

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

JAN. 3 and 10, 1936.*

I.—GENERAL; PLANT; MACHINERY.

Evaporation of water from plane and cylindrical surfaces.

R. W. POWELL and E. GRIFFITHS (Inst. Chem. Eng., Nov., 1935, Preprint, 19 pp.).—The evaporation of H_2O at temp. up to 20° in excess of the air temp. from saturated plane surfaces (E_A g. per sec.) and from 1 cm. length of a vertical nonagonal prism, 18 cm. long \times 8.6–8.75 cm. diam. (E_B), and also from a vertical cylinder of approx. the same dimensions (E_C) has been determined gravimetrically and by calculation from the heat supplied electrically to the surfaces. For $u = 100 - 300$, $E_A = 2.12 \times 10^{-7} l^{0.77} b (p_w - p_a) \times (1 + 0.121u^{0.85})$; $E_B = 1.24 \times 10^{-6} u^{0.7} (p_w - p_a)$; and $E_C = 1.83 \times 10^{-6} u^{0.61} (p_w - p_a)$, where l and b = length in direction of wind stream and breadth, respectively, in cm. of the plane surface, u = wind velocity in cm. per sec., $(p_w - p_a)$ = the v.-p. difference in mm. Hg between the surface and the air. When a ridge is placed in front of the plane surface to give the effect of the walls of a pan, E_A depends on l ; for regions near the ridge the evaporation decreases, but further away it increases owing to the effect of turbulence. The heat transferred from the plane surface to the air by evaporation, radiation, and convection has been determined; the heat transferred by evaporation is 70–85% approx. of the total, depending on the conditions. For a nonagonal prism the evaporation decreases from the panel facing the wind towards the sides, where it is a min., and then increases to a max. at the back.

D. K. M.

Fundamental principles of drying.

E. A. FISHER (J.S.C.I., 1935, 54, 343–348 T).—Two groups of factors govern rate of loss of H_2O from any kind of material: external drying conditions (e.g., temp., humidity, and effective velocity of the air, and heat supply) and internal factors. The latter control the rate of movement of moisture from the interior to the surface of the material; the former the rate of loss from the surface to the outside air. It is shown that rate of evaporation from a surface is controlled by the wet-bulb depression and is independent of dry-bulb temp. as such. This relation is only ideally true: the actual evaporation temp. is usually $>$ the wet-bulb temp. owing to radiation and conduction effects. A typical rate-of-drying curve ($dw/d\theta$ against moisture content, W) consists of four distinct portions, three linear and one curved. In some such curves one or more of the sections may be absent. The effect of these variations in type on the design of drying plant is referred to. Various explanations of the shape of the rate curves are discussed.

E. A. F.

Wetted surface in ring-packed towers. F. MAYO, T. G. HUNTER, and A. W. NASH (J.S.C.I., 1935, 54, 375–385 T).—The actual surface of $\frac{1}{2}$ -in. and 1-in. rings

filling packed haphazardly in towers has been measured by employing paper rings in conjunction with a dye solution for the wetting liquid. The exterior of the rings was wetted more than the interior and the tower wall was wetted more than the ring surface. The wetting liquid flowed away from the centre of the packing to the tower walls, the distribution of the liquid over the packing layers being given mathematically by Gaussian distribution curves. The % of the total ring surface wetted varied directly with the wetting liquid mass velocity but was independent of countercurrent gas flow. The flooding point where the packing becomes logged with liquid and completely wetted was a function of both gas and liquid mass velocities. The liquid hold-up in the tower was found to be independent of the gas rate but to increase with the liquid rate. The thickness of the liquid films or streams actually on and immediately adjacent to the tower walls increased from top to bottom of the tower, but the average film thickness over the whole tower was approx. const. and independent of both gas and liquid flow rates. Some different types of ring packing have been compared by means of a liquid-distribution factor.

Screen analysis for plant control. E. W. PUGH (J. Amer. Ceram. Soc., 1935, 18, 346–349).—The grain-size distribution is displayed as the plotting, on functional graph paper, of the "second accumulation" of the ordinary screen analysis (residue) figures. This is a simple numerical and practical expression of fineness. Full details of the screen-analytical procedure and calculation are given.

J. A. S.

Micro-projector for determining particle-size distribution and number concentration of atmospheric dust. C. E. BROWN and W. P. YANT (U.S. Bur. Mines Rept. Invest. 3289, Oct., 1935, 8 pp.).—The no. concn. and particle-size distribution of atm. dust in samples collected by the Owens jet dust counter have been determined by projecting images of the particles at high known magnification on to a ruled translucent screen, the observations being made from behind the screen (details given); the vals. agree with those obtained by the microscopical method. It is indicated that impinger samples can be examined by this micro-projection method.

D. K. M.

Determination of dust in gases. B. F. BALISON (Trans. Thermo-Tech. Inst. Moscow, 1934, No. 6, 16–23).—It is best to pass the gases through a hydraulic seal. Cloth filters should be used when chemical determinations of the dust are required. For hot gases, refractory filters are used.

CH. ABS. (e)

Thermodynamic characteristics of the processes of liquefaction of gases. N. I. GELIFERIN and

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

I. P. USJUKIN (Chimstr., 1934, 6, 573—581; 1935, 7, 10—14).—A theoretical discussion of the energy consumption in air-liquefaction processes. CH. ABS. (e)

Working-material problems of today in the [German] chemical industry. E. RABALD (Chem. Fabr., 1935, 8, 441—446).—A statistical review.

E. L. S.

Fuels for boilers.—See II. **Scaling of mild steel in furnaces.**—See X. **Paint mill.**—See XIII. **Percolators.**—See XX.

PATENTS.

Rocking furnace. METALLGES. A.-G. (B.P. 436,563, 28.11.34. Ger., 30.11.33 and 25.10.34).—An elongated furnace (*F*) is set level and is rockable about a longitudinal axis; it is provided with a low roof and with inclined baffle blocks extending up through the bed, which alone effect the travel of material; also, if desired, *F* may have baffle walls with inclined upper edges.

B. M. V.

(A) **Muffle and like furnaces.** (B) **Furnaces and their operation.** H. W. SPENCER and L. S. DAVIS (B.P. 436,180—1, 9.10.34).—Furnaces constructed of refractory blocks suspended from metal work in such a way that no block exerts any substantial strain on any other are described. In the muffle furnace (of A) the large blocks are lined inside with thinner blocks or tiles keyed into them, leaving spaces for the heating gases. In the non-muffle furnaces (of B) the metal suspending framework is cased in and the space used to preheat the combustion air.

B. M. V.

Salt-bath furnaces. SOUTH METROPOLITAN GAS CO., and D. CHANDLER (B.P. 436,442, 5.2.34).—Luminous gas flames are burned in an annulus between the outer, heat-insulating wall and a SiC sleeve, the salt vessel (above) and flue outlet (below) being inside the sleeve. The damper and gas cock are linked.

B. M. V.

Furnace tuyères. J. Y. JOHNSON. From AMER. ENG. CO. (B.P. 436,178, 8.8.34).—Grate elements for an underfeed stoker are described.

B. M. V.

Heat insulation. C. G. MUTERS (B.P. [A—E] 399,502—4, 415,457, and Addn. B.P. 435,997, [A—C] 29.2.32, [D] 23.2.33, [E] 28.3.34. Swed., [A—C] 3.3.31, [E] 6.4.33; U.S., [D] 23.2.32).—The construction of hermetically sealed elements containing gas of lower conductivity than air is described in (A—C), and methods of filling them without bursting, in (D, E).

B. M. V.

Heat insulation. N.V. INTERNAT. ALFOL-MAATS., Assees. of ALFOL-DYCKERHOFF GES.M.B.H. (B.P. 435,916, 12.3.35. Ger., 24.8.34).—A continuous web of pliable material is wound around the vessel to be insulated; various forms of spacers to create air insulation are described.

B. M. V.

Heat-exchange tubes. F. W. GREEN (B.P. 436,656, 16.4.34).—The gills of tubes are themselves provided with fins, gills, or spikes.

B. M. V.

Drying of subdivided material. T. GRAM, and TECHNO-CHEM. LABS., LTD. (B.P. 436,388, 10.4.34).—Material suspended in a current of gas (which provides the heat for drying) is caused to be turbulent by suitably forming the walls of the conduit, and is afterwards

separated in a cyclone or the like. The dried material, if valueless, may be burned and the gases of combustion used to form the drying medium.

B. M. V.

Drying of dyestuffs and other materials. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 436,077, 1.3.34).—Material which is liable to become crusted or conglomerated is charged in comparatively thick layers on several storeys in a drying chamber by means of rotating rakes, set at the initial thickness above the floors, which scrape excess material to slots through which it falls to the next floor. Towards the end of drying, the rakes are gradually lowered until all the material has arrived at the lowermost outlet.

B. M. V.

Absorption refrigerating apparatus. ELECTRO-LUX, LTD., Assees. of H. FREDHOLM (B.P. 358,844, 17.2.31. Swed., 18.2.30).—The absorption liquid comprises LiNO₃ in which the NH₃ refrigerant is always dissolved to an extent sufficient to render the mixture liquid.

B. M. V.

Absorption-refrigerating processes. A. CARPMAEL. From GES. F. DRUCKTRANSFORMATOREN (KOENEMANN-TRANSFORMATOREN GES.M.B.H.) (B.P. 436,736, 25.4.34).—The use is claimed, in a continuous absorption process having a large range of temp., of an absorbent comprising non-volatile metallic salts in liquid form, e.g., LiNO₃, LiCl, alkali perchlorate, ammoniacal ZnCl₂, ZnBr₂, AlCl₃, MgI₂, KBr; the Li salts are especially suitable since absorption (of NH₃) may be effected at temp. suitable for the generation of steam under pressure. [Stat. ref. to B.P. 358,844 (preceding abstract).]

B. M. V.

Refrigeration. G. MAIURI (B.P. 391,378, 28.10.32).—An ultimate source of cold (e.g., solid CO₂) very much colder than the desired temp. of refrigeration is caused to liquefy a fluid (e.g., NH₃ at a pressure suitable to the temp. desired) which has been evolved from conc. liquor by the presence of inert gas; the fluid after vaporisation by the act of refrigeration collects dil. absorbent liquor in an ejector and lifts it (as conc. liquor) so that it may run back by gravity through an external cooler (which removes the heat of absorption) and heat exchanger to start a fresh cycle.

B. M. V.

Refrigeration. P. E. FISHER, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 436,893, 21.4.34).—In a system substantially as described in B.P. 391,378 (cf. preceding abstract), the ejector acts on the conc. liquor and the levels are chosen to prevent flow-back through the nozzle.

B. M. V.

Congeaing solution [for refrigerators]. J. FLEISCHER, Ass. to FRIGIDAIRE CORP. (U.S.P. 1,968,195, 31.7.34. Appl., 28.4.32).—The refrigerating solution consists of, e.g., KCl 15, BaCl₂ 5, NaCl 5, agar 1.5, and H₂O 73.5%; most of the solution freezes at —10°, but the agar gel prevents the crystals settling to the bottom of the remaining aq. NaCl, which does not freeze until —24°.

A. R. P.

Apparatus for regulating automatic heating, cooling, and similar plants. M. EGLI (B.P. 436,756, 27.6.34).—An apparatus is described in which a main electric switch is turned off at arbitrary, fixed intervals

and the time of switching on is varied by a temperature-sensitive device. B. M. V.

Thermostats. G. G. ROYER (B.P. 436,836, 16.2.35. Fr., 16.2.34).—A thermometer bulb or other non-deformable casing is provided with a (metallic) filler formed with slots on its cylindrical surface. These slots contain the expansible material in the form of narrow rings presenting great surface for heat conduction and permitting materials of an alcoholic, greasy, or waxy nature (16 are claimed) to be used with reasonable time lag. B. M. V.

Stone crushers. HUMBOLDT-DEUTZMOTOREN A.-G. (B.P. 435,959, 23.10.34. Ger., 26.10.33).—Two stages of crushing are effected by one gyratory shaft, each being separately adjustable; this may be effected by making the crushing head of the first stage of conical shape, and of the second of inverted-conical shape, with mantles to suit. B. M. V.

Grinding such materials as ore. W. MAUSS (B.P. 436,534, 12.4.34. S. Afr., 6.7.33).—A no. of planetary drums are centrifugally rotated about their common axis and more slowly about their own axes; grinding bodies may be present. The ground material is displaced over an returned lip at the top of the drums by the entry of fresh material. B. M. V.

Impact pulverisers. E. E. BENTALL (B.P. 435,925, 18.6.35).—Protection for the nuts on the pivot pins of swing hammers is described. B. M. V.

Pneumatic separators. E. C. LOESCHE and M. BERZ (B.P. 436,566, 29.1.35).—An upward current of air and downward current of coarse material pass through perforations in a horizontal rotating plate, the size of the perforations and the current of air being variable. B. M. V.

[Pneumatic] centrifugal classifying apparatus. W. W. TRIGGS. From INTERNAT. PRECIPITATION CO. (B.P. 436,491, 24.1.35).—An impeller at one end of a cylindrical casing produces vortical movements of gas away from the impeller in the outer part and towards it in the inner part. The outlet for coarse material is at the periphery, at the end remote from the impeller, and the outlet for fines and gas is at an intermediate radius approx. between the two vortices. B. M. V.

Centrifugal separation of mixtures. SHARPLES SPECIALTY Co., Assees. of L. D. JONES (B.P. 436,903, 24.5.34. U.S., 27.5.33).—The position of 3 separate outlets for oil, sludge, and acid is specified. B. M. V.

Sifting, straining, or filtering apparatus. SEITZ-WERKE G.M.B.H., and R. ADAMS (B.P. 436,359, 26.4.35).—A no. of planetary drums of filter material are rotated about their own axes (A_1) and centrifugally about the common axis (A_2) of the machine. The prefill is fed by box-like members to the outside of the drums at points nearest A_2 , and the filtrate is run off at A_1 into a common trough. B. M. V.

Apparatus for degreasing metal and like non-absorbent articles by means of volatile solvents. J. A. M. W. MITCHELL, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 436,155, 5.4.34).—An outer tank is divided by partitions of less height, each compartment being

provided with cooling coils. Transfer of vapour over the top and of liquid at the bottom of the dividing walls is permitted. B. M. V.

Centrifuges. GUTEHOFFNUNGSHÜTTE OBERHAUSEN A.-G. (B.P. 436,496, 22.3.35. Ger., 24.3.34).—A centrifuge of the basket type is not provided with a basket, but has a polygonal rotor provided with outlet orifices at the angles. B. M. V.

Centrifuge. H. SCHULZ (B.P. 436,895, 24.4.34. Ger., 10.5.33).—A centrifuge for the continuous discharge of solids, in which an inner bowl is rotated at right-angles to the outer, is described. B. M. V.

Centrifuges. VICKERYS, LTD., and C. J. SALISBURY (B.P. 436,915, 1.8.34).—In a centrifuge in which collected material (e.g., paper pulp) is discharged through a narrow annular outlet, a fixed blade is provided to dig into and agitate the thick pulp just prior to entry into the outlet. B. M. V.

Filtering apparatus for dewatering of slurry and clarification of water. H. J. GREAVES (B.P. 436,823, 3.10.34).—After settling out from coal-washery H_2O and after, if desired, addition of slack, coal sludge is filtered in an internal, rotary-drum, vac. filter. B. M. V.

Separation of liquids. F. A. F. CRAWFORD, W. A. P. CHALLENGOR, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 435,615, 19.1.34).—A mixture of, e.g., nitroglycerin (I) and waste acids, or of (I) and wash waters therefrom, is passed through a cylindrical separator provided with a baffle consisting of a strip wound spirally around a central axis, its edges being in close proximity to the walls of the separator. The strip is inclined radially from the axis to the periphery in an upward direction when the more rapidly separating component is heavier, and in a downward direction when it is lighter, than the mixture. The separated liquids are withdrawn at different levels and the feed is adjusted to keep the baffle completely submerged. The separator is provided with a sight glass. W. J. W.

Atomisation of liquids. L. PEYCRU (B.P. 436,829, 12.21.34. Luxemb., 13.12.33 and 10.12.34).—In a carburettor for internal-combustion engines and the like, the liquid (before mixing with the main air stream) is broken up by vibrating flexible blades. B. M. V.

Apparatus for distillation of volatile constituents from washing or like oils. P. D. WALMSLEY and W. B. KENDALL (B.P. 435,867, 3.4.34).—The axis of a tower (T) is occupied by a heating tube (within which may be incorporated a multi-tubular preheater the oil tubes in which are packed). The annular or true distillation space of T is packed and provided at intervals with conical deflectors to direct the oil on the heating tube. B. M. V.

Bulk evaporators. C. MCNEIL (B.P. 436,562, 3.11.34).—The space below, and likewise above, the calandria is divided by partitions, and external downflow pipes are provided so that the sections of the calandria operate in series. (Cf. B.P. 411,429; B., 1934, 705.) B. M. V.

Apparatus for expulsion of acid gas from a solution containing a soluble acid salt of the gas.

G. J. HORVITZ (B.P. 436,005, 3.4.34. U.S., 28.2.34).—In a tower the descending liquid is heated in succession by (1) rising gas alone, (2) recirculated hot solution [from the bottom of (3)] in several countercurrent out-of-contact stages, and (3) external heat. B. M. V.

[Catalytic] exhaust filters. DEGEA A.-G. (AUERGES.) (B.P. 436,331, 19.11.34. Ger., 20.11.33).—The exhaust gases [and air] entering a catalytic mass are preheated by the combustion gases leaving it. B. M. V.

Apparatus for mixing two fluids. ETABL. JACOB-DELAJON COMP. CÉRAMIQUE DE POUILLY-SUR-SAÔNE ET BELVOYE (B.P. 436,417, 9.10.34. Fr., 11.10.33).—A cam gear for a pair of cocks is arranged so that one motion of the handle (*e.g.*, turning) alters the ratio of the fluids, and another motion (*e.g.*, depression) alters the total delivery. B. M. V.

Generation of air foam. KOMET KOMP. F. OPTIK, MECHANIK, U. ELECTROTECHNIK G.M.B.H. (B.P. 435,979, 15.4.35. Ger., 14.4.34).—Motive steam is mixed in injectors with, in succession, (1) foam former through a jet axial to the steam jet, (2) H₂O, (3) air. B. M. V.

[Encased-asbestos] heat insulation. S. C. E. and S. V. STONE (B.P. 436,910, 19.6.34).

Refrigeration. E. W. MOSS. From INGERSOLL-RAND Co. (B.P. 436,261, 9.11.34).

Roller mills and the like and [adjustable] guides therefor. DUNLOP RUBBER Co., LTD., H. WILLSHAW, and L. S. BLANCHARD (B.P. 436,743, 10.5.34).

Centrifugal separators. H. G. C. FAIRWEATHER. From NAT. ACME Co. (B.P. 436,550, 14.4.34).

Complete combustion. Corrosion prevention.—See II. Dry-cleaning filters.—See VI. Acid gases.—See VII. Porous bodies.—See IX. Mn steel [for crusher jaws].—See X. Temp. regulation.—See XI. Drying vegetables etc.—See XIX.

II.—FUEL; GAS; TAR; MINERAL OILS.

Barakar coals of the Jharia coalfield, Bihar and Orissa, India. C. FORRESTER (J. Inst. Fuel, 1935, 9, 30—58).—The geology of the Jharia and associated coalfields is outlined. Proximate analyses, washability data, and ash analyses of the Barakar coals of the Jharia coalfield have been collected. The coals contain 10—20% of a highly siliceous ash (SiO₂ 52, Al₂O₃ 24—41%). The results of washability tests, confirmed by the evidence of X-ray examination, show that only small reductions in the ash content can be effected by present cleaning methods, but attention is directed to the possible advantage of such reductions and the desirability of producing a coke with relatively const., rather than low but variable, ash content. A. B. M.

Composition and quality of Mid-Asia coals. A. I. KARELIN and O. V. NEFEDIEVA (Chim. Tverd. Topl., 1934, 3, 305—321).—A review. CH. ABS. (e)

Petrographical description of tertiary coals from the Artemov mines in the Far-Eastern district. O. F. GRATSHEVA (Chim. Tverd. Topl., 1934, 5, 294—304). CH. ABS. (e)

Burei coal basin. A. N. KRISCHTOFOVITSCH. Coals of the Moscow basin. N. G. TITOV (Chim. Tverd.

Topl., 1934, 5, 287—293, 595—601).—Analyses are recorded. CH. ABS. (e)

“Sensitisation” and other observations on [coal] slurry flocculation. E. T. WILKINS (J.S.C.I., 1935, 54, 391—393 T).—The general superiority of certain hydrophilic colloids over electrolytes for the flocculation of coal slurries is attributed to their ability to flocculate particles of > colloidal dimensions. Results which appear inconsistent with the “charge-neutralisation” theory of flocculation were obtained when slurries were treated with positive and negative gelatin sols. The withdrawal of electrolytes by electro dialysis did not modify the flocculating power of gelatin. Wetting agents and other surface-active substances were capable of “sensitising” flocculation by gelatin and potato starch but not by electrolytes. An excess of sensitiser may be prejudicial to rapid settlement.

Humic acids. G. L. STADNIKOV, K. I. SUISKOV, and A. A. USCHAKOVA (Chim. Tverd. Topl., 1934, 5, 581—590).—In the reaction of humic acid (I) with Ca(OH)₂, salts are formed from (I) and from phenols. In studies of lignin and (I) preps. the magnitude of the final adsorption, as well as the process of double decomp., may be used in characterising (I). CH. ABS. (e)

Relative value of fuels for small domestic hot-water boilers. E. S. GYNGELL (J. Inst. Fuel, 1935, 9, 59—62).—Tests on a boiler having a fuel capacity of 0.73 cu. ft. lead to the conclusions that (a) high-temp. cokes are less flexible and more difficult to ignite than anthracites, steam coals, or low-temp. cokes, but can be burned with greater efficiency than the latter; they are suitable for continuous operation at fairly const. load or for intermittent use where easy ignition can be effected by the use of gas; (b) for continuous operation with widely varying load on the smaller type of domestic boiler, where high flexibility is essential, anthracite appears to be the most suitable fuel; (c) domestic boilers should be provided with waterways over the fire in order to utilise heat from burning volatile matter when more reactive fuels are being used; they should also be provided with means for admitting a controllable amount of air directly over the fuel bed. The observed efficiencies varied from 58 to 75.7%. A. B. M.

Addition of water to boiler slacks. A. C. DUNNINGHAM and E. S. GRUMMELL (J. Inst. Fuel, 1935, 9, 24—29).—Tests carried out on a small experimental grate (12 in. in diam., 6-in. fuel bed) show that the addition of H₂O to a slack decreases its resistance to the passage of air and that improved combustion follows as a result of the more uniform air distribution. The relative resistances of a no. of fuels to each of which 5% of H₂O had been added were dependent on the degree of fineness of the fuels, in particular on the proportion through ½-in. mesh. Addition of more H₂O lowered the resistance still further; *e.g.*, for one slack the resistance fell from 52 mm. (H₂O-gauge) with 5% of added H₂O to 18 mm. with 12.5%. The H₂O must be distributed uniformly over the fuel to obtain the optimum effect. The bulk *d* of a fuel decreases with addition of H₂O and there is a correlation (for the same fuel) between the resistance and the bulk *d*; there is, however, no abs. relationship

between bulk d and resistance applicable to all fuels. The variations of resistance as combustion proceeds on the experimental grate is correlated with the behaviour of the fuel on a travelling grate. A. B. M.

Rapid determination of water content of coal mixtures. M. E. NEĬMARK (Koks i Chim., U.S.S.R., 1933, 3, No. 8, 41—44).—To 50 g. of coal in a dry 200-c.c. stoppered flask are added 100 c.c. of 0.5*N*-NaHCO₃. After shaking and filtering, 50-c.c. aliquot portions of filtrate are titrated with 0.5*N*-H₂SO₄, the H₂O content being calc. from the dilution of the NaHCO₃.

CH. ABS. (e)

Rapid determination of pyritic sulphur and sulphate sulphur in coal. M. E. LONDON, A. P. SHADANOVSKAJA, K. M. GONTSCHARENKO, and E. B. BERGER (Koks i Chim. U.S.S.R., 1933, 3, No. 8, 45—51).—To determine pyritic S, 1 g. of the coal is incinerated, the ash boiled with 50—60 c.c. of 50% HCl, filtered off, and Fe determined in the filtrate by the Zimmermann-Reinhardt KMnO₄ method. The HCl-sol. Fe is determined separately and subtracted. Sulphate-S is determined by treatment with 10% HCl, pptn. of Fe with aq. NH₃, and determination of SO₄" with BaCl₂.

CH. ABS. (e)

Choice of method for cleaning coal from the Don basin. N. I. NAUMOV (Koks i Chim. U.S.S.R., 1933, 3, No. 3, 35—46).—A discussion. CH. ABS. (e)

Flotation concentration of coal to be used for electrode carbon. L. MAIER, L. TZUCKERMANN, and P. LUISENKO (Chim. Tverd. Topl., 1934, 5, 655—661).—A 1% aq. NaCl solution was used in the flotation. The best concn. was obtained with coals containing ash and the pyrite in the form of enclosures in the vitrain or durain, but not in the fusain. The concentrates were lower in H₂O than those prepared by flotation with oils. The yield of concentrate, calc. on pure coal, was 74%.

CH. ABS. (e)

Hydrogenation of a colloidal solution of coal. J. M. PERTERRA (J. Inst. Fuel, 1935, 9, 16—23; cf. B., 1933, 818; 1934, 259).—Various data relating to the effect of solvents on coal (heats of immersion, interfacial tension, rates of penetration, etc.) are discussed. From the heat of wetting the "internal area" of a coal was estimated to be 4.8×10^6 sq. cm./g.; a similar val. was obtained for a lignite from the variation of H₂O content during drying. On hydrogenating a colloidal dispersion of lignite in anthracene oil (430°, 200 atm., MoO₃ catalyst) the lignite was completely converted into liquid products, except for a slight formation of gas.

A. B. M.

Measurement of pressure in the plastic zone [of coal]. E. M. DUBNER (Koks i Chim. U.S.S.R., 1933, 3, No. 8, 6—10).—Curves can be obtained giving gas pressure inside the plastic layer as a function of temp. Comparison with the gas-evolution curves shows the period of intense gas evolution to correspond with the rising portion of the pressure curves. CH. ABS. (e)

Low-temperature carbonisation of coals from the Plotnikovski district. A. N. BASCHKIROV and D. B. ORECHKIN (Chim. Tverd. Topl., 1934, 5, 621—625).—Data are recorded. CH. ABS. (e)

Determination of the life of active charcoal from its breakdown point. F. KRZYL (Z. ges. Schiess- u. Sprengstoffw., 1935, 30, 318—320, 354—356).—A review of the methods for detecting the passage of gas through the C, (a) by its odour, and (b) by definite determinations.

W. J. W.

Properties of activated carbon. E. R. SUTCLIFFE (India-Rubber J., 1935, 90, Spec. No., 37—38).—The desirable features in an activated C, especially with respect to relative adsorption up to the points of "breakdown" and saturation, respectively, are discussed.

D. F. T.

Salted coke. P. N. NIKOLAEV (Koks i Chim. U.S.S.R., 1933, No. 5—6, 9—13).—Material suitable for use in Ti ore smelting was obtained by (a) mixing the coal charge with salt and (b) quenching ordinary coke with 10% brine. Method (a) damaged the walls of the coke ovens; (b) was suitable for any coke, but NaCl losses were greater.

CH. ABS. (e)

Controlled operation of a carburetted water-gas plant. II. Rept. 37 of Joint Research Committee, Inst. Gas Eng. and Univ. Leeds. F. J. DENT, W. H. BLACKBURN, and N. H. WILLIAMS (Inst. Gas Eng., 1935, Publ. No. 122, 160 pp.; cf. B., 1935, 6).—The performance of a carburetted water-gas plant depends on the air-steam ratio, the relative durations of blow and run, the blast pressure, the fuel-bed depth, the coke size, and the operation of the self-clinking grate. Total manufacturing costs per therm are a min. on high output. To achieve this, air and steam supplies should be so controlled that the blow gases contain no more heat than is required for carburetting and the rate of steam supply is the max. compatible with high oil efficiency. Control may be effected by regulation to a definite CO₂ content in the blow gases. The observations necessary for control are critically discussed, as are also the modifications in operation (lower blast pressure and rate of steam supply) necessary for economical working on reduced output. Neither a shallow fuel bed nor small coke is advantageous. A self-clinking is better than a hand-clinkered plant.

J. W. I

Generation of hydrogen sulphide in water-sealed gasholders. GAS LIGHT & COKE Co. and SOUTH METROPOLITAN GAS Co. (Inst. Gas Eng., 1935, Publ. No. 117, 20 pp.).—H₂S is formed in gasholders by bacterial reduction of sulphates of holder-H₂O. Formation of H₂S may be prevented by using H₂O of low [SO₄"'] (< 2 grains per gal.) and so treating with ZnO paste that excess of sol. Zn is always present. Methods of sampling and testing gas and holder-H₂O for H₂S are described.

J. W. I

Progress in dry sulphur removal from gas. A. RETTENMAIER (Gas- u. Wasserfach, 1935, 78, 848—849).—The output of dry-purification plant can be increased approx. 4-fold, with relation to space requirements, by conversion of the flat (box) type purifier into the tower type. Recently a new method, employing regeneration entirely separated from the purification process, and using increased [O₂], has resulted in the output of a purifier becoming doubled. Regeneration is carried out with a gas mixture containing 5% of O₂

at 30–40°. The new process and the working of an experimental plant are described and a comparison is made between the two types of purifier. The new method results in diminished capital expenditure by reason of the great saving in space occupied by the plant. E. L. S.

Freeing industrial gases from hydrogen sulphide with recovery of elemental sulphur. M. V. HOFTMAN, S. G. ARONOV, and E. M. MICHELSON (Koks i Chim. U.S.S.R., 1933, No. 5–6, 49–55; cf. B., 1934, 786).—H₂S is absorbed by alkaline As₂O₃ solution.

CH. ABS. (e)

Air vitiation and gas appliances. C. A. MASTERMAN, E. W. B. DUNNING, and A. B. DENSHAM (Inst. Gas Eng., 1935, Publ. No. 116, 76 pp.; cf. B., 1932, 52).—The report reviews possible causes of air vitiation due to gas appliances in a general way, including possible nuisance from odour, as well as expanding the work on possible hazard to health and referring the whole to practical conditions in occupied rooms. Vitiation of the air is defined. The odour of excessive concn. of products of combustion is attributed to S oxides, for which a permissible limit of 0.0001% is derived. The effect of air vitiation on combustion is referred to, and characteristic curves show how different gas appliances are affected as vitiation increases. As a result of previous work and further tests now reported, a generalisation is attempted on the degree of ventilation to be expected in normal occupied rooms. E. L. S.

Corrosion from products of combustion of gas.

III. Tube experiments (contd.). Rept. 36 of Joint Research Committee, Inst. Gas Eng. and Univ. Leeds. J. W. WOOD and E. PARRISH (Inst. Gas Eng., 1935, Comm. No. 121, 48 pp.; cf. B., 1935, 6).—The action of products of combustion of town gas on typical materials used in the construction of gas appliances has been further examined. Experiments are described in which tubes constructed of Pb, Sn, solder, Al, brass, Cu, Fe (black), Fe (galvanised), Zn, and Ni were subjected to the continuous action of the products of combustion of gas containing 8 grains of S per 100 cu. ft. Pb, Sn, and solder showed marked superiority over all the other metals. The rate of corrosion falls as the S content of the gas is reduced; complete removal of S from town gas does not entirely eliminate corrosion. E. L. S.

Primary tar. I. RAPOPORT, V. ABRAMOVA, and A. SIOVA (Chim. Tverd. Topl., 1934, 5, 372–379).—Low-temp. carbonisation when carried out as a cracking process should be operated at 450–550°. In furnaces of the McLoren type, or in gas producers with a preheating of the charge, the tar is very little cracked.

CH. ABS. (e)

Chemical study of low-temperature tar. J. I. TSCHULKOV (Koks i Chim. U.S.S.R., 1933, 3, No. 8, 18–21).—When primary tar was fractionated with org. solvents (Et₂O or CHCl₃) it yielded a fairly large proportion of neutral mineral oil, resinous substances, and phenols, the last-named being further separated.

CH. ABS. (e)

Extraction of aromatic hydrocarbons from Rumanian petrol. V. T. CERCHEZ (Bul. Soc. Chim.

România, 1934, 16, 31–36).—Fractionation of a Rumanian petrol containing 20.5% of aromatic hydrocarbons (I) by SO₂ gives fractions containing > 50 and < 13% of (I). Distillation gives fractions containing > 31% of (I). The b.p. of benzol and toluol is lowered considerably by the accompanying large amounts of non-aromatic hydrocarbons. R. S. C.

Distillation of high-boiling substances by means of heated oil. S. M. LEVIN (Koks i Chim. U.S.S.R., 1933, 3, No. 10, 79–80).—A system for distilling high-boiling substances (e.g., C₁₀H₈), using petrolatum or paraffin oil circulating in a closed cycle for heating, is described. CH. ABS. (e)

Conversion of acetylene into motor fuel by catalytic hydrogenation. Comparison of this process with pyrogenic condensation. B. KWAL (Chim. et Ind., 1935, 34, 773–776).—Pyrogenic condensation of C₂H₂ to liquid products suitable for use as motor fuel is most successful when active C–Cu₂O is used as catalyst, owing to hydrogenation of the products at the expense of C₂H₂ converted into C. This loss is avoided if C₂H₂ (3 atm.) and H₂ (15 atm.) are treated by these catalysts at 170°; C₂H₂ is then completely converted, without deposition of C, and 70% of liquid products are obtained, of which 4% has b.p. < 70° and 89% b.p. < 160°; the catalysts remain active after the reaction. E. W. W.

Desulphurisation of benzene. G. V. KOPELEVITSCH, A. I. BRODOVITSCH, and I. R. HECHT (Chim. Tverd. Topl., 1934, 5, 652–655).—In determining S in C₆H₆, air is passed through a measured amount of C₆H₆, the mixture is burned, the products are passed through H₂O₂, and the H₂SO₄ is titrated with 0.1N-NaOH (accuracy of determination, 0.002%). CH. ABS. (e)

Purification of crude benzene and its fractions. G. N. TIUTUNNIKOV (Koks i Chim. U.S.S.R., 1933, 3, No. 10, 28–30).—A discussion of purification with H₂SO₄. CH. ABS. (e)

[Composition of the] fatty acids formed in small quantities in the Fischer-Tropsch benzene synthesis. H. KOCH, H. PICHLER, and H. KÖLBEL (Brennstoff-Chem., 1935, 16, 382–387).—When using a Co catalyst the yield of fatty acids amounted to 0.35% of the main liquid hydrocarbon product. 80% of these acids were recovered from the reaction liquor; they consisted of HCO₂H, AcOH (about 2/3 of the mixture), EtCO₂H, and PrCO₂H. The remainder of the acids were extracted from the hydrocarbon product, and consisted of saturated C_{5–10} fatty acids. Unsaturated acids were absent. A. B. M.

Action of bleaching earths [on benzine]. E. ERDHEIM (Petroleum, 1935, 31, No. 44; Öle, Fette, Wachse, No. 1, 6–7).—Further experiments are reported (cf. B., 1935, 757) on the decolorising action of 18 materials (including earths, wood charcoal, activated C, and SiO₂ gel) on benzine solutions of red and yellow dyes, I, and Vulkanöl. The decolorising action of earth differs from that of activated C, for whereas the alcoholic extract of the earth after use shows a deeper colour than corresponds to the % decolorisation, no colouring matter was extracted by the same procedure from used activated C although the decolorising efficiency

was 100%. The action of SiO_2 gel more nearly corresponds to that of earth, but traces of Fe in the gels affect the results. C. C.

Mutual solubility of castor oil and benzine. D. HOLDE (Petroleum, 1935, 31, No. 44; Öle, Fette, Wachse, No. 1, 1).—Although castor oil is not sol. in an excess of benzine, up to 55% of normal benzine and 48% of light petroleum are sol. in castor oil. C. C.

Synthetic gasoline from carbon monoxide and hydrogen. I. S. TSUTSUMI (J. Fuel Soc. Japan, 1935, 14, 110—116; cf. B., 1934, 132).—Experiments carried out on the production of synthetic gasoline from CO and H_2 by heating the gas mixture in a quartz tube in presence of Co-Cu- U_3O_8 -kieselguhr as catalyst show that for gasoline formation there existed an optimum reaction temp. and gas velocity. From the viewpoints of the life of the catalyst and yield of gasoline it was found preferable to use a raw gas mixture of $\text{CO} : \text{H}_2 = 1 : 2$. The best ratio of metal to kieselguhr in the catalyst was 3 : 4 or 1 : 1. Ni catalyst was studied and also the effect of the addition of Cu on the reduction temp. of Co oxide or mixed oxides of Co and Ni. In a Co-10% Cu-12% U_3O_8 catalyst, half the Co may be replaced by Ni without any effect on its activity and reduction temp. Ag was found to be superior to Cu as a catalytic promoter. The mechanism of gasoline formation from CO and H_2 is discussed. E. L. S.

