that of domestic sewage. This waste has now been removed from the public sewers, as the business has been transferred to the coast, so that the effluent may be discharged into estuarial waters. C. J.

Experiments on a trade sewage. J. HURLEY (J. Inst. Sewage Purif., 1935, I, 164—174).—Experiments preliminary to works extensions indicate that activated-sludge treatment of effluent from percolation filters is preferable to treatment with acid or by "bioflocculation" before filtration, for dealing with the strong trade sewage of Shipley. Return of surplus activated sludge to the crude sewage may be expected to improve sedimentation and densify the activated sludge. C. J.

Chemistry of sewage containing trade wastes. J. M. WISHART (J. Inst. Sewage Purif., 1935, I, 152—163).—The principal types of trade waste in the West Riding of Yorkshire are discussed, and, in conjunction with M. LOVERT, tests are described for the detection and determination of their constituents. C. J.

Criticism of the albuminoid ammonia determination [in sewage]. W. WATSON (J. Inst. Sewage Purif., 1935, I, 191—199).—The method of determination of albuminoid and $\text{NH}_3\text{-N}$ as described in the Ministry of Health's "Methods of Chemical Analysis as Applied to Sewage and Sewage Effluents" is criticised from the viewpoint of the sewage-works chemist, and a standard method is suggested to shorten considerably the time required. A comparison is made between the empirical results usually determined for both albuminoid N and O_2 absorption with abs. determinations of total org. N and complete oxidation. C. J.

Preparation and conditioning of aluminium sulphate solution before applying to water. C. LEIPOLD (J. Amer. Water Works Assoc., 1936, 28, 74—96).—The use of ground alum and continuous mechanical agitation is recommended when applying the coagulant by the solution-feed method. The rate of dissolution depends largely on the position and speed of the paddles. With the dry-feed method attention must also be paid to the shape and capacity of the tank and to the control of the H_2O supply for variable H_2O temp. The quality of the resultant floc is unaffected by the preparatory agitation or concn. of the solution. Recommendations are made to improve the efficiency of the dry-feed method. C. J.

Rôle of the permanganate number in the examination of chemical pulp-mill effluents. H. HAUPTBAUTZEN (Zellstoff u. Papier, 1935, 15, 436—438).—Sulphite pulp-mill effluent generally shows a very high KMnO_4 titre, but its org. constituents are comparatively stable to biochemical and autoxidation processes, to which, in contrast, domestic sewage with the same

initial KMnO_4 titre will react very rapidly. Thus KMnO_4 is inadequate for determining the polluting effects of different effluents, which requires a knowledge of the org. compounds present, but it is useful for controlling the rate of oxidation of a known effluent. D. A. C.

Analysis of waste waters and the techno-sanitary evaluation of some dephenolising methods. J. I. TSCHULKOV (Koks i Chim., 1935, No. 9, 24—27).—Variations in the impurities in waste waters from coke by-product plants are considered, especially the concn. of phenols and $\text{C}_5\text{H}_5\text{N}$ bases. Efficiencies of various methods of purification are discussed with respect to toxicity to living organisms, particularly fishes. D. M. M.

Disinfectant paints.—See XIII. **Katadyn process in industry.**—See XIX.

See also A., Feb., 177, **Determining F in H_2O . [Analysis of] foetid air.**

PATENTS.

Purifying, sterilising, and conditioning of air. E. E. J. MONTJOL (B.P. 440,865, 23.4.35. Fr., 23.4. and 27.12.34).—A fan with filters and sterilisers is described. B. M. V.

System for vaporising [disinfecting] liquids and absorption of smoke, evil odours, and the like. P. L. VIDAL (U.S.P. 1,994,932, 19.3.35. Appl., 27.2.33. Fr., 27.2.32).— CH_2O or other disinfectant is produced by the incomplete oxidation of an alcohol (MeOH) by means of a catalyst (china clay—Ag) heated from an external source, the apparatus preferably comprising a wick surrounded by the catalyst, an electric heater, and a cover which is opened when current passes. B. M. V.

Manufacture of a composition of matter [disinfectant]. J. N. ROCHE, ASSR. to AMER. TAR PRODUCTS Co., Inc. (U.S.P. 1,981,123, 20.11.34. Appl., 26.2.31).—Claim is made for a mixture of a chlorophenolic substance 2—60, e.g., chloroxylenol 10, a hydrocarbon oil 10—63, e.g., neutral tar oil 60, and a soap solution 30%. A. R. P.

Filtering masses for gas masks for affording protection against hydrocyanic acid. SOC. ITAL. PIRELLI (B.P. 440,943, 2.9.35. It., 18.9.34).—An inorg. basic salt (basic Cu^{II} carbonate) and an oxide of a heavy metal, e.g., Fe, Cr, Ni, or Mn (MnO_2), are ground together, wetted, moulded, and dried at 100—120°. B. M. V.

Manufacture of cleansing agents for the skin. J. BERTRAM and E. SCHEWECK (B.P. 434,866, 31.1.35. Ger., 1.2.34).—A mixture of starch jelly with aq. Na_3PO_4 glycerin, and an absorptive material, e.g., sawdust, is claimed. A. R. P.

Insecticide. G. ALGARD (B.P. 440,536, 29.3.35. Swed., 6.4.34).—A mixture of *p*- $\text{C}_6\text{H}_4\text{Cl}_2$ 200, naphtha (Borneo) 220, C_2HCl_3 830 kg., and pyrethrum extract (18% concn.) 3 litres is claimed as a non-staining and non-inflammable insecticidal spray. The proportions may be varied by 10%. E. J. B.

Gas detector.—See XI.