Recovery of used oil. H. RÖSNER (Chem.-Ztg., 1935, 59, 921—924).—Filtration, centrifuging, and treatment with fuller's earth or H_2SO_4 are methods applicable according to the amount and nature of the impurity. G. H. C.

Estimation of the combustion products from the cylinder of the petrol engine and its relation to knock. A. EGERTON, F. L. SMITH, and A. R. UBELOHDE (Phil. Trans., 1935, A, 234, 433—521).—Analysis of the gases from the cylinder of a Delco knock-rating engine showed that some combustion occurred in the knocking zone prior to passage of flame. Max. concn. of aldehydes (about 1 in 150) was attained at the moment the flame reached the sampling valve, while "peroxides" (oxidising substances which react with KI) were also detected (about 1 in 10^4), but disappeared before the flame reached the valve. With increased knock the proportion of "peroxides" increased. No "peroxides" were detected when benzol was used as fuel. Addition of PbEt_4 to the gasoline decreased the amount of aldehydes and "peroxides" found. Since addition of the former to the fuel had no appreciable effect on the amount of "peroxides" formed, the latter were not oxidation products of aldehydes. Aldehydes did not appreciably affect knock. "Peroxides" were not increased by addition of H_2 to the charge although this gas had an antiknock effect. Tests with pure fuels (e.g., pure hydrocarbons, H_2 , etc.) indicated that the "peroxides" formed were mainly NO_2 . There is a pronounced peak in the "peroxide" curve, in general, slightly before t.d.c.; the apparent decrease in the later stages of the combustion is due to inhibition of the liberation of I owing to the presence of SO_2 formed from S compounds in the fuel (pure C_6H_6 gave peroxides), and also to lack of sufficient O_2 in the burnt gases to combine with NO.

NO_2 may be partly removed by unsaturated vapours. Added NO_2 did not induce knock with a hydrocarbon fuel although it did so with H_2 , but the amount formed increased when knock occurred. The effect of pro-knocks such as $\text{C}_5\text{H}_{11}\cdot\text{NO}_2$ cannot therefore be due to liberated NO_2 , but must be due to the org. radical. Insufficient evidence is available to indicate the source of the NO_2 . The aldehydes formed are shown to be mainly CH_2O . Very little org. acid could be detected. A no. of org. peroxides of the type which might occur as peroxidised products of hydrocarbons were prepared and their reactions with a no. of reagents studied, particularly in presence of NO_2 . From tests in which the peroxide was sprayed into the intake air, it was shown that Et_2O_2 and EtO_2H are potent proknocks (1 pt. in 10^5), H_2O_2 has a slight proknock effect, but butaldehyde peroxides and amylene peroxides did not show proknock action. Engine tests with $n\text{-C}_6\text{H}_{14}$ indicate the presence of org. peroxides in the region of knock just prior to the passage of flame. The vapours of K and Tl were much more effective than was PbEt_4 in suppressing detonation and previous conclusions are confirmed, that to be effective the antiknock must be in a state of incipient oxidation and that it should be capable of being oxidised to a higher oxide. Vapours of Se and Te were effective antiknocks, but Na, Cd, Zn, and I were ineffective. The decomp. of PbEt_4 at 218° , 280° , and 306° is briefly discussed. The relation between knock, ignition, and the effect of antiknocks on ignition points is discussed, and it is suggested that knock is due to the sudden explosion of a presensitised portion of the charge in an engine cylinder owing to a branch-chain type of reaction among the substances formed by partial combustion. The apparent anomalous behaviour of org. peroxides, org. nitrites, and NO_2 in raising the ignition point of hydrocarbons, although they do not act as antiknocks, may be due to the production of other radicals which are essential to the propagation of chains and may give rise to branching of chains and so to explosive ignition. The general character of hydrocarbon combustion is held to be consistent with the formation of products such as aldehyde peroxides, decomp. of which may give rise to the low ignition range. C. C.

Kinetics of catalytic oxidation of hydrocarbons.—See III. Effect of NH_3 liquors etc. on concrete.—See IX. Scaling of mild steel in furnaces.—See X. Coumaronoid resins.—See XIII. Rubber in the gas industry. Road surfaces.—See XIV. Detecting petroleum in cassia oil.—See XX.

PATENTS.

Clarification of coal slurry and the like. GES. F. FORDERANLAGEN E. HECKEL M.B.H., F. VOHMANN, and E. TRÜMPELMANN (B.P. 435,954, 29.8.34).—Superposed on a final decantation tank (D) is a feed chamber (F); the pulp and any pptg. agent are led from F to the lower part of D through a no. of spiral conduits embracing D and while therein are thoroughly mixed and the separation is initiated. B. M. V.

Production of artificial fuel. E. W. BROCKLEBANK, W. B. MITFORD, and C. H. LANDER (B.P. 435,187, 9.3.34. Addn. to B.P. 421,556; B., 1935, 294).—The

process of the prior patent is applied to a blend of coking and non-coking coals of $> 10\%$ ash content, the blend being ground to a fine powder before admixture with the oil in order to distribute the ash evenly throughout the material. The coke has no tendency to form clinker when used in forges and other hearths used in metal-working. A. B. M.

Conversion of solid fuels and product derived therefrom or other materials into valuable liquids.

C. KRAUCH and M. PIER, Assrs. to STANDARD-I. G. Co. (U.S.P. 1,983,234, 4.12.34. Appl., 29.7.32. Ger., 14.2.25. Cf. B.P. 313,505; B., 1930, 700).—Brown coal, brown-coal tar, cresylic acid, etc. are treated with H_2 under pressure (50–200 atm. or higher) at 300–700° in presence of a sulphide of a metal of group VI, *e.g.*, Mo. A. B. M.

Obtaining complete combustion in furnaces, boilers, and the like. G. BACHLER, and ROTATIONS-FEUERUNGSPATENTGES. M.B.H. (B.P. 436,551, 18.4.34).—Steam or air is injected into the combustion space in hollow streams having a rotating impetus. B. M. V.

Hydrogenation of carbonaceous materials. F. UHDE (B.P. 435,457, 20.3.34. Ger., 20.3.33).—Apparatus suitable for the continuous hydrogenation of oils etc. by the process of B.P. 405,371 (B., 1934, 391) is described. The initial material is mixed with H_2O and finely-divided Fe (together with a salt and/or catalyst, if desired) and the mixture pumped through a heat exchanger into the reaction vessel. This may be a vertical vessel containing a series of stationary cups and a stirrer so arranged that the materials flow down through the cups in succession. The vessel can be heated externally by hot gases. The products are withdrawn from the vessel and passed through pressure-reducing means to a separator. The solid product is dried, reduced, *e.g.*, by means of water-gas at a suitable temp., to convert the Fe oxides back into metal, and recirculated. A. B. M.

Treatment of gas. (A) G. A. BRAGG, (B) E. V. HARLOW, (A, B) Assrs. to KOPPERS Co. OF DELAWARE (U.S.P. 1,983,338 and 1,983,366, 4.12.34. Appl., [A] 5.5.32, [B] 16.4.32).—(A) Gas is freed from suspended particles (*e.g.*, pitch) by electrical pptn., the formation of troublesome deposits in the apparatus being prevented by spraying atomised tar into the gas just before it enters the precipitator. Part of the cleaned gas is compressed and used for atomising the tar. (B) A mixture of coke-oven tar and water-gas tar is used for flushing the collecting electrode; it is preferably added to the gas in atomised form as in (A). A. B. M.

Gas purification. D. L. JACOBSON, Assr. to KOPPERS Co. OF DELAWARE (U.S.P. 1,983,375, 4.12.34. Appl., 14.5.30).—Raw coal-distillation gases are partly cooled to remove the greater portion of the tar and are then scrubbed, at a temp. at which no condensation of H_2O and NH_3 occurs, with a solvent which removes tar acids, so that on subsequent cooling the NH_3 liquor which condenses is free from phenols. A tar distillate (b.p. 200–300°) containing bases forms a suitable solvent. Used solvent may be freed from tar acids by washing with aq. NaOH and may then be recirculated. A. B. M.

Manufacture of asphalt. E. B. McCONNELL, Assr. to STANDARD OIL Co. (U.S.P. 1,982,920, 4.12.34. Appl., 3.7.31).—Petroleum residuum is oxidised by being passed in atomised form countercurrent to heated air. A. B. M.

Production or recovery of polynuclear organic compounds [from bituminous substances].

J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 435,254, 8.2., 12.2., 15.2., 1.3., 24.3., 7.4., 30.5., 27.6., and 8.10.34, and 29.1.35).—Pure polynuclear hydrocarbons, *e.g.*, pyrene, chrysene, retene, fluoranthene, etc., are recovered from the high-boiling fractions of the products obtained by the hydrogenation of coal, lignite, colophony, etc. (but not high-temp. tar) by various processes of which the following are typical: (a) the hydrogenation conditions having been chosen to give max. yields of such hydrocarbons, the high-boiling fractions are fractionated with steam under reduced pressure and the hydrocarbons separated from the appropriate fractions by crystallisation; (b) the fractions are diluted with benzene and treated with dil. acid, the oil which thereupon separates is neutralised and fractionated *in vacuo*, and then these fractions are allowed to crystallise; (c) the fractions are freed from asphalt and paraffin wax and refractionated; (d) the fractions are dehydrogenated, *e.g.*, by heating in contact with a suitable catalyst, and then refractionated. A. B. M.

Corrosion prevention [for steel oil-distillation vessels]. A. H. J. OTTO and J. F. VAN HOLST, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,968,093, 31.7.34. Appl., 28.11.32).—A lining spaced from the walls of the vessel is provided in the lower part of the condenser in oil-cracking operations so that the corrosion caused by the hottest reaction products is confined to a readily replaceable part. A. R. P.

Refining of mineral oils. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 437,174, 17.5.35. U.S., 19.5.34).—Oil of low sludging characteristics, suitable for transformers, is obtained by treating mineral oil, *e.g.*, of naphthenic type, with an 85:15 mixture of H_2SO_4 and H_3PO_4 , in proportions equiv. to 5 lb. of acid mixture to 46 gals. of oil. C. C.

Refining of relatively low-boiling cracked hydrocarbons. A. L. MOND. From UNIVERSAL OIL PRODUCTS Co. (B.P. 437,023, 19.4.34).—Cracked gasoline is first stabilised by suitable fractionation and the hot, stabilised product is treated with solid, active absorbent, *e.g.*, fuller's earth, at 149–232°/250 lb. per sq. in. The product may be revaporised (using indirect heat exchange) and fractionated to separate polymerides. The gasoline obtained by condensation is sweetened, *e.g.*, by plumbite treatment. Apparatus is claimed. C. C.

Treatment of olefine hydrocarbons. A. L. MOND. From UNIVERSAL OIL PRODUCTS Co. (B.P. 437,188, 13.4.34).—Gaseous olefines ($> C_2$), *e.g.*, from cracking processes, previously freed from gum and resin-forming constituents by treatment with absorbent clay, and also from H_2S , are polymerised by means of a catalyst consisting of a mixture of H_3PO_4 and solid absorbent (siliceous) material calcined at 180–300° (200–275°). Metal oxides and/or chlorides may be added to the

catalyst before calcining, together with an org. binder which chars on heating, *e.g.*, cellulose, starch, asphalt.

C. C.

Treatment of distillate petroleum product. J. B. RATHER, L. C. BEARD, JUN., and O. M. REIFF, Assrs. to SOCONY-VACUUM OIL Co., INC. (U.S.P. 1,989,528, 29.1.35. Appl., 26.6.30).—Petroleum distillate, *e.g.*, gasoline or kerosene, is rendered stable as regards colour, gum formation, and odour by addition thereto of $\geq 0.02\%$ of an ethanolamine. Such compounds may be introduced directly or dissolved in a solvent, *e.g.*, Pr^nOH , and may be added to the still during distillation, placed in the condenser, or added to the distillate.

C. C.

Sweetening of hydrocarbon distillates. J. C. MORRELL, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,968,089, 31.7.34. Appl., 11.11.29).—Mercaptans are removed by treatment with a mixture of PbO , Na_2SiO_3 , and borax.

A. R. P.

Treatment of petroleum emulsions. W. B. LERCH, Assr. to J. S. DEWAR (U.S.P. 1,990,293, 5.2.35. Appl., 14.10.29).—Emulsified petroleum, *e.g.* tank bottoms, is heated to $88-94^\circ$, thoroughly mixed with brine at the same temp. by air or natural-gas agitation, and a suitable chemical added. After settling, salt H_2O is run off from the bottom of the tank until the bottom of the oil layer reaches a desired level, when the oil is drawn off through an outlet at this elevation.

C. C.

Utilisation of sludge acid [from petroleum refining]. W. GLASER (U.S.P. 1,989,512, 29.1.35. Appl., 8.9.31. Czechoslov., 10.9.30).—Metal sulphates are obtained from sludge acid (from treatment of petroleum products with H_2SO_4) by mixing the sludge with clay or bauxite, heating the mixture to 160° , and calcining, below the dissociation temp. of the sulphate, in an oxidising atm. to burn away all org. matter.

C. C.

Top-cylinder lubricant. E. B. BEALE, Assr. to STANDARD OIL Co. (U.S.P. 1,990,365, 5.2.35. Appl., 21.3.32).—The product consists of an alkylolamine salt of a fatty acid (oleic, stearic, ricinoleic, sulphurised oleic or ricinoleic, chlorinated oleic), which is added in the proportion of 100–1000 c.c. to 5 gals. of gasoline. The salt may be first dissolved in oil (mineral oil, 70–120 sec., Saybolt, at $38-8^\circ$) and added to the fuel or mechanically introduced into the cylinder.

C. C.

Purification of lubricating oils. C. M. AMBLER, JUN., Assr. to SHARPLES SPECIALTY Co. (U.S.P. 1,990,359, 5.2.35. Appl., 19.1.33).—The removal of solid impurities, *e.g.*, C, from used lubricating oil is facilitated by mixing the latter with 0.1–1% of $\text{OH}\cdot\text{C}_5\text{H}_{10}\cdot\text{NH}_2$, keeping the mixture, and centrifuging, the temp. being maintained throughout at $66-94^\circ$.

C. C.

Lubricating greases. STANDARD OIL DEVELOPMENT Co. (B.P. 436,998, 7.1.35. U.S., 3.8.34).—Stable, non-sweating greases are prepared from hydrocarbon oil, 5–30% of Ca soap, 15–20% of amorphous hydrocarbon wax, *e.g.*, petrolatum, a small amount of oil-sol. Na sulphonate, and sufficient H_2O ($\geq 5\%$) for emulsification. Glycerin, oiliness agents, *e.g.*, Et oleate, solid lubricants, and fillers may be added.

C. C.

(A) **Journal**, (B) **cup, grease.** W. P. HILLIKER, Assr. to STANDARD OIL Co. (INDIANA) (U.S.P. 1,989,196–7, 29.1.35. Appl., [A] 6.10.30, [B] 9.8.32).—(A) Journal grease of uniform, non-spongy structure is obtained by melting (40.5% of) a hydrogenated fatty acid (composed chiefly of C_{18} -acids) at $105-150^\circ$ with (40% of) heavy mineral oil and adding 13% of NaOH (d 1.5) until neutralisation is effected. A small amount of uncombined fat, *e.g.*, 6% of lard oil, may be added and a little H_2O . (B) Cup grease is prepared by heating a small proportion of petroleum oil, H_2O , and CaO with hydrogenated fatty compound at $126-150^\circ$ until saponification is complete, and then working in oil and small amounts of H_2O (0.3–1.5%) at $104-115^\circ$ until the soap content is 2–35%. Finally the mixture is stirred at $88-100^\circ$ to stabilise the grease against ageing.

C. C.

Apparatus for cracking of oil. A. C. SPENCER and E. W. LUSTER, Assrs. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,998,402, 16.4.35. Appl., 11.8.27).

Cracking of hydrocarbons. (A) H. L. PELZER, (B) W. S. GULETTE, Assrs. to SINCLAIR REFINING Co. (U.S.P. 1,993,894 and 1,994,246, 12.3.35. Appl., [A] 14.5.29, [B] 16.12.29).

Pyrolysis of petroleum oils. N. E. LOOMIS, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,998,248, 16.4.35. Appl., 27.1.28).

Conversion of petroleum oils. W. M. CROSS, Assr. to GASOLINE PRODUCTS Co., INC. (U.S.P. 1,998,571, 23.4.35. Appl., 24.7.30).

Conversion of high-b.p. oils. R. E. WILSON, Assr. to STANDARD OIL Co. (U.S.P. 1,996,091, 2.4.35. Appl., 1.11.26. Renewed 8.1.32).

Treatment [conversion] of hydrocarbon oils. G. ARMISTEAD, JUN., and W. T. DONALDSON, Assrs. to TEXAS Co. (U.S.P. 1,999,270, 30.4.35. Appl., 2.6.28).

Hydrocarbon oil conversion. J. B. HEID, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,996,243, 2.4.35. Appl., 19.11.30).

(A) **Handling of residual oils.** (B) **Distillation and conversion of hydrocarbons.** G. S. DUNHAM, Assr. to SOCONY-VACUUM OIL Co., INC. (U.S.P. 1,998,122–3, 16.4.35. Appl., [A] 23.1.32, [B] 25.8.32).

Apparatus for treating petroleum. O. J. NELSON, Assr. to OILCO CORP. (U.S.P. 1,993,017, 5.3.35. Appl., 28.12.29).

Refining apparatus for crude oil. J. P. and T. P. BOHAN (U.S.P. 1,999,954, 30.4.35. Appl., 5.4.32).

Oil and gas separator. E. W. PITTMAN, Assr. to PETROLEUM IRON WORKS Co. OF TEXAS (U.S.P. 1,994,110, 12.3.35. Appl., 11.4.33). H. H. CANTERBURY (U.S.P. 1,999,396, 30.4.35. Appl., 24.12.31).

Treatment of hydrocarbon oils. J. C. MORRELL and C. H. ANGELL, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,995,005, 19.3.35. Appl., 3.12.31).

Treatment of hydrocarbon distillates. L. C. HUFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,993,446, 5.3.35. Appl., 13.11.30).

Dewaxing of hydrocarbon oils. (A) R. H. GARDNER, (B) E. J. MARTIN, Assrs. to SINCLAIR REFINING Co.

(U.S.P. 1,995,740 and 1,995,744, 26.3.35. Appl., [A] 20.10.31, [B] 8.8.31).

Dewaxing of oils. A. BERNE-ALLEN, JUN., ASST. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,993,256, 5.3.35. Appl., 19.10.32).

Treatment of oil-wax mixtures. I. M. PERKINS and F. B. HOBART, ASSTS. to ATLANTIC REFINING CO. (U.S.P. 1,994,485, 19.3.35. Appl., 20.6.31).

Separation of oil-wax mixtures. I. M. PERKINS and S. S. KURTZ, JUN., ASSTS. to ATLANTIC REFINING CO. (U.S.P. 1,998,464, 23.4.35. Appl., 3.7.31).

Distillation [of lubricating oils]. W. H. BAHLKE and T. E. STOCKDALE, ASSTS. to STANDARD OIL CO. (INDIANA) (U.S.P. 1,997,675, 16.4.35. Appl., 28.8.30).

Dewatering [coal] slurry. Atomisation of liquids. Oil distillation.—See I. H₂ from natural gas.—See VII. Road-surfacing materials.—See IX. Insecticide.—See XVI.

III.—ORGANIC INTERMEDIATES.

Mechanism of production of hydrocarbons from fatty acids by [catalytic] hydrogenation at high temperature and pressure. Y. YENDO (Bull. Inst. Phys. Chem. Res. Japan, 1935, 14, 965—1080).—Oleic (I) and stearic acid (II) are converted into mixtures (d 0.7) of lower paraffins by catalytic hydrogenation under pressure. Best results (yield 60—70%) are obtained by heating for 2—3 hr. at 125—150 atm., first at 400° and then at 450°. During the process CO and CO₂ are produced and then converted into CH₄ and H₂O. (I) is converted into (II) at 180—200° and (II) is then converted, at higher temp., into higher paraffins which, at 450°, break down into lower paraffins, the breakdown being endothermic and accompanied by an abrupt fall of temp. Fish oils yield saturated hydrocarbons and glycerol yields oily products on hydrogenation. W. McC.

Kinetics of catalytic oxidation of hydrocarbons and their derivatives. E. L. LEDERER (Petroleum, 1935, 31, No. 44, 1—11; cf. B., 1936, 27).—On theoretical grounds, equations are derived for the rate of oxidation of hydrocarbons and other org. compounds on the assumption of a series of reactions, in one case involving the combination of 1 atom of O and in the second case where a peroxide is ultimately formed. In the first case the curve obtained is parabolic and in the second sigmoid. Using the method of Evers and Schmidt, the rate of oxidation of hydrocarbons, alcohols, phenols, aldehydes, fatty acids, and C₆H₆ has been studied, the O₂ absorbed being measured at intervals up to 150 min. The results are given in tables and graphs. The type of curve indicates the type of reaction. Reactions of the second type occur with compounds containing < 2 double linkings and an active group (OH or CO₂H) or a branched chain. Aromatic compounds with a double linking in a side chain or with a branched side chain and an OH group also give reactions of this type. The reaction coeff. (K) rises with increasing mol. wt. Terpenes show the highest reaction rate of hydrocarbons. A knowledge of

oxidation characteristics is important in evaluating lubricating and transformer oils, but determinations of K for mixtures are rather unsatisfactory. In general, it is sufficient to determine the "oxidation no.," *i.e.*, the amount of O₂ (measured in amp.-min., by the Evers-Schmidt apparatus) which 1 g. of oil will absorb in 100 min. at 100°, since in almost all cases the O₂ absorbed-time curve is linear. C. C.

$\beta\gamma$ -Dichlorobutane as a solvent. M. V. LICHOSCHERSTOV, S. V. ALEXEEV, and T. V. SCHALAEVA (J. Chem. Ind. Russ., 1935, 12, 705—709).— ψ -Butylene, a by-product of the synthetic-rubber industry, and Cl₂ yield (CHMeCl)₂ (I), which is a valuable solvent for fats, resins, and cellulose esters. In addition, the high solubility of Cl₂ in (I) renders it a useful medium for reactions of chlorination. R. T.

Preparation of butyl alcohol from by-products formed in the synthesis of butadiene by the method of S. V. Lebedev. M. I. USCHAKOV and S. S. LIVSCHITZ (Sintet. Kautschuk, 1934, No. 2, 7—9).—The "butyl fraction" is hydrogenated (Ni catalyst) under pressure at various temp. A min. pressure of 5 atm. and a min. of 3% of catalyst are necessary. The product, b.p. 115—117°, has d_4^{20} 0.8159, n_D^{20} 1.3968. CH. ABS. (r)

Decrease of alcohol recovery during the contact process [for butadiene]. N. I. SMIRNOV (Sintet. Kautschuk, 1934, No. 1, 13—22).—The working conditions for the prep. of butadiene from EtOH by a contact process are discussed. The recovery of EtOH decreases with rising temp. (best 420—450°) and with increase in the layer of catalyst, and increases with decreasing time of contact. CH. ABS. (r)

Concentration of formaldehyde solutions. P. P. KORSHEV, P. A. FROLOVA, and I. M. ROSSINSKAJA (J. Chem. Ind. Russ., 1935, 12, 721—724).—Dil. aq. CH₂O is made neutral with CaCO₃, H₂O is distilled off at 32°/30 mm., and 37% aq. CH₂O is distilled from the concentrate at 1 atm. The same product may be obtained in one operation from 13% aq. CH₂O by adding CaCl₂ to 33% and distilling at 1 atm. R. T.

Determination of acetaldehyde and carbon dioxide. I. E. FILINOV and V. P. SCHATALOV (Sintet. Kautschuk, 1934, No. 1, 22—30).—MeCHO is absorbed from the gas phase by N-NH₂OH.HCl saturated with NaCl. CO₂ is absorbed in 30% KOH. An apparatus for determining the two gases is described. Et₂O does not interfere. CH. ABS. (e)

Coefficient of distribution of acetaldehyde between butadiene and water during the washing of crude butadiene. L. M. BUKREEVA-PROZOROVSKAJA and I. M. TZERKOVNIKOVA (Sintet. Kautschuk, 1934, No. 1, 36—40).—The ratio of the amount of MeCHO (I) in the butadiene (II) to the amount in the H₂O increases with temp. and with decreasing concn. of (I) in (II). CH. ABS. (r)

Synthesis of thiuram. V. I. KUZNETZOV and D. E. LOGUNOVA (J. Chem. Ind. Russ., 1935, 12, 709—712).—The yields of (NMe₂CS₂)₂ (I) may be increased by the following modifications of the present method. In the reaction NHMe₂ + CS₂ + NaOH \rightarrow NMe₂CS₂Na, the amount of NaOH initially added should suffice only for liberation of NHMe₂, but not for neutralisation of

$\text{NMe}_2 \cdot \text{CS}_2 \cdot \text{H}$ (II), and the remaining NaOH should be added gradually. (II) is oxidised to (I) by adding H_2SO_4 to aq. Na_2CO_3 solutions containing NaNO_2 , under conditions not permitting the escape of CO_2 . Oxidation by Cl_2 in aq. Na_2CO_3 solution is not suitable, owing to destruction of (I), with formation of $\text{S}(\text{CS} \cdot \text{NMe}_2)_2$. R. T.

Recovery of aniline from waste water from diphenylamine production. B. I. KISSIN and N. V. KULIGIN (J. Chem. Ind. Russ., 1935, 12, 715–721).—The H_2O is passed through a layer of NHPH_2 (I), from which NH_2Ph is periodically extracted by washing with dil. HCl . An alternative procedure consists in extracting the H_2O with liquid (I) at 70° . R. T.

Distilling high-boiling substances. Purification of C_6H_6 . Fatty acids from benzene synthesis.—See II. **Wetting agents.**—See VI. **Polymerisation of butadiene.**—See XIV. **Determining Me anthranilate.**—See XX.

PATENTS.

Separation of alcohols. E. I. DU PONT DE NEMOURS & Co. (B.P. 437,210, 25.4.34. U.S., 25.4.33).—Saturated and unsaturated alcohols ($\llcorner \text{C}_{10}$) are separated by extraction with liquid SO_2 , in which the latter are sol., at $\llcorner 10^\circ$ (-12°). A. W. B.

Production of methacrylic acid and alkyl esters thereof. J. W. C. CRAWFORD, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 437,197, 20.4.34).— $\text{CMe}_2(\text{OH}) \cdot \text{CN}$ is treated with one or more (1.5) mols. of an alkyl H sulphate (I), e.g., MeHSO_4 , at 130 – 140° , in presence, if desired, of H_2SO_4 and Cu bronze, and then refluxed with H_2O and, preferably, the alcohol corresponding to (I); if other alcohols are used, mixed esters are obtained. A. W. B.

Polymerisation of methyl methacrylate. E. I. DU PONT DE NEMOURS & Co. (B.P. 437,284, 26.4.34. U.S., 26.4.33).—Me methacrylate (I) is heated, e.g., at 65° , in an org., H_2O -sol. solvent for (I), e.g., MeOH , diluted with H_2O in amount just sufficient to avoid pptn. of (I) at the reaction temp. The concn. of (I) in the total solution is $\gg 22$ vol.-%. Polymerising agents, e.g., Bz_2O_2 , may also be present. Apparatus is described. A. W. B.

Production of mixed esters of polyhydric alcohols and of carbohydrates. E. I. DU PONT DE NEMOURS & Co. (B.P. 436,885, 20.4.34. U.S., 20.4.33).—Cellulose, e.g., cotton, in presence of an excess in wt. of one or more org. carboxylic acids, at least one of which is an acid other than AcOH , e.g., EtCO_2H , $\text{CH}_2\text{Ph} \cdot \text{CO}_2\text{H}$, $\text{C}_6\text{H}_4\text{Cl} \cdot \text{CO}_2\text{H}$, (C_{3-10} fatty acids), is treated with keten in presence of H_2SO_4 or HF . A. W. B.

Manufacture of acetic anhydride. H. DREYFUS (B.P. 436,868, 19.4.34).—Thermal decomp. of AcOH vapour to give Ac_2O , e.g., at 300 – 900° (600 – 800°), is catalysed by presence of HPO_3 obtained by thermal decomp., e.g., at $\gg 400^\circ$, of orthophosphates of NH_3 or of volatilisable amines, e.g., N_2H_4 , NH_2OH , $\text{C}_5\text{H}_5\text{N}$. A. W. B.

Manufacture of aldehydic compounds. A. T. LARSON, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,989,700, 5.2.35. Appl., 23.5.33).—The reaction

between CO and hydrocarbons (I), e.g., C_6H_6 , in presence of AlCl_3 is accelerated by addition of $\gg 15\%$ [on the wt. of (I)] of aldehyde- AlCl_3 complex, i.e., unhydrolysed reaction product from a previous prep. A. W. B.

[Cyclic process of] distillation of methylamine mixtures. E. I. DU PONT DE NEMOURS & Co. (B.P. 436,874, 19.4.34. U.S., 19.4.33).—Mixtures of NH_2Me , NHMe_2 (I), and NMe_3 (II), free from NH_3 , are distilled at $\gg 55$ lb. per sq. in. to yield an azeotropic mixture and pure (II). The former, when distilled at $\llcorner 55$ lb. per sq. in., e.g., at 1 atm., yields a new azeotropic mixture and pure (I). The process may be operated continuously; apparatus is described. A. W. B.

Manufacture of aminonitriles. GES. F. KOHLENT-TECHN. M.B.H. (B.P. 436,692, 21.9.34. Ger., 21.9.33 and 31.3.34).—Hydroxynitriles, e.g., $\text{OH} \cdot \text{CH}_2 \cdot \text{CN}$, are treated with liquid NH_3 or a supersaturated aq. or alcoholic solution of NH_3 at \llcorner room temp. / \gg 1 atm. Excess of NH_3 is removed in gas form by adjustment of pressure. A. W. B.

Solvent recovery. CARBO-NORIT-UNION VERWALTUNGS-GES. M.B.H. (B.P. 436,399, 14.5.34. Ger., 28.6.33).—Solvents are recovered without gummy constituents by absorption in C or the like followed by steaming downwards. Part of the solvent condenses in the lower parts of the absorbent and travels downwards as liquid. The whole (liquid, vapour, and steam) is washed with H_2O , alkali, or acid and subjected to distillation by steam. B. M. V.

Production of hydrocarbons or derivatives thereof. K. S. JACKSON, G. E. WAINWRIGHT, H. R. HAILES, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 436,653, 6.4.34).— C_6H_6 and/or PhCl , together with polychlorobenzenes and Cl_2 , are passed through an unpacked SiO_2 tube at 700 – 850° to yield Ph_2 and chlorinated Ph_2 ; the reaction time is 2 sec.—1 min. A. W. B.

Manufacture of neutral cresylic acid ester of phthalic acid. L. P. KYRIDES, Assr. to MONSANTO CHEM. Co. (U.S.P. 1,989,699, 5.2.35. Appl., 30.1.32).—Mixed cresols, xylenols, etc. (2 mols.) are treated with $o\text{-C}_6\text{H}_4(\text{COCl})_2$ (1 mol.) at about 80° . The products are decolorised by washing with a 1–2% aq. KMnO_4 solution; they are for use in plastic preparations. A. W. B.

Manufacture of carbazole derivatives [of the anthraquinone series]. SOC. CHEM. IND. IN BASLE (B.P. 433,574, 20.7.34. Switz., 20.7.33).—An *o*-amino-anilinoanthraquinone with a free position *ortho* to the NH is diazotised and heated at $\gg 100^\circ$, if desired, in presence of an org. medium (PhNO_2) and an org. base (NHPH_2 , NPhEt_2). The products may be nitrated or halogenated. Examples are carbazoles from: *o*-amino-anilinoanthraquinone; 4'-chloro-2'-aminoanilinoanthraquinone, m.p. $\gg 300^\circ$ (m.p. of carbazole, 303°), brominated (yellow vat dye); 4-*o*-aminoanilino-1 : 1'-dianthraquinonylamine (grey); 3'-amino-*p*-anisidinoanthraquinone (m.p. 254°); 1-*o*-nitroanilino-4-benzamidoanthraquinone, m.p. 248 – 249° , reduced to amine, m.p. 260 – 261° , and carbazolated (olive). C. H.

Polynuclear org. compounds.—See II.

IV.—DYESTUFFS.

Sources of natural dyes [and tanning materials]. C. D. MELL (Text. Col., 1935, 57, 703—706).—Historical notes are given of dyeing and tanning substances obtainable from the superficial roots of spruce trees, the leaves of bearberry bushes (*Ericacæ*), and the asphodel plant. A mordant dye (bluish-grey on Al, and mignonette-green on Fe) is obtained from the latter, and a yellow dye for wool (Al mordant) from the last-named.

A. J. H.

Dyes and tanning substances obtained from the hop plant. C. D. MELL (Text. Col., 1935, 53, 777—778).—Historical and botanical data are given concerning brown and pink (on Al mordant) colouring matters obtained from the roots and stems, and the flowering panicles respectively, and of tanning substances found in the roots of the plant.

A. J. H.

Shade of methylene-blue. K. D. SCHTSCHERBATSCHEV (Rekonstr. Textil. Prom., 1934, 13, No. 5, 34—35).—The German standard contains intentionally added red. The Russian product appears more greenish. A hydrochloride of 99.7% purity is obtained from the commercial Zn double salt by treatment with NaCO_3 to remove Zn, followed by crystallisation from HCl solution and recrystallisation from EtOH.

CH. ABS. (p)

Precision in the determination of dyes. G. MARTIN (Rev. Gén. Mat. Col., 1935, 39, 423—428).—The method of comparative dyeings is considered mathematically. The biggest error—that introduced in the actual visual comparison—amounts to about 2% with yellows, blues, reds, and greys and 5% with black, the average for all colours being 3.5%. Errors in weighing and measuring vol. increase the average error to 5%. Tests on a photocolorimeter were no more accurate than visual comparisons.

S. C.

Determination of Gardinol and Brilliant Avicol. C. J. PEDERSEN (Amer. Dyestuff Rep., 1935, 24, 137—138).—The dyes are determined by means of the turbidity produced by reaction with 1-amino-5-ethoxythiazole hydrochloride. Soaps and common inorg. radicals do not interfere. Sulphated or sulphonated textile assistants cannot be distinguished by this test.

CH. ABS. (p)

Determination of glycerol in dye suspensions for printed fabrics. A. BOHANES (Chem. Obzor, 1935, 10, 28).—The dye (10 g.) is placed in a graduated cylinder, 50 c.c. of abs. EtOH are added, and the mixture is diluted to 100 c.c. with Et_2O and shaken. After 1 hr. 25 c.c. of the clear liquid are removed and the amount of glycerol is determined after evaporation at 105°.

CH. ABS. (p)

PATENTS.

Manufacture and application of monoazo dyes [for acetate silk, silk, wool, and leather]. IMPERIAL CHEM. INDUSTRIES, LTD., and A. H. KNIGHT (B.P. 431,564, 8.12.33).—A 2:4-dinitroaniline (not carrying Cl or Br in position 6) or 2:4-dinitro- α -naphthylamine is diazotised and coupled with an *N-n*-butyl- or *isobutyl-N*-sulphatoalkylarylamine of the C_6H_6 series, e.g., $\text{NPhBu}\cdot\text{C}_2\text{H}_4\cdot\text{SO}_3\text{H}$ (reddish-violet) or $m\text{-N}(\text{C}_6\text{H}_4\text{Me})\text{Bu}\cdot\text{C}_2\text{H}_4\cdot\text{SO}_3\text{H}$.

C. H.

[Manufacture of] metalliferous azo dyes. IMPERIAL CHEM. INDUSTRIES, LTD., and M. MENDOZA (B.P. 433,454, 12.1.34).—The dye dianisidine \rightarrow (alkaline) 2 mols. of 2S-acid, is treated with hot aq.-ammoniacal solution of a Cu salt until demethylated. The completely coppered dye is fast to light and soap.

C. H.

Manufacture of chromiferous [azo] dyes. SOC. CHEM. IND. IN BASLE (B.P. 431,598, 17.4.34. Switz., 21.4.33).—An *o*-hydroxyazo dye $\text{NH}_2\cdot\text{C}_{10}\text{H}_6\text{-}n(\text{OH})(\text{SO}_3\text{H})_n \rightarrow \alpha$ - (I) or β - $\text{C}_{10}\text{H}_7\text{-OH}$ (II), where $n = 1, 2, \text{ or } 3$, or a mixture of chromable azo dyes containing at least one such dye, is treated with an alkali or alkaline-earth chromite containing one or more Cr atoms for each chelate group. Examples are: 1:2:4-aminonaphtholsulphonic acid \rightarrow (I) with aq. K chromite (III) at 74—78°; 1:2:4-acid \rightarrow (II) at 75—78° and 3-amino-*p*-cresol-6-sulphonic acid \rightarrow (II) with (III) (navy-blue on wool).

C. H.

Manufacture of brominated vat dyes. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 431,654, 13.2.34).—The vat dyes of B.P. 339,396 (B., 1931, 338) are made bluer and faster to Cl by bromination.

C. H.

Manufacture of [acid wool] dyes. I. G. FARBENIND. A.-G. (B.P. 431,652, 12.1.34. Ger., 27.5.33).—A *p*-aminobenzaldehyde is condensed with a compound containing reactive Me or CH_2 , at least one component carrying SO_3H . Examples are: *p*-diethylamino-*o*-sulphobenzaldehyde (I) with $\text{CH}_2(\text{CN})_2$ in alcoholic $\text{C}_5\text{H}_5\text{N}$ (yellow); (I) with thioindoxyl (red), 5-methylcoumaranone (orange), 2-thiolthiazol-5-one (orange), COMe_2 , COPhMe , or quinaldine; *p*-dibenzylaminobenzaldehyde with $\text{CH}_2(\text{CN})\cdot\text{CO}_2\text{Et}$ (yellow); *o*-chloro-*p*-diethylaminobenzaldehyde with 1-*m*-sulphophenyl-3-methyl-5-pyrazolone (II) (orange); *p*- $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{CHO}$ with (II) (orange-yellow).

C. H.

Manufacture of (A) acid safranin dyes, (B) [acid] safranin dyes. I. G. FARBENIND. A.-G. (B.P. 431,708—9, 15.1.34. Ger., [A] 14.1.33, [B] 14.1. and 11.8.33).—An isorosinduline-6-sulphonic acid is condensed (A) with a *p*-arylenediamine having at least one unsubstituted NH_2 and carrying either a 2-alkyl or in positions 2 and 5 neutral substituents, e.g., alkyl, alkoxy, or halogen, and finally sulphonated if desired; or (B) with a *p*-phenylenediamine-3-sulphonic acid carrying in the 4- NH_2 -group an aryl, hydroaryl, aralkyl, or alkyl. Examples are: (A) 13-acetamidodiethylisosinduline-1:6:11-trisulphonic acid with 2:5-diamino-*m*-xylene (blue); 11-methyldiethylisosinduline-1:6-disulphonic acid (I) with 2:5-tolylenediamine (blue), 2:6-dichloro-*p*-phenylenediamine (greenish-blue), or 2:5-diamino-*m*-xylene-4-sulphonic acid (greenish-blue); (B) diethylisosinduline-1:6:13-trisulphonic acid with 4-aminodiphenylamine-2-sulphonic acid (greenish-blue); (I) with 4-amino-2'-dimethoxydiphenylamine-2-sulphonic acid (blue), 4-aminomethylaniline-2-sulphonic acid (blue), or 4-aminocyclohexylaniline-2-sulphonic acid (blue).

C. H.

Manufacture of [thio]indigoid vat dyes. I. G. FARBENIND. A.-G. (B.P. 431,661, 8.6.34. Ger., 8.6.33).—A dichlorothioindoxyl, carrying alkoxy in position 5, 6, or 7 and having one free position *ortho* to the alkoxy,

or a reactive α -derivative of the corresponding thioisatin, is condensed with a thioindoxyl or an isatin (or a reactive α -derivative) of the C_6H_6 or $C_{10}H_8$ series. Examples are: 6:7-dichloro-5-methoxythioindoxyl (I) with 9-chloro- α -naphthisatin (grey); 4:7:5-isomeride of (I) with 5-bromoisatin α -chloride (navy-blue); 4:5:7-isomeride with 5:7-dichloroisatin α -chloride (blue). The prep. of 2:3-dichloro-1-methoxyphenyl-4-thioglycollic acid, m.p. 159°, the 2:5:1:4-compound, m.p. 116°, the 3:4:1:6-compound, m.p. 122°, and 4:7-dichloro-6-ethoxythioindoxyl, m.p. 192°, is described.

C. H.

Drying dyes.—See I. Carbazole derivatives.—See III. Dyes for sensitising emulsions.—See XXI.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

[Difference in properties of silk from the] inner and outer layers of silk cocoons. R. TSUNOKAYE (J. Soc. Dyers and Col., 1935, 51, 384—387).—Examination of separate successive lengths of 112.5 m. taken (outside to inside) from various qualities of Japanese silk cocoons shows the fibre thickness to increase to a max. at the 2nd length and then decrease regularly (e.g., 2.94, 3.23, 2.92, 2.33, and 1.36 denier), whereas the sericin content decreases steadily from the outer to inner layers (e.g., 25.7, 19.2, 15.1, 14.1, and 13.5%). The sericin in the outer layers contains more, and less, sericin-A and -B, respectively, than that of the inner layers. The well-known apparent coarser appearance of silk fibres taken from the outer layers of a cocoon is due partly to their flatter cross-section, but mainly to their higher content of sericin. Sericin has a higher H_2O -absorbency than fibroin, so that during reeling of the cocoons in hot H_2O the outer fibres swell > the inner and also thereby become more transparent and less white.

A. J. H.

Degumming of real silk materials. A. J. HALL (Text. Mercury and Argus, 1935, 93, 303, 307).—The chemical processes involved are discussed with reference to sericin-A and -B and various degumming agents including NaOH, Na_2CO_3 , Na_2SiO_3 , Na_3PO_4 , borax, $NaHCO_3$, and soap, the efficiency of which decreases in the order named (soap excepted).

A. J. H.

Acid and alkaline hydrolyses of silk fibroin. E. WALDE and R. EDGAR (Proc. Iowa Acad. Sci., 1934, 41, 171—172).—Changes in wt., N content, wet breaking strength, and elongation of silk fabric after hydrolysis by NaOH or HCl under varying conditions are recorded.

CH. ABS. (p)

Testing of silk hose. ANON. (Silk J. & Rayon World, 1935, 12, Aug., 31).—Tests recently formulated by the Nat. Bur. Standards of the U.S. Bur. Commerce for determining the "distensibility," "recoverability," and "stretch-endurance" are described briefly.

A. J. H.

Alkalis and wool. F. R. HARRISON (Text. World, 1935, 85, 2247).—Data are given showing the effect on the wet and dry tensile strengths of worsted yarn produced by steeping it for 15 min. at 50° in aq. solutions of Na_3PO_4 , Na_2CO_3 , NH_3 , NaOH, and borax of p_H 8.75—13.01. It is established that the p_H rather than the alkali determines the damage to the wool.

A. J. H.

Alkaline decomposition of wool keratin. M. BARR and R. EDGAR (Proc. Iowa Acad. Sci., 1934, 41, 170).—The decrease in wt., N, S, wet breaking strength, and ratio of S in the hydrolysate to that of the residual wool increase with the concn. of alkali used and the temp. (25—55° for 10 hr.). Mathematical relationships between the factors are examined.

CH. ABS. (p)

Amino-nitrogen contents of wool and collagen. M. HARRIS and J. R. KANAZY (Proc. Amer. Assoc. Text. Chem. Colorists, 1935, 124—129).—Treatment of wool, collagen, and arginine (I) with HNO_2 yields increasing amounts of N_2 with time, as the acid acts on the guanidine (II) nuclei. The method is based on different rates of N_2 evolution from protein and from (I). The action of HNO_2 on a (I) nucleus differs from that on NH_2 . The % of NH_2 -N in the total N is 2.53 for wool and 2.77 for collagen.

CH. ABS. (p)

Action of sulphuric acid on wool and conditions of scouring. O. S. CHOVANSKAJA (Trans. Butlerov Inst. Chem. Tech. Kazan, 1934, No. 2, 67—72).—Chemical consumption of H_2SO_4 by wool depends on its fat and K contents and on mineral impurities. Adsorption of acid varies with the grade of wool and is little influenced by fibre contamination. The two processes are complete in 2 hr. in the cold and in 30 min. at 30°.

CH. ABS. (p)

Recovery of lanoline by extraction from waste waters of wool scouring. M. SERJAKOV and N. PARAMANOVA (Maslob. Shir. Delo, 1934, 9, No. 5, 39—40).—The H_2O is acidified (H_2SO_4) to contain 0.1—0.2% acidity, and extracted with light petroleum in a special autoclave. 97—98% of the lanoline is recovered.

CH. ABS. (p)

True density of cellulose. W. B. CAMPBELL and J. K. RUSSELL (Quart. Rev. Forest Prod. Lab. Can., 1935, 21, 24—26).—The d of cotton-cellulose does not vary according to the nature of the liquid medium if precautions are taken to avoid intermediate drying. Vals. recorded in H_2O , MeOH, EtOH, and C_6H_6 all approximate to 0.62, and it is no longer necessary to postulate the presence of H_2O of extraordinary high d in order to account for the lower vals. hitherto obtained with H_2O by comparison with He and with org. solvents. It is believed that the results lend support to the conception of shrinking by forces of internal liquid tension, bonding by recrystallisation, and the formation of pockets in the structure, when cellulose is dried from H_2O .

H. A. H.

X-Ray examination of the effect of removing non-cellulosic constituents from vegetable fibres. J. HEWITT (Nature, 1935, 136, 647).—Chlorinated fibres of sisal with the Cl-compounds not removed give photographs of diminished intensity. With purified fibres there is no diminution of intensity; an improved definition results.

L. S. T.

Fibre classification using three screens. G. D. O. JONES, W. S. MORRIS, and H. W. JOHNSTON (Quart. Rev. Forest Prod. Lab. Can., 1935, 21, 34—36).—Fractionation of groundwood and beaten sulphite pulps, using three screens (14-, 28-, and 200-mesh) instead of five as previously advocated (B., 1933, 502) gives satisfactory fibre differentiation.

H. A. H.

Electrical method for measuring the moisture content of fabrics. J. L. SPENCER-SMITH (J. Text. Inst., 1935, 26, 336—340 T).—The fabric is inserted between the plates of a condenser, and the increase in capacity measured with a dynatron oscillator and a valve voltmeter. A single curve relating increase in capacity with H₂O content is obtained for linen in all states, cotton, and rayon. A. G.

Determination of lignin by hydrolysis of accompanying carbohydrates by sulphuric acid. J. WIERTELAK (Polish Agric. Forest. Ann., 1935, 34, 129—133).—The method of Ritter *et al.* (B., 1932, 593) is preferred. CH. ABS. (p)

Determination of lignin in wood with 72% sulphuric acid. F. B. KOMAROV (Bumashn. Prom., 1934, 13, No. 12, 32—37).—König's method is modified. The deresinified sawdust (1 g.) is treated with 15 c.c. of 72% H₂SO₄, added slowly, with occasional shaking for 2.5 hr. Coniferous woods are treated at 25—26° and deciduous woods at 20—21°. The mixture is diluted with H₂O to 200 c.c. and boiled (reflux) for 1 hr. The residue is filtered, washed free from H₂SO₄, and dried to const. wt. Vals. thus obtained for spruce and pine were 0.3—0.5% > those by König's method (48 hr. at 16—17°), which causes some decomp. of lignin. Spruce and aspen yielded lignins of similar empirical composition (64.08 and 64.35% C respectively). The OMe content and reducing power of lignin varied with the method of separation, the physical structure of the wood, and the nature of the lignin. CH. ABS. (p)

Vapour-pressure studies in the [sulphite-] cooking of wood. P. E. GISHLER and O. MAASS (Quart. Rev. Forest Prod. Lab. Can., 1935, 21, 1—9).—A new technique has been developed to study changes in the system CaO-SO₂-H₂O during the digestion of spruce wood, using pure reagents of accurately known concn. It is established that CaO and SO₂ are used up in the ratio of 1 : 2. The CO₂ produced is a reaction product of lignin and not of cellulose. H. A. H.

Nitration of cellulose. IV. Effect of nitrogen oxides on nitration with nitric acid. Z. A. ROGOVIN and K. TICHONOV (Iskusst. Volok., 1934, 5, No. 7, 41—46; cf. B., 1935, 299).—In the nitration of cotton with 2 pts. (wt.) of 95% HNO₃ at 20° for 2—5 hr., the addition of N oxides effected a higher degree of nitration. N₂O₅ was the most effective. N₂O₃ and N₂O₄ increase destruction of cotton. CH. ABS. (p)

Denitration of nitrocellulose in the process of centrifugal separation from the acid. I. M. NAIMAN, N. D. TROITZKI, and J. G. DANUSHEVSKI (Iskusst. Volok., 1934, 5, No. 7, 47—51).—A filterable turbidity in nitrocellulose is traced to partial denitration during centrifuging. This occurs principally in the outer layers and is caused by dilution of spent acid with H₂O sucked in with air. Pyroxylin is not affected in this way since the spent acid is much more conc. CH. ABS. (p)

Decomposition of nitrocellulose with liberation of nitrous oxide. R. VANDONI (Compt. rend., 1935, 201, 674—675).—Nitrocellulose with 25% HNO₃ at 50° affords a mixture of gases consisting mainly of CO₂

and N₂O, and small amounts of NO, N₂, H₂, CH₄, and CO. J. L. D.

Cellulose triacetate. J. GRARD (Compt. rend., 1935, 201, 678).—Cellulose with AcOH-0.5N-HClO₄, followed by treatment with Ac₂O-CCl₄ below 10°, gives a triacetate, which is better suited to industrial needs than the "commercial" product. J. L. D.

Viscose research of the "Piatiletka" plant. A. SCHPITALNUI (Iskusst. Volok., 1934, 5, No. 8, 55—58).—Matt viscose is more susceptible to contaminated finishing solutions than is the normal product. Matt viscose contains minute cavities formed by incomplete removal of CS₂. The problem of dealing with contaminated cellulose is examined. CH. ABS. (p)

[Viscose] staple-fibre production. H. JENTGEN (Kunstseide, 1935, 17, 389—401).—Various manufacturing systems are compared and the Steimmig process (B., 1934, 139) is described. The spun filaments may be cut in the acid condition immediately after spinning, or after purification and immediately before or after the final drying; various cutting machines are described. Stretching of the filaments only has an important influence on their properties when exerted during spinning and coagulation. A. J. H.

[Manufacture of] viscose film yarn. ANON. (Silk J. & Rayon World, Sept., 1935, 12, 35—37).—Methods and machinery are described and illustrated. A. J. H.

Use of ammonium sulphate baths in viscose spinning. S. P. LIPINSKI (Iskusst. Volok., 1934, 5, No. 8, 19—29).—Substitution of a mixture of H₂SO₄ 132, Na₂SO₄ 230, ZnSO₄ 15, and (NH₄)₂SO₄ 70 g. per litre for glucose yields as good a product. The rayon gives slightly darker shades in dyeing than does the glucose product. CH. ABS. (p)

Recovery of viscose-precipitating baths. A. PAKSCHVER and M. MARGULIS (Iskusst. Volok., 1934, 5, No. 8, 46—52).—In the recovery by evaporation, no glucose (I) is lost by heating at < 100° for 6 hr., but 13% of (I) disappears during boiling for 6 hr. Only pure Na₂SO₄.10H₂O crystallises from the liquor. This proceeds with more difficulty and at lower temp. in liquor from Mg baths than in that from NH₄ baths. CH. ABS. (p)

Purification of ventilation gases of the viscose-spinning room. A. PAKSCHVER and P. EFIMOV (Iskusst. Volok., 1934, 5, No. 8, 13—19).—A two-chamber scrubber is described in which H₂S is absorbed in 2% NaOH and CS₂ in 5—8% Na₂S solution. CH. ABS. (p)

Importance of sulphate soaps as raw material¹ in large-scale [paper] production. E. PYHÄLÄ (Finnish Paper and Timber J., 1934, 697—701).—Methods of utilising the crude soap, a by-product of sulphate-pulping, include ashing to regenerate Na salts, distillation with H₂SO₄ to recover resins, and purification by bleaching and clarifying. CH. ABS. (p)

Lead [in the paper industry]. E. WIGZELL (Finnish Paper and Timber J., 1934, 940—941).—Most of the Finnish cellulose industries use an antimonial Pb (> 2% Sb). The use of Pb containing Te is recommended. CH. ABS. (e)

Detecting alkali in fibres. Determining mercerised cotton.—See VI. **Nitrocellulose lacquers from wood pulp.**—See XIII. **Lining for rubber tyres. Self-vulcanising cements [for cotton etc.]**—See XIV. **Cotton fibre. Cotton-pest [control]**—See XVI. **Wool growth and characteristics.**—See XIX.

PATENTS.

Production of mixed esters of cellulose. D. R. WIGGAM and J. S. TINSLEY, Assrs. to HERCULES POWDER Co. (U.S.P. 1,988,532, 22.1.35. Appl., 30.3.31).—Cellulose nitrate (0.25–5.0% N) is treated with an anhydride of an org. acid $C_nH_{2n}O_2$ ($n = 2-4$), e.g., AcOH, and an org. acid ($n = 3-7$), e.g., EtCO₂H, in presence of a catalyst (H₂SO₄), and the mixed ester is pptd. by a non-solvent. F. R. E.

Treatment [lubrication] of filaments, threads, foils, fabrics, and the like of organic derivatives of cellulose. BRIT. CELANESE, LTD. (B.P. 436,703, 22.1.35. U.S., 23.1.34).—Textile materials of org. derivatives of cellulose are dressed with a mixture of a H₂O-insol. lubricant (olive oil) and a phenol (cresylic acid) to give low-lustre effects. F. R. E.

Production of [non-curling] films, foils, thin sheets, and the like. CELLULOID CORP. (B.P. 436,784, 5.6.35. U.S., 9.6.34).—The films etc. having a cellulose-derivative base, after stripping from the drum support on which they have been deposited, are passed in contact with a heated surface so that the air-side is heated to a higher temp. or for a longer period than the wheel side. F. R. E.

Luminous [sheet] material. J. E. BRANDENBERGER, Assr. to DU PONT CELLOPHANE Co., INC. (U.S.P. 1,988,476, 22.1.35. Appl., 29.9.31. Fr., 8.10.30).—A film of cellulosic material (cellulose acetate, regenerated cellulose) is coated with a composition containing a luminous material, or two transparent sheets are joined by an adhesive containing the luminous material (ZnS, CaS, radioactive substance). F. R. E.

Manufacture of vulcanised fibre. J. K. ANTHONY, Assr. to H. B. FAX (U.S.P. 1,988,441, 22.1.35. Appl., 24.3.31).—Felted cellulose sheets are soaked in a hydrating agent (ZnCl₂, H₂SO₄), squeezed, washed, freed from surplus H₂O, plied together by treatment with cuprammonium solution or by application of a solution of a bonding agent (glue, shellac, artificial resins, etc.), and finally dried under pressure. F. R. E.

Manufacture of paper pulp. E. & M. LAMORT FILS (B.P. 437,242, 8.4.35. Fr., 6.4.34).—Apparatus for dry-shredding pulp bales is claimed. D. A. C.

Felting of paper-pulp fibres on the wet part of paper- and board-making machines. S. P. H. E. HOLGERSSON and W. A. E. TIBELL (B.P. 437,241, 6.4.35).—Paper stock flowing on to a Fourdrinier wire is vibrated 4000–6000 times per min. Apparatus is claimed. D. A. C.

Manufacture of paper. C. J. O'NEIL, Assr. to JOHNS-MANVILLE CORP. (U.S.P. 1,989,709, 5.2.35. Appl., 27.4.32).—Pitch troubles are eliminated by adding to the paper stock in the beater a small quantity (e.g.,

0.75% of the wt. of pulp) of calcined diatomaceous earth (3–6 μ particle size). D. A. C.

Manufacture of waterproof paper, particularly suitable as weatherproof posters. J. KNAGGS, and PORTALS, LTD. (B.P. 436,878, 20.4.34).—The formalin or hardening bath used as in, e.g., B.P. 391,350 (B., 1933, 544) is modified by addition of an adhesive (dextrin, flour), which is not rendered entirely insol. in H₂O by CH₂O. Before drying, the paper is kept moist for about 24 hr. F. R. E.

De-inking of paper. H. B. HASS, Assr. to PURDUE RESEARCH FOUNDATION (U.S.P. 1,990,376, 5.2.35. Appl., 6.8.34).—Paper printed with C inks is beaten at 45–80° with commercial soap containing 3–6% of a chlorinated aliphatic or aromatic hydrocarbon. The pulp is then screened and washed. D. A. C.

Calendering or drying of materials. W. W. SPOONER (B.P. 436,654, 16.4.34).—Paper or the like is heated on one side by contact with a metallic surface (e.g., a heated roll in a paper-making machine), and to the other side are applied a no. of inclined jets or air at high velocity and at a temp. > that of the paper, the air being collected in a hood, reheated, and used again. B. M. V.

Centrifuges [for pulp].—See I. **Mixed esters of polyhydric alcohols.**—See III. **Conditioning filaments etc.**—See VI. **Plaster boards.**—See IX. **Thermoplastic rubber derivatives.**—See XIII. **Saccharification of cellulose.**—See XVII.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Suitability of metals for dyeing machinery. J. G. GRUNDY (J. Soc. Dyers and Col., 1935, 51, 377–384).—An extension of previous investigations (B., 1929, 243), the results obtained with direct dyes of the Diazo Fast and Rosanthrene series, basic, sulphide, vat, and insol. azoic dyes being tabulated. Results are also given of the behaviour of various metals when exposed to the liquors used in large-scale dyeing. Contrary to previous claims, no practical advantages accrue by the use of Staybrite FMB steel in place of the FDP brand for making apparatus for use in dyeing with basic, direct, developed, sulphide, vat, and Cibacet dyes, bleaching of cotton with aq. H₂O₂, and kieren of cotton with aq. Na₂CO₃ and NaOH, but the former has much greater resistance to Cl₂ and the acid liquors used in dyeing Neolan dyes. A theory of the non-corrosive properties of Staybrite steel is discussed. A. J. H.

Evaluation of wetting-out agents. T. KENNEDY (Dyer, 1935, 74, 389–391).—The usefulness of the Herbig method (cf. Evans; B., 1935, 795) is confirmed, and a modified form is described in which the hanks of yarn are lowered by a special pulley system into a solution of the wetting agent for an exact period, then withdrawn, and weighed without centrifuging. Capillarity and fabric-sinking tests are described. A. J. H.

Wool dyeing. C. H. YOUNG (Can. Text. J., 1935, 52, 23–25, 43–44).—Methods and typical recipes for various classes of dyes are described. A. J. H.

Dyeing of woollen rag stock and other textile waste fibre. S. WADENBERG (Text. Recorder, 1935, 53,

Aug., 51, Oct., 65, Nov., 33, 35).—Stripping and dyeing methods suitable for woollen rags, weavers' and spinners' waste, viscose-rayon waste, scouring and falling flock, mohair, alpaca, and camel-hair and jute waste are described. Certain machines and dyes are especially mentioned. A. J. H.

Dyeing and scouring of Angola [cotton + wool] yarn. V. L. PALLET (Text. Colorist, 1935, 57, 731—733, 780).—The cotton in the yarn is usually sufficient to prevent felting of the wool, so the hanks of yarn are scoured and bleached chain-wise in rope-washing or open soaper machines followed by dyeing in the Hussong machine with mixtures of direct and neutral-dyeing acid wool dyes. A. J. H.

Direct dyeing of cellulose. S. M. NEALE (Text. Recorder, Sept., 1935, 53, 45—46).—Factors which control the absorption of dyes by cotton and cellulose rayons are discussed. The particle size of the dye is considered to be less important than the condition of the cellulose in determining dye absorption. A. J. H.

Dyeing of acetate rayon-cotton union fabrics. R. H. BOURDON (Silk J. & Rayon World, Oct., 1935, 12, 32—33).—Methods and recipes are described with special reference to the 2-colour dyeing of fabric pre-mercerised without hydrolysis of the acetate rayon. A. J. H.

Dyeing methods for viscose staple fibre and its mixtures with other fibres. G. RUDOLPH (Kunstseide, 1935, 17, 421—423).—Methods are described and suitable dyes listed. A. J. H.

Selection of dyes for padding [fabrics]. H. C. BORGHETTY and J. ZAPARANICK (Amer. Dyestuff Rep., 1935, 24, 639—640).—"Shade jumping" (the change of shade which occurs when padded fabric is subjected to the finishing processes) may generally be traced to the use in the padding liquor of dyes the affinity of which for the fabric is not at a max. under the conditions of temp. and electrolyte concn. obtaining during padding. The possibility of shade jumping may be ascertained by impregnating the padded fabric with aq. NaCl + Turkey-red oil and then drying on a steam-heated surface. A. J. H.

Processing [dyeing and finishing] of coloured felt for use in musical instruments. C. HILES (Text. Col., 1935, 57, 678—679).—In dyeing with acid dyes the wool felt, hair felt, baize cloth, and various "bushing" and "backing" fabrics, volatile HCO_2H is used instead of H_2SO_4 . Less acid thereby remains in the dry dyed material, and risk of rusting of metal in contact therewith is lessened. A. J. H.

Preparation and dyeing of rayon piece goods for printing. P. H. STOTT (Proc. Amer. Assoc. Text. Chem. Colorists, 1935, 141—144).—The removal of products of decomp. after dyeing is emphasised. Washing efficiency, which is improved by addition of sulphonated aliphatic alcohols, is tested by placing the goods in dil. aq. NaBO_3 or H_2O_2 . Yellowing likely to appear within 14 days is shown immediately by the test. CH. ABS. (p)

Dermatitis from dyed hair, furs, and fabrics. J. T. INGRAM (Dyer, 1935, 74, 345; cf. B., 1935, 722).—The results of trials on 1000 patients when patch-tested

with aq. solutions of *m*- and *p*- $\text{C}_6\text{H}_4(\text{NH}_2)_2$ for 1—24 days showed that only 4 contracted dermatitis. A. J. H.

Printing of coir [coconut-fibre] mats. S. HOLGEN (Amer. Dyestuff Rep., 1935, 24, 619—621).—Methods for bleaching with $\text{NaOCl} + \text{HCl}$, KMnO_4 , NaHSO_3 , and $\text{Na}_2\text{S}_2\text{O}_4$ followed by printing with basic, direct, and acid dyes are described. A simple wooden printing frame is used instead of the usual roller machine. Printed effects having special fastness to H_2O are produced with pigments (Prussian-blue, chrome-green, lampblack, etc.) dispersed in boiled linseed oil. A. J. H.

Printing of [cotton] sleeve linings. N. H. CARUTHERS (Text. Colorist, 1935, 57, 739—741, 780).—Printing methods and recipes are given for sateen, regina, and jeanette fabrics, using basic, direct, chrome-mordant, and vat dyes. The "closed" finish which is usually required is obtained by beetling for about 8 hr. A. J. H.

Printing of white discharges on rayon piece goods. J. M. HILL (Silk J. & Rayon World, 1935, 12, Nov., 35—36).—Methods and recipes suitable for fabric dyed with direct dyes, which are made faster to washing by diazotisation and coupling with a naphthol, are described. A. J. H.

Printing of silk fabric with direct dyes. J. M. HILL (Silk J. & Rayon World, 1935, 12, Oct., 33—34).—Practical details relating to degumming, printing, the composition of printing pastes, steaming, and washing-off are given. Brighter colours are obtained by first weighting the fabric by means of SnCl_4 and Na_2HPO_4 . A. J. H.

Aniline-black printing. F. A. NEWTON (Text. World, 1935, 85, 2256).—Practical suggestions are made for preventing streaks and tendering. A satisfactory prussiate printing paste consists of $\text{NH}_2\text{Ph}\cdot\text{HCl}$ (1 lb.), NH_2Ph (1 oz.), NaClO_3 (5 oz.), starch-gum tragacanth thickening (4 pints), and Na_4 (or K_4) $\text{Fe}(\text{CN})_6$ (9 oz.) per gal. A paste made with $\text{K}_4\text{Fe}(\text{CN})_6$ will keep for 3—4 days without appreciable decomp. A. J. H.

Application of aniline-black in textile printing. ANON. (Text. Colorist, 1935, 57, 659—662, 708).—Practical details of prussiate and Cu processes are described. Clearing of black streaks in the unprinted parts is effected by padding the fabric with dil. aq. bleaching powder, passing it over drying cylinders, and afterwards washing out the residual active Cl. Chromed fabric which has not been soaped should be completely freed from residual Cr before drying, since this produces greening of the black shade. A. J. H.

Recent developments in textile finishing. L. G. LAWRIE (J. Text. Inst., 1935, 26, p 375—377).—A lecture. A. G.

Finishing of pure and par-weighted silk-crêpe fabrics. P. LEBRUN (Text. World, 1935, 85, 2048).—Previous to finishing, the wet dyed fabric is festoon- (not stenter-)dried. Weighted fabric is more liable than pure fabric to become chafed during wet processing; chafe marks are removed by rubbing with an oil emulsion (olive oil 2 pts., CCl_4 1 pt., solvent naphtha 7 pts.).

Weighted fabric gives a more lustrous finish than pure fabric and requires dulling by impregnation with an aq. suspension of TiO_2 .
A. J. H.

Dull finishing of knitted rayon fabric. F. P. W. WILSON (Amer. Dyestuff Rep., 1935, 24, 643—644).—A padding machine is described in which tubular fabric is impregnated with an aq. suspension of an insol. white pigment (*e.g.*, china clay) while passing between two horizontally opposed rubber rollers sprayed with the suspension.
A. J. H.

Formulation of hat and fabric finishes. P. H. FAUCETT (Paint, Oil, and Chem. Rev., 1935, 97, No. 19, 12—16).—The formulation of suitable cellulose nitrate lacquers is discussed.
D. R. D.

Determination of mercerised cotton with the fluorescence microscope. E. GRUMSTEIDL and F. HAMKA (Indian Text. J., 1935, 45, 172—173).—Differences between raw and bleached cotton and raw and bleached mercerised yarns can be shown by differences in fluorescence colours. Eosine-extra-yellow is a suitable dye for determining the degree of mercerisation.
CH. ABS. (p)

Use of Methyl Green for detecting traces of alkali in fibrous materials. E. CLAYTON (J. Soc. Dyers and Col., 1935, 51, 387—388).—The alleged abnormal behaviour of wool towards Methyl Green (I) (C.I. No. 684) observed by Unna and Golodez (*cf.* Haller; B., 1930, 856) is explained by assuming the presence of alkali in the wool. 200 c.c. of 0.0005% (I) are almost decolorised on boiling with 0.25 c.c. of 0.01N-NaOH, but this sensitivity to alkalis is considerably less at lower temp. Magenta is 12 times less sensitive. Very dil. aq. (I) is decolorised quickly when boiled in an ordinary new glass boiling tube, but not in a SiO_2 or Pt basin. (I) is useful for detecting the presence of traces of alkali and acid in wool when oxidising agents are absent.
A. J. H.

Dry cleaning of rayon fabrics. H. ROCHE (Silk J. & Rayon World, Oct., 1935, 12, 38).—Suitable methods and solvents are described for viscose and acetate rayons. $CHCl_2CCl_2$ is not suitable for acetate rayon owing to its plasticising action.
A. J. H.

Stain-removal methods [for textiles]. ANON. (Text. Colorist, 1935, 53, 729—730, 787).—Descriptive.
A. J. H.

Sizing of rayon yarns. ANON. (Silk J. & Rayon World, 1935, 12, Sept., 32).—A "Raycol" size which contains linseed oil and is completely removable by simple scouring of sized yarn after oxidation is described.
A. J. H.

Application of latex [to fabrics]. J. F. HOTCHKISS (Text. World, 1935, 85, 666—667).—The compounding of latex for backing pile fabrics is described, and control tests are indicated.
CH. ABS. (p)

[Preparation of] crease-resisting fabrics. C. AMICK (Amer. Dyestuff Rep., 1935, 24, 553—557, 622—624, 632—633, 645—648, 665).—Practical finishing methods are described with special reference to the use of CH_2O -urea resins and to the manner in which various fibres and types of fabric respond to the finishing

treatment. Long-stapled cotton responds better than short-stapled. Viscose-rayon crêpe fabrics, acetate rayon, and cotton-wool fabrics yield only moderately satisfactory anti-crease finishes. Linen shows the highest loss of tensile strength when anti-crease-finished. Rayon pile fabrics are especially suitable for anti-crease finishing.
A. J. H.

[Treatment of] bruised silk and rayon fabrics. ANON. (Text. Mercury and Argus, 1935, 93, 328).—Bruised or chafed marks on silk fabric, as caused by rubbing of the fabric surface during degumming and dyeing, are removed by brushing with an oil (*e.g.*, olive oil); suitable apparatus is described.
A. J. H.

Determining dyes.—See IV. **Sol. starch for textiles.**—See XVII.

PATENTS.

Treatment of spools of textile material with liquids or other fluids. J. ANNICQ (B.P. 436,511, 7.6.35).—The spools are mounted on a resilient openwork core, which fits on a telescopic foraminous tube.
B. M. V.

(A) **Filter apparatus for dry-cleaning units.** (B) **Condensers, particularly for dry-cleaning apparatus.** J. R. COURTNEY and H. WARD (B.P. 436,585—6, 12.3.34).—(A) Claim is made for the use of suction in combination with closely-woven fabric filter medium without filter aid. The filter chamber is maintained full of prefilter, preferably by another pump delivering excess liquid from the dry-cleaning vessel into the filter under slight pressure, the excess being by-passed. (B) The cooling-tubes are very tortuous and baffles are provided to ensure that no vapour can avoid a condensing surface.
B. M. V.

Plant for chemical laundrywork, dry-cleaning, and the like, and method of operation. A. L. MOND. From I. G. FARBENIND. A.-G. (B.P. 436,061, 25.3.35).—Draw-off connexions for solvent and drying air are described.
B. M. V.

Dressing [sizing] of artificial silk. T. KOCH, Assr. to AMER. ENKA CORP. (U.S.P. 1,984,139, 11.12.34. Appl., 18.10.33. Ger., 18.10.32).—Rayon is sized with a drying-oil (*e.g.*, linseed, tung) size containing an org. base [*e.g.*, aromatic bases (xylydines), alkylanilines, heterocyclic bases (quinoline), and especially alkylamines derived from aliphatic alcohols (an ethanalamine)] so that acids formed by oxidation of the oil are simultaneously neutralised and tendering of the rayon is thereby avoided.
A. J. H.

Conditioning [oiling] of filaments, yarns, fibres, and like materials. BRIT. CELANESE, LTD. (B.P. 436,925, 19.12.34. U.S., 19.12.33).—The use of tea-seed oil for conditioning textiles, particularly of cellulose acetate, is claimed. Solvents, *e.g.*, $CH_2(O-C_2H_4-OMe)_2$, and hygroscopic substances such as a glycol may also be present.
A. W. B.

Monoazo dyes for silk etc.—See IV. **Lubricating fabrics etc.**—See V. **Transfer ink. Thermoplastic rubber derivatives.**—See XIII. **Gum for printing.**—See XVII.

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

Effect of steam on the degree of precipitation of sulphuric acid mist. G. RUBNIKOV (Chimstr., 1935, 7, 45—46).—The pptn. of H_2SO_4 mist, formed in Kestner evaporators, is more effective when steaming is employed, and the adsorption of the pptd. mist by the coke boxes is nearly doubled. CH. ABS. (e)

Determination of iron and aluminium by Crispo's method in natural phosphates. R. MEURICE and P. MARTENS (Ann. Chim. Analyt., 1935, [iii], 17, 313—314).—Crispo's method gives high results, except when only small amounts of Fe are present. Modified procedure is recommended. E. S. H.

Application of electrolytic litharge. A. O. SKIRSTIMONSKI, B. MINKIN, E. VILIAMOVITSCH, S. SOKOLOV, and N. STERNZAT (Trans. State Inst. Appl. Chem., U.S.S.R., 1934, No. 19, 86—95).—The vol., wt., and reactivity of PbO are affected by the conditions of prep. Electrolytic litharge is suitable for manufacture of pigments and optical glass and for accumulators. CH. ABS. (p)

Rôle of beryllium oxide in soda-flux treatment of bauxites. A. ROMWALTER (Publ. Dept. Min. Met. Roy. Hung. Palatin-Joseph Univ. Tech. Econ. Sci. [Sopron], 1934, 6, 58—59).—Hungarian bauxites contain BeO which practically all remains in the red slag of the soda flux. The filtered solution of aluminates is free from Be. CH. ABS. (p)

Decomposition of beryl and preparation of beryllium. R. STRAUSS (Angew. Chem., 1935, 48, 745—750).—A review of progress, 1930—1935.

Activation of kaolin for catalytic processes. A. A. TSCHEREPNEV and N. P. LARIN (J. Chem. Ind. Russ., 1935, 12, 690—691).—An active catalyst for EtOH dehydration is obtained by adding 100 g. of kaolin dehydrated at 750—800° to 625 c.c. of 33% HNO_3 . After 24 hr. at room temp. the mass is heated at 60—80° for 4 hr., and a slight excess of aq. NH_3 is added. After a further 24 hr. the product is washed (6 litres of H_2O at 60°), pressed, dried at 120°, and heated at 350° to remove H_2O of hydration. R. T.

"I-S" diagrams for hydrogen, carbon monoxide, nitrogen, nitrogen + hydrogen, and carbon monoxide + hydrogen. N. I. GUELPÉRIE and I. M. NAIDITCH (Chim. et Ind., 1935, 34, 1011—1020).—The diagrams have been prepared from published data for pressures \gt 1000 atm. and temp. \lt 600°. E. S. H.

Efficiency of stabilisers used in the preservation of hydrogen peroxide. J. SONOL (Rev. fac. cienc. quim. La Plata, 1934, 9, 15—28).—Phenacetin, NHPAc, PhOH (I), and thymol (II) permitted little decomp. of H_2O_2 . Salicylic acid, BzOH, and chloral hydrate were effective at first, but failed later. AcOH and $CH_2Ph \cdot CO_2H$ had little effect. (I), (II), and tannic acid colour the solution. Uric acid is too insol. for the purpose. CH. ABS. (p)

Determining S in coal. S from gas.—See II. **Determining MeCHO and CO_2 .**—See III. **Silicic**

acid for rubber.—See XIV. **Determining $BaSiF_6$ in insecticides.**—See XVI. **Na_2HPO_4 .**—See XX.

PATENTS.

Recovery of hydrocyanic acid [from calcium cyanide]. G. H. BUCHANAN and G. B. WINNER, Assrs. to AMER. CYANAMID Co. (U.S.P. 1,967,051, 17.7.34. Appl., 25.3.24).— $Ca(CN)_2$ is agitated in an atm. of steam at reduced pressure. A. R. P.

Phosphoric acid purification by solvent extraction. C. A. VANA, Assr. to GRASSELLI CHEM. Co. (U.S.P. 1,968,544, 31.7.34. Appl., 23.11.33).—Crude aq. H_3PO_4 is agitated with cyclohexanol, which removes the H_3PO_4 from the H_2O . The acid is recovered by evaporating the solvent or by agitating it with much H_2O . A. R. P.

Apparatus for production of solid ammonium sulphate and diammonium phosphate. C. J. HANSEN, Assr. to KOPPERS Co. of DELAWARE (U.S.P. 1,968,682, 31.7.34. Appl., 3.6.31. Ger., 30.5.30).—A combination of evaporators, saturators, crystallisers, pumps, filters, and dryers is claimed for treating a mixture of H_2SO_4 and H_3PO_4 with NH_3 and crystallising the salt mixture. A. R. P.

Ammoniating [ammonium dihydrogen phosphate]. L. BOOR, Assr. to AMER. CYANAMID Co. (U.S.P. 1,967,049, 17.7.34. Appl., 6.4.29).—Steam and NH_3 in proportions sufficient to maintain the charge at 80—100° by the heat of the reaction and to avoid deposition of moisture on the crystals are passed over solid $NH_4H_2PO_4$ to produce $(NH_4)_2HPO_4$. A. R. P.

Production of alkali carbamates. R. B. MACMULLIN, Assr. to MATHIESON ALKALI WORKS, INC. (U.S.P. 1,969,516, 7.8.34. Appl., 6.4.34).— $KHCO_3$ is treated under pressure at \gt 50° with a 75—95% excess of NH_3 in the form of a solution containing \gt 35% of NH_3 (preferably liquid NH_3), and the resulting $NH_2 \cdot CO_2K \cdot H_2O$ crystals are separated from the mother-liquor at \gt 50°; a 94% conversion is claimed. A. R. P.

Production of by-product calcium sulphate [from phosphate rock]. C. S. BRYAN, Assr. to RUMFORD CHEM. WORKS (U.S.P. 1,969,449, 7.8.34. Appl., 17.10.31).—Kieselguhr is added to the mixture of rock and H_2SO_4 during the decomp. process, to convert the F into H_2SiF_6 , and the resulting $CaSO_4 \cdot 2H_2O$ is collected, washed, dried, and converted into plaster of Paris. A. R. P.

Production of dicalcium phosphate. W. R. SEYFRIED (U.S.P. 1,969,951, 14.8.34. Appl., 11.9.33).—Moist phosphate rock is continuously fed into the top of a reaction tower into the middle of which HCl gas at 100—150° is injected, to produce a solution of $CaCl_2$ and $Ca(H_2PO_4)_2$, from which $CaHPO_4$ is pptd. by addition of CaO. A. R. P.

Production of dicalcium phosphate and ammonium sulphate. J. HAGENS, L. ROSENSTEIN, and W. HIRSCHKIND, Assrs. to BARRETT Co. (U.S.P. 1,967,205, 17.7.34. Appl., 10.8.28).—Commercial Ca superphosphate powder is intimately mixed with liquid NH_3 to produce $CaHPO_4$, $NH_4H_2PO_4$, and $(NH_4)_2SO_4$. A. R. P.

Production of soluble phosphates in the solid state. F. G. LILJENROTH (U.S.P. 1,969,894, 14.8.34. Appl., 31.3.31. Swed., 3.4.30).—Phosphate rock is dissolved in H_2SO_4 , the pptd. CaSO_4 removed, and the filtrate neutralised with NH_3 , mixed with fine crystals from the final operation, dried, crushed, and separated into coarse and fine crystals. A. R. P.

Separation of magnesium chloride from calcium chloride. T. A. BORRADAILE, Assr. to ALKALINE EARTHS Co. (U.S.P. 1,968,737, 31.7.34. Appl., 16.3.33).—The solution is evaporated until the H_2O content is $\equiv \text{CaCl}_2 \cdot 6\text{H}_2\text{O}$, the necessary quantity of NH_4Cl added to form $\text{MgCl}_2 \cdot 2\text{NH}_4\text{Cl} \cdot 6\text{H}_2\text{O}$, and the solution cooled to $< 30^\circ$ to allow the double salt to crystallise. A. R. P.

Manufacture of cobalt titanate. W. J. CAUWENBERG, Assr. to TITANIUM PIGMENT Co., INC. (U.S.P. 1,969,061, 7.8.34. Appl., 29.10.32).—A neutral TiO_2 pulp from the hydrolysis of $\text{Ti}(\text{SO}_4)_2$ is mixed with CoCO_3 ($\text{TiO}_2 : \text{CoO} = 1 : 1$ mol.) and the mixture is dried at 95° and calcined at 900° for 4 hr. to obtain a bright yellow-green pigment, or at 800° for 10–24 hr. to obtain a blue-green pigment. A. R. P.

Production of tin oxide. E. FELDMANN (U.S.P. 1,968,933, 7.8.34. Appl., 21.3.31. Ger., 29.3.30).—Claim is made for a furnace for oxidising Sn comprising a hearth with a const.-level device for supplying it with molten Sn, a scraper to remove the SnO_2 , and heating and oxidising blasts. A. R. P.

Solidification of carbon dioxide. T. EICHMANN, Assr. to INTERNAT. CARBONIC ENG. Co. (U.S.P. 1,969,169, 7.8.34. Appl., 16.5.32).—Liquid CO_2 at the triple point is admitted to a chamber, provided with a plunger, through an expansion valve fitted with a velocity-decreasing nozzle, whereby it is converted into "snow"; the plunger is then moved upwards to reduce the pressure and produce expansion of the liquid in the snow, whereby the latter is solidified; finally the plunger is moved downwards to compress the solid into hard blocks. A. R. P.

Preparation of hydrogen [from natural gas]. J. C. WOODHOUSE, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,968,063, 31.7.34. Appl., 30.9.30. Renewed 30.9.33).—Steam and natural gas or other volatile hydrocarbon are passed at high temp. over a Ni catalyst prepared by reducing NiC_2O_4 pellets with H_2 at 260–300°/26 atm. A. R. P.

Purification of gases [for ammonia synthesis]. D. A. ROGERS, Assr. to ATMOSPHERIC NITROGEN CORP. (U.S.P. 1,968,655, 31.7.34. Appl., 13.6.31).—The gas mixture containing CO_2 is compressed adiabatically and passed through a circulating system containing a CO_2 solvent (H_2O); the CO_2 -saturated solvent is used for cooling the compressed gases prior to passing them to the absorber, so that the heat of the gases assists in expelling the CO_2 . A. R. P.

Recovery of acid gases [from flue gases]. G. J. HORVITZ (B.P. 436,220 and 436,369, 3.4.34. U.S., [A] 28.2.34, [B] 18.10.33).—(A) Gases which are acid with S compounds are scrubbed with an aq. solution of double alkali-metal- NH_4 salt of a tri- or poly-basic

acid, the solution being regenerated by heating; a system of heat exchange in stages is described. Suitable salts are: $\text{Na}(\text{NH}_4)_2\text{PO}_4$, $\text{Na}(\text{NH}_4)_2\text{AsO}_4$, $\text{Na}_2(\text{NH}_4)_2\text{P}_2\text{O}_7$, $\text{Na}_2(\text{NH}_4)_2\text{P}_4\text{O}_{12}$, and $\text{Na}(\text{NH}_4)_2$ citrate. (B) Gases containing CO_2 or other weak acid are scrubbed with NH_3 solution and H_2O in succession; the NH_4HCO_3 is caused to react with NaH_2PO_4 to liberate CO_2 and the $\text{NaNH}_4\text{HPO}_4$ is heated to liberate NH_3 . (Cf. U.S.P. 1,916,980; B., 1934, 402.) B. M. V.

Dispersion of solids [e.g., sulphur]. A. SZEGVARI, Assr. to AMER. ANODE, INC. (U.S.P. 1,969,242, 7.8.34. Appl., 8.2.32).—Molten S is poured in a thin stream into H_2O to obtain 8–10-mesh globules, 100 pts. of which are ground in a colloid mill with 65 pts. of H_2O containing gelatin 1 pt., casein 1 pt., and a little alkali. The resulting dispersion contains 60% of S and remains stable for long periods at $> 60^\circ$. A. R. P.

Expelling acid gas from solution.—See I. S from pyrites smelting. **Etching solution.** Colloidal Ag compounds. **Flux for welding Mg etc.**—See X. **Fertilisers.**—See XVI.

VIII.—GLASS; CERAMICS.

Electrical firing in the ceramic and glass industries. J. COURTOIS (Ceram. Verr. Email., 1934, 2, 391–394, 441–443; Bull. Amer. Ceram. Soc., 1935, 14, 344–346).—The various types of kilns and furnaces which have been used in the firing and decoration of hard and soft porcelain and in the melting, annealing, decoration, and hardening of glass are briefly reviewed. The cleanliness of electrical heating is best applied to the finer class of product. The metallic or refractory heater elements and the induction type of (glass-melting) furnace are described. Cost data are given. J. A. S.

Survey of surface temperatures of a glass tank melting furnace. H. S. Y. GILL and N. A. NICHOLS (J. Soc. Glass Tech., 1935, 19, 189–207 r).—An attempt to correlate the progressive changes in the outside surface temp. (measured with a surface pyrometer) of a glass tank furnace during its operating period of 90 weeks with changes in tank-block thickness due to corrosion, and with other variable conditions internal and external to the furnace, is described. The temp. of the outer surface was somewhat affected by small changes in the internal conditions (e.g., furnace temp.); the crown (until insulation was applied) was the most sensitive part of the structure in this respect, the effect on the walls being greatly reduced by contact with the hot glass. The changes in surface temp. occurred only when the variations in internal conditions extended over relatively long periods (e.g., 2–3 days). The major factors controlling the surface temp. were: the insulation, in the case of the crown; the normal air (affected by the seasons and draughts) around the base and lower portions of the sides; and the cooling air, applied under pressure to the blocks near the flux line. The corrosion of the side wall blocks over a period of several months caused an increase in surface temp. despite the air cooling, this effect being most marked at the flux line. It is concluded that measurements of the surface temp. afford a guide to the corrosion of the tank walls and bridge, and indicate, before the walls are so

thin as to glow red, where extra cooling air is required. For the crown and base the surface-temp. changes are less definite indications of the corrosion, being attributed mainly to seasonal variations in the temp. of the furnace surroundings. A. L. R.

Use of highly aluminous material in the manufacture of pots for melting optical glass. G. L. EFREMOV and K. G. KUMANIN (*Keram. i Steklo*, 1934, **11**, No. 12, 13—18).—Introduction of finely-ground kyanite into the mix for glass-melting pots increases the resistance of the pots to the melt. Protective kyanite coatings on the inside of the pot were most effective. The thermal stability of the pots was increased by using a dense lining on a porous body. Refractory clay with a high Fe content does not affect the quality of the glass if it is covered with a protective layer. CH. ABS. (e)

Effects of borax and alumina in glass. C. W. PARMELEE and A. E. BADGER (*Glass Ind.*, 1934, **15**, 235—238).—A review. CH. ABS. (e)

Glasses for low-voltage insulators on high-frequency communication lines. E. I. AVRAMENCO (*Keram. i Steklo*, 1934, **11**, No. 12, 29—31).—A discussion of the effects of composition of glass on its dielectric losses. Data are recorded. CH. ABS. (e)

Colour formation in glasses and glazes. F. H. NORTON (*Glass Ind.*, 1935, **16**, 45—48).—A review of factors causing colour formation. CH. ABS. (e)

Constitution and colour of glasses containing iron and manganese oxides. W. E. S. TURNER and W. WEYL (*J. Soc. Glass Tech.*, 1935, **19**, 208—216 T).—From a comparison of the colour and light absorption of $\text{Na}_2\text{O}-\text{CaO}-\text{SiO}_2$ glasses containing Mn and/or Fe oxides with that of Mn oxides and salts dissolved in aq., acid, vitreous, or org. solvents, it is concluded that in a glass containing Mn the proportion of the purple-colouring Mn_2O_3 increases with increasing [Mn], but is very small compared with that of the faintly-colouring MnO, and that the Mn_2O_3 is easily reduced by FeO present. Glasses containing 2% of Fe and up to 4—5% of Mn oxides are relatively transparent because the Mn_2O_3 is reduced to MnO, and FeO (bluish-green) is oxidised to the golden-brown and more transparent Fe_2O_3 . The colour of glasses containing both Fe and Mn oxides depends on the total Fe_2O_3 and MnO present. A. L. R.

Determination of mean specific heats at high temperatures of some commercial glasses. C. W. PARMELEE and A. E. BADGER (*Univ. Ill. Eng. Expt. Sta.*, 1934, Bull. 271, 24 pp.).—Data are recorded for 9 specimens. CH. ABS. (e)

Scratch-hardness of toughened plate glass. A. J. HOLLAND and W. E. S. TURNER (*J. Soc. Glass Tech.*, 1935, **19**, 221—230 T).—The features and dimensions of scratches and cuts made by a diamond or a W-alloy cutting wheel on ordinary or toughened plate glass were compared. Under the same cutting conditions, the scratch hardness of both glasses appears to be of the same order. A. L. R.

Effects of storage on chemical durability of glass containers. V. DIMBLEBY, H. S. Y. GILL, and W. E. S. TURNER (*J. Soc. Glass Tech.*, 1935, **19**, 231—243 T).—

The effect of various conditions of storage on the appearance and chemical durability (measured by the amount of alkali extracted from the inner surface in the standard 5-hr. boiling test with H_2O) of six different makes of 4-oz. medicine bottles was determined. Changes in the glass surface were affected markedly by the conditions of storage (e.g., temp., humidity, atm. containing acid gases, and previous washing). After storage, the inner surfaces tended to be alkaline (especially for bottles stored with closed mouths) and the outer to be slightly acidic. The durability of the inner surface of initially satisfactory bottles was improved, that of bottles originally of poor durability being reduced, by storage. Both good and poor bottles showed greater durability, measured after storage, when washed or boiled with H_2O before storage. The effect of storage on the uniformity of the alkali-extraction val. from individual bottles of a group could not be definitely established. A. L. R.

Use of magnesium aluminate (spinel) as a material for glass-melting containers. C. W. PARMELEE and K. C. LYON (*J. Amer. Ceram. Soc.*, 1935, **18**, 338—340).—A series of mixtures of Al_2O_3 , MgO (I), fireclay grog, and $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$ were made into crucibles and used for direct measurements of corrosion by bottle glass at 1400° . (I) material was permeable to molten glass and quite useless as a refractory. Its failure was due, not to excessive porosity, but probably to the formation of a very fluid glass. The prep. of artificial (I) is described and the physical properties of the refractory mixtures are recorded. J. A. S.

Kinetics of solid-phase reactions of certain carbonates with mullite, silica, and alumina. G. R. POLE and N. W. TAYLOR (*J. Amer. Ceram. Soc.*, 1935, **18**, 325—337).—The rate of reaction (as indicated by the vol. of CO_2 evolved from 150—200-mesh materials) of each of the materials quartz, corundum, and $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$ with Na_2CO_3 and CaCO_3 were measured at $600-750^\circ$ and $500-600^\circ$, respectively. The prep. and results of microscopical and X-ray examination of artificial $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$ are described in detail. Vals. for the reaction coeff. (K) and the "energy of activation" (q) are calc. The degree of interaction with Na_2CO_3 ($700-750^\circ$) decreases in the order corundum ($q=74,600$ g.-cal./mol.), quartz (120,800 g.-cal./mol.), $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$. The rates of reaction with CaCO_3 are much lower than with Na_2CO_3 and decrease in the order $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$, corundum, quartz. The reaction rates were too low to enable K and q vals. to be calc. The results for $\text{SiO}_2 + \text{Na}_2\text{CO}_3$ and $\text{SiO}_2 + \text{CaCO}_3$ agree with those of Turner (B., 1934, 360). It is concluded that refractories containing large amounts of corundum are preferable to $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$ refractories, provided the other characteristics (porosity etc.) are identical. J. A. S.

Mechanical method for measurement of plasticity of clays and mixtures of clays. J. W. WHITTEMORE (*J. Amer. Ceram. Soc.*, 1935, **18**, 352—359).—An apparatus is described in which measurements are made of the rate of penetration of the clay by a constantly loaded (15-lb.) hemisphere ($d = 3$ in.). $d = at^P$, where d is the penetration, a is a function of the apparatus and the air and H_2O contents of the clay, and P is a direct

numerical measure of the plasticity. P was found to increase if the clay was aged, de-aired, or coagulated. The recovery of penetration on removal of the load is related to α and the amount of air in the clay. J. A. S.

Effect of solid-liquid ratio on grinding a ceramic non-plastic. K. SCHWARTZWALDER and P. G. HEROLD (J. Amer. Ceram. Soc., 1935, 18, 350—352).—Particle-size measurements (with the Wagner turbidimeter) showed that the distribution obtained by dry-milling in a Hardinge mill could be duplicated by wet-grinding in a laboratory mill if the proper solid-liquid ratio and grinding time were selected. A solid-liquid ratio of 2.7 : 1 gave more particles of 0—10 μ and < 325-mesh and less particles of 10—60 μ than did a ratio of 1 : 15.

J. A. S.

Recent revisions of high temperatures. L. D. MORRIS and S. R. SCHOLES (J. Amer. Ceram. Soc., 1935, 18, 359—360).—The revised vals. for the m.p. of Ni 1455°, Pd 1555°, Pt 1773 \pm 1°, Rh 1966 \pm 3°, Ir 2454 \pm 3° necessitate corrections for the Al₂O₃-SiO₂ system as follows: eutectic 1551°, cristobalite 1729°, 3Al₂O₃.2SiO₂ 1877°, Al₂O₃ 2083°. The various sources of the data are given.

J. A. S.

Determination of alkalis in silicates with special reference to high-alumina refractories. E. B. READ (J. Amer. Ceram. Soc., 1935, 18, 341—346).—The J. L. Smith reaction (NH₄Cl + CaCO₃) carried out at 1200° (using an elongated crucible with the upper end H₂O-cooled to prevent loss of alkali) effected complete decomp. in a single fusion and gave better results than the method of breaking down with HF + HNO₃ + H₂SO₄, followed by removal of MgO with 8-hydroxyquinoline. Full analytical details of each method are given. J. A. S.

Litharge.—See VII.

PATENTS.

Circulation of glass in glass-furnace gathering-basins or forehearth. UNITED GLASS BOTTLE MANUFACTURERS, LTD., and T. C. MOORSHEAD (B.P. 436,271, 12.2.35).—A mass of refractory material (preferably not shaped as an impeller) is rotated and reciprocated in the forehearth. B. M. V.

Muffle furnaces.—See I. **Thermoplastic rubber derivatives.**—See XIII.

IX.—BUILDING MATERIALS.

Density of gases in rotary cement kilns. ANON (Cement, 1935, 8, 273—278).—Tabulated data calc. from the reference books are given. T. W. P.

Uncombined lime in Portland cements. W. WATSON and Q. L. CRADDOCK (Cement, 1935, 8, 269—271).—Qual. and quant. methods for determining free CaO and Ca(OH)₂ are reviewed. T. W. P.

Blast-furnace slugs with properties similar to those of a Portland cement. G. MUSSGNUMG (Zement, 1935, 24, 485—490, 530—537; Tonind.-Ztg., 1935, 57, 775—778, 789—791, 803—804; Building Sci. Abs., 1935, No. 1431).—Using a hot air blast containing a high proportion of O₂, and with increased limestone, products were obtained with properties similar to those of Portland cements. Data on setting times, soundness, and

strength of a variety of mixes are given. The rate of cooling of the slag had little effect on cement strength. CaC₂ was present (1—3%), but could be removed by oxidation. T. W. P.

Determination of the proportions in mortar and concrete. C. R. PLATZMANN (Cement, 1935, 8, 257—260).—Details of the methods in use in Germany are described. For (a) CaO-sand and (b) cement-sand mortars, extraction with HCl and back-titration with NaOH is employed. In (b) a reference test must be made with the same cement as is used in the mortar. For concretes, the cement is dissolved in HCl and the residue determined. A check determination of CaO or SiO₂ in the filtrate is made. T. W. P.

Effect of ammoniacal liquor and coal tar on concrete. S. I. IDASCHKIN (Koks i Chim., 1933, No. 5—6, 19—23).—Concrete specimens (Portland cement 70, diatomite 30%, glazed by 20% water-glass, set for 6 months) showed an increase in tensile and compression strengths after immersion in NH₃ liquor for 28 days. Replacement of steel by concrete for the storage of such liquors is recommended. CH. ABS. (e)

[Use of] German wood as constructional material in the chemical industry. RAMSTETER (Chem. Fabr., 1935, 8, 446—450).—Advantages of wood as a structural material for building plant and vessels of conveyance are discussed. Examples are given of its use for the construction of chemical plant and apparatus, as, e.g., German beech, ash, and maple for filtration apparatus. The attack of wood by insects and fungi, and methods of preventing this, are discussed.

E. L. S.

Tool-handle waxing.—See XII. **Road surfaces.**—See XIV.

PATENTS.

Manufacture of porous bodies or materials. H. W. SPENCER. FROM H. T. BELLAMY (B.P. 436,814, 31.7.34).—The articles are composed of diatomaceous earth (67—95%), clay, a volatile solid aromatic compound (e.g., C₁₀H₈), H₂O, and, if coarser pores are desired, a non-volatile combustible (e.g., sawdust). B. M. V.

Surfacing materials for roads and the like. W. GOOCH (B.P. 436,187, 7.2.35).—Five specified grades of aggregate are dried and mixed with 6—8% of bitumen at 193°. B. M. V.

Composite plaster boards or slabs for building purposes. E. F. MACTAGGART, O. MARGETSON, and JOINTLESS WALLS & CEILINGS, LTD. (B.P. 436,079, 2.3.34).

Stone crushers.—See I. **By-product CaSO₄.**—See VII.

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

Agglomeration of Krivorog iron ores. S. T. ROSTOVITZEV and S. M. MEEROV (Domez, 1934, No. 11—12, 7—39).—Agglomeration tests on the ore (Fe 59.8—68.3, SiO₂ 2.1—12%) are described. The theory of agglomeration is discussed. CH. ABS. (e)

Reducibility of Krivorog ores. A. N. POCHVISNEV and M. S. GONTSCHEVSKI (Domez, 1934, No. 11—12,

45—50).—Reduction tests with H_2 at 800° on the ore and its agglomerate are described. Decrease of rate of reduction with increase in particle size is less pronounced in the agglomerate than in the ore. CH. ABS. (e)

Basic open-hearth process. R. HAY (J. West Scot. Iron Steel Inst., 1934, 42, 33).—A discussion of Ferguson's results (B., 1935, 409). CH. ABS. (e)

Physical chemistry of steelmaking. (A) **Control of iron oxide in the basic open-hearth process.** C. H. HERTY, JUN., C. F. CHRISTOPHER, H. FREEMAN, and J. F. SANDERSON. (B) **Deoxidation of steel.** C. H. HERTY, JUN. (Carnegie Inst. Tech. Brds. Co-op. Bull., 1934, No. 68, 104 pp.).—(A) A review. An empirical relationship is given for the effect of slag basicity on the available Fe oxide in the slag.

(B) A review and discussion. CH. ABS. (e)

Chromium oxide in open-hearth slags. B. P. SELIVANOV, A. S. GINZBERG, and M. M. VOROVITSCH (Rep. Centr. Inst. Met., 1934, No. 16, 5—14).—The high η of open-hearth slags with $> 6-7\%$ of Cr_2O_3 is due to formation of FeO, Cr_2O_3 . Measurements at 1300° showed that η increased with the Cr_2O_3 content. With 15% of Cr_2O_3 the slag could not be poured.

CH. ABS. (e)

Nature of slag inclusions in steel and their determination. J. T. LUKASCHEVITSCH-DUVANOVA (Rep. Centr. Inst. Met., 1934, No. 16, 49—59).—Dissolution of the sample in Br- or I- H_2O gave a separation of the same inclusions as dissolution in HNO_3 , but took much longer. The Fe carbides were not attacked. The electrolytic method from salt solutions does not dissolve the carbides, but attacks inclusions not otherwise attacked (silicate globules enveloped in Fe_2O_3 , and magnetic globules containing Fe oxides 70, MnO 20%). The most detrimental inclusions were Al_2O_3 , spinels, and Fe oxides and SiO_2 .

CH. ABS. (e)

Bibliography of non-metallic inclusions in iron and steel. L. F. MCCOMBS and M. SCHRERO (Carnegie Inst. Tech. Brds. Co-op. Bull., 1935, No. 70, 308 pp.).

CH. ABS. (e)

Copper in malleable iron. C. S. SMITH and E. W. PALMER (Metals Tech., 1935, 2, Tech. Publ. 603, 21 pp.).—Dilatometric methods show that Cu accelerates the 1st- and 2nd-stage graphitisation of white cast Fe, but the effect may be partly effaced by rate of heating. The presence of 1% of Cu results in a 50% reduction of graphitising time; 1—1.5% of Cu increases the yield point of malleable Fe and renders further improvement possible by age-hardening after suitable heat-treatment.

W. P. R.

Use of cast-iron scrap in the cupola charge. A. H. DIERKER and R. P. SCHNEIDER (Ohio State Univ., Eng. Exp. Sta. Bull., 1935, No. 88, 6 pp.).—Tests are described, using 50—94% of cast-Fe scrap in the charge.

CH. ABS. (e)

Solubility of manganese sulphide in cupola slags. B. P. SELIVANOV, A. S. GINZBERG, and M. M. VOROVITSCH (Rep. Centr. Inst. Met., 1934, No. 16, 144—145).—Cupola slags can absorb up to 3% of MnS during operation. Liquefaction occurs when the [MnS] is $> 3\%$. Dissolution of MnS in the slag is not favoured by a temp. $> 1300-1350^\circ$.

CH. ABS. (e)

Effect of deoxidation on impact strength of carbon steels at low temperatures. C. H. HERTY, JUN., and D. L. MCBRIDE (Carnegie Inst. Tech. Brds. Co-op. Bull., 1934, No. 67, 41 pp.).—The low-temp. impact strength of mild C steels increases with decreasing O content of the steel. The order of resistance to low-temp. (0° to -40°) embrittlement was: thoroughly killed steels containing definite amounts of Al in solution, semi-killed steels to which Al has been added, Si-killed steels, rimmed steels. The best low-temp. impact results were obtained by H_2O -quenching from 875° , followed by tempering at 675° . Overheating may cause a fall in impact strength at low temp. even if no grain-growth has occurred. In the as-rolled condition most of the steels studied showed poor impact properties at -20° .

CH. ABS. (e)

Effect of deoxidation on ageing of mild steels. C. H. HERTY, JUN., and B. N. DANILOFF (Carnegie Inst. Tech. Brds. Co-op. Bull., 1934, No. 66, 38 pp.).—The susceptibility of normalised rimmed steels to quench-ageing is very high (max. for 0.04—0.05% C). In semi-killed steels ageing is less, and diminishes with increasing [C]. Si-killed steels quench-age considerably, and Al-killed steels very little. With 0.12—0.25% C they are practically non-quench-ageing. The quench-hardening of normalised steels decreases with increasing [C] and with the degree of deoxidation. Other factors which influence ageing are discussed. Al-killed steels show a tendency to soften after quench-ageing. CH. ABS. (e)

Scaling of mild steel in sulphur-free and sulphur-containing furnace atmospheres. Inst. Gas Eng. Gas Research Fellowship Rept., 1934-35. H. C. MILLETT and J. W. COBB (Inst. Gas Eng., 1935, Comm. No. 127, 76 pp.).—The influence of temp., period of exposure, gas velocity, and the composition of the furnace atm. on the scaling of mild steel was investigated with special reference to S. There is a certain crit. furnace-gas velocity below which scaling decreases rapidly with the gas velocity. The scaling effect in N_2 was negligible, but when some of the N_2 was replaced by CO_2 scaling was noticeable, the effect being definitely more pronounced when the CO_2 was replaced by steam. Addition of small concns. of SO_2 to the "neutral" furnace atm. (*i.e.*, containing CO_2 , H_2O , and N_2) produced a rapid increase in the amount of oxidation, and with increase in $[SO_2]$ the scaling was also increased but at a diminishing rate. Scaling in S-free and S-containing atmospheres increased rapidly with temp., and increased also as the period of exposure was increased, but at a rapidly diminishing rate. Free H_2 and CO in an atm. containing SO_2 reduced scaling, but large amounts were required to prevent scaling completely.

E. L. S.

Metallurgical effects produced in steel by fusion-welding. A. B. KINZEL (Metals Tech., 1935, 2, Tech. Publ. 597, 15 pp.).—The heat of welding affects the microstructure of a small zone near the weld, where the ductility is reduced. Min. tensile strength is found in the zone subjected to a max. subcrit. temp. Commercial steel plate is susceptible to strain-age brittleness which is evident in welded plate if the latter is cold-worked before welding.

W. P. R.

Soldering or brazing of alloy steels. J. P. REED (J. Sci. Instr., 1935, 12, 364).—A light coating of Cu is first plated on to the clean metal. C. W. G.

Reactions in the solid state. Initial course of subcritical isothermal diffusion reactions in austenite in an alloy steel. H. A. SMITH (Metals Tech., 1935, 2, Tech. Publ. 602, 20 pp.).—The initial stages of decomp. of austenite at 450° have been studied in an alloy steel containing Mn 6.4% and C 0.92%, by means of microscopical examination, dilatation, electrical conductivity, permeability, hardness, and lattice parameters. The conductivity method is the most sensitive for indicating the initial stages, but microscopical examination is considered the most reliable for estimating the vol.-% of the various phases present during decomp. W. P. R.

Rate of dissolution of iron in molten zinc. H. GRUBITSCH (Angew. Chem., 1935, 48, 689—691).—For Armco Fe the rate of dissolution increases slowly from 430° to 480°, and then rises sharply to a max. at 495°, above which temp. it first decreases, and then increases slowly at > 520°. The max. occurs at approx. the same temp. for various steels. The importance of corrosion of Fe by Zn in the formation of local elements in Zn-coated metal sheets is discussed. H. J. E.

Copper precipitation. A. J. CADDICK (Metal Ind., 1935, 46, 213—215).—A revolving barrel replaced the usual pptn. tank. To ensure a Cu content of approx. 50 g. per cu. m. in the treated liquor, a barrel 3 m. in diam. and 6 m. long would be required, at a rate of feed of 45 cu. m. of liquor per hr. Barrel-pptn. may be advantageous for continuous operation on liquors with 30—40 kg. of Cu per ton. For low-grade liquors it is more costly than tank-pptn. CH. ABS. (e)

Influence of iron, aluminium, and silicon on impact values of brasses at higher temperatures. M. NISHIKAWA and E. ITO (Suiyokwai-shi, 1934, 8, 625—629).—Fe has only a small effect on the impact vals. of brasses with 62—65% Cu (max. at 750—850°, according to the Cu content). Al and Si have a much greater effect, and the temp. showing the max. impact val. are displaced to lower vals. CH. ABS. (e)

Remelting and refining of scrap. Nickel. E. R. THEWS (Metal Ind., 1935, 46, 265—268).—Data for gas absorption, which is the chief difficulty in Ni refining, are given. Among solid impurities (S, C, Si), S has the largest embrittling effect. Oxide embrittlement can be removed by deoxidation with Mg. Mn is not effective. Mg and Mn both have a high affinity for S, but MgS forms small spheres which are dispersed through the grain and at boundaries. MnS concentrates at grain boundaries and spoils mechanical properties of the metal. Operating conditions are reviewed. The furnace lining should be basic, since NiO combines readily with SiO₂. Removal of As, Zn, Fe, Si, and C during oxidation is quant. Pb is difficult to remove unless accompanied by Zn. CH. ABS. (e)

Aluminium-copper-nickel alloys of high tensile strength subject to heat-treatment. W. A. MUDGE and P. D. MERICA (Metals Tech., 1935, 2, Tech. Publ., 619, 12 pp.).—Monel metal to which Al 4.0, Mn 0.5,

Fe 1.5%, and small amounts of C, S, and Si have been added develops a wide range of properties by heat-treatment, and the alloy is capable of being age-hardened. It has excellent corrosion-resisting properties and in the fully-hardened condition has a tensile strength of 70 tons per sq. in. W. P. R.

Physical and casting properties of nickel-silvers. T. E. KIHILGREN, N. B. PILLING, and E. M. WISE (Metals Tech., 1935, 2, Tech. Publ. 610, 31 pp.).—Data are given on the relationship of composition of nickel-silvers to colour, tarnish resistance, hardness, and liquidus temp. for alloys with Ni \geq 30, Zn \geq 50, Sn up to 8, and Pb up to 10%. Sn increases hardness and Pb appears to emphasise the hardening effect of Zn. Both Sn and Pb are useful for enhancing the casting properties. Deoxidation prior to casting is effected with Mn, Mg, and Si, but small amounts of Si may cause porosity in alloys containing Pb as an impurity. W. P. R.

Rôle of the spectroscope and of minor elements in die-castings. T. A. WRIGHT (Metals Tech., 1935, 2, Tech. Publ. 614, 9 pp.).—The importance of small amounts of certain impurities in die-casting alloys, e.g., Pb in Zn-base alloys, entails careful chemical control of the raw material. Spectrographic analysis of very low % is cheaper and quicker than chemical analysis, but the latter is easier and more reliable for the determination of large amounts of impurities. W. P. R.

Flotation of galena and chalcocite of near-colloidal size with potassium [*n*]-amyl xanthate and amyl dixanthogen. P. MALOZEMOFF (J. Physical Chem., 1935, 39, 1043—1056; cf. B., 1933, 631).—The influence of collector concn., pH , and O₂ has been investigated. The action of the above flotation agents on the minerals appears to be the same. R. S.

Extraction of vanadium from basic open-hearth slags by the soda method. M. N. SOBOLEV and N. S. KRASILNIKOV (Redk. Met., 1934, 3, No. 6, 14—27; cf. B., 1935, 409).—Open-hearth slags (CaO 5—20, SiO₂ 18—36, V₂O₅ 2—10%) were crushed to 50—60-mesh, roasted with 25% of Na₂CO₃ at 830—850° for 4—5 hr., and leached with H₂O. The optimum V extraction (80—90%) was obtained from slags with SiO₂ 18, CaO 5—10, Fe + Mn 35, and V₂O₅ 6—8%. Approx. 50% of the Cr in the slag was recovered with the V. After roasting 8 tons of slag in a rotary kiln and leaching, V was pptd. with CaO (overall recovery 70%). CH. ABS. (e)

(A) Recovery of vanadium from cast iron, prepared from Ural titaniferous magnetite, in an open-hearth furnace at the Novo-Tagilisk metallurgical plant. A. D. CHODUKO. (B) Recovery of vanadium from Kerch cast iron in a basic open-hearth furnace at the Ilich plant at Mariupol. S. B. DRITSCHKE (Rep. Centr. Inst. Metals, 1934, No. 16, 28—36, 15—27).—(A) 10 tons of V-cast Fe (C 3.40, Si 1.48, Mn 1.26, V 0.40, Cr 0.40, Ti 0.32, P 0.164, S 0.075%) and 10 tons of scrap (C 0.10, Mn 0.4, P 0.05, S 0.05%) were smelted in an open-hearth furnace. Mn and Fe ores were used as V oxidisers. The V passed into the slag more completely at lower temp. (average V₂O₅ in slag 7.23—9.23%). The average V recovery

was 91%. The process should be carried out on a magnesite bottom.

(b) Tests are described on the production of a slag with a max. recovery of V and a min. content of P_2O_5 (< 7–10%) and CaO. CH. ABS. (e)

Microscopical examination of agglomerate from Nikopolisk manganese ore. P. KANIBOLITZKI (Domez, 1934, No. 11–12, 50–55). CH. ABS. (e)

Direct reduction of manganese ore. Z. I. NEKRASOV (Domez, 1934, No. 11–12, 56–60).—The ore contained Mn 45.66 and SiO_2 9.63%. At 1150°, in absence of Fe sponge, only 15% reduction took place with H_2 in 2 hr. On addition of 20% of Fe sponge reduction was increased to 90%. In C reduction at 1100° the addition of 20% of the sponge increased the reduction from approx. 14% in 7 hr. to 67.8%. CH. ABS. (e)

Continuous production of magnesium from carnallite. V. P. PAVLOV (Legk. Met., 1934, 3, No. 10, 9–16).—The electrolysis of carnallite is made continuous by feeding fresh molten mineral into the bottom of the bath, thereby displacing residual KCl. CH. ABS. (e)

Manufacture, properties, and uses of refined aluminium. R. GADEAU (Chim. et Ind., 1935, 34, 1021–1026).—An electrolytic refinement of Al on the industrial scale is described. Products with a purity of up to 99.9986% have been obtained. The pure Al is much softer than the usual product. Its conductivity is 65% that of Cu. It possesses an extraordinary resistance to the chemical action of acids and alkalis, and is very resistant to the corrosive action of air and sea- H_2O . E. A. H. R.

Soldering of aluminium. H. SILMAN (Metal Ind., 1935, 46, 218).—A high-temp. solder generally contains 70–95% of Al, alloyed with Cu, Ni, Mn, Zn, Sn, Si, etc. A satisfactory flux contains KCl 45, NaCl 30, LiCl 15, KF 7, and $KHSO_4$ 3%. For temp. between 250° and 420° a suitable solder contains Zn 50, Sn 46.5, Cu 2.5, and Pb 1%. Solders of high corrosion-resistance contain Sn 73.2, Zn 22, Al 1.8, Bi 0.5, and P 2.5%. A low-temp. flux of stearic acid or yellow dextrin and petroleum jelly mixed with $MgCl_2$ and NaCl may, in addition, contain Na_2SO_4 and borax. A low-temp. reaction solder consists of $ZnCl_2$ 90, NaF 2, and NH_4Br 8%. Zn is liberated and this alloys with the Al without the use of a flux. CH. ABS. (e)

Hardening effects of heat-treatment on aldreiy-type light alloys. S. KISHINO (J. Chem. Soc. Japan, 1935, 56, 230–235).—When Aldrey in the completely annealed state is heated above 350° its hardness increases, due to dissolution of Mg_2Si . When quenched aldreiy is heated its hardness increases suddenly at approx. 250°, due to the appearance of Mg_2Si crystals. CH. ABS. (e)

Improvements of aluminium alloys of high copper content by magnesium additions. H. BOHNER (Aluminium, 1935, 17, 72–73).—In Al–Cu–Mg alloys the tensile strength is higher the higher is the quenching temp. for the same thermal treatment, or the higher is the tempering temp. Additions of Mg to Al–Cu alloys increase the tensile strength. Addition

of Ti + Mn or of Mn to Al–Cu–Mg alloys improves the tensile strength and increases the elongation. The elastic limits of Al–Cu–Mg–Mn–Ti and of Al–Cu–Mg–Mn alloys are discussed. CH. ABS. (e)

Effect of composition on mechanical properties and corrosion-resistance of some aluminium die-castings. E. H. DIX and J. J. BOWMAN (Metals Tech., 1935, 2, Tech. Publ., 616, 12 pp.).—Corrosion-resistance is adversely affected by Cu and Sn, but not by Fe, Ni, or Zn. Fe and Cu increase tensile strength, but decrease ductility. A high-Si alloy in which all impurities except Fe are limited to traces has excellent corrosion-resisting properties and retains good mechanical and casting properties. W. P. R.

Corrosive action of cold water on metals. F. TÖDT (Chem.-Ztg., 1935, 59, 924–925).—The importance of corrosion research is stressed. G. H. C.

Recent advances in metal-cleaning technology. R. W. MITCHELL (Metal Clean. Finish., 1935, 7, 9–14, 65–68).—A review and discussion, with physical data for various solvents. CH. ABS. (e)

Data on theoretical metallurgy. III. Free energies of vaporisation and vapour pressures of inorganic substances. K. K. KELLEY (U.S. Bur. Mines, Bull. No. 383, 1935, 132 pp.). **IV. Metal carbonates—correlations and applications of thermodynamic properties.** K. K. KELLEY and C. T. ANDERSON (*Ibid.*, Bull. No. 384, 1935, 73 pp.).—III. Equations and data are given for the principal volatile inorg. compounds of nearly all the elements and for the elements themselves when the b.p. is low.

IV. Data are given for the thermodynamic properties and solubilities of the carbonates of the common metals, and examples of the use of these data in various metallurgical problems are discussed, e.g., the possibility of a stepwise dissociation of a mixture of carbonates, and the use of carbonates for purifying solutions of certain metal salts. Fe^{III} can be removed completely from Cu^{II} salt solutions by treatment with $CaCO_3$, but Fe^{II} is only partly pptd. The action of SO_2 on low-grade Mn ores should effect complete removal of the Mn provided it is present as a free oxide, but leaching of $MnCO_3$ ores with aq. NH_4 salts is shown to be thermodynamically disadvantageous, although leaching of such ores with aq. $CaCl_2$ should theoretically give good results. A. R. P.

Results of the [German] Metal Management in construction and manufacture. KESSNER (Chem. Fabr., 1935, 8, 439–441).—Attempts made to employ German, instead of foreign, raw materials in different branches of industry are described. Thus, e.g., brass can be replaced by Fe, Al, and wood for house and kitchen utensils, Zn by Al for milk cans, Cu alloys by stainless steel for stop valves, etc. E. L. S.

Renovating a silver[-plating] bath. W. T. WILKINSON (Process Engraver's Month., 1934, 41, 305–306).—The Ag can be pptd. as Ag_2CO_3 , washed by decantation, and redissolved in HNO_3 , accumulated by-products being thus eliminated. CH. ABS. (e)

Salted coke [for Ti ore]. Corrosion from products of combustion.—See II. Pb in the paper

industry.—See V. **Metals for dyeing machinery.**
—See VI. **Prep. of Be.**—See VII. **Blast-furnace slags and cement.**—See IX. **Corrosion prevention.**
—See XIII.

PATENTS.

Production of age-resisting iron and steel. C. WALLMANN and E. KUMPMANN (U.S.P. 1,970,067, 14.8.34. Appl., 30.6.32. Ger., 22.1.32).—Scrap Fe is melted with CaO in a basic open-hearth furnace, SiO₂ material is added slowly to flux down the CaO floating on the Fe bath, the Mn in the slag is reduced back into the metal by any known method, and the metal is tapped when the desired properties are obtained.

A. R. P.

Manufacture of steel. V. V. SOLDATOFF (U.S.P. 1,968,917, 7.8.34. Appl., 30.6.33).—A mixture of pig Fe and scrap Fe is melted in a reverberatory furnace fired with oil or gas, and air is blown through the molten metal to burn out the C while the bath is agitated with a current of CO₂.

A. R. P.

High-speed steel. J. K. SMITH, Assr. to BERYLLIUM CORP. (U.S.P. 1,968,966, 7.8.34. Appl., 10.8.31).—The steel contains C 0.2–0.7, W 12–22, Cr 1–7, and Be 0.2–5%. The Be increases the hardness at a red heat and the life of the tool.

A. R. P.

Heat-treatment of manganese hard-steel objects. H. RESOW, Assr. to F. KRUPP GRUSONWERK A.-G. (U.S.P. 1,968,960, 7.8.34. Appl., 21.12.32. Ger., 9.8.30).—Austenitic Mn-steel articles, e.g., crusher jaws, are heated to 1000° and the portions to be subjected to pressure and wear, e.g., the ridges, are cooled to < 920° by streams of compressed air or high-pressure steam to produce carbide pptn.; the whole article is then quenched.

A. R. P.

Manufacture of ferro[*-silicon*] alloys. E. A. JONES (U.S.P. 1,969,886, 14.8.34. Appl., 23.5.32).—Fe ore is smelted in a blast furnace to produce high-Si pig Fe, which is tapped into a gas-fired furnace and treated with Si to give the desired %; when the charge is quite fluid it is tapped into an electric furnace, in which it is refined and treated with small additions of other metals.

A. R. P.

Ferrous alloy [resistant to corrosion]. R. P. DE VRIES (U.S.P. 1,969,705, 7.8.34. Appl., 13.11.31).—The alloy contains Cr 10–25 (15.88), Ag 0.03–< 1 (0.18), C > 0.5, Si 0.82, and Cu, Al, or Mo > 2 (0.8)%.
A. R. P.

Seamless-steel vessels. ELECTRO METALLURG. CO., Asses. of F. M. BECKET and R. FRANKS (B.P. 436,184, 4.7.35. U.S., 20.3.34. Addn. to B.P. 414,211; B., 1934, 1016).—An austenitic steel resistant to intergranular corrosion at 400–650° comprises Cr 15–25, Ni 6–12, C > 0.2, and Nb + Ta > 4 (3)%, the Nb : Ta ratio being > 1.

B. M. V.

Flux for silver-soldering stainless steel. A. J. MAFFIA (U.S.P. 1,968,841, 7.8.34. Appl., 15.12.31).—Mixtures of borax, NH₄Cl, and H₃BO₃ (1 : 1 : 1 or 3 : 1 : 2) are claimed.

A. R. P.

Carburisation of [steel] brake drums. A. L. BOEGEHOLD, C. J. TOBIN, and C. F. SMART, Assrs. to GEN. MOTORS RES. CORP. (U.S.P. 1,967,077, 17.7.34.

Appl., 13.7.32).—Sheet steel is pressed into the desired shape, then annealed and simultaneously carburised on the friction surface, and finally struck in a die to finished dimensions.

A. R. P.

Washing and/or classifying metalliferous earths.

H. W. BEARCROFT (B.P. 436,455, 11.4.34).—An elongated trough with rakes and counter-jets of H₂O is described.

B. M. V.

Manufacture of high-electroconductive copper alloy.

D. K. CRAMPTON and J. J. VREELAND (U.S.P. 1,969,702, 7.8.34. Appl., 20.5.33).—Cu of > 99.8 (99.95)% purity is deoxidised with P (as Cu₃P) in amount sufficient to leave 0.001–0.1% P in the metal, and, after working to the desired shape, the metal is heated for 1 hr. at > 730° in air to oxidise the residual P and cause the resulting P₂O₅ to separate as discrete particles which have no influence on the electrical conductivity.

A. R. P.

Ferric chloride etching solutions [for copper printing plates etc.].

A. C. WHITE and S. M. STOEISSER, Assrs. to DOW CHEM. CO. (U.S.P. 1,969,678, 7.8.34. Appl., 25.9.31).—The solution consists of aq. FeCl₃, \bar{d} 1.38–1.53 (1.48), containing Fe₂(SO₄)₃ or Al₂(SO₄)₃ 4–6, and a sugar (glucose) 0.5–3%.

A. R. P.

Zinc-distillation plant.

W. MALKOMES, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 1,968,413, 31.7.34. Appl., 13.6.31. Ger., 14.5.30).—Mixtures of roasted Zn ore and coal dust are briquetted and the briquettes are coked by passing through them countercurrently the hot gases resulting from the subsequent reduction process, which is carried out in continuously operated, externally heated retorts.

A. R. P.

Treatment of zinc sulphide ores.

F. E. LEE, Assr. to CONSOLIDATED MINING & SMELTING CO. OF CANADA, LTD. (U.S.P. 1,969,567, 7.8.34. Appl., 6.8.32).—ZnS concentrates are roasted and the SO₂ evolved is collected in a sludge of ZnO from a previous roast. The resulting basic ZnSO₃ is decomposed with H₂SO₄ to yield pure SO₂ and aq. ZnSO₄, which latter compound is purified and electrolysed for recovery of Zn and regeneration of H₂SO₄ for re-use.

A. R. P.

Pyritic smelting and recovery of sulphur.

N. E. LENANDER, Assr. to TEXAS GULF SULPHUR CO. (U.S.P. 1,969,021, 7.8.34. Appl., 21.5.32. Ger., 19.2.32).—Arsenical pyrites is subjected to semi-pyritic smelting in a shaft furnace with a closed top, the charge having a sufficient proportion of coke added to ensure that all the O₂ in the blast is consumed, but insufficient to reduce any appreciable amount of the SO₂ or As₂O₃ formed. The gases are passed through a high-temp. precipitator to collect the As₂O₃, then through a reducing catalyst to obtain S and H₂O, which are condensed separately.

A. R. P.

[Tarnish-resisting silver] alloys.

R. H. LEACH, Assr. to HANDY & HARMAN (U.S.P. 1,969,018–9, 7.8.34. Appl., [A] 10.6.32, [B] 1.3.34).—The alloy contains Ag 80–92.5, Sn 5–3, Ni 0.25–1, and (A) Cd or (B) Zn 14.5–3%. The standard Ag alloy contains Sn 3.5, Ni 0.5, and Zn or Cd 3.5%.

A. R. P.

Manufacture of colloidal solutions of metals [silver] and of metallic compounds in poly[hydric

alcohols. C. H. VON HOESSLE, Assr. to CHEM. FABR. VON HEYDEN A.-G. (U.S.P. 1,969,166, 7.8.34. Appl., 30.8.30. Ger., 10.6.29).—Aq. AgNO_3 is treated with aq. NaOH and the ppt. of Ag_2O is washed and suspended in a 1% solution of gum arabic or Na ligninsulphonate in glycerin; the Ag_2O is then reduced to metal by passing a stream of H_2 through the hot solution. The metal may subsequently be converted into colloidal AgI or Ag_2S by treatment with I or H_2S . A. R. P.

Refining of lead-bismuth alloy. J. J. FINGLAND, A. D. TURNBULL, and P. F. MCINTYRE, Assrs. to CONSOLIDATED MINING & SMELTING CO. OF CANADA, LTD. (U.S.P. 1,967,053, 17.7.34. Appl., 20.8.31).—Argentiferous Pb containing 20–40% Bi (obtained by melting anode slimes from the Betts process) is melted with PbO to remove Cu, then treated with Zn to remove Ag and Au, and finally subjected to fractional crystallisation to obtain pure Bi–Pb eutectic; this alloy is refined electrolytically in aq. PbSiF_6 to obtain cathode Pb, and a Bi slime which is fire-refined in the usual way. A. R. P.

Extraction of metals [manganese] from [low-grade] ores. A. T. SWEET and J. D. MACCARTHY, Assrs. to GEN. MANGANESE CORP. (U.S.P. 1,969,769, 14.8.34. Appl., 23.9.29. Renewed 1.3.32).—Mn ores containing MgCO_3 and CaCO_3 are calcined to expel CO_2 , the oxides are digested with aq. NH_4Cl to dissolve CaO and MgO, and the liberated NH_3 is combined with the CO_2 to form $(\text{NH}_4)_2\text{CO}_3$, which is added to the CaCl_2 and MgCl_2 solution to ppt. the carbonates and regenerate NH_4Cl for re-use. A. R. P.

Manufacture of [hard tantalum boride] alloy. C. W. BALKE, Assr. to RAMET CORP. OF AMERICA (U.S.P. 1,968,067, 31.7.34. Appl., 29.5.30).—Claim is made for a sintered alloy of Ta boride with 3–15% of an Fe-group metal (8% Ni). A. R. P.

Preparation of sand moulds [for casting magnesium alloys]. E. PLAYER, Assr. to MAGNESIUM DEVELOPMENT CORP. (U.S.P. 1,968,958, 7.8.34. Appl., 24.4.33. Ger., 27.4.32).—The moulds and cores are sprayed with 10% aq. glucose or similar sugar. A. R. P.

Flux for autogenously welding magnesium and its alloys. W. O. BINDER, Assr. to DOW CHEM. CO. (U.S.P. 1,968,984, 7.8.34. Appl., 23.12.31).—A mixture of BaCl_2 20–50 (40), LiCl 4–6 (5), and a 40–50 : 60–40 mixture of NaCl and KCl (NaCl 25, KCl 30%) is claimed. A. R. P.

Coating [of magnesium articles]. R. T. WOOD, Assr. to MAGNESIUM DEVELOPMENT CORP. (U.S.P. 1,968,922, 7.8.34. Appl., 19.11.32).—The articles are sand-blasted, immersed in boiling 3% aq. NaCl for 4 min., washed, immersed in 20% aq. CrO_3 for 2 min., dried, and coated with paint. A. R. P.

Inhibiting the corrosive action of alkaline aqueous solutions etc. I. STONE (U.S.P. 1,968,722, 31.7.34. Appl., 29.8.32).—The corrosive action of cosmetics, soaps, polishes, etc. packed in metal containers is prevented by adding a small quantity (0.05–0.1%) of NaNO_2 to the prep. A. R. P.

Electrolyte for deposition of copper and copper alloys. D. GERNES (U.S.P. 1,969,553, 7.8.34. Appl.,

30.7.32).—The solution contains 60 g. of Cu_2Cl_2 dissolved in 1 litre of cold 40% $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ and is operated at 30° with 1–1.5 amp. per sq. dm. Zn–Cu or Ni–Cu alloys may be deposited from the bath by adding the appropriate chloride. A. R. P.

Manufacture of pulverulent chromium. L. D. JENSEN (U.S.P. 1,968,490, 31.7.34. Appl., 27.11.31).—Conc. aq. CrO_3 (e.g., 40%) is electrolysed at < 25° with an Al cathode and a c.d. of 2 amp. per sq. in., to produce a copious evolution of H_2 and a powdery Cr deposit. A. R. P.

Manufacture of clad metals [for X-ray targets]. A. F. B. CHANDLER, Assr. to WESTINGHOUSE LAMP CO. (U.S.P. 1,968,069, 31.7.34. Appl., 29.10.32).—A W target is melted into Cu in an atm. of H_2 , and the H_2 is replaced by N_2 before the Cu is allowed to solidify, to prevent occlusion of H_2 . A. R. P.

Grinding ores etc. Degreasing metal.—See I. Artificial fuel [for forges etc.].—See II. Magnet alloy. Electric current rectifiers.—See XI.

XI.—ELECTROTECHNICS.

Asbestos in electrical insulation. H. WARREN (India-Rubber J., 1935, 90, Spec. No., 19–22).—The varieties, properties, and some applications and products of asbestos are reviewed. D. F. T.

Electrode C.—See II. Measuring moisture in fabrics.—See V. Litharge.—See VII. Firing in the ceramic and glass industries. Glasses for low-voltage insulators.—See VIII. Soldering or brazing alloy steels. Mg from carnallite. Refined Al. Ag-plating baths.—See X. Dehydration of pigments. Pigment suspensions and electric fields.—See XIII. Electrofiltration of soils. Determining p_{H} of soils. Oxidation-reduction potentials of soils.—See XVI.

PATENTS.

[Armoured] electric accumulators. COMP. GÉN. D'ÉLECTRICITÉ (B.P. 437,707, 29.3.35. Ger., 2.5.34).—Conductors of Al covered with Pb or an alloy thereof are arranged along the axes of microporous, closed rubber tubes containing the positive active material, and are connected by bars of Al covered with a similar but thicker deposit. J. S. G. T.

Electric current rectifiers. E. RUPP, Assr. to GEN. ELECTRIC CO. (U.S.P. 1,968,570–1, 31.7.34. Appl., [A] 11.11.32, [B] 12.7.33. Renewed [B] 24.5.34. Ger., [A] 14.11.31, [B] 14.10.31).—The rectifier is built up of sheets of W which have been heated in air until coated on one side with the blue oxide, and is then coated on the other side with a supporting sheet of Ni and on the blue side with (A) Ag or (B) Bi. A. R. P.

Gaseous electric-discharge devices [metal-vapour lamps]. (A, B) G. GAIDIES, (A) M. REGER, (B) E. TARJÁN and M. THOMAS, Assrs. to GEN. ELECTRIC CO. (U.S.P. 1,968,822–3, 7.8.34. Appl., [A] 7.1.32, [B] 21.8.33. Renewed [A] 24.10.33. Ger., [A] 17.1.31, [B] 23.9.32).—(A) The lamp contains a rare gas and Mg vapour to give a green light, the action of Mg on the Pb glass being prevented by a lining of borosilicate glass

containing \geq 50% of SiO_2 . (B) Hg-vapour lamps are made of glass containing SiO_2 73, B_2O_3 2, Al_2O_3 1.8, K_2O 13, Na_2O 2, CaO 6.2, and ZnO 2%. A. R. P.

Luminescent electrical-discharge device. R. FOSTER and S. K. WALDORF (Assr.) (U.S.P. 1,969,642, 7.8.34. Appl., 22.11.33).—Claim is made for a glow-discharge lamp containing a 1:1 (vol.) mixture of He and CO_2 (or CO) at low pressure. A. R. P.

Ionisation of gases, more particularly applicable to conditioning air for ventilation. C. P. YAGLOU (B.P. 436,467, 4.5.34).—A.c. at > 8000 volts is applied to point electrodes producing a silent discharge and causing air flow. The path between the electrodes and earth is varied to vary the rate of destruction of negative ions relative to positive ions, so that their ratio may be adjusted to any desired val. B. M. V.

Irradiating a substance by means of ultra-violet rays. E. C. BERNDT and H. M. CREIGHTON (B.P. 436,205, 5.1.34. U.S., 16.1.33).—A substance that may be harmed by excessive irradiation is caused to flow through a no. of treatment zones in a layer many times thicker than the penetration of the rays, the liquid being mixed up between each treatment. B. M. V.

Manufacture of permanent magnet [from aluminium-cobalt-nickel-iron alloy]. W. E. RUDER, Assr. to GEN. ELECTRIC Co. (U.S.P. 1,968,569, 31.7.34. Appl., 3.6.33).—Cast magnets of an alloy of Fe with Al 6—15 (12), Ni 12—30 (20), and Co \geq 10% are annealed at 1000—1500°, quenched, and reheated at 600° to produce pptn.-hardening. A. R. P.

Magnetic separators. H. H. THOMPSON and A. E. DAVIES (B.P. 436,138, 26.1.34).—A cylindrical rotating screen of Fe or steel receives the material inside and is partly embraced by arcuate magnets, preferably of alternate polarity; the screen is preferably divided (magnetically) by brass rings between the poles. B. M. V.

Potentiometers. W. J. CLARK, C. H. BOSANQUET, R. A. BELL, R. MATTHEWS, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 436,887, 20.4.34).—A potentiometer for measuring small e.m.f. (e.g., in the determination of $[\text{H}^+]$) comprises a Wheatstone bridge having at least 1 limb composed of a triode valve to the grid of which is applied a known e.m.f., with and without the unknown e.m.f. The known e.m.f. may be tapped off the filament circuit of the valve, and rectifying and other devices are incorporated so that the apparatus may be of the all-mains variety. B. M. V.

Apparatus for agitation of electrolyte in electrolytic cells. J. G. WALLING (B.P. 436,176, 24.7.34).—The electrolyte is withdrawn to a pump and returned through a pipe having a no. of adjustable jets. B. M. V.

Temperature-regulating systems employing thermostats. S. C. MOUNT, and R. CRITALL & Co., LTD. (B.P. 436,802, 18.4.34).—An electrical system is described in which a low-set thermostat regulates a central heating unit (C) only, and on operation by hand of a change-over switch a high-set thermostat regulates C in conjunction with an additional radiant or other type of heater. B. M. V.

Electrical storage batteries. L. FULLER, G. J. A. FULLER, E. W. SUDLOW, and T. W. HAYES (B.P. 437,947, 2.5.34. Addn. to B.P. 383,529).

[Preventing terminal corrosion of] electric batteries. E. W. LASS (B.P. 437,946, 2.5.34).

Electric incandescence lamps. N.V. PHILIPS' GLOEILAMPENFABR. (B.P. 436,078, 1.3.34. Ger., 3.3.33).

Regulating automatic heating etc. plant.—See I. **Treating gas.**—See II. **Cu alloy. Treating ZnS ore. Refining Pb-Bi. Electrodeposits of Cu and its alloys. Cr powder. X-Ray targets.**—See X.

XII.—FATS; OILS; WAXES.

Hydrolysis of fats in presence of activated charcoal. A. I. RABINOVITSCH (Maslob. Shir. Delo, 1934, 9, No. 5, 26—30).—Use of charcoal during hydrolysis improves the colour of the fatty acids and the quality of the glycerol. Acid-washed (HCl) strongly activated charcoals are necessary. Adsorbed fat is recovered by solvents. Charcoal must be reactivated after hydrolysis. CH. ABS. (p)

Kinetics of the oxidation of fats and oils. E. L. LEDERER (Petroleum, 1935, 31, No. 44; Öle, Fette, Wachse, No. 1, 2—5; cf. B., 1936, 10).—Saturated aliphatic fatty acids and olefinic acids give reactions of type I (involving the combination of 1 atom of O) and the higher unsaturated acids with a conjugated double linking those of type II (in which a peroxide is ultimately formed). The velocity coeff. of reactions of type II is generally $>$ those of type I; 5—10% of the former type in a mixture is sufficient to give a sigmoid curve. Tables give the results of oxidising fatty oils by the Evers and Schmidt method. The latter gives a rapid procedure for determining the tendency of a technical product to become rancid. Drying oils are rapidly oxidised, but no induction period was observed. Antioxidants do not alter the type of the reaction but lower the rate of reaction. The amount of O_2 absorbed ultimately is the same. Pyrocatechol, pyrogallol, and $\beta\text{-C}_{10}\text{H}_7\text{OH}$ are the most effective. The action of antioxidants is probably due either to the formation of intermediate products which are difficult to oxidise or to the inhibition of the formation of readily oxidisable products. A comparison of various antioxidants is obtained by comparing the time which elapses before the turning point of the curve. C. C.

Control of the cooking of salted-out soaps. M. ZALIOPO (Maslob. Shir. Delo, 1933, 9, No. 5, 27—30). The optimum condition of salting-out of soap with reference to the η and d of the "paste" phase correspond to the triple point. This is least favourable with reference to the salted-out phase and separation of paste from impurities is difficult. A means of determining optimum conditions for practical working is described. CH. ABS. (p)

Determination of fatty acids in soaps containing fillers. I. GINZBURG (Maslob. Shir. Delo, 1934, 10, No. 2, 34—36).—The sample (5—6 g.) is heated (reflux) with 100 c.c. of 60% EtOH till no more dissolves. The clear liquid is decanted and the process repeated. The combined solution is diluted to contain approx. 20% of EtOH, and fatty acids are separated by hydrolysis

with HCl, extracted with Et₂O, and analysed in the usual way. CH. ABS. (p)

Rapid determination of clay in soap. L. TURBIN (Maslob. Shir. Delo, 1933, 9, No. 5, 30—32).—The sample (1—2 g.) is dissolved in 40 c.c. of EtOH on the water-bath. The residue is washed by decantation with 50% EtOH, collected on a filter, washed with EtOH and then with EtOH—Et₂O (1 : 1), and dried at 105°.

CH. ABS. (p)

Actinodaphne and Litsza fats as raw materials for new detergent. S. V. PUNTAMBEKAR (Indian Forester, 1934, 60, 707—709).—The oils contain trilauryl from which is prepared Na lauryl sulphate for use as a detergent. CH. ABS. (p)

Behaviour of linolenic acid, linseed oil, and tung oil on heating. K. MEINEL (Naturwiss., 1935, 23, 721).—The Br-binding no., determined by the author's procedure (A., 1932, 717; 1934, 753), of technical linseed stand oil is 15 units < that of raw linseed oil; the val. for linolenic acid fell 5.5 units on heating for 6 hr. in N₂ at 250° and 10 units in 10 hr. under the same conditions. This is ascribed to the isolated double linkings being transformed into conjugated systems. The Br-binding no. of tung oil rises on heating, this being ascribed to disappearance of the conjugation. The differing degrees of conjugation of linseed and tung oils are reflected in the difference (approx. 32) between these vals. for the oils.

G. H. C.

Cooking of oiticica oil. H. KEMNER (Farbe u. Lack, 1935, 545—546).—Samples of the oil were heated (a) at 280° for 10 min. and (b) at 240° for 1 hr. (rate of temp. rise 6° per min.) and then exposed to light. Sample (a) gave a white, cryst. ppt. after 8 days and reassumed its usual fatty consistency after 14 days; repeated heating did not produce a clear oil. Sample (b) showed a ppt. after 8 weeks and became fatty in 3 months. This pptn. was not hindered by diluting the oil with light petroleum or incorporating rosin, PbO, or glycerol; cooking for $\frac{1}{4}$ hr. was insufficient to prevent pptn. and lower or higher temp. were also ineffective. Wrinkling of oiticica oil films is prevented by incorporating artificial or natural resins, particularly copal esters; their H₂O-resistance is < that of tung oil films.

S. M.

Effect of hydraulic pressure on the oil content of press cake. I. KOLPAKOV and M. PASMANIK (Maslob. Shir. Delo, 1933, 9, No. 5, 10—12).—The pre-treatment conditions of the pulp (temp., H₂O content, etc.), and not the pressure applied, is the principal factor controlling the oil content of the cake. Oil retention is also a function of its adsorption by constituents of the cake. CH. ABS. (p)

Ash content of sunflower-seed oil cake. I. P. KOLPAKOV and M. L. GINZBURG (Maslob. Shir. Delo, 1934, 10, No. 1, 34—35).—The ash content varies with season and district of origin. Trade standards must be set up accordingly. CH. ABS. (p)

Pigment component from sunflower oil from sub-Carpathian Russia. Chromatographic method for its isolation. R. RETOVSKY and A. URBAN (Chem.

Obzor, 1934, 10, 201—203).—The presence of a carotenoid pigment in the oil is established. Discoloration of the oil by EtOH is a catalytic photo-reaction based on chemical changes in the pigment. CH. ABS. (p)

Ozonisation of fatty acids of cottonseed oil. P. RUFIMSKI (Maslob. Shir. Delo, 1934, 9, No. 4, 41—42).—Treatment of fatty acids with air or O₃ produces bleaching, a rise in solidification temp., an initial increase followed by a decrease in mol. wt., and an increase in OH-acid content. CH. ABS. (p)

Detection of rape oil in edible oils. J. GROSSFELD (Chem.-Ztg., 1935, 59, 935—936).—Grossfeld and Peter's Pb salt—EtOH method (B., 1935, 159) for the separation of isooleic acid has been adapted for the separation and identification of erucic acid, and serves to detect 20% or more of rape oil in, e.g., linseed oil; only one crystallisation is necessary, but the necessity for the presence of small amounts of H₂O, in order to restrain the dissolution of Pb erucate (I) in EtOH, is emphasised. It is suggested that smaller additions of rape oil can be detected by a method involving the adsorption of (I) on a ppt. of Pb palmitate derived from a mixture of the oil sample and palmitic acid.

E. L.

Determination of sediment in vegetable oils. D. KRAFT (Maslob. Shir. Delo, 1934, 9, No. 5, 23—24).—To the sample (15 c.c.) are added 3 c.c. of a saturated solution of CaCl₂ in HCl and 5 c.c. of COMe₂. After 2—3 min. the mixture is centrifuged for 15 min. at 1500—2000 r.p.m. and the vol. of sediment observed. Apparent increases in sediment due to cooling of oils are due to swelling of pptd. solids and not to further pptn. CH. ABS. (p)

Viscosity of fatty oils. H. A. BOEKENOGEN (Fettchem. Umschau, 1935, 42, 177—180).—The η (in centipoises) of 15 vegetable oils at 20° (cf. Schrader, B., 1934, 770), 30°, 40°, and 50° have been determined. Linseed oil (η at 20° = 47.7) is the least, and rape oil (η at 20° = 90.9) is the most, viscous (the special case of castor oil being excluded), but there are exceptions to the generalisation that the more unsaturated oils are the less viscous, although there are indications that the introduction of a double linking into the C chain lowers η . The η -temp. curves of the various oils are roughly of the same type, but not quite superimposable, those for the *Cruciferae* oils diverging from the others.

E. L.

Use of vegetable oils as anti-foam agents. N. VOROBEV (Maslob. Shir. Delo, 1934, 9, No. 4, 25—27).—Among vegetable oils castor oil had the highest anti-foaming power. Linseed oil is slightly less active and is improved in this respect by boiling. The action of the oils in lowering the surface tension of molasses is due to the presence of OH. CH. ABS. (p)

Hydrogenation of the solid fraction (stearin) of Japanese sardine oil. M. P. BELOPOLSKI and O. B. MAXIMOV (Bull. Far East. Branch Acad. Sci. U.S.S.R., 1934, No. 9, 111—115).—The fraction filtered from the oil at 8—10° produced on hydrogenation with Niekieselguhr catalyst an odourless fat, m.p. 28.9°, solidifying at 24.3° and having I val. 94.7. CH. ABS. (p)

Action of kieselguhr on oils at high temperatures. M. P. BELOPOLSKI and O. B. MAXIMOV (Bull. Far East. Branch Acad. Sci. U.S.S.R., 1934, No. 9, 117—123).—Experiments with Japanese sardine oil show that kieselguhr accelerates polymerisation, which at 250° is accompanied by partial decomp. with formation of free acids. Kieselguhr has no action in vac. The effect of kieselguhr is unrelated to its composition. At 250° there is no isomerisation of acids of the oleic series.

CH. ABS. (p)

[Tool-]handle waxing. ANON. (Ind. Finishing, 1935, 11, No. 11, 18).—Formulæ and methods of application of wax polishes for wooden tool handles are given.

D. R. D.

Mutual solubility of castor oil and benzine.—See II. $\beta\gamma\text{-C}_4\text{H}_8\text{Cl}_2$ as solvent. **Hydrocarbons from fatty acids.**—See III. **Lanoline. Sulphate soaps from paper production.**—See V. **Factice.**—See XIV. **Oil-bearing plants. Linseed oil.**—See XVI. **Hydrogenated oils. Indian butter and ghee.**—See XIX.

PATENTS.

Oil extraction processes and apparatus. F. M. HAMILTON (B.P. 436,489, 8.1.35).—Fish livers, blubber, etc. are disintegrated by rotating knives in a jacketed pan maintained at about 100°, without addition of steam, additional oil, etc., and the mass with any exuded oil is passed directly (without manual handling) to a filter-press, whereby the released oil is expressed from the cake residue.

E. L.

Degreasing articles.—See I. **Lubricants. Greases**—See II. **Oiling filaments etc.**—See VI. **Inhibiting corrosion by alkalis.**—See X.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Water-cooled stone mill [for paints]; its introduction and improvement. J. W. KENT (Paint, Oil, and Chem. Rev., 1935, 97, No. 21, 26—27).—Historical.

D. R. D.

New materials for [paint, varnish, and lacquer] coatings. C. A. KLEBSATTEL (Paint, Oil, and Chem. Rev., 1935, 97, No. 21, 34—38).—A review of recent developments.

D. R. D.

Drying of casein paints. M. M. MUSCHKATBLAT, I. M. BRUSCHKIN, and BESPALKO (Za Lakokras. Ind., 1934, No. 1, 31—33).—The determination of H_2O in casein colours is based on the temp. at which 1:1 (vol.) mixtures of EtOH extracts of the material and light petroleum separate into two layers. The petroleum should not have too high a d , and the casein is preferably passed through a sieve (100 meshes per sq. cm.) prior to the determination.

CH. ABS. (p)

Formulation and application of chlorinated-rubber [paints]. G. SCHULTZE (Farben-Ztg., 1935, 40, 1165—1167).—A general dissertation.

S. S. W.

Antifouling paints etc. M. RAGG (Farben-Ztg., 1935, 40, 1167—1169).—A summary is given of the lines on which antifouling research has proceeded in the last decade, nature of surface, effect of different waters, suitability of various pigments, etc. being dealt with.

It is considered that no major advance has been recorded in the period under review.

S. S. W.

Corrosion prevention and paint. B. SCHEIFELE (Farben-Ztg., 1935, 40, 1164—1165).—A general discussion on the functions of anti-corrosive paints.

S. S. W.

Evaluation of rust-preventive paints by swelling characteristics. H. WOLFF and G. ZEIDLER (Farben-Ztg., 1935, 40, 1199).— H_2O -swelling of paint films should not be regarded as a function of pigment or vehicle separately, but, as is illustrated graphically for white-lead and yellow-ochre, depends on the pigment-vehicle ratio. Speed of H_2O -absorption, effect on adhesion, and effect of successive swelling and drying out on film structure are features of swelling that need investigation.

S. S. W.

Zinc pigments. R. M. NEUMANN (Paint, Oil, and Chem. Rev., 1935, 97, No. 21, 56—57, 76).—A review.

D. R. D.

Spontaneous ignition of litharge and linseed oil. A. A. STOLJAROV (Za Lakokras. Ind., 1934, No. 2, 33—35).—Ignitions occur only during mixing and first grinding and with only some grades of PbO . They are not due to chromate impurities.

CH. ABS. (p)

Causes of chalking in titanium-white. A. SHUKOVA and A. SOVALOVA (Za Lakokras. Ind., 1934, No. 2, 11—14).—Chalking is caused by the instability of the system TiO_2 -linseed oil to atm. action and is the result of inertness and poor wettability of TiO_2 in oil. The system is stabilised by addition of soaps (Ba oleate, Na soaps of linseed fatty acids). Use of fillers retards chalking. Discoloration of Ti-white paints in the dark is avoided by igniting the TiO_2 at 800°.

CH. ABS. (p)

Electro-osmotic dehydration of pigments and pigment[—oil] pastes. J. F. SACHER (Farbe u. Lack, 1935, 543—544).—Difficulties in the way of large-scale application are discussed by reference to suggested processes.

S. M.

Behaviour of pigment suspensions in a high-tension electric field. E. A. BECKER (Angew. Chem., 1935, 48, 691—696).—Results of the electrophoresis shown by 9 pigments (e.g., lithopone, Ti-white) when suspended in various media (e.g., cellulose lacquer, linseed oil), with applied voltages of 12,000—18,000 volts, are described. The sign of the charge on the pigment particles varied with the suspending medium. In certain cases the particles were uncharged. Linseed oil, stand-oil varnish, and cellulose lacquer contained no charged colloidal particles. The mechanism of sediment formation in paints and enamels is discussed.

H. J. E.

Nitrocellulose and combination lacquers. F. ZIMMER (Chem.-Ztg., 1935, 59, 941—945).—A general dissertation on nitrocellulose lacquers, their historical development, manufacture, and application.

S. S. W.

Nitrocellulose lacquers from wood pulp. L. E. AKIM and A. S. KONOPLEV (Za Lakokras. Ind., 1934, No. 2, 17—19).—The prep. from unbleached sulphite pulp of a product containing 95—96% of α -cellulose is described. Lacquers obtained from the nitrated material

withstand exposure as effectively as do those from linters. CH. ABS. (p)

Influence of the quality of the raw material and method of esterification on the properties of ester varnishes obtained from polymerides produced by cracking petroleum and from soda soaps of synthetic acids. A. I. DRINBERG and N. I. VETZ (Za Lakokras. Ind., 1934, No. 1, 17—27).—Synthetic acids used for esterification must have sap. val. \leq 123 and acid val. \leq 97. Unsaponifiable mineral oil should be present in \gt traces. Esterification of Na salts of acids by Cl-derivatives of the polymerides should be carried out in progressive stages. CH. ABS. (p)

Finnish spruce resins. IV. Oxidation by potassium permanganate of the resinic acid, m.p. 142—143°. A. M. NORDSTRÖM (Finska Kemistsamfund. Medd., 1934, 43, 115—120).—Oxidation in alkaline solution yields a monobasic (OH)₄ acid, C₂₀H₃₄O₆, m.p. 162°. The acid and Na salt are dextrorotatory. CH. ABS. (p)

Nature of certain fir (*Abies*) oleoresins. C. A. BICKFORD, S. C. CLARKE, and E. C. JAHN (Proc. 5th Pacific Sci. Congr., 1934, 5, 3941—3948).—Analyses are recorded. The resin acids contain abietic and probably pimic acid. The volatile oils contain β -pinene and β -phellandrene and smaller amounts of limonene, bornyl acetate, and cadinene. CH. ABS. (p)

Shellac moulding powders. W. H. GARDNER, B. GROSS, C. C. WHIPPLE, and M. FASIG (Brit. Plastics, 1935, 6, 571—574, 584).—Details are given of the prep. of moulding compositions by incorporating shellac, fillers, colouring material, plasticisers, and "ripening chemicals," e.g., H₂C₂O₄, on hot plastic rolls, the resultant sheets being powdered, dried, and cured. Moulding procedure is described and general, mechanical, and electrical properties of the moulded articles are summarised. S. S. W.

[Synthetic]-resin manufacturing equipment. J. M. SANDERSON (Paint, Oil, and Chem. Rev., 1935, 97, No. 21, 42).—The large-scale manufacture of glyptal resins is described. D. R. D.

Chemistry in the modern synthetic-resin plant. BECK, KOLLER & Co. (Paint, Oil, and Chem. Rev., 1935, 97, No. 21, 54—56).—Plant used by this company is described and illustrated. D. R. D.

Light-coloured coumaronoid resins. A. ROUSTCHINSKY (Chim. et Ind., 1935, 34, 766—772).—Commercial naphtha of b.p. 145—150° gives on fractionation dark-coloured products only. When, however, high-boiling samples of naphtha obtained from crude benzene were distilled in steam or in superheated steam, at 210°, products were obtained which, when heated at 150°, were freed from H₂O and oils and yielded yellow resins. E. W. W.

Resistance of synthetic resins to the action of solutions of salts, alkalis, acids, and gases. S. JAKUBOVITSCH and M. GOLDBERG (Za Lakokras. Ind., 1934, No. 2, 44—47).—All resins showed poor resistance to HCl, H₂SO₄, H₃PO₄, NaCl. Varying degrees of resistance were shown to HNO₃, NaOH, NH₃, SO₂, and Cl₂. CH. ABS. (p)

β -C₄H₈Cl₂ as solvent.—See III. Cellulose triacetate.—See V. Fabric finishes.—See VI. Litharge.—See VII.

PATENTS.

[Water-soluble] transfer ink. O. F. LOHMANN, Assr. to SUPERIOR TRADEMARK MANUFG. Co., INC. (U.S.P. 1,990,193, 5.2.35. Appl., 23.6.32).—Typical marking compositions, removable from fabric by washing, comprise saponifiable wax, e.g., carnauba, beeswax (3 pts.), boiled linseed oil, e.g., No. 8 lithographic varnish (2 pts.), NaOH ($\frac{3}{8}$ pt.), N(C₂H₄·OH)₃ (1 pt.), granulated sugar ($\frac{3}{4}$ pt.), MgO ($\frac{3}{4}$ pt.), and pigment as required. S. S. W.

Offset printing ink. C. P. SHAW, Assr. to DETROIT MOULDING CORP. (U.S.P. 1,989,250, 29.1.35. Appl., 28.7.33).—For printing wood-grain effects in relief the ink contains, preferably, 35—40% of pigment and 65—60% of vehicle; 14 pts. by wt. of this are thinned with 86 pts. of a mixture of castor oil (15.9%), colourless "00" litho-varnish (22.1%), stearine (26.6%), and turpentine (35.4%). S. M.

Refining of rosin. J. N. BORGLIN, Assr. to HERCULES POWDER Co. (U.S.P. 1,990,367, 5.2.35. Appl., 8.10.32).—Wood rosin or lower-grade gum rosin containing objectionable colouring matter is dissolved in an inert solvent (petrol) and heated with resorcinol and SO₂ gas or a compound evolving it (Na₂S₂O₄), these two ingredients being added in solution in a solvent, e.g., EtOH, COMe₂, immiscible with the rosin solvent. S. S. W.

Manufacture of [non-adhesive] rosin size. G. J. MANSON, Assr. to MANSON CHEM. Co. (U.S.P. 1,990,457, 5.2.35. Appl., 10.5.24).—Rosin (85 pts.) is dispersed in the cold in presence of clay (15 pts.), in a slightly alkaline solution, e.g., 2% aq. NaOH (102 pts.), a small amount of rosinate acting as emulsifying agent and most of the rosin in the emulsion being free. S. S. W.

Preparation of [phenol-aldehyde] synthetic resin. O. SÜSSENGUTH, Assr. to BAKELITE GES.M.B.H. (U.S.P. 1,989,951, 5.2.35. Appl., 4.12.31. Ger., 12.12.30).—A resin which does not darken appreciably when heated to 180° is obtained by mixing an org. acid, e.g., citric, with the condensation product of a phenol, COMe₂ or other ketone, and an aldehyde in presence of a basic catalyst (NaOH, NH₃). S. M.

Preparation of [odourless phenol-aldehyde] synthetic resin compositions. H. I. WATERMAN and A. R. VELDMAN, Assees. of W. COLTOF (B.P. 437,085, 14.3.35. Holl., 14.3.34).—A phenol-aldehyde condensation product which is liquid when warm and plastic when cold is poured into a liquid, e.g., C₆H₆, PhMe, Et₂O, which dissolves only the impurities and in which a filler is suspended; after filtering, washing, and drying, a moulding powder is obtained. The condensate may also be pretreated with COMe₂, EtOH, etc. S. M.

Light-coloured [alkyd resin] coating composition. P. ROBINSON and B. E. SORENSON, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,989,711, 5.2.35. Appl., 2.8.30).—Discoloration during storage or stoving is prevented by using an oil-modified alkyd resin with which is incorporated Bz₂O₂ or other org. peroxide or derivative. S. M.

Polymerisation of [resinous] derivatives of unsaturated organic acids. J. W. C. CRAWFORD, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 437,271, 28.3.34).—An acrylonitrile or α -alkyl homologue is treated, without heating, with an oxyacid of Mn or a salt thereof, e.g., KMnO_4 (0.01—0.05 g.-equiv. of O per g.-mol. of nitrile); the colour of the resinous polymeride is thus considerably reduced. S. M.

Polymerisation of [coumarone] resins. G. K. ANDERSON, ASSR. to NEVILLE CO. (U.S.P. 1,990,215, 5.2.35. Appl., 5.7.33).—In the manufacture of coumarone resins, the original liquid containing polymerisable substances is run at a suitably controlled slow rate into a bath of liquid (inert to the polymerising reaction and to the catalyst, but a solvent for the resultant resin), e.g., hydrocarbons from coal or petroleum, which has been activated by finely-dispersing catalyst therein, e.g., 5% of H_2SO_4 (d 1.83). S. S. W.

Manufacture of [vinyl] plastic composition. M. C. REED, ASSR. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 1,989,246, 29.1.35. Appl., 17.3.31).—Rubber (1—10%) is incorporated with the polymeride of a vinyl halide and/or ester; milling of the resin is thereby facilitated. Vulcanising agents may be added. S. M.

Thermoplastic rubber derivatives. WINGFOOT CORP. (B.P. 437,304, 22.1.34. U.S., 20.1. and 22.12.33).—A halogen-containing derivative of rubber such as a partly saturated rubber hydrochloride (prep. described) containing \leq 29% Cl is rendered more stable by incorporating a photochemical inhibitor, viz., one or more of the following: $(\text{CH}_2)_6\text{N}_4$, dicyclohexylamine, ditetrahydrofurfurylamine, methyleneaminoacetonitrile, cyclohexylamine- CH_2O , cyclohexylaminoacetonitrile, $(\text{NEt}_2\cdot\text{CS})_2\text{S}_2$, $\text{NH}\cdot\text{C}(\text{NHPh})_2$, dihydroxydiphenylpropane. The product can be formed into transparent films by spreading a solution, or paper or fabrics can be impregnated or coated with it for use as wrapping material. It can also be used as a cement in laminated glass. D. F. T.

Manufacture of cork composition. H. D. ELKINGTON. From BOND MANUFG. CORP. (B.P. 436,452, 10.4.34).—PhOH and excess of paraformaldehyde are heated in an alkaline catalyst until a heavy liquid is produced; this is mixed with comminuted cork in which softener, e.g., $\text{O}[\text{C}_2\text{H}_4\cdot\text{OH}]_2$, has been absorbed. After moulding, the conversion is finished by heating. B. M. V.

Neutral cresylic acid ester.—See III. Co titanate. —See VII. Coating Mg. —See X. Coating compositions. —See XIV.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Natural stabilisers of latex. W. H. STEVENS (India-Rubber J., 1935, 90, Spec. No., 36—37).—The latex of Abiarana gutta-percha (*Lucuma lastiocarpa*) is more stable than that of *Hevea brasiliensis* and can be transported from Brazil to Europe without added preservative. It is acidic and is not coagulated by alkalis; the electrophoretic movement of the particles is to the cathode. Coagulation can be effected by EtOH or COMe_2 . The content of N and resins in the dried

product is $>$ that for *Hevea* rubber. After the addition of Abiarana latex, *Hevea* latex is not coagulated by acids. D. F. T.

Emulsions for latex. H. BARRON (Rubber Age [London], 1935, 15, 325—329).—A review and discussion. CH. ABS. (p)

Preparation of colloidal silicic acid as an active filler for rubber. S. A. SUBBOTIN and A. N. LUKIANTSCHIKOV (Sintet. Kautschuk, 1934, 1, 34—35).—Na silicate is treated with NaHCO_3 in presence of Na_2CO_3 and yields a fine colloidal silicic acid (I). Tensile strength of rubber preps. containing (I) is $>$ when gas-black is used. CH. ABS. (p)

Testing of pneumatic and solid tyres. R. N. JOHNSON (J. Res. Assoc. Brit. Rubber Manuf., 1933 (1935), 2, 129—140, 141—152).—A review of literature to Sept., 1925.

Non-adhesive lining material for [rubber-] tyre manufacture. N. ZVEREV (J. Rubber Ind., U.S.S.R., 1934, 11, 269—270).—A mixture of casein 45, glycerol 45, and kaolin 10 pts. is moistened with H_2O to the required consistency, applied 2—3 times on both sides of cotton material, dried for 1—1.5 hr., and treated with CH_2O . CH. ABS. (p)

Sponge lining for rubber rugs. L. AKOBSHANOV (J. Rubber Ind. U.S.S.R., 1934, 11, 140—145).—Details of manufacture are described. CH. ABS. (p)

[Uses of] rubber in the gas industry. C. R. AUSTEN (Trans. Inst. Rubber Ind., 1935, 11, 264—282).—Its uses are surveyed, including such aspects as conveyor belts, rubber joints for gas mains (the relative advantages and disadvantages being indicated), rubber-proofed bags for temporary closure of mains, flexible metallic tubing, non-crushable all-rubber tubing (Corflex) and rubber diaphragms in geysers. D. F. T.

Rubber, bitumens, and road surfaces. H. BARRON (India-Rubber J., 1935, 90, Spec. No., 23—31).—A survey of the varieties, properties, nature, and technical behaviour of bituminous materials is followed by a review of the application of bituminous materials to rubber-compounding and their use (with or without previous emulsification, and alone or with rubber or latex) for road-surfacing. D. F. T.

Some incompletely solved rubber problems. J. R. SCOTT (India-Rubber J., 1935, 90, Spec. No., 2—5).—The rate and nature of the swelling of rubber by different liquids and the plastic flow and "recovery" of rubber are problems concerning which fundamental knowledge is still seriously lacking. D. F. T.

Modern developments in the softening of rubber. T. L. GARNER (India-Rubber J., 1935, 90, Spec. No., 6—8; B., 1935, 685).—An indication is given of various methods for softening rubber and the effect of pine tar, fatty acids (and their Zn salts), and the higher alcohols. The usefulness of such agents is not limited to their softening action. D. F. T.

Variations of smoked sheet rubber. J. YOUNG and E. H. RUCH (Trans. Inst. Rubber Ind., 1935, 11, 343—353; cf. B., 1934, 547).—In experiments on the relative behaviour of dark- and light-coloured smoked sheet during their progressive conversion *via* C-black

"master-batches" into tyre treads, the persistence of difference in plasticity causes difficulties in the processing of the light rubber and the latter gives a poorer dispersion of the C black in the master-batch and the tread "compound," but in the finished tread the dispersion is as good as in the tread from the dark rubber. Washing and drying appears to lead to considerable improvement in the wear-resistance of the light rubber. D. F. T.

Strength of vulcanised rubber. W. H. REECE (Trans. Inst. Rubber Ind., 1935, 11, 312—335).—A crit. and mathematical consideration of various methods adopted for selecting a "true" val. for the ultimate tensile strength of rubber from a no. of discrepant experimental results and of the various types of test-piece commonly adopted. D. F. T.

Semi-ebonite. II. P. A. GIBBONS and F. H. COTTON (Trans. Inst. Rubber Ind., 1935, 11, 354—376; cf. B., 1935, 685).—The volatile products formed in the ageing of semi-ebonite in a current of air at 70° were analysed by passing them successively through CaCl₂ (to collect H₂O), CuSO₄ on pumice (H₂S), acid Ag₂SO₄ solution (SO₂), aq. KOH (CO₂). Although the semi-ebonite increased in wt., it also formed H₂O, SO₂, CO₂, and H₂S. Tests were also made on semi-ebonite as to its resistance to abrasion, wear, bending, tearing, and flexing; ultra-violet light caused rapid deterioration, as judged by flexing-resistance. Stress-strain measurements were also made in comparison with a black shoe-sole "compound," the latter proving tougher and stronger. D. F. T.

Internal heating of ebonite during vulcanisation. H. A. DAYNES (Trans. Inst. Rubber Ind., 1935, 11, 336—342).—Mathematical treatment is given to a simple case of the problem of the heat changes occurring in a thin layer of rubber mixture during its vulcanisation to ebonite. D. F. T.

History of factice manufacture. J. F. E. RUFFELL (Trans. Inst. Rubber Ind., 1935, 11, 289—294).—A technical review of the development of the production of factice or "rubber substitute" from vegetable oils. D. F. T.

Use of "substitute" in rubber manufacture. E. H. HURLSTON (Trans. Inst. Rubber Ind., 1935, 11, 295—301).—The character and uses of white (cold-vulcanised) and brown (heat-vulcanised) rubber substitute are indicated. The incorporation of white substitute in a rubber mixture commonly retards vulcanisation by heat, this effect being used sometimes to prevent premature vulcanisation in presence of ultra-accelerators. With some org. accelerators, however, e.g., tetramethylthiuram disulphide, white substitute may further accelerate heat-vulcanisation, this effect being generally more marked at lower temp. Brown substitute is manufactured in several forms which are used almost exclusively in heat-vulcanised goods; all increase the plasticity of the unvulcanised rubber mixing, although in different degrees. D. F. T.

Testing of [rubber] substitute. J. H. CARRINGTON (Trans. Inst. Rubber Ind., 1935, 11, 302—311).—Substitute may be tested as to colour and fineness, odour, *d*, non-acidity, mineral matter, unsaponifiable content, and

successive extraction by COMe₂ (I) and CHCl₃. Carefully standardised conditions are essential to ensure concordant results by (I) extraction. Hot (I) removes increasing quantities of free oil and S and causes a slow "depolymerisation" of the material, whilst the effect of heat is to cause some polymerisation. The last two effects are opposite and this accounts for the crossing of the curves for rate of extraction by the Soxhlet and Knoefler methods, respectively. Determination of free S by oxidation of the (I) extract gives erroneously high results and treatment with Na₂S₂O₃ and titration of the resulting Na₂S₂O₃ with standard I solution is recommended. It is desirable also to make practical tests on a rubber mixture containing the substitute. D. F. T.

Technology of the polymerisation of butadiene. V. M. ZAVALKOV (Sintet. Kautschuk, 1934, No. 2, 15—29).—The "rod method" of polymerisation is described. CH. ABS. (p)

Determination of volatile components in sodium-butadiene rubber. B. FAINBERG and N. TRANKOVSKAJA (Sintet. Kautschuk, 1934, No. 2, 9—11).—The rubber contains (i) gas consisting of [·CHMe]₂ and butadiene (I) and (ii) volatile substances composed of the residue of rectified (I). The latter is determined by heating at 150° for 3 hr. in a current of N₂ or CO₂. CH. ABS. (p)

Self-vulcanising cements. FABRITZIEV, BUIKO, and PAHOMOVA (India-Rubber J., 1935, 90, Spec. No., 9—16).—Zn butylxanthate (I) on account of its low crit. point (59°) was selected as accelerator for experiments on the vulcanisation of films obtained by the evaporation of compounded rubber solution. The activity of (I) is enhanced by the presence of *p*-C₆H₄Me·NH₂ (II), which reduces the crit. temp. to 40°. The effect of varying proportions of ZnO, stearic acid, Zn stearate, and S, as well as of the two named accelerators, on the tensile qualities of the products obtained by vulcanising the dried films in H₂O at 80°, is recorded. As a result of these and other tests on the ageing of the products, the storage qualities of the solution and its cementing powers for leather, cotton, and rubber, the finally recommended mixture is a C₆H₆ solution of unplastified rubber 100, S (pptd.) 3, ZnO 3, (I) 3, (II) 2; preferably made in two portions so as to keep the accelerating constituents and S separate until required for use. The age-resistance of the vulcanised films is good, and is not improved by the additional inclusion of a commercial antioxidant. D. F. T.

Butadiene. βγ-C₄H₆Cl₂ as solvent.—See III.
Latex for fabrics.—See VI. **Chlorinated-rubber paints.**—See XIII.

PATENTS.

Production of rubber latex and latex concentrates suitable for adhesive purposes. METALLGES. A.-G. (B.P. 437,013, 23.4.35. Ger., 23.4.34).—There is incorporated or formed in the latex or its concentrates the product obtained by the action of strong bases (KOH, NaOH) on sugar in the warm. Such latex gives dried films with persistent adhesiveness. D. F. T.

Manufacture of sponge rubber from latex or rubber solutions. H. R. MINOR, Assr. to LIQUID

CARBONIC CORP. (U.S.P. 1,990,460, 5.2.35. Appl., 26.10.32).—A vulcanisable dispersion of rubber in a liquid medium of b.p. < the vulcanising temp. is charged with an inert gas, *e.g.*, CO₂, under pressure and is then vulcanised by heat; the liquid medium is permitted to vaporise and escape, but the inert gas is retained within the rubber mass by maintaining the surrounding inert gas under pressure. D. F. T.

Compounding of rubber. W. S. CALCOTT and W. A. DOUGLASS, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,989,788, 5.2.35. Appl., 27.6.29).—Resistance of rubber to deterioration by ageing is increased by incorporating a monohydroxydiarylmethane, *e.g.*, OH·C₆H₄·CH₂Ph or CH₂Ph·C₁₀H₆·OH. D. F. T.

Manufacture of [coating] compositions containing chlorinated rubber. I. G. FARBENIND. A.-G. (B.P. 437,302, 27.4.34. Ger., 28.4.33).—Chlorinated rubber is dissolved in a volatile mixture of aliphatic and/or hydroaromatic hydrocarbons, b.p. > approx. 250° (100—190°), and incorporated with ketones and/or esters of org. acids, the hydrocarbons preponderating. D. F. T.

Machines for extruding rubber and like materials ST. HELENS CABLE & RUBBER CO., LTD., H. C. HARRISON, and A. J. ENSOR (B.P. 436,864, 13.4.34).

Vinyl plastic. Rubber derivatives.—See XIII.

XV.—LEATHER; GLUE.

Control of vat liquors [in sulphide-lime treatment of skins]. U. LUBRANO (Boll. Uff. Staz. Sperim. Ind. Pelli, 1935, 13, 260—264).—Determinations of total alkalinity and contents of Na₂S, CaO, and NH₃ in the liquors used for the wet-paddling method and of total alkalinity and CaO in the skins are discussed. The ratio of total alkali absorbed to total CaO absorbed is approx. const. and independent of dilution. F. O. H.

Determination of the turgescence of pelt during tanning. F. POTHIER (J. Soc. Leather Trades Chem., 1935, 19, 534—543).—The coeff. of turgescence (*T*) = 100*e*/*E*, where *E* and *e* are the thicknesses of the pelt before and after applying a given pressure on a form of instrument described. *T* has been determined during the course of tanning with different materials, *viz.*, chestnut, oakwood, myrobalans, quebracho, pine, mimosa, and valonia. Chestnut and oakwood extracts yield the firmest leather, valonia and mimosa give moderate firmness and quebracho, pine bark and myrobalans yield a soft leather. D. W.

Determination of chromium. III. Rapid detection and determination in chrome leather. D. BRARD (Ann. Chim. Analyt., 1935, [iii], 17, 317—319; cf. A., 1934, 982).—The leather is treated with HNO₃—HClO₄ or HNO₃—H₂SO₄—HClO₄ mixtures to remove org. matter. Cr is determined in the liquid by the usual methods. E. S. H.

Action of different metal compounds on gelatin. E. ELÖD and T. SCHACHOWSKOY (Kolloid-Z., 1935, 73, 236).—Polemical (cf. A., 1934, 1318). E. S. H.

Natural tanning materials. Hop tans.—See IV. **NH₃-N in collagen.**—See V. **Self-vulcanising cements.**—See XIV.

PATENTS.

Manufacture of raw-hide products. H. G. HALLORAN (U.S.P. 1,990,121, 5.2.35). Appl., 21.7.33).—Raw hide is mechanically disintegrated in H₂O, other fibrous material, *e.g.*, wood pulp, flax, is mixed therewith, and the resultant product is tanned. D. W.

Monoazo dyes for leather.—See IV. **Rubber-latex adhesives.**—See XIV.

XVI.—AGRICULTURE.

Soil survey of the Lower Bhavani project area. T. L. RAO and M. R. BALAKRISHNAN (Madras Agric. J., 1935, 23, 64—67).—The area surveyed is lateritic derived from gniess, partly massive and partly granitic. CH. ABS. (p)

Pedology of soils of France. II. Azonal soils. V. AGAFONOV (Ann. Agron., 1935, 5, 165—189).—Analytical data and the formation of a no. of types are discussed (cf. A., 1934, 388). A. G. P.

Ceylon soils. II. General characteristics of Ceylon soils, typical soil groups of the island, and a tentative scheme of classification. A. W. R. JOACHIM (Trop. Agric., 1935, 84, 254—275).—The topography, chemical characteristics, and classification of these soils is discussed. A. G. P.

Microbiological phenomena of Sahara soils, C. KILLIAN and D. FEHÉR (Ann. Inst. Pasteur, 1935, 55, 573—622).—The soils contain customary classes of bacteria and fungi in active forms. The P and K reserves are adequate to carry crops on irrigated areas. The proportion of sol. PO₄''' ∝ bacterial activity. A. G. P.

Alkali soils. S. C. CHOWDHURY (Allahabad Farmer, 1935, 9, 33—40).—Conditions of formation of alkali soils are discussed. Analyses of black- and white-alkali soils are given. CH. ABS. (p)

Nature and origin of black turf soils. J. J. THERON and P. LE R. VAN NIEKERK (S. Afr. J. Sci., 1934, 31, 320—346).—The org. matter content of these soils is not sufficiently high to account for their colour. Resistant lignin-humus complexes form the greater part of the org. matter. The soils are constructively formed and have high proportions of bivalent bases without appreciable brackishness. Black turfs are formed over and can only be derived from basic igneous rocks. They form a definite climatic type and are fundamentally identical with Russian chernozems, although differing somewhat in morphology. CH. ABS. (p)

Fertility and soil reaction in turf production. D. MOSES (S. Afr. J. Sci., 1934, 31, 288—298).—The marked response in yield of grass clippings to N fertilisers is increased by dressings of P fertilisers. Further improvement is obtained by treatment with K and with FeSO₄. To maintain a good cover where (NH₄)₂SO₄ is applied liming is necessary. Changes in reaction due to manurial treatment may be in the range p_H 3.8—8.3. CH. ABS. (p)

Abnormal acid soil. II. S. OSUGI, S. AOKI, and S. MORITA (J. Agric. Chem. Soc. Japan, 1935, 11, 34—49; cf. B., 1934, 1073).—Titratable acidity in the KCl extracts of these soils coincided with that calc.

from the Fe⁺⁺ and Al⁺⁺⁺ contents. The abnormal condition is reversible as the wet soil dries out, and was most marked in soils maintained at 70—100°. Sterilising by heat or chemicals reduced abnormality, which is related to the H₂O-sol. org. matter content.

CH. ABS. (p)

Chemical characteristics of soil profiles. II. Mutual interaction of podsol materials. S. MATTSON and F. GUSTAFSSON (Lantb. Högsk. Ann., 1935, 2; Proc. Internat. Soc. Soil Sci., 1935, 10, 126—127; cf. B., 1935, 964).—Soils having different isoelectric points interact. In podsoles the B-horizon possesses a certain Ca equiv. with respect to its ability to neutralise material in the A-horizon. The effect of incorporating the two horizons in podsoles by deep ploughing is discussed from this viewpoint.

A. G. P.

Movement of colloidal clay in red sandy soils, a factor interfering with normal soil properties. S. RAVIKOVITSCH (Hadar, 1934, 7, 246—251, 272—275).—Mediterranean red soils are degraded by downward movement of clay. They are characterised by high proportions of exchangeable Mg throughout the profile. Degradation is absent from soils containing limestone pebbles. Movement of clay is associated with decomp. of the complex, SiO₂ tending to remain in the surface, and Al and Fe moving downward. Al accumulates in alluvial layers. Liming and rational manuring with irrigation restrict degradation.

CH. ABS. (p)

Solonising soil masses by the capillary rise of field solutions. E. F. PAVLOV (Repts. Gorki Agric. Inst., 1932, 2, 33; Proc. Internat. Soc. Soil Sci., 1935, 10, 125).—During the capillary rise of NaCl solutions in soil, exchangeable Ca⁺⁺ is only partly replaced by Na⁺, but practically all displaced Ca⁺⁺ is transferred as CaCl₂ to the upper parts of the column.

A. G. P.

Soil-colour classes. J. K. TAYLOR (J. Australian Inst. Agric. Sci., 1935, 1, 111—113).—Apparatus and technique for determining soil colour are described.

A. G. P.

Soil respiration and the concentration of carbon dioxide in the soil air of cultivated soils. H. WURMBACH (Wiss. Arch. Landw., 1934, A, 10, 484; Proc. Internat. Soc. Soil Sci., 1935, 10, 129—130).—CO₂ production in soils is largely influenced by the nature and stage of growth of the crop, and the [CO₂] reached in the soil air is dependent on the mechanical conditions of the soil.

A. G. P.

Absorbed manganese [in soils]. E. F. PAVLOV (Repts. Gorki Agric. Inst., 1933, 2, 3; Proc. Internat. Soc. Soil Sci., 1935, 10, 124).—Replaceable Mn occurs only in unsaturated soils.

A. G. P.

Soil organic matter. I. V. TIURIN (Proc. Ural Acad. Sci., 1934, No. 2, 37; Proc. Internat. Soc. Soil Sci., 1935, 10, 150).—Waksman's method (acid hydrolysis) serves to distinguish org. matter decomposable by micro-organisms from that which is stable in this respect.

A. G. P.

Electrofiltration of soil. A. MAXIMOV (Polish Agric. Forest. Ann., 1935, 34, 26—89).—The process of electrofiltration takes a similar course in different soil types. The end-point is indefinite since small amounts

of bases (insufficient to produce appreciable effect on exchange measurements) are extracted from Al silicates for a prolonged period. The final p_H attained was approx. 3.5 (rarely 3.0). The method gave results in agreement with that of Gedroiz.

CH. ABS. (p)

Comparison of different types of glass electrodes for determining the p_H of soils. H. L. DEAN and R. H. WALKER (Proc. Iowa Acad. Sci., 1934, 41, 127—132).—No consistent differences were observed between results obtained from four different electrodes. The modified bulb Ag—AgCl type of electrode is the most practicable.

CH. ABS. (p)

Manufacture of humus by the Indore process. (SIR) A. HOWARD (J. Soc. Arts, 1935, 84, 25—59).—A lecture.

Minimum amount of electrolytes contained in the water of sphagnum bogs. I. A. TITOV (Trav. lab. biogeochim. Acad. Sci. U.S.S.R., 1935, 3, 61—62).—The amount of electrolytes assimilated by vegetable growths is such that the H₂O approaches the condition of distilled H₂O. Analyses are recorded.

CH. ABS. (p)

Methods for measuring oxidation-reduction potentials of soils with special reference to orchard soils. M. PEECH and L. P. BATJER (Cornell Univ. Agric. Exp. Sta. Bull., 1935, No. 625, 23 pp.).—Potentials are measured in soils suspended in 0.1N-H₂SO₄, using a vac.-tube potentiometer. Use of H₂SO₄ prevents bacterial activity during the test, lowers the susceptibility of some soils to oxidation, reduces the time necessary to obtain a stable reading, and prevents variations resulting from previous use of the electrode. No appreciable reduction occurs in soils until the temp. reaches 13°.

A. G. P.

Exchange reaction of basic slag with soils and permutit. P. KÖTTGEN (Phosphorsäure, 1935, 5, 89—94).—In mixtures of glass sand, basic slag, and H₂O there was an appreciable increase in solubility of slag during 3—20 days. Addition of permutit to the mixture did not increase the total solubility, but increased the rate of dissolution.

CH. ABS. (p)

Action of the iron in basic slag. A. WILHELMJ and S. GERICKE (Phosphorsäure, 1935, 5, 95—102).—Differences in crop response in different soils, attributable to the presence of Fe in slag, are correlated with the solubility of Fe in the soils.

CH. ABS. (p)

Bacteriological method for measuring available phosphorus in soils. F. B. SMITH, P. E. BROWN, and C. C. MENSING (Proc. Iowa Acad. Sci., 1934, 41, 85—88).—No correlation was apparent between the results of the Truffaut and Bezsonov method and extraction with 0.002N-H₂SO₄. The fixation of N by *Azotobacter* is not a function of the P assimilated.

CH. ABS. (p)

Significance of carbon dioxide in making phosphorus available in soils. H. C. MILLAR and F. B. SMITH (Proc. Iowa Acad. Sci., 1934, 41, 117—121).—The decomp. of P minerals in soil is largely effected by H₂CO₃. CaO does not decrease the availability of P, and hence does not cause reversion. Straw may depress the availability of native P in soil, but increases that of added rock phosphate.

CH. ABS. (p)

Is there a deficiency of available potassium in so-called alkali soils of Iowa? H. C. DEAN (Proc. Iowa Acad. Sci., 1934, 41, 133—137).—The total K of soils examined was adequate, but available K was deficient. Applications of KCl and straw produced greatest yield increases on greenhouse soils.

CH. ABS. (p)

Manurial action of magnesium. C. BRIOUX and E. JOUIS (Ann. Agron., 1935, 5, 193—204).—In pot cultures, Mg increased the yield and Mg content of the crop, the effect being more marked in stems and leaves than in grain. Beneficial effects were much less marked in field trials.

A. G. P.

Selenium and other toxic minerals in soils and vegetation. O. A. BEATH, H. F. EPPSON, and C. S. GILBERT (Wyoming Agric. Exp. Sta. Bull., 1935, No. 206, 56 pp.).—Methods of determining Se in soil and plant materials are given. Absorption of Se by various crop plants and the tolerance of animals are examined.

A. G. P.

Toxicology of plants in S. Africa. D. G. STEYN (Onderstepoort J. Vet. Sci., 1934, 3, 359—473).—Factors concerned in poisoning of goats by *Chrysocoma tenuifolia* are examined.

CH. ABS. (p)

Chemical factors and the quality of crops. G. GUYON (Ann. Agron., 1935, 5, 243—248).—The influence of manurial treatment is discussed.

A. G. P.

Cover crops and the turnover of plant nutrients in soil. R. M. BARNETT and H. W. JONES (Citrus Ind., 1934, 15, No. 12, 15—16).—Incorporation of *Crotalaria striata* with soil was followed by the passage of 75—96% of the N, P, K, and Ca of the plants into the soil solution in 1.5 years. Less was recovered in this way if the crop was used as a mulch. The plant nutrients were liberated over the entire period of decomp. The ash of leaf mould from pine and hardwood contained much Zn. Distribution of leaf mould on maize soils lowered the incidence of "white bud." The disease was also prevented by direct addition of ZnSO₄.

CH. ABS. (p)

Soil acidity and plant growth. L. C. CHADWICK (10th Nat. Shade Tree Conf. Proc. Ann. Meet., 1934, 14—21).—The growth of a no. of species in soils adjusted to varying p_H is examined.

CH. ABS. (p)

Distribution of roots in porous and non-porous plant containers. L. H. JONES and H. D. HASKINS (Plant Physiol., 1935, 10, 511—519).—The size of plant roots varies with the H₂O content of the soil. In porous pots the distribution of H₂O-sol. solids in soil decreases in successive concentric cones from the centre of the pot outward. Cement pots are porous to air, but do not maintain a lateral movement of H₂O in soil. The root system of plants in cement pots ramifies throughout the soil as in a non-porous pot.

A. G. P.

Field experiments in agricultural research. II. T. EDEN (Trop. Agric., 1935, 84, 131—149).—Statistical methods are applied to the layout of field trials and interpretation of results.

A. G. P.

Improved pastures in the coastal belt. II. Production under intensive management. D. MOSES (S. Afr. J. Sci., 1934, 31, 299—314).—The carrying

capacity and mineral constituents of herbage in the coastal belt of Natal are examined.

CH. ABS. (p)

Weed flora and soil reaction. K. SCHMALFUSS (Angew. Bot., 1935, 17, 191—199).—The growth of *Chenopodium album* is adversely affected by acid soil condition. The distribution of the species is an index of the CaO status of soils.

A. G. P.

Evidence of swamping in rice soils. K. S. KIRITSCHENKO (Proc. All-Union Inst. Rice Culture, 1933, No. 1, 52; Proc. Internat. Soc. Soil Sci., 1935, 10, 147).—Evidence of swamping includes formation of colloidal Fe and FeO, replaceable Fe⁺⁺, volatile acids, H₂S, and O₂. Tests should be applied every month during flooding.

A. G. P.

Injurious after-effects of juar [sorghum]. C. P. DUTT (Allahabad Farmer, 1935, 9, 28—32).—Juar roots contain more sugar than those of maize and allied crops. To this fact is attributed the harmful effect (decreased NH₃ and NO₃[']) on crops sown immediately after the juar is harvested.

CH. ABS. (p)

Factors influencing growth and yield of potatoes in Florida. M. R. ENSIGN (Plant Physiol., 1935, 10, 465—482).—The H₂O content of the soil at the period of stolon formation is the principal factor concerned.

A. G. P.

Relation between the equivalent acidity of sources of nitrogen and their efficiency in potato fertilisation. F. W. PARKER (Amer. Potato J., 1935, 12, 60—62).—The efficiency of org. and inorg. N potato fertilisers is determined by their equiv. acidity, and by the susceptibility of the soil to leaching. Natural sources of org. N have low equiv. acidities.

CH. ABS. (p)

Chemical properties of scab-infected potato soils. A. NEMEC (Phytopath. Z., 1935, 8, 303—305).—Although no definite relationships can be established, scab infection of soils is associated with acidity, high availability of N and K, and insufficiency of Ca and Mg.

A. G. P.

Significance of lipins, especially of phosphatides, in the frost-resistance of plants. A. F. WILHELM (Phytopath. Z., 1935, 8, 225—236; cf. B., 1935, 1061).—The frost-resistance of red-cabbage cells is lowered by sp. reagents affecting lipins (Et₂O, CHCl₃, urethane). The phosphatides of young plants are irreversibly modified and pptd. by freezing. The amount of protein and phosphatide pptd. by freezing the sap of hardened plants is < that from unhardened plants. Relationships are examined between the level of N and P nutrition of plants, frost-resistance, and phosphatide content. Deficiency of N or P or excessive N supplies for barley caused high sensitivity to cold and low phosphatide content.

A. G. P.

Effect of increased amounts of phosphate as superphosphate on yield and sugar content of sugar beet. O. ENGELS (Superphosphat, 1935, 11, 3—7).—Superphosphate increased the yield and sugar content of beet to a stage beyond which further additions increased the yield without affecting the % of sugar.

CH. ABS. (p)

Queensland cotton-research station, Belvela. Progress report, 1933-4. W. G. WELLS, L. M. HODGE, and W. A. R. COWDRY (Empire Cotton-Growing Corp.

Prog. Repts., Exp. Stations [1933—4], 1935, 1—9).—Growth of cotton in 8 successive years on a virgin alluvial clay loam lowered the C and N contents, narrowed the C : N ratio of the soil, and modified its physical properties.

CH. ABS. (p)

Effects of certain soil types, seasonal conditions, and fertiliser treatments on length and strength of cotton fibre. O. A. POPE (Arkansas Agric. Exp. Sta. Bull., 1935, No. 319, 98 pp.).—Statistical analysis of experimental data is utilised to assess the significance of factors affecting fibre characteristics.

A. G. P.

Effect of calcium on root development of transplanted cotton plants. V. A. NOVIKOV (Central Asia Cotton Res. Inst. Bull., 1934, No. 2, 52—55).—Addition to soil of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ or CaHPO_4 when transplanting improved root development and growth.

CH. ABS. (p)

Soils in relation to fruit growing in New York. VI. Tree behaviour on important soil profiles in the Williamson-Marion area, Wayne County. J. OSKAMP.

VII. Tree behaviour on important soil profiles in the Kinderhook, Germantown, and Red Hook areas in Columbia and Dutchess counties. L. P. BATGER and J. OSKAMP (Cornell Univ. Agric. Exp. Sta. Bulls., 1935, No. 626, 29 pp.; No. 627, 30 pp.; cf. B., 1934, 1113).—Profile characteristics are examined in relation to suitability for orchard fruits.

A. G. P.

Citrus nutrition. H. R. OPPENHEIMER (Hadar, 1934, 7, 268—271).— H_2O -culture tests are recorded. Formation of new leaves and roots of sweet lime decreased in proportion to the Ca content of the nutrient. The Ca content of Palestinian irrigation H_2O is sufficient to maintain an adequate supply of Ca.

CH. ABS. (p)

Seasonal variation of plant nutrients in raspberry plantings under different cultural treatments. G. H. HARRIS and J. J. WOODS (Proc. 5th Pacific Sci. Congr., 1934, 4, 2683—2691).—The effects of fertiliser treatment on the NO_3^- , PO_4^{3-} , K, Ca, Mg, SO_4^{2-} , HCO_3^- , and Cl⁻ contents, sp. resistance, and p_{H} of raspberry soils are recorded.

CH. ABS. (p)

Irrigation and the quality of the crop of oil-bearing plants. N. N. IVANOV and V. V. ARASIMOVITSCH (Bull. Appl. Bot. U.S.S.R., 1934, A, No. 11, 81—94).—The oil content of the crops increases with the no. of irrigations to a max., beyond which further irrigation causes a decline. Except in flax, the I val. of the oil is not affected by the no. of irrigations.

CH. ABS. (p)

Properties of linseed oil in relation to the mineral-salt nutrition of the plant. K. SCHMALFUSS and H. MICHEEL (Angew. Bot., 1935, 17, 199—207).—Small but definite differences in the I val. of the oil are attributable to differences in nutrient status of soils. Un-manured plants produced a slightly higher % of oil in the seed.

A. G. P.

Fertilising tulips. F. W. HANDLEY (Holland County Counc. [Lincolnshire] Bulb Res. Sub-Comm. Expts. with Bulbs, Rept. [1933], 1934, 21—26).—The wt. of bulbs grown in soil was increased by application

of $(\text{NH}_4)_2\text{SO}_4$, but was not appreciably affected by K_2SO_4 . In sand cultures a complete nutrient was the most effective. Omission of K did not affect growth or appearance, but flower stems were less rigid. Omission of N or P caused poor, weak growth.

CH. ABS. (p)

Chemistry in crop production. A. GORJAĀNOV (Crop-Protection [Moscow], 1934, 1, 5—7).—New insecticidal and fungicidal preps. of Cu, As, and S, recently developed in U.S.S.R., are described.

CH. ABS. (p)

Precision testing in the laboratory of the toxicity of lime-sulphur and of Bordeaux mixture as protective fungicides. H. B. S. MONTGOMERY and M. H. MOORE (East Malling Res. Sta. 22nd Ann. Rept., 1935, 217—222).—Appropriate technique is described.

A. G. P.

Combined fungicide-contact-insecticide sprays in 1934. M. H. MOORE and H. B. S. MONTGOMERY (East Malling Res. Sta. 22nd Ann. Rept., 1935, 208—216).—Fairly good control of scab was obtained with one "pink spray" and 2 post-blossom treatments with CaO-S , to which at petal fall were added nicotine and sulphonated Lorol, Lethalate, or sulphite lye as spreader. Sawfly and red spider were satisfactorily controlled.

A. G. P.

Determination of barium silicofluoride in insecticidal powders. A. BONIS (Ann. Falsif., 1935, 28, 461—463).—The powder is fused with $\text{Na}_2\text{CO}_3 + \text{K}_2\text{CO}_3$ and sol. Si removed from the warm conc. aq. extract in 2 stages using $(\text{NH}_4)_2\text{CO}_3$ and a solution of ZnO in aq. NH_3 . The solution is then made slightly alkaline to Na_2CO_3 , and the F' and excess of CO_3^{2-} are pptd. at the b.p. with CaCl_2 , the filtered ppt. being washed with 10% AcOH and the residue ignited and weighed. The SiO_2 may be determined in the insol. from the extraction of the original melt and from the two subsequent pptns., and this serves as a check if BaSO_4 or CaSO_4 has been used as adulterant. If, however, a siliceous impurity is present, the liquor after removal of SiO_2 is pptd. with H_2SO_4 and the BaSO_4 is weighed; results obtained by the two methods differ by 0.03%.

J. G.

Utility of hydrogen peroxide as a seed dip. F. PICHLER (Phytopath. Z., 1935, 8, 245—251).—Effective concns. of H_2O_2 cause germination injury.

A. G. P.

Seed treatments for controlling stripe disease of hulless barley. T. F. YU and H. K. CHEN (Nanking J., 1933, 3, 235—242).—Cu dusts reduced but did not eliminate the disease. Dipping seed in Tillantin or Uspulun gave nearly complete control. CH_2O (1 in 320) was less effective.

CH. ABS. (p)

Treatment of hulless oats to prevent covered smut [*Ustilago levis* (Kell. and Sw.) Magn.]. T. F. YU and H. K. CHEN (Nanking J., 1933, 3, 235—242).—Dusting with Cu carbonate or Tillantin-B gave best results. Solutions of CuSO_4 (2.5%) or of CH_2O (1 : 120—320) were effective, but they reduced the stand of plants.

CH. ABS. (p)

Control of cereal smuts by seed treatment. W. F. HANNA and W. POPP (Sci. Agric., 1935, 15, 745—753).—Comparative trials are recorded of a no.

of org. Hg preps. and Cu dusts. The latter are preferably used only for wheat and hull-less oats. In some cases Cu and Hg dusts increased seed emergence.

A. G. P.

(A) **Controlling wattle bagworm by dusting.** L. B. RIPLEY and B. K. PETTY. (B) **Controlling wattle bagworm by salt, as proposed by Henkel and Bayer.** L. B. RIPLEY, B. K. PETTY, and G. A. HEBURN (Union S. Afr. Dept. Agric. Sci. Bull., 1934, No. 131, 3—17, 18—24).—(A) The order of efficiency of dusts was Paris Green > Na_2FeF_6 > natural cryolite > Ca arsenate. Natural cryolite was more adhesive than the synthetic material and was improved by incorporation of 7.3% of petroleum oil. BaSiF_6 and Na_2SiF_6 lacked appropriate adhesiveness.

(B) Applications of NaCl (600 lb. per acre) temporarily increased the NaCl content of wattle foliage, but had no action on bagworms at any stage of development.

CH. ABS. (p)

Tree injection—diagnosis and cure of chlorosis in a peach tree. W. A. ROACH (East Malling Res. Sta. 22nd Ann. Rept., 1935, 139—141).—Severe Fe chlorosis was diagnosed and cured by injection methods.

A. G. P.

Tree injection—invigoration by injection of fertilisers. W. A. ROACH (East Malling Res. Sta. 22nd Ann. Rept., 1935, 135—138).—Injection of a complete fertiliser solution (K_2HPO_4 + urea) nearly doubled the shoot growth of apple trees, the effect being greater in trees absorbing the larger amounts of nutrient solution. Attacks of apple leaf hopper and red spider were less severe on injected trees.

A. G. P.

Control of apple-blossom weevil and of apple sawfly in 1934. W. STEER and F. J. D. THOMAS (East Malling Res. Sta. 22nd Ann. Rept., 1935, 194—203; cf. B., 1935, 1013).—Eggs of the sawfly are very susceptible to nicotine (I), which when added to the CaO-S petal-fall spray gives good control. Derris root controls migratory larvæ, but is inferior to (I) as a petal-fall spray. For the latter purpose Pb arsenate alone or in combination with CaO-S is less effective than CaO-S-derris (with wetting agent). Blossom capping by the blossom weevil was reduced 50% by derris dust. BaSiF_6 was ineffective.

A. G. P.

Apple-blossom weevil experiments, 1934. Impregnation of tree-banding materials. R. M. GREENSLADE, A. M. MASSEE, and F. J. D. THOMAS (East Malling Res. Sta. 22nd Ann. Rept., 1935, 180—184).—Promising results are recorded of trials with solutions of wax or of $\text{C}_6\text{H}_2\text{Cl}_4$ in C_2HCl_3 . Bark and trunks of trees were uninjured.

A. G. P.

Control of apple surface-eating tortricid larvæ. F. J. D. THOMAS (East Malling Res. Sta. 22nd Ann. Rept., 1935, 205—207).—Derris-soap applied 9 weeks after petal fall reduced the tortricid damage by 50%. BaSiF_6 was somewhat less effective.

A. G. P.

Development of scab in stored apples. H. WORMALD (East Malling Res. Sta. 22nd Ann. Rept., 1935, 232—235).—Occurrence of the disease is described. Routine spraying is necessary to avoid storage scab.

A. G. P.

Laboratory tests of bactericides on the plum bacterial canker organism. H. WORMALD (East Malling Res. Sta. 22nd Ann. Rept., 1935, 151—155).—A no. of bactericidal preps. are examined.

A. G. P.

***Byturus tomentosus*, Fabr. V. Control of the raspberry and loganberry beetle.** W. STEER (East Malling Res. Sta. 22nd Ann. Rept., 1935, 191—193; cf. B., 1935, 1013).—On loganberries derris was as effective when incorporated with CaO-S and sulphite lye or with colloidal Cu-sulphite lye as when used with soft soap. A single dusting with derris in late May failed to control beetle on raspberries.

A. G. P.

Control of cherry yellow-leaf on nursery stock. G. L. MCNEW and D. E. BLISS (Iowa Agric. Exp. Sta. Bull., 1935, No. 332, 155—189).—Best results were obtained with a 4-6-50 Bordeaux mixture, the efficiency of which was somewhat improved by additions of casein, resin-fish oil soaps, or oil emulsions.

A. G. P.

New combined spray for citrus trees contains ethyl mercuric oleate in oil. W. H. TISDALE (Citrus Ind., 1935, 16, No. 3, 8).—The stock emulsion contains oil 60 and Et Hg oleate (I) 0.51%. Suitably diluted (1 to 60), the spray controls scab and melanose and reduces stem-end fungus infections. After spraying, (I) disappears in a few weeks and recurrence is permitted of beneficial fungi which hold scale insects in check. No oil injury results from the spray and twig and leaf growth is stimulated.

CH. ABS. (p)

Codling-moth control. J. H. NEWTON (Colorado State Bur. Plant and Insect Control Circ., 1935, No. 65, 23 pp.).—Greater efficiency of Pb arsenate (I) sprays is obtained with coverage of the film type, e.g., when Ca caseinate is used. Casein is preferably incorporated with (I) and CaO added subsequently. Large proportions of the spreader cause excessive run-off, leaving too thin a film. Control is improved by addition of 1% of summer oil to (I), but not by admixture of nicotine. Film-coverage residues were more easily removed by acid washing, which is not always effective for F-bearing sprays. On certain varieties cover spraying with cryolite was as effective as (I).

A. G. P.

Insecticides: substitutes for lead arsenate. D. C. MOTE and B. G. THOMPSON (Proc. 5th Pacific Sci. Congr., 1934, 5, 3411—3417).—Of materials examined, Ca arsenate gave best results for codling moth, without injury to fruit or foliage. Pyrethrum was most satisfactory on canning beans. Oils caused calyx injury on apples.

CH. ABS. (p)

Citrus mealy-bug [*Pseudococcus citri*] and its association with ants in the Eastern Province. B. SMIT and H. J. BISHOP (Union S. Afr. Dept. Agric. Sci. Bull., 1934, No. 125, 41 pp.).—*P. citri* was controlled by nicotine-soap sprays, but not by oil sprays followed by HCN. Ants prevented control of *P. citri* in some cases. Effective trap-baiting (arsenite) is described.

CH. ABS. (p)

Effect of arsenical and copper insecticides on the natural control of whiteflies and scale insects by fungi on orange trees in Florida. S. B. HILL, JUN., W. W. YOTHERS, and R. L. MILLER (Florida Entomologist, 1934, 18, 1—4).—After spraying with Pb arsenate,

Na_3AlF_6 , or K_3AlF_6 , and, more notably, by Cu preps., whitefly infestation increased through destruction of parasitic fungi. Cu sprays similarly increased the population of purple scale.
CH. ABS. (p)

Pecan-rosette control in Texas. C. L. SMITH, A. O. ALBEN, and J. R. COLE (Proc. 14th Ann. Meet. Texas Pecan Growers Assoc., 1934, 41—46).—Satisfactory results are obtained by use of ZnSO_4 as a spray, or direct to soil, or in holes in tree trunks.

CH. ABS. (p)

Zinc treatment of pecan rosette. A. H. FINCH and A. F. KINNISON (Arizona Agric. Exp. Sta. Ext. Circ., 1934, No. 82, 11 pp.).—Recommendations are made for the practical application of ZnSO_4 to affected trees.
A. G. P.

Coffee in Kenya. I. Chlorosis and die-back. V. A. BECKLEY. II. Vegetative propagation of coffee. S. GILLET (Empire J. Exp. Agric., 1935, 3, 203—209).—Four types of chlorosis are distinguished: (i) due to inadequate N supply, associated with die-back of branches and heavy crop losses and arrested by N manuring; (ii) attributed to deficiency of carbohydrates in plants, accompanied by severe die-back of branches and roots but less severe losses of crop, not prevented by N manures unless applied very early in the season; (iii) affecting terminal leaves and frequently accompanied by malformation; and (iv) resembling S-deficiency chlorosis in the early stages and associated with lowered % of dry matter and Fe in the plants.

A. G. P.

Control of boring insects. C. C. HAMILTON (10th Nat. Shade Tree Conf. Proc. Ann. Meet., 1934, 31—36).—Infested areas in sugar maple were painted with pine oil alone or mixed with maize or sperm oil and containing nicotine (I). A paint of (I), pine oil, and bentonite is suggested for killing larvæ before penetration.

CH. ABS. (p)

Laboratory trials of wetters against woolly aphid (*Eriosoma lanigerum*, Hausm.). R. M. GREENSLADE (East Malling Res. Sta. 22nd Ann. Rept., 1935, 185—190).—A method of testing wetting agents is described. Of a no. of materials examined, none had any solvent action on the wax of woolly aphid.

A. G. P.

Fungus diseases [of bulbs]. E. R. WALLACE (Holland County Council. [Lincolnshire] Bulb Res. Sub-Comm. Expts. with Bulbs Repts. [1933], 1934, 37—47).—Among various treatments for tulip "fire," CH_2O (1 pt. of formalin in 150 pts. of H_2O , for 1 hr.) "Bouisol" (1:150, for 8 hr.), and Steriform [1:50, for 5 min. (twice)] showed good skins. HgCl_2 or the above used on vac. machines injured bulbs.

CH. ABS. (p)

Cotton and its insect pests. E. HARDY (Text. Recorder, 1935, 53, Aug., 21).—Methods for control of boll weevils, bollworms, flea-beetles (*Nisotra*), and leaf-rolling Pyralid moths in cotton-growing areas are reviewed.

A. J. H.

History and control of the [cotton] boll weevil in Oklahoma. C. E. SANBORN, E. HIXSON, H. C. YOUNG, E. E. SCHOLL, and C. F. STILES (Oklahoma Agric. Exp. Sta. Bull., 1934, No. 222, 32 pp.).—Appropriate

cultural practices coupled with Ca arsenate dusting are recommended.
A. G. P.

Eel-worm disease of chrysanthemums. W. D. REID and W. COTTIER (New Zealand Agric. J., 1935, 51, 219—223).—Recommended control measures include steam-disinfection or CS_2 -fumigation of potting soil, washing of cuttings with CaO-S colloidal S, spraying with nicotine sulphate in early growth stages, and repeated spraying with CaO-S colloidal S subsequently.

A. G. P.

Lucerne seed inoculation in Queensland. T. H. STRONG (J. Australian Inst. Agric. Sci., 1935, 1, 113—114).—Satisfactory field trials are recorded.
A. G. P.

Carpenter worm. Biology and control. J. A. MUNRO and A. C. FOX (N. Dakota Agric. Exp. Sta. Bull., 1934, No. 278, 23 pp.).—For fumigation of tunnels "Dowfume" ($\text{C}_3\text{H}_6\text{Cl}_2 + \text{CCl}_4$) is preferable to CS_2 . Tunnels are sealed after treatment.
A. G. P.

Efficacy of carbon tetrachloride in roundworm control. J. E. ACKERT and G. L. GRAHAM (Poultry Sci., 1935, 14, 228—231).—Administration of CCl_4 in gelatin capsules gave complete control of the nematode in young chickens without notably injurious effects. Egg production was lowered for 7—10 days after treatment.
A. G. P.

Control of free-living larvæ of bursate nematodes of domestic animals. I. W. PARNELL (Trop. Agric. [Trinidad], 1935, 12, 111—113).—Urine and urea were the most effective agents for sterilising manure against the larvæ. The lethal action of artificial fertilisers declines in presence of manure.
A. G. P.

Effect of arsenic, as used in poisoning grasshoppers, on birds. F. E. WHITEHEAD (Oklahoma Agric. Exp. Sta. Bull., 1934, No. 218, 54 pp.).—Domesticated and wild fowl do not consume sufficient arsenical bran bait or poisoned grasshoppers to cause injury. No cumulative effects were observed.
A. G. P.

PATENTS.

Manufacture of fertilisers. F. W. SPERR, JUN., ASSR. to KOPPERS CO. OF DELAWARE (U.S.P. 1,968,323, 31.7.34. Appl., 14.1.34).—Superphosphate is converted into CaHPO_4 and $\text{NH}_4\text{H}_2\text{PO}_4$ by continuously circulating through it air containing a small proportion of NH_3 , the amount of the latter absorbed after each treatment being made up by addition of NH_3 before the air is passed back into the treating vessel.
A. R. P.

Insecticide. E. W. ADAMS, ASSR. to STANDARD OIL CO. (U.S.P. 1,969,491, 7.8.34. Appl., 12.9.28).—An insecticide capable of forming stable emulsions with H_2O and effective as an antiparasitic spray for trees and plants consists of a light petroleum oil ("straw oil") 75—85 (79.8), creosote 0.1—5 (0.5), oil-sol. sulphonates derived from the treatment of mineral oil with H_2SO_4 20—10 (14.5), Na resin soap 3.5—2 (2.8), H_2O 1—2 (1.4), and EtOH 0.6—1.2 (1%).
A. R. P.

Extraction of toxins from roots for manufacture of insecticides. BOOTH STEAMSHIP CO., LTD., and H. G. WARD (B.P. 437,171, 30.3.35).—Roots containing rotenone are extracted with EtOH containing 1.5 vol.-%

of H_2SO_4 . The filtrate, neutralised and mixed with soap and/or H_2O , is used as an insecticide. R. S. C.

$CaHPO_4 + (NH_4)_2SO_4$.—See VII.

XVII.—SUGARS; STARCHES; GUMS.

Chemical-technical dynamics of long [sugar] beet campaigns. S. F. SKORBILIN (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1933, No. 13, 3—9).—Variations in output, sugar losses, molasses yield, colour and purity of juice with the advance of the season's campaign are examined. CH. ABS. (p)

Characteristic effects of defecation and first carbonation [of sugar juice]. P. M. SILIN and Z. A. SILINA (Trans. Centr. Sci. Res. Inst. Sugar Ind. U.S.S.R., 1933, 13, 38—50).—A shortened period of defecation at 85—90° is equiv. to a longer period at a lower temp. If the decline in alkalinity during evaporation and sugar boiling is abnormally great, or if foaming occurs, an increase in the period or temp. of defecation is indicated. Addition of CaO while cold tends to restrict the increase of colour during defecation and improve purity. The lower limit of alkalinity in the first carbonation is 0.06% CaO. CH. ABS. (p)

Applications of the hand refractometer in sugarcane research. I. Sampling sugar cane for sucrose. C. G. LENNOX. **II. Studies with the hand refractometer.** U. K. DAS. **III. Practical uses for the "punch-juice sample."** C. G. LENNOX. **IV. Use of the "punch-juice sampler" and hand refractometer in Formosa.** Y. KUTSUNAI (Hawaiian Planters Rec., 1934, 39, 13—18, 18—20, 20—24, 24—25).—In sampling for sucrose the greatest error occurs in the stalk-to-stalk variation. A sampler is described for obtaining a few drops of juice from the middle dry-leaf portion of the stem. Sampling systems are described, based on statistical data for expected error.

CH. ABS. (p)

Progress of the purity quotient during manufacture of potato starch. B. HOSPES (Z. Spiritusind., 1935, 58, 349; cf. B., 1935, 1159).—An increase in the purity quotient ($Q = \% \text{ pure starch, calc. on dry matter}$) can be followed at corresponding stages both in the principal and secondary processes during potato-starch manufacture. The increase in Q during any particular stage is dependent on the nature of the process followed, and is, in general, of smaller significance the greater is the no. of stages employed. I. A. P.

Aktivin-S, a solubilising agent for starch in sizing and finishing [textiles]. C. M. MEHTA (Indian Text. J., 1935, 45, 137).—The properties of Aktivin-S are reviewed. CH. ABS. (p)

Starch acidity. J. MAYRHOFER (Oesterr. Chem.-Ztg., 1935, 38, 178—179).—Commercial starch is normally acid in reaction. Methods for the determination of titratable acidity (A) are discussed and a recommended method is described. There is no relationship between A and ash or PO_4''' content. A may be influenced by NH_2 -acids. True acidity and A (likewise, therefore, p_H and $1/A$) change in the same direction from one sample to another, but without any regularity. I. A. P.

Gum arabic. ANON. (Text. Col., 1935, 57, 682; Dyer, 1935, 74, 392).—A review. A. J. H.

Anti-foam agents [for molasses].—See XII. **Sugar beet. Control of boring insects.**—See XVI. **Sucrose in dried prunes. Cane molasses as dairy feed.**—See XIX.

PATENTS.

Saccharification of cellulose materials. H. DREYFUS (B.P. 436,877, 20.4.34).—Cellulosic material is saccharified with H_2SO_4 , which is recovered, after dilution if necessary, by addition of hydrated Fe_2O_3 . The basic Fe^{III} sulphate is separated, decomposed by heat, and the SO_3 absorbed in aq. H_2SO_4 , whilst the residual Fe_2O_3 is hydrated by steam and re-used. F. R. E.

Manufacture of a depolymerised starch to be used as adjunct in baking. H. LÜTHJE (B.P. 437,314, 3.7.34. Ger., 6.7.33).—Starch is heated with $\sphericalangle 27\%$ of H_2O on hot plates or rolls at 120° for $\sphericalright 15$ sec., to yield depolymerisation, but not degradation, products. E. B. H.

[Preparation of] light coloured gum for fabric printing. P. KAPLAN, ASSR. TO RICHARDS CHEM. WORKS, INC. (U.S.P. 1,990,330, 5.2.35. Appl., 26.6.31).—Aq. cooking of Shiraz and karaya gum is effected with an acidic liquor (H_2SO_4 , H_3PO_4 , AcOH, etc.), whereby darkening of the gum is prevented. A. J. H.

XVIII.—FERMENTATION INDUSTRIES.

Hop pectin. H. FINK and F. JUST (Woch. Brau., 1935, 52, 341—344, 349—351, 362—365; cf. B., 1935, 779).—The bitter principles were removed from hop-cone meal by preliminary extractions with Et_2O and MeOH, the dried residue (I) being then freed from sugars, much mineral matter, etc. by extraction with H_2O at 30—40°. The final residue was repeatedly extracted with boiling H_2O , and from the extracts hydrato-pectin (II) was isolated in approx. 12% yield, calc. on (I). The araban constituent of (II) was separated by repeated washing with 70% EtOH, and yielded solely arabinose on hydrolysis. The residue of Ca Mg pectate (PO_4''' present in the ash) was converted into pectic acid (III) by acid treatment. (III) proved similar in composition to (III) of beet or flax, yielding on hydrolysis galacturonic acid, *l*-arabinose, galactose, and OMe. The compositions were not identical, however, hop-(III) yielding in particular less OMe. I. A. P.

Malt grist. F. M. WIENINGER (Woch. Brau., 1935, 52, 377—380).—The construction and use of modern malt mills is described, and problems met with in the prep. of brewery grists are discussed. The extract yields of individual sieved fractions of grists from several malts under various conditions of mashing and after-treatment are indicated. I. A. P.

Evaluation of malt grist by means of control sieves and proposals as to sieves suitable for process and laboratory grists. F. M. WIENINGER (Woch. Brau., 1935, 52, 380—382).—The suitability of various arrangements of sieves for evaluating malt grist is discussed and the danger of sieve variation indicated. On the basis of sieve examination of various grists (cf. preceding abstract), recommendations are

made as to suitable sets of sieves for use with laboratory and large-scale grists. I. A. P.

Interpretation of malt analyses. H. L. HIND and E. N. HAMNETT (J. Inst. Brew., 1935, 41, 429—438).—The ordinary methods of malt analysis are inadequate for the purpose of fully assessing the brewing val. of the malt. The "index of modification" (M) (permanently sol. malt-N \times 100/total malt-N) gives valuable information as to the condition of the malt, as does also "extract index" ($EI = E + 10 \cdot 6N - 0 \cdot 22G$, where E = malt extract in brewers' lb., N = malt-N, G = 1000-corn wt. of malt). This equation for calculation of EI has been derived empirically, but gives useful results in practice in determining the efficiency of malting. The application of M and EI to the interpretation of malt analyses is discussed. For malts of the types generally used in Britain, the normal vals. for well-modified malts of M and EI are, respectively, 36 and 108 (2-rowed), or 30 and 103 (6-rowed). I. A. P.

Spirituous liquors derived from grain. Gin. E. DORCHES (Ann. Falsif., 1935, 28, 452—456).—Methods of prep. of various types of gin are described and numerous analytical data tabulated. Important diagnostic features of pure gin are the non-EtOH content, which is < 322 mg./100 c.c. of 100° EtOH, and the higher alcohols which vary considerably, although a val. of < 270 indicates adulteration. The acid, ether, and aldehyde contents vary considerably, except for products from the same factory, and the furfuraldehyde normally occurs in negligible traces. "Fantaisie" gin and "artificial gin" are described. Except in borderline cases (e.g., when the added EtOH is small) the analytical differentiation of the various gins is not difficult. J. G.

Chromatographic and spectrophotometric detection of artificial colouring of wine. H. MOHLER and W. HÄMMERLE (Z. Unters. Lebensm., 1935, 70, 193—195).—The artificially coloured wine was adjusted to contain up to 50% of EtOH and passed through an adsorption tube of H₂O-free Al₂O₃. When treated with 0.5% tartaric acid in 50% EtOH, the natural pigment was retained while the added dye passed through. The spectrophotometric results are preliminary. E. C. S.

Preparation of fruit and berry wines by means of suitable pure cultures. L. M. HOROVITZ-VLASSOVA, E. M. ROVENSKAJA, and E. G. ANDRIEVSKAJA (Z. Unters. Lebensm., 1935, 70, 186—192).—"Kwass" (wine of low EtOH content) is prepared by fermentation of the pasteurised must with a yeast which is without action on sucrose (I) and ferments only glucose and fructose. The % EtOH may be increased by partial inversion of (I) during pasteurisation. "Bread kwass" is similarly prepared by inoculation of the pasteurised wort with spores of *B. Leichmanni* and yeast-cells in the ratio 5:1. Phosphates stimulate the fermentation. E. C. S.

Activation of kaolin.—See VII.

PATENTS.

Production of nutrient material for growth of yeast cells. A. F. J. FRIEDEL (B.P. 436,591, 11.4.34).—A suspension of waste yeast (or macerated peas, beans,

animal protein, etc.) is heated with 2—15% (on dry wt. of yeast etc.) of H₃PO₄, or equiv. amounts of P₂O₅ or acid phosphates, at $< 100^\circ$; the time of digestion is dependent on the temp., being shorter the higher is the temp. When the desired digestion has been obtained, the cooled liquid is treated, if necessary, with alkali to adjust the acidity to any required val. (2—10% on dry solids). The liquid product (containing PO₄ and NH₂-acids) may be used direct, or obtained in a finely-divided powdered form by spray drying, or oxidising agents (KBrO₃) or starchy material may be mixed with it. I. A. P.

Ageing of [alcoholic] liquors. A. B. CAYWOOD (U.S.P. 1,990,266, 5.2.35. Appl., 13.10.33).—A rectifying treatment is carried out in a (white-oak) cask having a charred inner surface, and provided with steam-pipes whereby an initial temp. of 43.3° is produced in the contained liquor. The temp. is then uniformly raised to attain 65.5° after 10 hr., air under pressure being meanwhile introduced and intimately mixed with the liquor by rotating paddles in order to promote oxidation. Volatilised constituents are removed to a condenser. The treated liquor is then transferred to other similarly charred casks and maintained at 35—37.7° for 30 days, after which it is fit for consumption. I. A. P.

XIX.—FOODS.

Control of loose smut of wheat. F. MURASHKINSKI (Crop Protection [Moscow], 1934, 1, 30—31).—Steeping in 5% EtOH at 40° markedly reduced infection on soft wheat in 8 hr., and entirely removed smut from hard wheat in 3 hr. CH. ABS. (p)

Sugars of flour and dough. H. COLIN and H. BELVAL (Bull. Soc. chim., 1935, [v], 2, 1907—1912).—A detailed account of work already noted (A., 1935, 1290; B., 1935, 746).

Detection of bleaching and baking-quality improving agents in flour. H. RADELOFF (Z. Unters. Lebensm., 1935, 70, 169—180).—A procedure is outlined for the detection of the common bleaching and improving agents. No bleaching effect of the latter could be detected after 7 months' treatment. E. C. S.

Influence of dough-making and fermentation on the structure of bread crumb. J. R. KATZ (Bakers' Weekly, 1934, 82, No. 4, 40—42; No. 5, 36—38).—The arrangement of starch granules in dough changes during ripening and may be related to the staling of bread. Fermentation with large amounts of yeast at a high temp. causes poor keeping quality. The beneficial effect of "shortening" and use of gelatinised starch is probably due to the improved physical condition of the gluten (I). The CO₂ produced during fermentation induces progressive inhibition of H₂O by (I). As "free H₂O" disappears, yeast attacks glutenin, thus making (I) "shorter." CH. ABS. (p)

Ropiness of white bread and its prevention. V. STUHLIK (Chem. Obzor, 1935, 10, 4—6).—Spores of the organism concerned did not germinate at $p_H > 4 \cdot 60$. CH. ABS. (p)

- (i) Staling of bread and means of retarding it.
- (ii) Staling of breads other than white wheat

bread. (iii) What is the fundamental change in the staling of bread crumb? (iv) Further changes occurring during the staling of bread crumb.

J. R. KATZ (Bakers' Weekly, 1934, 82, No. 1, 40—42, 52; 1935, 85, No. 5, 37—38; 1934, 84, No. 9, 31—34; 83, No. 8, 26—28, 58; cf. A., 1934, 1070).—(i) The contraction of starch granules during staling is counteracted, to a greater or lesser extent, by the strength and consistency of the gluten.

(ii) Data showing compressibility, vol. of decantate, and sol.-starch content of whole wheat, rye, and pumpernickel breads confirm the view that changes in starch form the primary cause of staling.

(iii) Staling involves modification of the starch, a decrease in H₂O-binding capacity, and lowering of the H₂O-sol. starch content.

(iv) Changes in starch during staling are characterised by a difference in X-ray pattern. Only a part of the starch is affected. Gluten, coagulated by heat, shows a characteristic X-ray pattern which does not change during several days. No differences were observed in the protein content of the aq. extracts of fresh and stale bread.

CH. ABS. (p)

Are all the bacteria of bread killed during baking?

J. R. KATZ (Bakers' Weekly, 1934, 82, No. 8, 37—39).—Spores of *B. mesentericus* (rope-forming organism) survive baking. Appropriate quantities of lactic acid prevent the development of the spores. CH. ABS. (p)

Determination of the f.p. of milk.

C. A. KOPPEJAN (Chem. Weekblad, 1935, 32, 657).—The f.p. is best determined by the Gangl-Jeschki apparatus (B., 1935, 377). Skimmed and unskimmed milks give the same results if kept in melting ice for some time before the determination is made.

S. C.

Acidity of milk and dairy products.

H. H. SOMMER (Wisconsin Agric. Exp. Sta. Res. Bull., 1935, No. 127, 23 pp.).—The wt. discrepancy involved in using 9-c.c. samples of various products for determination of comparative acidity is noted. Dilution of milk samples with H₂O lowers the recorded titratable acidity since less Ca₃(PO₄)₂ is pptd. Vals. for individual and herd milks are examined and periodic variations discussed. Acidity of milk is not increased by feeding ensilage, H₂SO₄, or H₃PO₄. Mild mastitis lowers acidity and in rare cases causes an increase. Precautions necessary in comparing the acidity of milk, cream, condensed milk, and ice-cream mixtures are discussed.

A. G. P.

Standards adopted for examination of Indian butter and ghee.

S. D. SUNAWALA and Z. R. KOTHAVALA (Agric. Live-Stock India, 1935, 5, 480—488).—Differences in accepted standards of purity in various districts of India are discussed. Analyses of a no. of samples are recorded and recommendations made for standards for cow and buffalo products.

A. G. P.

Aëration process for the preparation of whipped cream.

C. A. GETZ and G. F. SMITH (Trans. Illinois State Acad. Sci., 1934, 27, 71—72).—Cream of any age, having 22—36% of fat, is charged with N₂O, CO₂, Me₂O, or CCl₂F₂ under pressure in a siphon bottle and ejected as a froth.

CH. ABS. (p)

Composition of ice[cream] powder. I. SZANYI (Z. Unters. Lebensm., 1935, 70, 204—205).—The % H₂O, protein, fat, H₂O-sol. and org. matter, starch, crude fibre, acids (as tartaric), and ash of 12 powders are tabulated.

E. C. S.

Manufacture of brick cheese. H. L. WILSON and W. V. PRICE (U.S. Dept. Agric. Circ., 1935, No. 359, 11 pp.).—Details of the process are given.

A. G. P.

Change in weight of eggs on boiling. G. MÉSZÁROS and F. MÜNCHBERG (Z. Unters. Lebensm., 1935, 70, 156—165).—Eggs boiled in the ordinary way and allowed to cool in air lost up to 2% in wt., but when cooled in H₂O they gained up to 1%. A small amount of salt was lost during boiling.

E. C. S.

Halogenised eggs. I. Iodised eggs. E. PEANO and I. PISSARO (Rev. sudamer. endocrinol., 1935, 18, 85—106).—Feeding of "Rhiodine" (an org. I prep.) increased the I content and decreased the size of eggs without affecting the no. laid. The Ca content of the shells declined. In yolks H₂O increased and org. matter and P contents decreased without change in total mineral content. The H₂O content of whites was increased. The mineral balance of the egg was disturbed and the calorie val. was lowered.

CH. ABS. (p)

Effect of various factors on extraction of soluble substances during cooking of meat.

D. I. LOBANOV and S. V. BIKOVA (Z. Unters. Lebensm., 1935, 70, 150—155).—Lean meat was placed in cold H₂O, brought to the boil, and boiled for 2½ hr. Coagulated protein, total solid, inorg. matter, creatine, and creatinine were determined in the extract. No difference was observed between the vals. for fresh and frozen meat. The effect of placing the meat immediately in boiling H₂O, and of heating at 80—85° instead of at 100°, was investigated.

E. C. S.

Preservation and utilisation of fish products in the tropics.

A. KREMPF (Proc. 5th Pacific Sci. Congr., 1934, 5, 3693—3697).—An autodigestion process is described. The products are mixed with fermented fish meal and manioc flour to form a "fish tapioca." Analyses are given.

CH. ABS. (p)

Detection of the onset of decomposition of fish meat as shown by contents of ammonia.

K. KIMURA and S. KUMAKURA (Proc. 5th. Pacific Sci. Congr., 1934, 5, 3709—3713).—Fish meat is considered fresh if the NH₃ and NH₂-N together are \geq 10 mg. per 100 g. Vals. $>$ 20 mg. indicate the beginning of decomp., and $>$ 30 mg. show that the first stage of definite decomp. is present.

CH. ABS. (p)

Sooty blotch on apples. A. M. BOTTOMLEY (Farming in S. Africa, 1935, 10, 31).—Blotches were removed by dipping in 1% bleaching powder solution (1 min.), exposing to the air for 5—10 min., and thoroughly washing.

CH. ABS. (p)

Spray-residue removal from apples and other fruits.

M. H. HALLER, E. SMITH, and A. L. RYALL (U.S. Dept. Agric. Farmers Bull., 1935, No. 1752, 25 pp.).—Methods, machinery, and costings are given.

A. G. P.

Determination of moisture in dried apples. F. D. MERRILL, C. C. BAYMILLER, and P. F. NICHOLS (Fruit Products J., 1935, 14, 232—234).—The effects of small variations in technique on results obtained by vac. and by H₂O-jacketed ovens are determined. CH. ABS. (p)

Preservation and storage of fruit. G. B. TINDALE and S. A. TROUT (J. Australian Inst. Agric. Sci., 1935, 1, 109—111).—Australian research on cold storage is reviewed. A. G. P.

Valencia [orange-]rind spot. L. J. KLOTZ and H. S. FAWCETT (Calif. Citrog., 1934, 20, 4).—The development of the disease is favoured by hot moist conditions and is accentuated by fumigation of fruit with HCN or by exposure to C₂H₄. CH. ABS. (p)

Sucrose content and glucose : fructose ratio of California dried prunes. P. F. NICHOLS [with R. D. BETHEL and F. FILPELLO] (Plant Physiol., 1935, 10, 575—578).—Fruit from "outside" areas, farther from the coast, has a higher sugar content and *d* than that from "inside" areas. Neither the sucrose content nor the glucose : fructose ratio is related to district of origin or size. The glucose content of prunes is much > the fructose content. A. G. P.

Vitamin-A content of sweet potatoes of the Prolific variety grown with varying fertiliser treatments. P. P. SWANSON, P. M. NELSON, and E. S. HABER (Iowa Agric. Exp. Sta. Rept. on Agric. Res., 1933, 119; 1934, 147).—When fed at a 35-mg. level sweet potatoes irrespective of manuring produced normal growth in vitamin-A-depleted rats. CH. ABS. (p)

Acceleration of the determination of moisture in potato flakes. B. LAMPE and R. DEPLANQUE (Z. Spiritusind., 1935, 58, 357—358).—Methods available for moisture determination are discussed, and the influences on the results of drying-oven construction and of the no. and positions in the oven of tests simultaneously carried out are emphasised. Other conditions being identical, drying at 120° for 1 hr. gives results in good agreement with those obtained by drying at 105° for 4 hr. I. A. P.

Occurrence of a pectin material in artichoke syrup. H. E. HARRISON and D. T. ENGLIS (Trans. Illinois State Acad. Sci., 1934, 27, 73).—Addition of 95% EtOH to artichoke syrup ppts. a gel which, after purification, shows the chemical characteristics of pectin. CH. ABS. (p)

Nutritive value of the pinto bean. H. B. BURTON and C. L. WILKINS (Proc. Oklahoma Acad. Sci., 1933, 13, 16—18).—The bean contains only traces of vitamin-A. CH. ABS. (p)

Composition of Szeged edelsüss-paprika milling products. I. HORVÁTH (Z. Unters. Lebensm., 1935, 70, 195—200).—Tables are given of the composition of the two components (pericarp freed from veins and washed seeds) and of the different grades of finished product. E. C. S.

Relation of hydrogen-ion concentration and total acidity to the taste of tomatoes. R. B. HARVEY and R. R. FULTON (Fruit Products J., 1935, 14, 238—239).—Among 26 varieties examined, *p*_H varied from 4.15 to 4.57 and total acidity from 0.318 to 0.610% (as

malic acid). If the sugar contents are disregarded, red-globe varieties should taste less sour than yellow varieties. CH. ABS. (p)

Vitamin -A, -B₁, -C, and -B₂ contents of canned tomatoes. P. M. NELSON, P. P. SWANSON, and E. S. HABER (Iowa Agric. Exp. Sta. Rept. on Agric. Res., 1933, 118; 1934, 146—147).—Storage (up to 3 years) did not affect the vitamin-A content of the tomatoes. CH. ABS. (p)

Keeping qualities of different varieties of vegetables. B. A. RUBIN and V. E. TRUPP (Compt. rend. Acad. Sci. U.S.S.R., 1935, 3, 225—228).—Both the "Spanish" and "Msterski" varieties of onion have a high sucrose content and the ratio sucrose : monosaccharide decreases on storage. The protein-N of the "Msterski" variety, which keeps well, is unchanged, whilst that of the Spanish onion decreases. As with the two varieties of onion, the better-keeping variety of cabbage (Amager) shows the greater loss of sugar. Both the leaves and stalks of "No. 1" cabbage (a poor-keeping variety) show less loss of dry substances than "Amager" on storage. P. G. M.

Relation between cell-membrane and crude fibre in vegetable foodstuffs. R. TURNAU (Z. Unters. Lebensm., 1935, 70, 129—135).—The % cell-membrane and crude fibre of 16 common vegetables (*e.g.*, roots, cabbage, potatoes, fungi) as determined by various methods are tabulated. In every case the former is approx. double the latter, so that in the examination of this type of material the tedious determination of cell-membrane can be avoided. E. C. S.

Detection of lecithin and egg-yolk in chocolates. F. E. NOTTBOHM and F. MAYER (Z. Unters. Lebensm., 1935, 70, 121—129).—The lecithin (I) content is calc. from the % of choline (*cf.* B., 1933, 330). Specimen analyses of samples of (I)-chocolate and egg-yolk chocolate are given. It is suggested that 3% of pure (I) and 5% of dried egg-yolk, respectively, should be the min. allowable amounts in articles so described. E. C. S.

Nutritive value of hydrogenated oils. S. I. UENO (Proc. 5th Pacific Sci. Congr., 1934, 5, 3673).—No loss of nutritive val. follows hydrogenation. For fish oils the process has a preservative effect. CH. ABS. (p)

Factors affecting the carotene content of lucerne hay and meal. H. R. GUILBERT (J. Nutrition, 1935, 10, 45—62).—Vac.-drying caused little or no loss of carotene (I) in lucerne hay. Autoclaving produced significant losses. The very marked decrease in (I) during sun-drying was diminished but not eliminated by preliminary autoclaving. Enzyme action and temp. effects involved were much < the photochemical activation of the destructive process. During storage of the hay or meal, loss of (I) increased with temp., the rate of loss being practically doubled for each 10° rise in temp. A. G. P.

Nutritive value of ophi (*Helcioniscus exaratus* and *H. argentatus*). II. Hæmoglobin regeneration in anæmic rats fed ophi. C. D. MILLER (Proc. Hawaii Acad. Sci., 1933, 8).—At the rate of 4—8 g. daily, ophi had little hæmoglobin-regenerating effect on anæmic rats. Supplements of Cu improved its

action. The fresh material has high Fe and low Cu contents. CH. ABS. (p)

Cane molasses as a dairy feed for dairy cows. L. A. HENKE (Hawaii Agric. Exp. Sta. Bull., 1934, No. 73, 17 pp.).—When supplemented with protein concentrates, molasses in amounts up to 25% of the other concentrates may be given without deterioration of reproductive capacity or increased abortion. Over a 7-year period molasses-feeding caused a very slight lowering in milk yield and fat %. A. G. P.

Dry concentrates as a partial substitute for whole milk in calf rations. E. S. SAVAGE and C. H. CRAWFORD (Cornell Univ. Agric. Exp. Sta. Bull., 1935, No. 622, 29 pp.).—In starting-rations for calves, \geq 22% of dry skim milk is needed in the ration and supplementary feeds may be limited to cereal products. For stall-fed calves some cod-liver oil should be given to prevent back-weakness. A. G. P.

Effect of the ration on wool growth and on certain wool characteristics. A. E. DARLOW, V. G. HELLER, and W. R. FELTON (Oklahoma Agric. Exp. Sta. Bull., 1934, No. 220, 24 pp.).—Rations containing different levels of protein and of cystine are compared. An optimum cystine consumption is indicated, and this is usually present in a normal balanced ration. A. G. P.

Proteins of sunflower seed and their degradation by the action of heat. A. M. GOLDOVSKI and A. A. BOZENKO (Maslob. Shir. Delo, 1933, No. 7, 8—10).—Degradation of the proteins by steam is a function of the temp. and of evenness of distribution of the condensate. Albumins are affected $>$ globulins. Degraded protein is insol. in H_2O and in 10% NaCl, but sol. in dil. NaOH. Heating for $>$ 5 min. causes formation of alkali-insol. products. CH. ABS. (p)

Canker and dry rot of swedes. W. BUDDIN (Min. Agric. Bull., 1934, No. 74, 47 pp.).—Promising results were obtained with Granosan, hot H_2O (50°), and Semesan. CH. ABS. (p)

Digestibility coefficients in feeding pigs on good versus bad silage. J. BORMAN, J. BOROWY, and M. POLOWICZ (Polish Agric. Forest. Ann., 1934, 32, 467—472).—Transition from good to bad silage in pig rations lowers the digestibility coeff. of the whole ration. With bad silage the crude energy val. of the digested food is 4.5% $<$ the total val. of the constituents. CH. ABS. (p)

Use of forage crops for growing and fattening swine. E. MARTIN (Arkansas Agric. Exp. Sta. Bull., 1935, No. 321, 32 pp.).—Comparative feeding trials are recorded. A. G. P.

Effect of feeding deaminised versus untreated cod-liver oils on growth, egg production, and mortality in poultry. H. S. GUTTERIDGE (Sci. Agric., 1935, 15, 771—772).—A high proportion of free fatty acids in cod-liver oil is usually associated with high N content. Vals. for sun-rendered oils were $>$ for steam-rendered oils. Oil from stale livers had considerable proportions of N. High-N oils caused inferior growth and lack of uniformity in chicks. Removal of the N constituents eliminated these unfavourable effects. A. G. P.

Reducing protein concentrates in rations of chicks at different ages. R. E. ROBERTS and C. W. CARRICK (Poultry Sci., 1935, 14, 156—163).—Chicks receiving high-protein rations during the first 4 weeks, and low-protein diet subsequently, showed no appreciable difference in wt. at 12 weeks and no increased mortality. A. G. P.

Method of analysing data of chick-nutrition experiments. H. W. TITUS and J. C. HAMMOND (Poultry Sci., 1935, 14, 164—173).—The method of "weighted squares of means" is applied to various data. A. G. P.

Sunflower-seed oil cake. Press cake. Determining rape oil in edible oil.—See XII. **Casein paints.**—See XIII. **Fruit-growing. Scab in stored apples. Coffee in Kenya.**—See XVI. **Mixture from proteins.**—See XX.

PATENTS.

Improvement of sweet corn for preserving. M. R. DAUGHTERS, Assr. to FROSTED FOODS CO., INC. (U.S.P. 1,969,730, 14.8.34. Appl., 24.10.31).—Whole-grain sweet corn which has been removed from the cob is blanched in boiling 1% aq. NaOH for 1 min., washed, soaked in 0.05% HCl, washed, dried, packed in a transparent wrapper, and frozen. A. R. P.

Clear liquid egg. H. HEUSER (U.S.P. 1,989,359, 29.1.35. Appl., 23.1.33).—A clear product is obtained by the addition of 2—4% of NaH_2PO_2 or other albumin-dissolving salt to preserved egg containing \leq 50% of sugar, and the removal of emulsified air. The product may be sterilised at 70—82°. E. B. H.

Treatment of fresh fruit. J. C. BAKER (U.S.P. 1,967,074, 17.7.34. Appl., 14.10.31).—Decay is prevented by treatment with air containing 0.01—0.5 g. of NCl_3 per cu. ft. A. R. P.

Process for the drying of potatoes and like vegetables, also applicable to cereals such as wheat and barley. W. C. MASON and W. W. HUTCHESON (B.P. 436,353, 3.4.35).—The vegetable matter is pressure-digested and reduced to a mash and then dried on heated rolls, the steam for both sections of the apparatus being bled from a prime mover. B. M. V.

Manufacture of pectin. SARDIK, INC., Assees. of W. W. COWGILL (B.P. 437,683, 8.6.34. U.S., 11.7.33).—See U.S.P. 1,973,613—4; B., 1935, 782.

Starch for baking.—See XVII. **Vitamin-B.**—See XX.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Preparation of pharmaceutical sodium phosphate. V. PAOLINI (Gazzetta, 1935, 65, 628—629).—It is suggested that Na_2HPO_4 may be prepared in a pure state by boiling a solution of Na_2CO_3 with $CaHPO_4$, which is decomposed to give the sol. $Ca(H_2PO_4)_2$. O. J. W.

Colorimetric assay of bismuth pharmaceuticals. C. S. LEONARD and A. CHAMPLIN (Compt. rend. Cong. pharm. Liège, 1934, 197, Reprint 47, 8 pp.).—Bi in Bi creams, salves, and "Tabloid" products is determined more rapidly and conveniently by a modification of Leonard's method (A., 1926, 975) than by either the

gravimetric sulphide or Bi oxide method. The sulphide method has a positive error (average 2.7%) which is higher if the sulphide is dried at 100° than if dried in vac., apparently due to the formation of oxysulphide. The oxide method is about as accurate as the colorimetric method.

E. H. S.

Mercuric phenyl nitrate and chloride. ANON. (J. Amer. Med. Assoc., 1934, 102, 1224—1227).—The nitrate is a powerful bactericide and fungicide, its action being relatively unaffected by org. matter. In concns. inhibiting bacterial growth the compounds do not affect the action of enzymes, toxins, or antigens.

CH. ABS. (p)

Preparation of a Paal-type mixture from proteins of various origins. E. P. EFTINA (Trans. Kirov. Inst. Chem. Tech. Kazan, 1935, No. 3, 55—59).—Colloidal Ag preps. are obtained from AgNO₃ and NaOH solutions of the proteins of rye flour, horse blood, beef, and milk curd.

CH. ABS. (p)

Percolation and percolators. C. KOCH (Pharm. Ztg., 1935, 80, 1170—1172).—From a study of the crit. factors of tube-percolation, *i.e.*, dimensions of percolator, diffusion, and rate of flow of solvent, the optimum conditions, particularly for the extraction of valerian root, have been obtained.

E. H. S.

Importance of the correction to be used in the determination of the morphine content of opium, in applying the procedure of the British Pharmacopœia, 1932. J. N. RAKSHIT (Ann. Chim. Analyt., 1935, [iii], 17, 315—316).—Sources of error are discussed. To the result for morphine, 0.66 g. per 100 g. of dry opium should be added.

E. S. H.

Canadian versus American flue-cured tobacco. Comparison of chemical constituents and primary prices. J. W. SYMONS (Canad. Chem. Met., 1935, 19, 259—261).—24 constituents of each of 5 Canadian (11—39 c. per lb.) and 4 American (17—80 c. per lb.) tobaccos have been determined and their influence on the quality is discussed. Generally, the Canadian were chemically equiv. to the American tobaccos which were twice the price.

E. H. S.

Hydrogen sulphide in tobacco smoke. A. WENUSCH (Z. Unters. Lebensm., 1935, 70, 201—204).—The H₂S does not arise as a result of SO₄'' in the tobacco, but possibly is derived from the protein. The [H₂S] in the smoke (0.2 mg. per litre) is too small to be of physiological importance.

E. C. S.

Essential oil industry of Seychelles. W. HOLDSWORTH-HAINES (Ann. Rept. Dept. Agric. Seychelles [1933], 1934, 23—28).—Yields and quality of a no. of oils are described.

CH. ABS. (p)

[Essential oils from Seychelles.] F. L. SQUIBBS (Ann. Rept. Dept. Agric. Seychelles [1933], 1934, 9—14).—Characteristic data for patchouli, palmarosa, citronella, and lemon-grass oils are recorded.

CH. ABS. (p)

Orris-root [oil]. E. S. GUENTHER (Amer. Perfumer, 1935, 30, 17—20, 56).—Prep. of oil of orris root is described. Its physical properties and chemical composition are examined.

CH. ABS. (p)

Distilling cedar-leaf oil. F. W. BROWN (Drug & Cosmetic Ind., 1935, 37, 587—589).—Descriptive.

Essential oil from the rhizomes of *Cyperus rotundus*, Linn. B. J. HEGDE and B. S. RAO (J.S.C.I., 1935, 54, 387—389 T).—Oils distilled from Madras rhizomes (4 samples), roots (1), and Mysore tubers (3) had, respectively: yield 0.65—0.75%, 0.94%, 0.45—0.61%; d_{20}^{30} 0.9784—1.0009, 0.9827, 0.9831—0.9843; n_D^{20} 1.5129—1.5132, 1.5117, 1.5055—1.5086; $[\alpha]_D^{20}$ +23.0° to +35.5°, +11.2°, —11.8° to —9.8°; acid val. 1.1—11.3, 10.9, 8.1—10.0; ester val. 4.9—20.1, 6.3, 4.8—8.9; Ac val. 63.3—84.0, 82.4, 87.4—100.8. The Madras oil contained *l*- α -pinene, cineole (trace), di- and tri-cyclic sesquiterpenes, two *sec.* (10% of the oil) and one *tert.* dicyclic sesquiterpene alcohols. The *tert.* alcohol, *isocyperol*, C₁₅H₂₄O, had b.p. 145—148°/8 mm., d_{20}^{30} 0.9993, n_D^{20} 1.5275, $[\alpha]_D^{20}$ +92.3°. The dicyclic alcohols and sesquiterpenes belong to the eudalene group (cf. B., 1925, 783; J.S.C.I., 1922, 41, 172 T).

E. H. S.

[Detection of] petroleum in cassia oil. W. H. SIMMONS (Perf. & Essent. Oil Rec., 1935, 26, 408).—The author's apparatus for steam-distillation (A., 1933, 926) is used. Petroleum has been detected in 90—95% cassia oil.

E. H. S.

Determination of menthone in peppermint oil by hydroxylamine. G. PARRAUD (Boll. Uff. Staz. Sperim. Ind. Essenze, 1935, 10, 110—111).—The oil (2—3 g.) is treated with EtOH-NH₂OH, HCl and the liberated HCl is titrated to Me-orange with slowly-added 0.5N-EtOH-KOH, the final titration being at the b.p. (1 c.c. \equiv 0.077 g. of menthone).

F. O. H.

Rapid identification of methyl anthranilate [in essential oils]. S. SABETAY (Ann. Falsif., 1935, 28, 478—479).—The material (4 drops) is warmed with 12 drops of a 1:2 mixture of Ac₂O and C₅H₅N for 5 min. on the water-bath, and diluted, warmed again, and cooled. The *N*-Ac derivate which separates is recryst. from EtOH (m.p. 99—100°). Zeisel's method is preferable, and equal in accuracy, to that of Hesse and Zeitschel for the determination of Me anthranilate (I) in neroli oil, being more sp. and rapid, and requiring less material. The % of (I) is given by 6.04 \times c.c. of 0.1N-AgNO₃/wt. of sample taken.

J. G.

Stabilisers for H₂O₂.—See VII.

PATENTS.

Production of vitamin-B. E. H. STUART, ASSR. to E. LILLY & Co. (U.S.P. 1,990,961, 12.2.35. Appl., 10.4.33).—Vitamin-B adsorbed on fuller's earth is removed by treatment with < 5% of aq. or aq.-alcoholic mineral acid (HCl, H₂SO₄) followed by adjustment of the *p*_H of the extract to 5—7.

E. H. S.

Manufacture of œstrogenous products. SCHERING-KAHLBAUM A.-G. (B.P. 437,051, 12.6.34. Ger., 13.6.33).—Tubers of *Butea superba* (Siamese "kwao kua") are extracted with org. solvents, *e.g.*, EtOH.

E. H. S.

Biological medicament [for treatment of gonorrhœal infections]. N. S. FERRY, ASSR. to PARKE, DAVIS & Co. (U.S.P. 1,990,982, 12.2.35. Appl., 13.10.30).—A true, extracellular toxin sp. to gonorrhœal infection is obtained by growing *M. gonorrhœæ* on a suitable

liquid medium to form a pellicle, incubating the medium until the pellicle begins to disintegrate, and then eliminating the organisms before autolysis occurs. By injection of the above toxin into an animal a sp. anti-toxin is prepared from the blood-serum. E. H. S.

Insecticides.—See XVI.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Wet-collodion, continuous tone negative-making.

W. J. SMITH and E. L. TURNER (Process Engraver's Month., 1934, 41, 273—274, 277—279).—To plain collodion (10 pts.) the following iodiser (1 pt.) is used: denatured EtOH 1 litre, CdI₂ 80 g., NH₄I 40 g., CdBr₂ 10 g., CaCl₂·6H₂O 10 g. Redevelopment increases the opacity before fixing, and increases the contrast if done after fixing. CH. ABS. (e)

Problems of [photographic] gradation—correctly and incorrectly solved. K. JACOBSON (Phot. Ind., 1935, 33, 1009—1010).—The ideal characteristics of positive emulsions on paper, for correct rendering of the gradation of a negative, are discussed. The proposals of Schmid (Camera, 1935, 14, 112) and of Hatschek (Photofreund, 1935, 15, 293) for the improvement of positives are considered insufficient; the method of Person (Phot. f. Alle, 1935, 31, 217), by which the highlight and shadow regions are extended at the expense of middle tones, is supported. J. L.

Theory of graininess. E. W. H. SELWYN (Phot. J., 1935, 75, 571—580).—Previous attempts to measure graininess are discussed. No satisfactory theory of density distribution on a physical basis has been obtained. On the assumption that a function of Δ , $d\Delta$, a , and a graininess const. G , can express the probability that a given area, a , has a density differing from the mean by an amount between Δ and $d\Delta$, mathematical considerations lead to the result that the distribution of density is described by a function of G/\sqrt{a} . If the apparent brightnesses of enlarged images compared are the same, and under certain other restrictions, the methods of L. A. Jones *et al.* (J. Franklin Inst., 1920, 190, 657; Trans. Soc. Motion-Pict. Eng., 1922, 6, 107) and Conklin (*ibid.*, 1931, 16, 162) will also measure G . The relation of G to grain-size remains uncertain. J. L.

Influence of sulphur compounds on the properties of highly sensitive photographic emulsions. A. CHARRIOU and (MLLE.) S. VALETTE (Bull. Soc. Franç. Phot., 1935, 22, 223—225).—K metabisulphite and small concns. of cystine or Na₂SO₃ do not affect the sensitivity or fogging of the emulsions. Na₂S does not affect (I), but, with the smallest amounts, produces intense fog. Sulphanilic acid, Na₂SO₃ (high concns.), cystine, and thioglycollic acid show, increasing in this order, desensitising action; previous statements that these compounds sensitise were based on experiments on emulsions of very low sensitivity. Allylthiourea and Na₂S₂O₄ are the chief compounds showing sensitising action at low concns.; with increasing concn. the sensitivity decreases and the fog increases rapidly. There is no advantage to be gained by addition of these substances during ripening of emulsions; the Ag₂S nucleus is therefore not the sensitising agent of emul-

sions. On the contrary, emulsions of higher sensitivity are produced by the destruction of all constituents of the gelatin other than proteins. J. L.

X-Ray examination of fibres.—See V.

PATENTS.

Sensitisation of photographic emulsions and manufacture of dyes therefor. KODAK, LTD., Assees. of L. G. S. BROOKER (B.P. 436,941, and 437,017, 16.1.34. U.S., 16.1.33).—By use of a strong base as condensing agent (cf. B.P. 408,571; B., 1934, 537) (A) 4 : 4'-tricarbo-cyanines, and (B) thiazolino- and thiazolo-tricarbo-cyanines, have been prepared. (A) 1 : 1'-Diethyl-, 1 : 1'-dimethyl-, and 1 : 1'-diallyl-4 : 4'-tricarbo-cyanine iodide sensitise photographic emulsions to infra-red light, with maxima at 980, 980, and 800—1000 m μ , respectively. (B) The sensitising max. of 3 : 3'-diethyl-thiazolinotricarbo-cyanine iodide is at 710 m μ , and that of 3 : 4 : 3' : 4'-tetramethylthiazolotricarbo-cyanine bromide at 790 m μ . F. M. H.

Manufacture of multicolour subtractive photographic prints. J. G. CAPSTAFF, Assr. to EASTMAN KODAK Co. (U.S.P. 1,969,452, 7.8.34. Appl., 12.11.31).—A film for colour photography comprises a transparent support carrying at least one sensitive emulsion layer on each side and a thin, easily removable, waterproof coating (cellulose ester in C₆H₆ or PhMe) over one of the sensitive layers. Suitable colour emulsions and means for developing the images are described.

A. R. P.

XXII.—EXPLOSIVES; MATCHES.

Brisance and its determination. A. MAJRICH and F. SORM (Z. ges. Schiess- u. Sprengstoffw., 1935, 30, 295—299, 337—340).—Various explosives were pressed into steel cylinders, 25 mm. diam. \times 40 mm. deep, with a cavity, 6 mm. diam. \times 30 mm. deep, and exploded in air, H₂O, and sand in a 6-litre bomb. The nos. of fragments weighing (a) 0.02 g., (b) 0.02—0.01 g., and (c) $<$ 0.01 g. were counted. The effect of d was considerable, but the physical condition (cryst., granular, or pptd.), provided there was complete detonation, had not much influence. Pb-block tests, with the steel tube tightly fixed in the block, of mixtures of Pentrite and Al (316 : 54; 948 : 433; 316 : 216) gave higher results than those with Pentrite, Hexogen, or tetryl. The detonation velocities of these mixtures were 7556, 7016, and 6798, respectively, as compared with 8075 for Pentrite. Pb-plate tests were also made. The results show that the relative figures for brisance depend on the method used. W. J. W.

Cellulose nitrate.—See V.

PATENTS.

Production of non-gelatinous blasting explosives. W. MORRIS. From E. I. DU PONT DE NEMOURS & Co. (B.P. 437,035, 23.4.34).—Hot NH₄NO₃ powder is mixed with a molten or partly molten mixture of a NO₂-compound, e.g., C₆H₂Me(NO₂)₃, and pentaerythritol tetranitrate at $>$ 100°, the whole being allowed to cool, with stirring. Other ingredients, such as NaNO₃ and CaCO₃, preferably in presence of a hydrocarbon oil, may be added. W. J. W.

Separating liquids.—See I.

XXIII.—SANITATION; WATER PURIFICATION.

Rapid determination of certain gases or vapours in air. KOHN-ABREST (Ann. Falsif., 1935, 28, 457—461).

—The apparatus consists essentially of a vessel containing the sample, a bubbler containing $\text{Ba}(\text{OH})_2$, a quartz combustion tube at 900° , a second bubbler, and an aspirator working at 2—6 litres 1 hr. in series. BaCO_3 produced in either bubbler is determined nephelometrically, or by titration with 0.125*N*- HNO_3 in presence of 2 drops of a 1:1 mixture of 1% solutions of phenolphthalein and Me-orange in EtOH, and a stream of CO_2 -free air. The first change (red to yellow) indicates neutralisation of free $\text{Ba}(\text{OH})_2$, and the second (yellow to red, permanent for 30 sec.), decomp. of BaCO_3 ; the difference $\times 0.00275 = \text{g. of } \text{CO}_2$. This neutralised liquor is used for determination of halogens and their derivatives or HCN etc. by the usual methods. J. G.

Germicidal efficiency of chloramine-T and calcium hypochlorite. D. B. CHARLTON and M. LEVINE (J. Bact., 1935, 30, 163—171).

—The killing time of a given [Cl] as chloramine-T decreased with rising temp. to an extent which was more marked at p_{H} 6.0 than at 8.7 and also decreased with rising acidity. The germicidal efficiency of $\text{Ca}(\text{OCl})_2$ was not measured by the available Cl content. The lethal concn. decreased with p_{H} in the range 11.3—8.3. Reaction is the greatest single factor influencing the activity of both compounds. A. G. P.

Alkaline springs and their geochemical significance. H. HARKASSOWITZ (Z. Kurortwiss., 1932, 2, 211—216).

—High mineral content in spring H_2O is not necessarily associated with high temp. Alkaline waters invariably originate in silicate rocks and are enriched in Na by absorption of K and alkaline earths. CH. ABS. (p)

Supervision of potable water supplies on liners.

R. MAHE (Ann. Hyg., 1934, 12, 313).—Use of NaOCl , KMnO_4 , or KI, or treatment with O_2 or ultra-violet rays, is recommended. CH. ABS. (p)

Deacidification of H_2O by marble and by calcined magnesite. L. H. L. KOOYMANS (Water, 1934, Jan. 5, 1).

—Sintered magnesite containing 0.4% CO_2 was unsatisfactory and a product ignited at a lower temp. and containing more CO_2 was used. CH. ABS. (p)

Possibility of improving ground-water supplies by treatment. C. C. DILLS (Southwest Water Works J., 1934, 16, No. 9, 11).

—The removal of Fe, Mn, CO_2 , and hardness is discussed. Pptd. $\text{Fe}(\text{OH})_3$ from H_2O containing 4.9 p.p.m. of Fe clogs meters. A Mn ppt. accumulates in the Pb connexions. CH. ABS. (p)

Disinfection of water by oligodynamic action of silver. R. WERNER (Prakt. Disinfekt., 1934, 26, 34—40).

—Utilisation of the Katadyn process is discussed. CH. ABS. (p)

Efficacy of filters containing silvered sand for disinfection of water. V. A. UGLOV and T. V. UGLOVA-OVCHINNIKOVA (Voенно-Med. Shur., 1933, 4, 95—101).

—The oligodynamic action of silvered sand grains was influenced by the total surface area of the sand and the time of contact with H_2O , but not by the method of deposition of Ag on sand. CH. ABS. (p)

Step-photometric determination of manganese in drinking and washing waters. R. BARIL (Mikro-

chem., 1935, 18, 250—255).—Mn is determined by the dimethyl-*p*-phenylenediamine reaction (B., 1928, 110) in presence of Na citrate. A standard extinction coeff.—[Mn] curve is given. R. S.

Determination of traces of heavy metals in mineral waters. K. HELLER, G. KUHLA, and F. MACHEK [with H. KÖHLER, A. VEIT, and O. WEILGUNY] (Mikrochem., 1935, 18, 193—222).

—The extraction of traces of heavy-metal ions from solution by CCl_4 containing diphenylthiocarbazone (A., 1934, 381) has been studied. Further concn. may be effected by shaking the CCl_4 solution with HCl and evaporating. Cu, Bi, Pb, Cd, Zn, Ni, and Co can then be determined polarographically. The presence of excess of other ions occurring, e.g., in Karlsbad spring H_2O does not affect the results. R. S.

Step-photometric determination of free chlorine in chlorinated water. L. GOLDENBERG (Mikrochem., 1935, 18, 235—249).

—The colour intensity of the *o*-tolidine reagent remains const. for 20 min. after mixing with H_2O containing Cl_2 , and then diminishes. The influence of CO_2 , Mn^{++} , NO_2^- , and Fe^{++} has been studied and tables of absorption vals. are given for different Cl_2 concns. R. S.

Antimalarial operations in the Vizagapatam harbour-construction area (1927—1933). K. SATYANARAYANA (Rec. Malaria Survey India, 1934, 4, 343—362).

—A mixture of crude oil with 2% of cresol (I) (not saponified) was effective in very saline H_2O . With lower salinity 1% of (I) sufficed. Bags containing cotton waste, sawdust, etc. soaked in crude oil served for running streams. A 10% Paris-Green mixture with soapstone etc. proved the best larvicide. CH. ABS. (p)

Effect of saline and free ammonia on the oviposition of *Anopheles subpictus* (Rossi). D. R. MEHTA (Rec. Malaria Survey India, 1934, 4, 411—420).

—Under laboratory conditions *A. culicifacies* oviposited in H_2O containing ≥ 6 p.p.m. of NH_3 . Under natural conditions larvæ were not found in H_2O having > 1 p.p.m. of NH_3 . *A. subpictus* deposited in H_2O containing ≥ 8.8 p.p.m. under laboratory conditions and preferred H_2O having > 2.5 p.p.m. of NH_3 . CH. ABS. (p)

Determining life of active charcoal. Air viti-
ation and gas appliances.—See II. Lanoline.—
See V. Dermatitis and dyes.—See VI.

PATENTS.

Water purification. O. M. URBAIN, Assr. to C. H. LEWIS (U.S.P. 1,968,724, 31.7.34. Appl., 3.2.33).—Solvated colloids are removed from H_2O by adding a small amount of Na naphthalenesulphonate, diphenoxide, or carminate to desolvate the colloids, imparting a max. charge to the desolvated colloids, and flocculating them by addition of basic Sn, Zn, Cu, or Zr chlorides. A. R. P.

Removal of iron and manganese from water. C. ZAPFFE (U.S.P. 1,990,214, 5.2.35. Appl., 5.3.31. Renewed 23.7.34).

—Fe and Mn are removed by contact for ≤ 10 min. with a catalyst containing MnO_2 and subsequent aëration and filtration through coke and sand-filters. C. J.

H_2O clarification.—See I. Inhibiting corrosion by alkalis.—See X. Air conditioning.—See XI.